ISSN-1806-0013

REVISTA DOR

Pesquisa, Clínica e Terapêutica

vol 14 • nº 2 • Abr/Mai/Jun • 2013

Sociedade Brasileira SBED para o Estudo da Dor 30 ANOS

Pain publications in Brazil

Publicações em dor no Brasil

Dear readers,

I am very happy to accept the invitation to act as coeditor of *Revista Dor* with Dr. João Batista Santos Garcia. It is with great awareness that we accept the mission of giving continuity to the productive work of Dr. Irimar de Paula Posso, making our journal, which is the major representative of pain publications in Brazil, increasingly professional. We will continue indexing and valuating our journal within the Brazilian and international scientific universe. Our country is increasingly being recognized due to its serious, innovative, well justified studies with well-done methodology and we want to invite you to be partners of our growth. After all, the journal is made up of all the excellent contributions that our pain researchers, professors, doctors, students and collaborators send to each edition, which we try to treat with care and endeavor for their printed and online publications in English.

This *Revista Dor* issue has a publication of Leão et al.[1] with a bibliometric analysis of pain publications in a Brazilian institution from 2008 to 2011. Authors show that, although the total number of pain studies of the above-mentioned institution being small, there is a clear trend to growth. Even more, most articles were published by international journals, with a mean impact factor of 2.3. These data cannot be extrapolated to the Brazilian context, but they show the potential of Brazilian studies and call the attention to the interest the subject is able to generate.

Brazil has pain research groups in several regions, who publish and may canalize part of their studies to *Revista Dor*, cooperating with the enhancement and indexation process of our journal.

Thank you in advance.

Silvia Regina Dowgan Tesseroli de Siqueira
Coeditor, Revista Dor

REFERENCE

1. Leão ER, Aquarone RL, Rother ET. Pesquisa em dor: análise bibliométrica de publicações científicas de uma Instituição de Pesquisa no Brasil. Rev Dor. 2013;14(2):95-100.

ORIGINAL ARTICLE

Frequency of primary headaches in the community and in specialized care centers*

Frequência das cefaleias primárias na comunidade e em centros de cuidados especializados

Ariovaldo Alberto da Silva Júnior[1], Rafael Mattos Tavares[2], Rodrigo Pinto Lara[2], Bruno Engler Faleiros[3], Luiz Paulo Bastos Vasconcelos[4], Rodrigo Santiago Gómez[4], Antônio Lúcio Teixeira[5]

*Received from the Headache Outpatient Setting, Clinicas Hospital, Federal University of Minas Gerais. Belo Horizonte, MG.

ABSTRACT

BACKGROUND AND OBJECTIVES: The comparison of headache features in general population and in tertiary care centers may explain factors associated to the search for medical assistance and the obstacles to such assistance. This study aimed at comparing demographic findings and the frequency of migraine and tension headache (THA) in general population and in a specialized care center.

METHOD: All inhabitants of a small village were interviewed about the presence of headache. In one randomly selected region, people who answered positively were evaluated by a team of neurologists specialized in headache. They have also evaluated a number of patients consecutively treated by a specialized center. Diagnoses have followed International Headaches Classification criteria (2004).

RESULTS: Participated in this study 1605 inhabitants of the whole village and 258 inhabitants of the region selected as sample. From these, 76 people reporting headache went through a neurological evaluation, as well as 289 patients of the specialized center. THA was the most common headache among general population (77.6%), followed by migraine (61.8%) with diagnostic overlapping in a good percentage of cases. In the outpatient setting the vast majority of patients had migraine (79.8%), while only 20.4% had THA, being the diagnostic association far less common.

CONCLUSION: THA is more common in the community and migraine prevails in specialized centers. Understanding the contrasts of both primary headaches within these two scenarios may help the planning of preventive actions and the use of health care resources.

Keywords: General population, Migraine, Studies in specialized centers, Tension headache.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A comparação entre as características da cefaleia encontradas na população geral e em centros de cuidados terciários pode elucidar fatores associados à procura de consulta médica e obstáculos ao atendimento. O objetivo deste estudo foi contrastar os achados demográficos e a frequência de migrânea e de cefaleia do tipo tensional (CTT) na população geral e em um centro de atendimento especializado.

MÉTODO: Todos os habitantes de uma pequena cidade foram entrevistados quanto à presença de cefaleia. Em uma região, escolhida por sorteio, os moradores que responderam positivamente foram avaliados por uma equipe de neurologistas especialistas em cefaleia. Esses profissionais também avaliaram uma casuística de pacientes atendidos consecutivamente em um centro especializado. Os diagnósticos seguiram os critérios da Classificação Internacional das Cefaleias-2004.

RESULTADOS: Foram entrevistados 1.605 moradores em toda cidade e 258 na região da amostra. Destes, os 76 que tinham cefaleia passaram por avaliação neurológica, bem como 289 pacientes do centro especializado. As mulheres representaram a maioria, tanto na comunidade quanto no ambulatório. Na população, a frequência de CTT foi de 77,6% e a de migrânea de 61,8%, havendo sobreposição diagnóstica em boa parcela dos casos. Já no ambulatório a vasta maioria dos pacientes tinham migrânea (79,8%), enquanto apenas 20,4% tinham CTT, sendo a associação diagnóstica bem menos comum.

CONCLUSÃO: A CTT é mais comum na comunidade e a migrânea em centros especializados. Conhecer os contrastes destas cefaleias primárias nestes dois cenários pode auxiliar o planejamento de ações preventivas e utilização dos recursos assistenciais.

Descritores: Cefaleia do tipo tensional, Estudos em centros especializados, Migrânea, População geral.

1. Neurologist, Doctor in Neurosciences, Assistant of the Headache Outpatient Setting, Clinicas Hospital, Federal University of Minas Gerais (UFMG). Belo Horizonte, MG, Brazil.
2. Medical Students, School of Medicine, Federal University of Minas Gerais (UFMG). Belo Horizonte, MG, Brazil.
3. Physician, Master Student of the Postgraduation Program in Neurosciences, Federal University of Minas Gerais (UFMG). Belo Horizonte, MG, Brazil.
4. Neurologists of the Headache Outpatient Setting, Clinicas Hospital, Federal University of Minas Gerais (UFMG). Belo Horizonte, MG, Brazil.
5. Assistant Professor of the Department of Medical Clinic, School of Medicine, Federal University of Minas Gerais (UFMG). Belo Horizonte, MG, Brazil.

Submitted in January 08, 2013.
Accepted for publication in May 23, 2013.
Conflict of interests: None – Sponsoring sources: None.

Correspondence to:
Dr. Ariovaldo Alberto da Silva Júnior
Avenida Timbiras 1940/803 – Lourdes
30140-061 Belo Horizonte, MG.
Phone/Fax: 55 (31) 3201-4577
E-mail: juniorariovaldo@uol.com.br

INTRODUCTION

Migraine and tension headache (THA) are the most common types of primary headache according to the epidemiological perspective[1]. Several studies with these types of headache have been carried out in tertiary centers or within the community[2]. Evidences suggest that data collected in these two different scenarios may significantly vary. For example, the incidence of migraine in a specialized center is 30% to 90%, and of THA is 5% to 30%[3]. On the other hand, the incidence of migraine in the community is 12% to 23% and of THA between 13% and 80% of the population[4]. Young and middle-aged females are disproportionately affected in all scenarios. With regard to THA, population-based studies show that males are more affected than females, while tertiary center studies suggest more frequency among females as compared to males[3,4].
Comparisons between population-based studies and specialized center studies will allow a more integrated understanding of such primary headaches, not only with regard to the epidemiology of the disease, but also with regard to factors associated to medical visits and barriers to adequate care[2].
These findings may be used for educational planning and for the development of preventive strategies aiming at optimizing treatment and resources[5]. The greater difficulty is that most studies carried out in specialized centers characterize patients within a sample where all patients have some type of headache. In the population, the denominator to access the frequency of the disease includes individuals with and without headache. The comparison, then, is not symmetric, which means that studies carried out in specialized centers describe a relative frequency, while population-based data describe the prevalence.
The development of studies with uniform methodology, specifically shaped to carry out such comparisons, may better reflect similarities and differences among primary headaches found in the population, in primary care centers and in specialized centers.
So, this study aimed at contrasting demographic data and the frequency of migraine and THA in the population and in a specialized care center.

METHOD

Community data were collected in Capela Nova, Minas Gerais, located approximately 150 km from the capital of the state, Belo Horizonte. According to the Brazilian Census from the year 2000, population was approximately 2066 inhabitants (1631 above 10 years of age). This study is part of a transversal study investigating the prevalence of headaches in all city residents, called Capela Nova Study.
The local Family Health Program (PSF) had broad coverage and maintained regular visits of health community agents to all 556 city homes.
From September to November 2005, all residents with more than 10 years of age were asked by these agents about the incidence of headache in the 12 months previous to the interview. People sleeping in the house were considered residents. The questionnaire had a heading (gender, age, marital status and education) and the question: "have you had headache in the last 12 months?"
After population interview, one of the six census micro-regions of the city visited by health community agents was randomly selected to make up the sample. There, all residents reporting headache the year before the study were invited for a neurological evaluation with headache specialists. Headaches diagnosis was based on the second edition of the International Classification of Headache Disorders-2004. Participants were evaluated in the health center of the city or at home, according to their availability, in the first months of 2006.
The Headaches Outpatient Setting of the Clinicas Hospital, Federal University of Minas Gerais (AmbCef-UFMG) is a tertiary reference headache center in the state. For this study, all patients assisted from February to March 2011 by the AmbCef-UFMG were consecutively evaluated by the same team of neurologists involved in community data collection.
Socio-demographic data and frequency of migraine and tension headache were compared between the sample of residents of the census micro-region and the sample of patients assisted by AmbCef-UFMG.

Statistical analysis

Demographic data and frequency of headaches were compared between groups. Data were transferred to Epi-info 200 by the coordinator of the study and were analyzed with the SPSS 12.0 program.
Headache frequency is presented as headache diagnosis, which was calculated together with the confidence interval, established as 5%.
Non parametric data were compared between groups with Chi-square test or Fisher Exact test (when expected values were low). Mann-Whitney test was used for continuous variables.
This study has followed the regulatory standards of the National Health Council (Resolution 196/1996).
The protocol and all forms were reviewed and approved by the Investigation Review Committee, Federal Fluminense University, in 08/17/2005, under registration 123/2005, and then by the Ethics Committee, Federal University of Minas Gerais, in 01/13/2011, under registration 0500.0.203.000.10.

RESULTS

Participated in this study 1605 residents across the city and 258 inhabitants in the census micro-region representing the sample. From these, 76 have reported headache in the year before the study and were evaluated by the team of neurologists. In the specialized center, 289 consecutive patients were evaluated.
Females represented the majority of studied individuals, both in the community (71.1%) and in the specialized center (86.9%), but proportionately, there have been more males with headache in the community as compared to the outpatient setting ($p < 0.05$). There has been no statistical differ-

Table 1 – Socio-demographic characteristics of patients treated in the UFMG Headaches Outpatient Setting and in the population.

	Headaches Outpatient Setting (n = 289)	Population (n = 76)	p value
Gender			
Female	251 (86.9%)	54 (71.1%)	0.001*
Male	38 (13.1%)	22 (28.9%)	
Education (years)			
Less than 8	136 (52.3%)	57 (75.0%)	0.002*
8 – 11	91 (35.0%)	14 (18.4%)	
11 or more	33 (12.7%)	5 (6.6%)	
Age			
Mean	42.6	40.3	0.246**
Standard deviation	15.0	15.2	
Minimum	14.0	11.0	
Maximum	88.0	76.0	

*Chi-square test ** Mann-Whitney test.

ence in age. Education level was significantly lower among the population. Table 1 compares demographic data between groups.

Among patients with headache, the relative frequency of both types of headache has significantly varied in the population as compared to the specialized center (Table 2). In the population, THA was the most frequent type of headache, affecting 77.6% of residents [95% confidence interval (CI) = 68.0% - 87.2%], and just 30.4% of specialized care patients (CI = 15.7% - 25.0). Conversely, in the specialized center, the vast majority of individuals had migraine (79.8%, CI = 74.1 – 83.6), while in the population this rate was 61.8% (CI = 50.6 – 73.0). It has to be mentioned that there has been more diagnostic overlapping between migraine and THA in the community as compared to the center, as shown in table 2.

The presence of other types of headaches, both primary and secondary, as well as daily chronic headache was also studied both in the population-based sample and in outpatient cases. But these data were presented in other publications[5-8].

DISCUSSION

When primary headaches were compared in the population and in the headaches outpatient setting, differences were found for gender and education level, but not for age. With regard to education, the difference was expected since the region studied is primarily rural, while headache patients from the center came from the metropolitan area where the access to education is easier. As to gender comparative analysis, although females were predominant in all groups, the female/male ratio was lower in the population, suggesting that males are less likely to look for medical assistance as compared to females. Maybe this is because headache in males tends to be less debilitating[8]. In fact, previous studies suggest that the impact of headaches is higher in females as compared to males[9]. It has been discussed that females are more attentive to their health and more likely to look for medical assistance regardless of the type of headache[10].

Our results are in line with previous studies, showing that THA is the most common type of headache in the population and that migraine is the most common reason for headache specialized assistance[11] and for visits to urgency services due to headache[12]. The relative frequency of migraine in the population (61.8%) was similar to THA (77.6%), but in the outpatient setting the frequency of migraine (79.8%) was much higher than THA, which was present in just one fifth of patients. Because migraine is more debilitating than THA, this finding was already expected[13].

The scenario may be extended because THA is less identified and diagnosed than migraine. Even in population-based studies, THA is described between 13% and 80% of the population, which is a huge discrepancy[14]. This might be due to the fact that THA phenotype is less marked than that of migraine. International Classification of Headache Disorders criteria, for example, admit pain attacks lasting from 30 minutes to 7 days for THA, as compared to 4 to 72 hours for migraine[15].

Anyway, this study advances in this field for exploring demographic and epidemiological differences between headaches found in general population as compared to a population of already screened patients. Parametric comparison of headaches frequency (and not prevalence) is original, but studies with more representative populations are still to be carried out.

CONCLUSION

Differences found in this study with regard to gender and frequency of migraine and THA, when comparing the community to a specialized center are significant.

Primary care services should understand such differences, including health community agents, so that they may adequately orient the population, being especially attentive to severe and recurrent headaches suggestive of migraine, so that such patients have early access to medical care.

On the other hand, specialized centers should also take into account the contrast of the reality of the community and of patients they treat. Knowing such differences may help both the clinical handling of primary headaches and the qualification of professionals not working in the most basic care levels.

Table 2 – Types of headache in the community and in the UFMG Headaches Outpatient Setting

	Headaches Outpatient Setting (n = 289)		Community (n = 76)		p value
	Percentage	95% CI	Percentage	95% CI	
Migraine	79.89%	[74.16; 83.63]	61.84%	[50.67; 73.02]	0.002*
THA	20.42%	[15.74; 25.09]	77.63%	[68.05; 87.22]	< 0.001*

*Chi-square test; CTT = tension headache

REFERENCES

1. Stovner LJ, Hagen K, Jensen R, et al. The global burden of headache: a documentation of headache prevalence and disability worldwide. Cephalalgia. 2007;27(3):193-210.
2. Gantenbein AR, Kozak S, Agosti F, et al. Headache patients in primary care and a tertiary care unit in Zürich, Switzerland. Cephalalgia, 2006;26(12):1451-7.
3. Silva-Júnior AA, Faleiros BE, Santos TM, et al. Relative frequency of headaches types- a longitudinal study in the tertiary care. Arq Neuropsiquiatr. 2010;68(6):878-81
4. Rasmussen BK, Jensen R, Olesen J. A population-based analysis of the diagnostic criteria of the International Headache Society. Cephalalgia. 1991;11(3):129-34.
5. da Silva AA Jr, Tavares RM, Lara RP, et al. Frequency of types of headache in the tertiary care center of the Hospital das Clínicas of the Universidade Federal de Minas Gerais, MG, Brazil. Rev Assoc Med Bras. 2012;58(6):709-13.
6. Junior AS, Krymchantowski A, Moreira P, et al. Prevalence of headache in the entire population of a small city in Brazil. Headache. 2009;49(6):895-9.
7. da Silva A Jr, Costa EC, Gomes JB, et al. Chronic headache and comorbibities: a two--phase, population-based, cross-sectional study. Headache. 2010;50(8):1306-12.
8. Silva Junior AA, Bigal M, Vasconcelos LP, et al. Prevalence and burden of Headaches as Assesses by the Health Family Program. Headache. 2012;52(3):483-90.
9. Lipton RB, Liberman JN, Kolodner KB, et al. Migraine headache disability and health-related quality-of-life: a population-based case-control study from England. Cephalalgia. 2003;23(6):441-50.
10. Lipton RB, Scher AI, Kolodner K, et al. Migraine in the United States: epidemiology and patterns of health care use. Neurology. 2002;58(6):885-94.
11. Tepper SJ, Dahlöf CG, Dowson A, et al. Prevalence and diagnosis of migraine in patients consulting their physician with a complaint of headache: data from the Landmark Study. Headache. 2004;44(9):856-64.
12. Silva Junior AA, Moraes DN, Rezende FB, et al. Frequência de cefaléias no pronto--atendimento do hospital das clínicas da Universidade Federal de Minas Gerais. Migrâneas Cefaleias. 2008;11(2):67-72.
13. Lipton RB, Bigal ME. Migraine: epidemiology, impact, and risk factors for progression. Headache. 2005;45(Suppl 1):S3-S13.
14. Bendtsen L, Jensen R. Tension-type headache. Neurol Clin. 2009;27(2):525-35.
15. Headache Classification Subcomitte of the International Headache Society. The Internacional Classification of Headache Disorders. 2nd Ed. Cephalalgia. 2004;24:1-160.

ORIGINAL ARTICLE

Urinary tract infection during gestation and its correlation with low back pain versus nursing interventions*

Infecção urinária na gestação e sua correlação com a dor lombar versus intervenções de enfermagem

Simone Regina Alves de Freitas Barros[1]

*Received from the Professional Improvement Center – Nursing Space. Recife, PE.

ABSTRACT

BACKGROUND AND OBJECTIVES: This study aimed at evaluating the prevalence of urinary tract infection (UTI) during pregnancy and its correlation with low back pain, as well as at analyzing prenatal assistance and orientations provided by two nurses during pregnant women assistance.

METHOD: This was a transversal, exploratory and descriptive study carried out with 124 pregnant women divided in 2 comparative groups (GI and GII), who received prenatal assistance in different moments by different professionals in a Family Health Unit between June 2009 and June 2010. Data were collected through perinatal records and semi-structured questionnaire.

RESULTS: Data analysis has shown that most pregnant women were aged between 20 and 29 years (67%), education has varied from no education (42%) to elementary school (33%). GI had 42% prevalence of UTI and GII 33%. As to genital hygiene habits, it has been observed that 17% of GI patients would not carry out any genital hygiene after vesical and intestinal eliminations and intercourse during pregnancy. In GII, 66% would carry out genital hygiene. Other study data have shown that 100% of GI patients have reported not having attended orientation groups during prenatal assistance versus 100% attendance of GII. As to low back pain, 85% of GI women and 84% of GII women with UTI have referred low back pain, being this association statistically significant.

CONCLUSION: The prevalence of UTI during gestation was 42% for GI and 33% for GII. Low back pain was the primary symptom reported by patients with confirmed UTI. There has been progressive spread of health and education knowledge during prenatal assistance provided by the GII professional with possible association with decreased incidence of UTI. This study proposes a topographic low back pain evaluation during patient's history for early UTI diagnosis and its potential association with low back pain; and suggests more emphasis on educational actions during prenatal assistance as a possible determining factor to decrease UTI during gestation.

Keywords: Pregnant women, Prevalence of urinary tract infection, Urinary tract infection.

RESUMO

JUSTIFICATIVA E OBJETIVOS: O objetivo deste estudo foi verificar a prevalência de infecção urinária (ITU) na gravidez e sua correlação com a dor lombar, bem como analisar a assistência pré-natal e orientações prestadas por duas enfermeiras durante o atendimento à gestante.

MÉTODO: Estudo transversal, exploratório e com abordagem descritiva realizado com 124 gestantes – divididas em 2 grupos comparativos (GI e GII) que receberam assistência pré-natal em momentos distintos por profissionais diferentes em uma Unidade de Saúde da Família entre junho de 2009 e junho de 2010. Os dados foram coletados por meio de ficha perinatal e questionário semiestruturado.

RESULTADOS: A análise dos dados demonstrou que a maior proporção das gestantes estava entre 20 e 29 anos (67%), a escolaridade variou entre nenhuma (42%) ao ensino fundamental (33%). O GI apresentou ocorrência de ITU em 42% e o GII, em 33%. Quanto aos hábitos de higiene genital, evidenciou-se no GI que 17% não realizavam nenhuma higiene genital após eliminações vesicointestinais e coito na gravidez. Já no GII, 66% realizavam higiene da região genital. Outro dado da pesquisa mostrou que 100% das gestantes do GI relataram não ter participado de grupos de orientação durante assistência pré-natal *versus* 100% de participação do GII. Quanto à dor lombar, verificou-se que 85% das mulheres que apresentaram ITU no GI referiram dor lombar e 84% do GII também relataram a mesma queixa, sendo essa associação estatisticamente significante.

CONCLUSÃO: A prevalência de ITU na gestação foi de 42% para o GI e 33% para o GII. A lombalgia foi a principal sintomatologia referida pelas gestantes com diagnóstico confirmado de ITU. Observou-se progressiva difusão dos conhecimentos em saúde e educação durante a assistência pré-natal prestada pelo profissional do GII com possível associação de redução de incidência de ITU. O estudo traz como proposta a investigação topográfica da dor lombar durante anamnese para o diagnóstico precoce de ITU e sua possível associação com a lombalgia e maior ênfase às ações educativas durante assistência pré-natal como possível fator determinante de redução de ITU na gestação.

Descritores: Gestantes, Infecção do trato urinário, Prevalência de infecção do trato urinário.

1. Nurse. Specialist in Public Health and Management, State University of Pernambuco; Post-graduate in Obstetric Nursing, Nursing Space; Master in Administration Health Organization, Higher Open School of Brazil; and Master Student in Public Health and Hospital Management, School of North Paraná, Buíque, PE Brazil.

Submitted in January 28, 2013.
Accepted for publication in May 06, 2013.

Correspondence to:
Simone Regina Alves de Freitas Barros
Av. Jonas Camelo, 316 – Centro
56520-000 Buíque, PE.
E-mail: simoninhabarros2010@hotmail.com

INTRODUCTION

Urinary tract infection (UTI) is a very frequent and common disease which may be present at any age. In adulthood, 48% of women have at least one UTI episode, and higher susceptibility is due to shorter urethra, more closeness of the anus to the vaginal vestibule and urethra and beginning of sexual activity[1].

Specifically during gestation, women go through many emotional, physical and physiological changes which make them more vulnerable to UTI. This is the third more common clinical intercurrence during gestation, affecting 10% to 12% of pregnant women. Urinary tract infection in pregnant women is even more concerning when asymptomatic because exactly for going unnoticed, this condition may lead to premature delivery and hospitalization of the mother. Asymptomatic bacteriuria (AB) in early pregnancy is also a risk for subsequent pyelonephritis. When symptomatic, the infection is also important however its diagnosis is faster due to the presence of symptoms which are defined according to the type of urinary tract infection. In some types of infections, low back pain may be the most reported clinical manifestation[2-5].

Among bacterial strains able to cause UTI in pregnant women, *Escherichia coli* is the most common urinary pathogen, responsible for approximately 80% of cases. To clinically diagnose UTI during pregnancy, it is necessary to remember that some symptoms are difficult to be characterized since during pregnancy some of them might be present, such as urinary frequency and dysuria. Micturition urgency may be present but in a lower scale, affecting approximately 1% to 5% of pregnant women. However, such manifestations may also be present in cystitis and pyelonephritis by urethral epithelium irritation or as irradiated pain of a higher urinary tract infection process[3].

Topographic infection history should be added to the diagnosis since, pedagogically, signs and symptoms are characteristic of each clinical presentation, but in practice such manifestations may confuse health professionals[3].

UTI is a relevant source of maternal complications (cellulitis and perinephric abscess, urinary obstruction, pre-term labor, premature chorioamniorhexis, anemia, chorioamnionitis, endometritis, preeclampsia, septic shock, multiple organs failure and death) and perinatal complications (prematurity, infection, periventricular leukomalacia, multiple organs failure and death)[4].

There are evidences that history during prenatal visits allow the identification of pregnant women at higher risk for UTI. So, the Department of Health (DH) has implemented in 2002 the Prenatal and Birth Humanization Program (PHPN). This program emphasizes clinical and laboratory procedures pregnant women should go through during the prenatal period, focusing also on the identification of risk situations requiring immediate clinical care[4]. PHPN also aims at the progressive spread of health and education knowledge during the prenatal period. However, little is known about the knowledge pregnant women really have about this process[4]. For such, the investigation about nursing guidance during the prenatal period was included in this study.

Low back pain is common in general population and is a frequent symptom in pregnant women with asymptomatic and symptomatic bacteriuria. Low back pain is considered one of the five commonest symptoms during pregnancy, especially as from the 3rd trimester. The prevalence of low back pain during pregnancy varies from 48% to 83%, according to some studies. World low back pain incidence in pregnant women is approximately 50%. Notwithstanding this high incidence, few data are reported by the literature about the pathophysiology and specific clinical manifestation of low back pain during pregnancy, probably because most health professionals consider it a normal and expected complaint during gestation. Low back pain etiology is multifactorial during gestation[5-19].

Low back pain affects from the last costal arch area to gluteal folds, and may unilaterally or bilaterally impair lower limbs by pain irradiation to that region. It has to be stressed that low back pain during pregnancy may be indicative of urinary tract infection. It may also be related to musculoskeletal system adaptations, influenced by the action of relaxin, which induces sacroiliac joint and pubic symphysis hypermotility making the pelvis unstable and contributing for low back pain. Conversely, low back pain may also be the single clinical manifestation of UTI[5-18].

Prenatal assistance is a relevant moment to convey information to women and to look for important clinical manifestations during gestation. In countries such as Brazil, due to medical assistance precariousness, systematized tracking of health conditions of pregnant women and the adequate meeting of their heath needs are very important aspects for the nursing team[6].

The Brazilian DH, in its "Technical prenatal and puerperium manual", as well as in other PHPN-related publications, establishes that type I urinalysis and urine culture should be routinely requested in the first prenatal visit and that urine summary should be repeated in the third trimester of gestation. It is also mandatory that urine collection for the exam is done under judicious antisepsis[6,7].

So, the knowledge of the prevalence of UTI in pregnant women is closely related to PHPN essence, since it is the basis to assure minimum assistance parameters for pregnant women, educating and making women more participative of the prenatal, delivery and puerperium follow-up process.

Considering literature data about UTI as risk factor for maternal and perinatal morbidity and mortality, we have evaluated the relevance of answering the question of the research: which is the prevalence of urinary tract infection during pregnancy and its correlation with low back pain? In addition to analyzing the activities developed by two nurses during prenatal assistance.

METHOD

This is a transversal quantitative study aiming at describing the activities of two nurses (I and II) in different periods

(2009-2010) during prenatal assistance[8]. The study was carried out in a Family Health Unit of the Cabo do Campo village, located in the municipality of Tupanatinga, PE.

Participated in this study 124 pregnant women (census sample) who entered prenatal assistance between June 2009 and June 2010. Studied population was divided in two groups: Group I (GI) – 62 pregnant women who started prenatal assistance in the second semester of 2009 and were assisted for six months by nurse I; and Group II (GII) – 62 pregnant women who started prenatal assistance in the first semester of 2010 and were assisted by nurse II.

After signing the Free and Informed Consent Term (FICT), the perinatal records of participants were analyzed, in addition to interviews with the groups who have answered a questionnaire with closed and open questions on guidelines given by nurses I and II during the prenatal period about: self-care, identification of risk situations for UTI, correlation of UTI and low back pain and understanding the importance of urinalysis and culture, results, and their participation in prenatal guidance groups, among other variables.

Microsoft Excel electronic spreadsheet was used to develop a database, which allowed the organization of data in tables. SPSS (Statistical Package for the Social Sciences 13.0) was used for statistical analysis, with 95% statistical reliability. Chi-square test was used to evaluate the association between low back pain and UTI, considering statistically significant $p < 0.05$.

This study was approved by the Research Ethics Committee, School of the Caruaruense Association of Higher Education, Caruaru, Pernambuco, process 0065.0.217.000-2010.

RESULTS

Using information obtained from used tools and after treating data, most relevant statements to understand the questions orienting the objectives of this study were selected.

Table 1 shows major socioeconomic and demographic characteristics of pregnant women of this study. Most patients (67%) were aged from 20 to 29 years. A significant number of pregnant women had no education (42%). With regard to occupation, most pregnant women (58%) have reported working in agriculture.

Table 2 shows characteristics of prenatal assistance, parity, types of previous deliveries and abortion. It was observed that most pregnant women had six or more consultations in a total of 88%.

With regard to previous deliveries, this study has shown that 72% had vaginal delivery and 28% Cesarean sections.

As to abortions, the study has shown that 80% of patients have not referred abortions and 12% have reported two or more abortions.

Table 3 summarizes the incidence of UTI during pregnancy, treatment and referral of these patients to risk prenatal assistance. In our research, the incidence of UTI confirmed by simple urinalysis and urine culture was 42% for GI and 33% for GII. There has been 0.9% decrease in UTI incidence from GI to GII. The study has also concluded that 80% of pregnant women (Group I) with UTI and assisted by nurse I were treated, while 100% of GII patients developing UTI during gestation were treated. It was also observed that 60% of GI patients with UTI were referred to risk prenatal assistance. In GII, 75% of patients were referred.

With regard to hygiene habits after vesical and intestinal eliminations and intercourse during pregnancy, most GI patients (50%) would use toilet paper cleaning from front to

Table 1 – Distribution of studied pregnant women according to socioeconomic and demographic variables.

Variables	Categories	%
Age (years)	Up to 19	12
	20-29	67
	30 or above	21
Education	None	42
	Basic education	33
	High school	25
	College	00
Occupation	Housewife	25
	Agriculture	58
	Paid job	08
	Others	09

Table 2 – Distribution of obstetric, gynecologic and prenatal assistance variables.

Variables	Categories	%
Prenatal	≤ 05 consultations	12
	≥ 06 consultations	46
	+ 07 consultations	42
Parity	0	25
	1	21
	2	29
	3 or more	25
Previous delivery	Vaginal delivery	72
	C-section	28
Abortion	0	80
	1	08
	2 or more	12

Table 3 – Distribution of symptom characteristics for the presence of urinary tract infection during pregnancy and treatment of patients.

Variables	Categories	%
Presence of urinary tract infection (confirmed)	2009 (Group I)	
	Yes	42
	No	58
	2010 (Group II)	
	Yes	33
	No	66
Treatment	2009 (Group I)	
	Yes	80
	No	20
	2010 (Group II)	
	Yes	100
	No	00
Refereed to risk prenatal assistance	2009 (Group I)	
	Yes	60
	No	40
	2010 (Group II)	
	Yes	75
	No	25

back, 33% from back to front and 17% would not do any hygiene. In GII, 83% used toilet paper from front to back, 17% from back to front and 66% would wash the genital region, according to guidelines of nurse II during prenatal visits.

It was also observed that behavior was different after evacuations and micturitions in GI, with reversed direction of 33% to front to back and 50% to back to front. Only 16% of pregnant women would wash the genital region. In GII, however, micturition hygiene direction was preserved and there has been significant increase in genital region washing after evacuation (66%). With regard to hygiene habits before and after intercourse, 83% of GI patients have reported no genital hygiene, while 66% of GII patients did it.

Table 4 shows the level of guidance about the importance of urinalysis, collection, results and professional guidance during prenatal assistance. It was observed that GI had 92% deficit with regard to the importance of the exam and urine collection techniques, while GII had a higher level of information about the subject (83%).

As to results, GI has reported not knowing the result of the exam although having presented it to the professional. In GII, 66% stated having received information with interpretation of results. Another important data was that 100% of GI patients have not participated in guidance groups during prenatal assistance, while 100% of GII patients have participated.

Table 5 shows that 85.5% of GI patients with confirmed UTI diagnosis have referred low back pain. In GII the percentage was 84% and a small percentage (from 14.5% to 16%) of patients with confirmed UTI diagnosis has not referred low back pain in both groups. There has been statistically significant association between UTI and low back pain ($p < 0.001$).

Table 4 – Distribution of pregnant women with regard to laboratory tests, their results and participation in guidance groups.

Variables	Categories	%
Have received guidance about the importance and collection for urinalysis	2009 (Group I)	
	Yes	08
	No	92
	2010 (Group II)	
	Yes	83
	No	17
Were informed about exam results	2009 (Group I)	
	Yes	25
	No	75
	2010 (Group II)	
	Yes	66
	No	33
Have participated in Guidance Groups during the prenatal period	2009 (Group I)	
	Yes	00
	No	100
	2010 (Group II)	
	Yes	100
	No	00

Table 5 – Distribution of patients who referred low back pain as major complaint.

Variables	Categories	n/ %
Patients with UTI diganosis (confirmed) who referred low back pain	2009 (Group I)	
	Yes	53/85.5*
	No	9/14.5*
	2010 (Group II)	
	Yes	52/84*
	No	10/16*
Patients without UTI diagnosis who referred low back pain	2009 (Group I)	
	Yes	26/42*
	No	36/58*
	2010 (Group II)	
	Yes	40/64.5*
	No	22/35.5*

*Chi-square test ($p < 0.001$).

DISCUSSION

UTI frequency and severity during pregnancy have been recognized for more than one century. In addition to being a relatively common problem during gestation, several questions about the subject still remain controversial and are reasons for clinical investigations. The subject becomes relevant due to its association with worse maternal and perinatal prognoses and findings scarcely discussed in the literature, such as a Turkish study which has shown the prevalence of UTI in women with eight years of education or less[3]. These data are in line with our study where a significant number of pregnant women were illiterate or had incomplete basic education.

For many years, pregnancy was seen as a predisposing factor for all types of UTI. Currently it is known that pregnancy, as isolated event, is not responsible for a higher incidence of UTI[8].

The DH recommends at least six medical visits during pregnancy. In Brazil, it has been observed that 77% of pregnant women had followed this guideline. In the case of Single Health System (SUS) users, the proportion was 74%. In our study, 42% of patients have attended seven or more consultations.

The World Health Organization (WHO) has considered that C-section rates above 15% are not justifiable[12]. Face to high C-section rates in Brazil, the DH has established limits for the payment of C-sections by SUS in up to 30%. Nevertheless, Brazil has presented in 2002 a total of 39.9% C-sections, with regional differences. Data from the National Demographics and Health Research from 2006 have shown C-section rates, in SUS-paid deliveries, between 33.6% and 44% in different Brazilian regions[10]. Our study has shown C-section rate of 28%.

According to WHO data, six million abortions are made every year in Latin America, being 1.4 million just in Brazil. According to DH data, every year, 250 thousand women are admitted to SUS hospitals due to complications after illegal or spontaneous abortions. The abortion rate in Brazil is 35 to 40 abortions for every one thousand women[11]. Our data have shown abortion rate of 20%. From 13% to 15% of maternal deaths as a consequence of pregnancy are related to abortion[11].

A recent study in São Paulo with puerperal women has observed that 66.8% had no UTI during pregnancy; however 33.2% have reported the disease[12]. The incidence of UTI in our research has varied between both groups with 42% for GI and 33% for GII.

A study with British women has shown that 48% had the habit of cleaning the genital region after micturition in the anteroposterior sense and 44% would do it in the reverse sense. The study has concluded that the habit of cleaning external genital organs in the posteroanterior sense had a higher correlation with the incidence of UTI during gestation[12], which confirms the observations of our study.

Another national study about genital hygiene habits of pregnant women has shown that 50.5% of them would do genital hygiene after evacuations, cleaning with toilet paper or wet wipes with front to back movements; 7.7% would do it in the opposite direction and 0.9% would do no genital hygiene. The two latter habits favor vaginal and urethral region colonization by micro-organisms of the enteral flora and are determining factors for UTI and vulvovaginitis[10]. Investigators studying genital hygiene after vesical eliminations were unanimous about the recommendation of cleaning the genital region after vesical and intestinal eliminations in the anteroposterior sense, in unidirectional movements from the perineum to the anus and coccyx[10].

Genital hygiene before intercourse is due to poor male hygiene which, in addition to including the inadequate penile washing before intercourse, may be related to intercourses in the presence of urethritis, condylomas and herpes. These diseases may bring severe early or late consequences for women. Early complications refer to the contamination by sexually transmitted disease agents and late for the possibility of evolving to cervical cancer[13].

Our study has shown in both groups (GI 83% and GII 66%) a significant number of no genital hygiene before intercourse. It is believed that sexual practice increases in 40% the risk of developing UTI and is one of the commonest means of mechanical transportation of bacteria from the skin around the anus to vagina and urethra[10-14].

It is important to orient pregnant women about healthy micturition practices such as: avoid delaying micturition and acquiring the habit of micturition before sleep and after intercourse because these practices may decrease bacterial multiplication time. Patients should also be oriented about increasing fluid ingestion and daily hygienic care, during bath, after micturition and evacuation and sexual practices, of low back pain investigation. These guidelines should be the focus of attention of health professionals along prenatal assistance[6,7].

Our study has shown that guidance deficit might be associated to the high prevalence of UTI during pregnancy. It was observed that GI and GII patients made their prenatal assistance according to DH recommendations, but only group II has received basic information. It is necessary to reinforce current recommendations for prenatal assistance, giving more emphasis to educational actions thus aiming at promoting education and health during pregnancy[10].

Data of our study about low back pain are in line with published studies which have shown that the prevalence of low back pain during gestation varies from 48% to 83%[5]. Another study on the prevalence of low back pain in pregnant women assisted in a clinic-school has also shown that 83.3% of patients had low back pain. The same study has evaluated pain intensity which, in 40% of pregnant women, was severe[18].

Another recent study on the prevalence of low back pain in pregnant women has shown that 73% of them had this symptom. Complaints start as from the second trimester with a prevalence of 43% and worsen in the third trimester in 48% of patients, contributing for the incapacity to perform daily life activities[19]. Our study has shown a statistically significant association between low back pain and UTI. Low back pain may be a UTI symptom and may also be the single clinic manifestation of an upper UTI, such as pyelonephritis. However, we have not found studies observing a positive correlation between low back pain intensity and urinary tract infection.

Nursing teams still lack more knowledge about pain as clinical sign of diseases such as UTI. It is known that the responsibility given to nurses to deal with pain and the several aspects depending on them for quality assistance might help understanding the reason for the high valuation and concern with technical precision in pain[16]. The study has shown that the major UTI complaint was low back pain. In the light of this finding, several complications may be prevented if nurses understand pain as a major vital sign during gestation. The assistance to pain is complex, requiring both knowledge and skills to adequately perceive and treat pain[18]. So, the participation of nurses in prenatal programs implies their clinical qualification to identify real and potential problems during gestation.

CONCLUSION

Our study has shown that the prevalence of UTI during gestation was 42% for GI and 33% for GII. Low back pain was the major symptom referred by pregnant women with confirmed UTI. It was also observed that the progressive spread of health and education knowledge during the prenatal program carried out by nurse II could have been a determining factor for the decreased incidence of UTI in GII as compared to GI.

Some facts deserve health professionals' special attention, especially from nurses who are responsible, as Family Health Strategy team members, for low risk prenatal programs. One of them is genital and post-intercourse hygiene during gestation. The other fact is the recognition of UTI symptoms, such as low back pain, since data suggest significant correlation between UTI and low back pain.

This study has also shown a knowledge gap about the importance of urinalysis, collection and interpretation of results.

This study is a reflection about the quality of prenatal assistance and proposes the importance that should be given to educational activities during prenatal assistance and to the simplest complaints through an effective communication

process. However, it is important to add that just guidance is not a guarantee for the absence of UTI during pregnancy. A qualitative history, including topographic pain evaluation, may cooperate for the early UTI diagnosis and prevent perinatal complications. Low back pain has to be valued since it is considered by health professionals a normal sign during pregnancy, who neglect prophylactic measures, which generates low back pain trivialization during gestation. Low back pain should be considered a disease which has to be duly evaluated and treated and attention is called for its association to urinary tract infections.

REFERENCES

1. Feitosa DCA, Silva MG, Parada CMGL. Acurácia do exame de urina simples para diagnóstico de infecções do trato urinário em gestantes de baixo risco. Rev Latino-Am Enfermagem. 2009;17(4):1104-69.
2. Jacociunas LV, Picoli SU. Avaliação de infecção urinária em gestantes no primeiro trimestre de gravidez. Rev Bras Anal Clin. 2007;39(7):55-7.
3. Duarte G, Marcolin AC, Quintana SM, et al. Infecção urinária na gravidez. Rev Bras Ginecol Obstet. 2008;30(2):93-100.
4. Mendoza-Sassi RA, Cesar JA, Ulmi EF, et al. Avaliando o conhecimento sobre pré-natal e situações de risco à gravidez entre gestantes residentes na periferia da cidade de Rio Grande, Rio Grande do Sul. Cad Saúde Pública. 2007;23(9):2157-66.
5. Assis RG, Tibúrcio RES. Prevalência e características da lombalgia na gestação: um estudo entre gestantes assistidas no programa de pré-natal da maternidade Dona Íris em Goiânia. Trabalho de Conclusão de Curso - Universidade Católica de Goiás. Goiâna, 2004. 31 p.
6. Barros SMO, Paula CAD, Rodrigues SSMW. Infecção urinária entre gestantes – intervenção de enfermagem para sua prevenção e tratamento. Acta Paul Enf. 1997;93(10):93-9.
7. Silveira MF, Barros AJD, Santos IS, et al. Exame de urina no pré-natal. Rev Saúde Pública. 2008;42(3):389-95.
8. Gunes G, Gunes A, Tekiner S, et al. Bacteriúria and socioeconomic associations among pregnant women in Malatya, Turkey. Public Health. 2005;119(11):1039-41.
9. Duarte G, Marcolin AC, Quintana SM, et al. Infecção urinária na gravidez. Análise dos métodos para diagnóstico e do tratamento. Rev Bras Ginecol Obstet. 2002;24(7):471-7.
10. Brasil. Ministério da Saúde. Programa de Humanização do Pré-Natal e Nascimento. Informações para gestores e técnicos. Brasília, 2007.
11. Batista CS. Infecção do trato urinário na gestação: conduta. Femina. 2002;30(8):553-5.
12. Ginecologia/Mulher. Taxa de aborto no Brasil é maior do que em países onde a prática é legalizada. Disponível em:<http://www.drashirleydecampos. com.br/noticias/17391>. Acesso em: 02 de dezembro de 2010.
13. Persad A, Wiechula R, Court A, et al. The JBI Model of evidence based healthcare. Int JEB Health Care. 2005;3(8):2-94.
14. Soares LA, Nishi CYM, Wagner HL. Isolamento das bactérias causadoras de infecções urinárias e seu perfil de resistência aos antimicrobianos. Rev Bras Med Fam Com. 2006;2(6):84-92.
15. Girão MJBC, Bacarat EC, Lima GR. Tract infections during pregnancy. Obstet Gynecol Clin North Am. 2002;28(3):454-8.
16. Barros SRAF, Pereira SSL, Almeida NA. A formação de acadêmicos de enfermagem quanto à percepção da dor em duas instituições de ensino superior. Rev Dor. 2011;12(2):131-7.
17. Ruviaro LF, Filippin LI. Prevalência de dor crônica em uma Unidade Básica de Saúde de cidade de médio porte. Rev Dor. 2012;13(2):128-31.
18. Silva DRR, Alves AT et al. Caracterização da dor lombar em gestantes atendidas no hospital universitário de Brasília. Universilas: Ciências da Saúde. 2006;1-2(4):37-48.
19. Santos MM, Gallo AP. Lombalgia gestacional: prevalência e características de um programa pré-natal. Arq Bras Ciên Saúde. 2010;35(3):174-9.

ORIGINAL ARTICLE

Pain research: bibliometric analysis of scientific publications of a Brazilian Research Institution*

Pesquisa em dor: análise bibliométrica de publicações científicas de uma Instituição de Pesquisa do Brasil

Eliseth Ribeiro Leão[1], Rita Lacerda Aquarone[2], Edna Terezinha Rother[3]

*Received from the Research and Teaching Institute, Israelite Hospital Albert Einstein (HIAE). São Paulo, SP.

ABSTRACT

BACKGROUND AND OBJECTIVES: Bibliometric analyses of scientific publications on pain are scarce in the literature. This study aimed at analyzing the scientific production on pain of a Research Institute.

METHOD: This is a retrospective cohort study analyzing articles published in indexed journals, by professionals affiliated to a Research Institute of a non-for-profit general hospital of the city of São Paulo, from 2008 to 2011. Searched databases were Medline, SCOPUS, Web of Science, Scielo and LILACS.

RESULTS: During the analyzed period, 47 articles have addressed pain, with mean of 11 articles/year in ascending trend. As to intellectual authorship, these publications have involved 258 authors, with predominance of physicians (77%). Twenty-four studies were carried out in collaboration with other institutions and 24 and, from them, 22 in partnership with Universities. Migraine (25.7%) and headache (14.9%) were most studied sub-themes, and epidemiological designs were the most observed (47%). Most researches (71%) were published by journals with impact factor, being 27 articles (57.4%) published by eight pain specialist journals. Mean impact factor of publications was 2.32. Twenty articles were quoted (42.4%): 102 by Web-of-Science and 135 by SCOPUS. Two articles were quoted twice by Scielo.

CONCLUSION: Although studies on pain are still a small part of total production of the analyzed institute, they show potential for growth. Most articles were published by international journals with impact factor and quotations which indicate quality of produced knowledge.

Keywords: Bibliometric indicators, Pain, Scientific publications.

RESUMO

JUSTIFICATIVA E OBJETIVOS: Análises bibliométricas das publicações científicas sobre dor são escassas na literatura. O objetivo foi analisar a produção científica sobre a temática da dor de um instituto de pesquisas.

MÉTODO: Estudo de coorte retrospectivo que analisou artigos publicados em periódicos indexados, de profissionais afiliados a um instituto de pesquisas de um hospital geral, filantrópico, da cidade de São Paulo, no período de 2008 a 2011. As bases de dados utilizadas foram Medline, Scopus, Web of Science, Scielo e LILACS.

RESULTADOS: No período analisado 47 artigos abordaram a temática da dor, com média de 11 artigos/ano em linha de tendência ascendente. Quanto à autoria intelectual, essas publicações envolveram 258 autores, com predominância da categoria profissional médica (77%). Foram realizados em colaboração com outras instituições 24 estudos e, 22 desses, em parceria com universidades. Enxaqueca (25,7%) e cefaleia (14,9%) foram os subtemas mais estudados e desenhos epidemiológicos foram os mais observados (47%). A maioria das pesquisas realizadas (71%) foi publicada em periódicos com fator de impacto, sendo 27 artigos (57,4%) divulgados em oito revistas especializadas em dor. A média do fator de impacto das publicações foi de 2,32. Receberam citações 20 artigos (42,4%): 102 na Web of Science e 135 na Scopus. Dois artigos receberam cinco citações na Scielo.

CONCLUSÃO: Embora os estudos sobre a temática da dor constituam pequena parcela da produção total do instituto analisado, estes demonstram potencial de crescimento. A maioria dos artigos foi publicada em periódicos internacionais e com fator de impacto e citações que indicam a qualidade do conhecimento produzido.

Descritores: Dor, Indicadores bibliométricos, Publicações científicas.

INTRODUCTION

Pain follows humankind history and medicine itself. Ancient reports show the concern not only with understanding the painful phenomenon, but also with finding resources to effectively manage and control it.

Theories have been proposed along time and, as from the 1970s, pain investigations have gained new breath with the creation

1. Doctor in Sciences. Researcher of the Research and Teaching Institute, Israelite Hospital Albert Einstein (HIAE). São Paulo, SP, Brazil.
2. Master Student of the Nursing School, University of São Paulo. Senior Nurse of the Rehabilitation Center, Israelite Hospital Albert Einstein (HIAE). São Paulo, SP, Brazil.
3. Coordinator of the Einstein Integrated Libraries System, Israelite Hospital Albert Einstein (HIAE). São Paulo, SP, Brazil.

Submitted in November 08, 2012.
Accepted for publication in April 26, 2013.
Conflict of Interests: None.

Correspondence to:
Eliseth Ribeiro Leão
Av. Albert Einstein, 627/701
05651-901 São Paulo, SP.
E-mail: eliseth.leao@einstein.br

of the International Association for the Study of Pain (IASP). Painful mechanisms and different treatments have been addressed by scientific publications, in addition to research results which are spread throughout international events, increasing the production of knowledge in this area[1].

Scientific production means each and every type of research and text production developed for gains in technological, social and human progress. It is through their publication that scientific works gain more expression and continuity, since they disclose their process of knowledge production as from any paradigm being considered[2].

Producing and communicating knowledge may assure the exercise of investigation, the exchange of ideas and potential solutions for human problems, especially to relieve pain and its consequent distress.

Study groups have stood out in recent decades in scientific research, as well as in teaching and assistance in specialized centers, in a multidisciplinary perspective. A bibliometric analysis of the period 1990-2001shows pain among the five most researched topics by controlled and randomized clinical trials[3].

In Brazil, the Brazilian Society for the Study of Pain (SBED), founded by a group of physicians in 1982, has a long time gathered professionals from different specialties interested in studying and managing pain. In addition, major health assistance excellence centers have given special attention to pain management, be it by incorporating it as the fifth vital sign, which assumes regular and systematic pain evaluation, be it by available treatments or even by generating knowledge of their research centers investigators.

However, publications on the profile and evolution of the scientific literature about pain, even international, are scarce[1], which makes difficult to further grasp the contribution of Brazilian researchers, especially those generated outside public universities. The advancement of knowledge produced by researchers should be translated into accessible information for the scientific community. Bibliometry is a way to place the production of a country in the international context, of an institution in its country and even of scientists with regard to their own communities. There are still many pain knowledge gaps, especially in Brazil, so it is necessary to establish the state of the art of its knowledge, mapping human resources, assistance and research to know where knowledge is.

The institution being studied has major influence in spreading knowledge because it is an excellence center in research and assistance, with pain management centers (Chronic Pain Group, Pain Group, Headache Group, Spine Group). In addition, it fosters research being acknowledged in 2012 with the SciVal Brasil Award, which recognizes Brazilian teaching and research institutions which stand out by the excellence of their scientific production, receiving the Citations per document category award.

The question posed by this study is: would locally generated knowledge cause any impact on pain scientific production state of the art or would it be limited to the resolution of isolated issues of the assistance practice of the center where it has been originated?

So, this study aimed at analyzing and characterizing the scientific production on pain of a private teaching and research institute.

METHOD

This is a retrospective cohort study carried out by checking the production of articles published in indexed journals, by researchers and/or assistance professionals and clinical staff acting in the research institute of a general non-for-profit hospital of the city of São Paulo. This research institute was founded in 1998 with the mission of "being reference in research, generation and disclosure of knowledge about health, for the benefit of society". It is responsible for managing institutional scientific production both of its group of researchers and of the institution's clinical staff and multidisciplinary team.

Articles published from 2008 to 2011 were analyzed in January 2012. Data were obtained from the publications monitoring carried out by the research center library.

Publications were monitored by an alert sign with query syntaxes or strategies by researchers name and institutions name, in all their variations. Query strategies were recorded in Medical Literature Analysis and Retrieval System Online (Medline), Scopus, Institute of Scientific Information Web of Knowledge Database (Web of Science), Scientific Electronic Library Online (Scielo) and Latin American and Caribbean Literature in Health Sciences (LILACS) databases, which stratify by researchers and institutions affiliated to these publications. By means of electronic daily or weekly notifications received from these databases, results were compared and each element of recovered records (author, title, source, pagination, etc.) was made consistent to prevent data duplication.

Recovered records were processed and indexed in a database which, in addition to bibliographic information, generates information about citations, impact factor, participation of other institutions, direct access to the electronic article and links to research projects approved by the institution.

Only scientific articles published in national and international journals indexed in respective databases were considered. Duplications and other publications, apart from scientific articles, were excluded.

The scientific production was analyzed according to: number of articles/year; number of authors; professional category of authors; cooperation with other institutions; sub-themes and types of study; journal impact factor (Journal Citation Reports – JCR – Web of Science); Qualis classification/Coordination of Improvement of Higher Level Education Personnel (Capes) and number of citations (Web of Science, Scopus, Scielo). Data were analyzed by the Microsoft Excell 2007 program and by descriptive statistics.

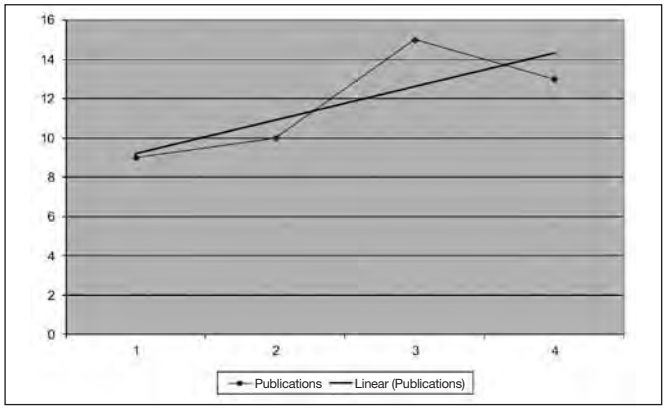
This study was approved by the Committee Research Institutional sob nº 1651/2012.

RESULTS

Scientific production and intellectual authorship

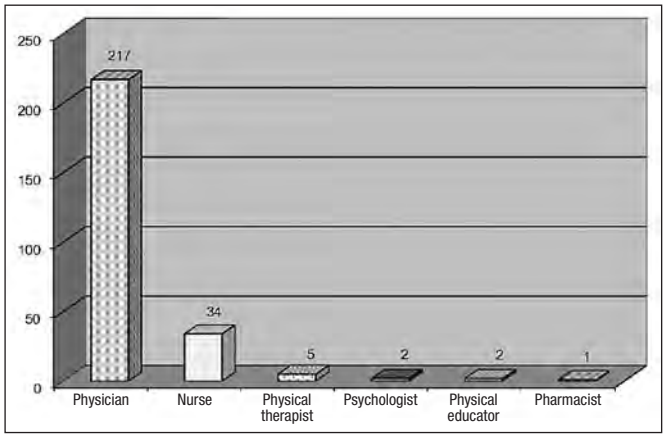
During the analyzed period of four years, total production of the institution corresponded to 1366 articles. From these, 47 (3.4%) addressed pain. Production distribution per year is shown in graph 1, where data indicate that scientific pro-

duction on pain, although small (mean of 11 articles/year), is growing as reflected by the trend line.



Graph 1 – Distribution of scientific articles by publication year in the period between 2008 and 2011. São Paulo, 2012.

With regard to intellectual authorship, these publications have involved 261 authors distributed by professional category, as shown in graph 2.



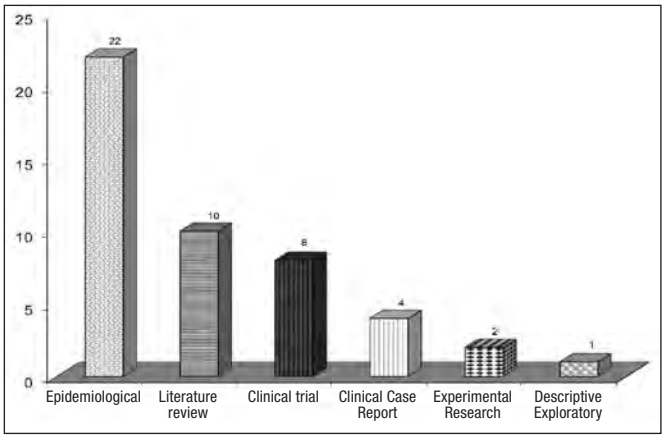
Graph 2 – Distribution of authors by professional category (2008-2011). São Paulo, 2012.

Physicians have participated in 36 articles, nurses in 13 articles and only three publications have evidenced the presence of other professionals (physical educator, physical therapist, psychologist and pharmacist). Multidisciplinary teams were responsible for 14 articles; 24 studies (51%) were carried out in cooperation with other institutions, being 22 (46%) in partnership with national and international universities.

Sub-themes and types of study

As to the distribution of studied themes, the most common were: migraine (25.7%); headache (14.9%); pharmacological treatment (10.7%); postoperative pain (8.6%); pelvic pain (6.5%); pain evaluation (4.2%) arthritis (4.2%); and musculoskeletal pain (4.2%). In a smaller extent, other 10 themes were addressed: coping and pain; endometriosis; fibromyalgia; genetics; non-pharmacological treatment; cancer pain; pediatric pain; placebo; painful procedures; and spirituality and pain (21%; 2.1% for each theme).

As to study designs, it has been observed a larger number of epidemiological studies (47%) corresponding to cohort, case control and transversal studies, as shown in graph 3.



Graph 3 – Distribution of published studies design (2008-2011). São Paulo, 2012.

Journals, impact factor and language

Articles were published in 24 journals, most of them international, the distribution, Qualis classification and impact factor of which are shown in table 1. As to language, 73% were pub-

Table 1 – Distribution of articles per journal and impact factor of scientific production on pain (2008-2011). São Paulo, 2012.

Journals	QUALIS	IF	*f*	%
Arthritis Care & Research	A1	4.851	1	2.1
Cephalalgia*	A1	3.430	5	10.7
European Journal of Neurology	A2	3.692	1	2.1
Journal of Rheumatology	A2	3.695	1	2.1
Anesthesia and Analgesia*	A1	3.286	1	2.1
Clinical Journal of Pain*	A2	2.813	1	2.1
Headache*	A2	2.524	3	6.5
Journal Orthopaedic Sports & Physical Therapy	B1	3.000	1	2.1
Journal of Headache and Pain*	B1	2.427	3	6.5
Journal of Rehabilitation Medicine	B1	2.049	1	2.1
Current Pain and Headache Reports*	B2	1.662	5	10.7
Medical Hypotheses	B2	1.150	1	2.1
Midwifery	A1	1.777	1	2.1
Journal of Midwifery & Womens Health	A1	1.163	1	2.1
Pediatrics International	B2	0.626	1	2.1
Arquivos de Neuro-Psiquiatria	B1	0.722	2	4.2
Acta Paulista de Enfermagem	A2	0.273	2	4.2
Journal of Pain Research*	A1	-	1	2.1
Expert Review of Neurotherapeutics	A2	-	1	2.1
Handbook of Clinical Neurology	B1	-	1	2.1
São Paulo Medical Journal	B1	-	1	2.1
Revista Dor*	B2	-	8	17.1
Einstein	B3	-	3	6.5
Pediatria (São Paulo)	B3	-	1	2.1
Total			47	100

IF = impact factor; * Pain-related journals.
Source: 2011 JCR Science Edition.

lished in English, 19% in Portuguese and English, and 8% in Portuguese.

Most published studies (6%) were published in journals with impact factor, with emphasis on 27 articles (57.4%) published in eight of (approximately) 40 journals specialized in pain. Mean impact factor of publications was 2.32 (variation from 0.273 to 4.851).

Although the impact factor or any other journal classification aims at assuring the quality of the journal and of the review process by peers, it not always reflects the quality of the individual article. Quantitative pain indicators may be seen merely as the scientific interest in developing research activities in this field and need to be complemented with indicators qualifying the merit of the content, such as citations analysis[1] shown in table 2. Twenty articles (42.5%) have received citations: 102 in Web of Science and 135 in Scopus. Two articles were cited in Scielo (total of five citations).

DISCUSSION

The analysis of scientific publications on pain produced by this institution shows an alignment of the organizational structure with regard to strategic assistance groups, but also observes that it follows international publications trend and profile.

Data have shown that the Brazilian production in 1977 was of three articles; in 1987, two articles; in 1997, 40 articles, and in 2007, 95 articles. The increasing production made Brazil jump to the 15th place in the international ranking (with emphasis in orofacial pain, which does not reflect the Brazilian reality for being linked to state of the art researchers and groups in this area), according to data published in 2010 about the evolution of scientific literature on pain during 30 years (1976-2007)[1].

However, these results may be improved. A retrospective cohort study evaluating the 348 studies presented in the 9th Brazilian Congress on Pain has identified that only 31 were published

Table 2 – Distribution of articles with citations in Web of Science and Scopus databases. São Paulo, 2012.

Artigos	Web of Science	Scopus
Chappell AS, Littlejohn G, Kajdasz DK, et al. A 1-year safety and efficacy study of duloxetine in patients with fibromyalgia. Clin J Pain. 2009;25(5):365-75.	19	20
Vieira DS, Masruha MR, Gonçalves AL, et al. Idiopathic intracranial hypertension with and without papilloedema in a consecutive series of patients with chronic migraine. Cephalalgia. 2008;28(6):609-13.	18	19
Queiroz LP, Peres MF, Piovesan EJ, et al. A nationwide population-based study of tension-type headache in Brazil. Headache. 2008;49(1):71-8.	17	17
Fukui PT, Gonçalves TR, Strabelli CG, et al. Trigger factors in migraine patients. Arq Neuropsiquiatr. 2008;66(3A):494-9.	14	19
Ruperto N, Lovell DJ, Li T, et al. Pediatric Rheumatology International Trials Organisation (PRINTO); Pediatric Rheumatology Collaborative Study Group (PRCSG).Abatacept improves health-related quality of life, pain, sleep quality and daily participation in subjects with juvenile idiopathic arthritis. Arthritis Care Res (Hoboken). 2010;62(11):1542-61.	7	5
Fukuda TY, Rossetto FM, Magalhães E, et al. Short-term effects of hip abductors and lateral rotators strengthening in females with patellofemoral pain syndrome: a randomized controlled clinical trial. J Orthop Sports Phys Ther. 2010;40(11):736-42.	5	6
Tanuri FC, de Lima E, Peres MF, et al. Melatonin treatment decreases c-fos expression in a headache model induced by capsaicin. J Headache Pain. 2009;10(2):105-10.	4	4
Podgaec S, Gonçalves MO, Klajner S, et al. Epigastric pain relating to menses can be a symptom of bowel endometriosis. Sao Paulo Med J. 2008;126(4):242-4.	4	6
Valença MM, Medeiros FL, Peres MF, et al. Neuroendocrine dysfunction in fibromyalgia and migraine. Curr Pain Headache Rep. 2009;13(5):358-64.	4	3
Kiche MT, Almeida FD. Therapeutic toy: strategy for pain management and tension relief during dressing change in children. Acta Paul Enferm. 2009;22(2):125-30.	2	2
Conforto AB, Lois LA, Amaro E Jr, et al. Migraine and motion sickness independently contribute to visual discomfort. Cephalalgia. 2010;30(2):161-9.	2	2
Fukushima FB, Barros GA, Marques ME, et al. The neuraxial effects of intraspinal amitriptyline at low concentrations. Anesth Analg. 2009;109(3):965-71.	1	1
Masruha MR, Lin J, de Souza Vieira DS, et al. Urinary 6-sulphatoxymelatonin levels are depressed in chronic migraine and several comorbidities. Headache. 2010;50(3):413-9.	1	1
Peres J, Gonçalves A, Peres M. Psychological trauma in chronic pain: Implications of PTSD for fibromyalgia and headache Disorders. Curr Pain Headache Rep. 2009;13(5):350-7.	1	1
Paiva ES, Costa ED, Scheinberg M. Fibromyalgia: an update and immunological aspects. Curr Pain Headache Rep. 2008;12(5):321-6.	1	1
Lucchetti G, Peres MF. The prevalence of migraine and probable migraine in a brazilian favela: results of a community survey. Headache. 2011;51(6):971-9.	0	1
Peres MF, Lucchetti G, Mercante JP, et al. New daily persistent headache and panic disorder. Cephalalgia. 2011;31(2):250-3.	0	1
Jorge LL, Feres CC, Teles VE. Topical preparations for pain relief: Efficacy and patient adherence. J Pain Res. 2011;4(1):11-24.	0	1
Speciali JG, Peres M, Bigal ME. Migraine treatment and placebo effect. Expert Rev Neurother. 2010;10(3):413-9.	0	2
Queiroz LP, Peres MF, Piovesan EJ, et al. A nationwide population-based study of migraine in Brazil. Cephalalgia. 2009;9(6):642-9.	0	16

(8.9%), mostly in Brazilian journals (64.5%), being considered much lower than the international mean. The author has also pointed the need to encourage professionals dealing with pain to publish their studies, since this is the best way to expose their ideas and experiences to the scientific world[4].

It is observed, however, that Brazilian production in general faces major challenges, not only quantitative but also qualitative, because the quality of such production – measured by the number of citations generated by an article in studies of other scientists, after being published – is still below the international mean.

Although there are no comparative data in the literature aimed at professional categories, it is believed that the authorship profile in other countries has similar distribution. The participation of a larger number of medical researchers has been observed when the subject is research involving clinical issues. It is also believed that other professionals, such as those dedicated to orofacial pain, have not appeared in this study due to strategic peculiarities of a quaternary hospital where our research institute is inserted, not characterizing a specific demand for this professional in such a limited group of investigators of this theme in the institution.

In the current Directory of Research Groups in Brazil, of the National Council of Scientific and Technological Development (CNPq), the search for the theme pain, stratified by area (within the broad Health Sciences area), shows the following distribution: 62 Medicine groups, 26 Dentistry groups, 21 Physical Therapy and Occupational Therapy groups, 17 Nursing groups and 8 Pharmacy groups.

Cephalic pain was the most widely studied theme and follows a world trend that shows its frequency. Approximately half to three quarters of adults aged between 18 and 65 years, refer having experienced headache in the last year. This is shown in studies from all continents, except Africa, where estimated prevalence in one year is lower than 22%. Migraine is reported by more than 10% of adults in this age group, also except for Africa and Western Mediterranean. Headache for more than 15 days in a month affects 1.7% to 4% of the world adult population. In many regions, data are uncertain due to the scarcity of good epidemiological studies[5].

In Brazil, a pain epidemiological study developed in the city of São Paulo has shown that from 2401 participants 22% have lower limbs pain, 21% back pain and 15% headache, for which many of them do not look for medical assistance. Headache/migraine was also pointed as the second more frequent co-morbidity in chronic pain individuals (31.2%)[6].

In our study, epidemiological designs have prevailed, followed by literature reviews. The analysis of studies published by Pain – IASP has shown that this type of study has remained stable for 30 years and pharmacological studies (animal behavior) had the highest growth. It is not known, however, whether the number of clinical trials is lower due to a lower number of researchers in this area or if such studies are less submitted or accepted by editorial guidelines[7].

To evaluate research and researchers, the impact factor has been widely used and is a criterion to grant sponsorships to universities. It has also been used as a major indicator of the decision-making process during post-doctorate programs[8].

World impact factor mean of the literature on pain is 3.11, and national mean of the 20 countries with the largest production has varied from 1.89 to 3.73. In 2006, Brazilian impact factor mean was 3.00[9]. Although the mean of this study has remained slightly below (2.32) available international and national means, it is worth highlighting that the studies were published by relevant journals and by a limited number of researchers, that is, production quantitatively compatible with the limited number of researchers dedicated to the theme, however with high scientific quality.

From 1995 to 2004, Brazilian neuroscientists have published in two worthy journals among the top-20, Cephalalgia and Headache[10], trend which is also observed among researchers of the studied institution, with eight published articles. The analysis of 6360 articles on pain has shown a distribution of publications in 1071 journals, being Pain the journal with the highest number of publications (294), closely followed by Headache (278) and Cephalalgia (235)[9].

One should also stress that the international literature has also several local journals, such as the *Revista Dor,* of the Brazilian Society for the Study of Pain (SBED), in which eight articles were published. These national journals, even if not published in English, are important for being a critical link among high level researchers and health professionals directly acting on assistance[1]. In this sense, the analyzed production shows a distribution of articles directed both to the international scientific community (62%) and to qualification/update of health students and professors in Brazil (38%).

Brazil has also a model created by Capes, called Qualis, which classifies scientific journals and is used for intellectual production disclosure of *strictu sensu* post-graduation programs. This system has played an induction role in the choice of where the researcher linked to the academic environment should publish, because it is the most important item in the process of programs analysis. The classification adopts seven extracts: A1, A2, B1, B2, B3, B4, B5 and C, where A1 has the highest weight (100) and C the lowest weight (zero), which ends up having a conductor role to where the researcher should publish[11]. What is observed is that journals with higher impact factor also correspond to those best classified by Capes.

Web of Science has been for a long time the primary tool to evaluate scientific production evolution worldwide. Based on publications referenced by it, many bibliometric indicators were developed to evaluate the production of countries, regions, universities, departments or laboratory and individual investigators. In 2004, the publishing house Elsevier B.V. has introduced Scopus in the market which, although not having the international impact of Web of Science, has been considered a good alternative. Scopus is a database with more than 33 million records extracted from more than 15 thousand journals with peer review from 4 thousand publishing houses and includes more than 1200 Open Access Journals and 500 Conference Proceedings, more than 600 Trade Publications and 200 Books Series. The difference between both databases may be

related to journal inclusion policies which are overtly different, and also to the classification of documents as articles, congress presentation summaries, etc. For citation analysis, Scopus has 20% more coverage as compared to Web of Science[12].

To better evaluate local realities, some authors even recommend the evaluation of scientific disclosure in national databases such as Scielo[1], among other alternative databases, taking into account the limitations of the inclusion of journals in Web of Sciences database and the criticisms from both developed and developing countries[8,13]. Databases, in general, have their own evaluation criteria for the indexation of journals and vary as a function of the evaluation objective and area of knowledge[11].

In the literature, citation analysis has been primarily focused on the so-called classic citations, such as the Gate Theory, published by Science in 1965, with 154 citations. Other important data indicate that the total number of citations of all published studies is decreasing, however the number or articles is increasing[7]. It is possible to infer that the higher the number of articles, the citations of authors of studies with less scientific relevance or with lower impact tend to be lower for being diluted among other available articles. However, our study has observed a high number of citations (237 when both major databases were added), which emphasizes the reach of such publications outside the institution and their contributions not only for the important award mentioned in the introduction to this article, but also for the international scientific community.

It is worth stressing that all classification methods discussed have limitations. Multidimensional evaluations on the impact of knowledge generation are difficult and represent a challenge. Measurements of the evaluation of social implications of new knowledge also have to be developed and are a field to be explored.

The major limitation of our study is that the analysis of the publications represents a small number of researchers of a same institution, although 51% of the studies had the participation of other primarily academic institutions. The qualitative analysis of knowledge generation and of major scientific contributions of each publication should be explored in further evaluations and a national multicenter study should also be the target of investigators of the theme, maybe headed by specialized pain centers and/or in partnership with SBED.

Nevertheless, results show the importance of knowing the interest on the development of studies in this area, in different contexts, including those where other research lines prevail. Brazil lacks data showing how pain research is being developed outside specialized centers, which also account for a significant part of assistance to painful patients who deserve a more accurate attention. This study hopes to have contributed to this.

CONCLUSION

Although studies on pain are just a small part of total production of the analyzed institute, they show potential to grow. Predominant professional category of the intellectual authorship is made up of physicians, which indicates the need for further engagement of the multidisciplinary team in the study of pain to generate specific knowledge for each area.

Epidemiological designs have prevailed and were aimed at the study of cephalic pains. Most articles were published in international journals with impact factor and citations, indicating the high quality of the knowledge produced, which suggests that the generated knowledge has contributed to the state of the art of scientific production on pain without being limited to loco-regional issues.

REFERENCES

1. Robert C, Wilson CS, Donnadieu S, et al. Evolution of the scientific literature on pain from 1976 to 2007. Pain Med. 2010;11(5):670-84.
2. Oliveira Filho R, Hochman B, Nahas FX. Fomento à publicação científica e proteção do conhecimento científico. Acta Cir Bras. 2005;20(Suppl 2):35-9.
3. Tsay MY, Yang YH. Bibliometric analysis of the literature of randomized controlled trials. J Med Libr Assoc. 2005;93(4):450-8.
4. Oliveira TR. Frequência de publicação de trabalhos científicos apresentados no 9º Congresso Brasileiro de Dor. Rev Dor. 2012;13(2):124-7.
5. World Health Organization. Atlas of headache disorders and resources in the world 2011. Geneva: Who Press; 2011.
6. Dias T, Latorre MRDO, Appolinario J, et al. The prevalence of chronic pain in São Paulo (Brazil): a population-based study using telephone interview. In: 5th World Congress World Institute of Pain, 2009, New York. Pain Practice. 2009;9:115-6.
7. Mogil JS. Simmonds K, Simmonds MJ. Pain research from 1975 to 2007: a categorical and bibliometric meta-trend analysis of every research paper published in the journal, Pain. Pain. 2009;142(1-2):48-58.
8. Kaltenborn K-F, Kuhn K. The journal impact factor as a parameter for the evaluation of researchers and research. Rev Esp Enferm Dig. 2004;96(7):460-76.
9. Robert C, Wilson CS, Donnadieu S, et al. Bibliometric analysis of the scientific literature on pain research: a 2006 study. Pain. 2008;138(2):250-4.
10. Nitrini R. The scientific production of Brazilian neurologists: 1995-2004. Arq Neuropsiquiatr. 2006;64(2B):538-42.
11. Erdmann AL, Marziale MH, Pedreira Mda L, et al. Evaluation of scientific periodicals and the brazilian production of nursing articles. Rev Lat Am Enfermagem. 2009;17(3):403-9.
12. Falagas ME, Pitsouni EI, Malietzis GA, et al. Comparison of PubMed, Scopus, Web of Science, and Google Scholar: strengths and weaknesses. FASEB J. 2008;22(2):338-42.
13. Satyanarayana K. Impact factor and other indices to assess science, scientists and scientific journals. Indian J Physiol Pharmacol. 2010;54(3):197-212.

ORIGINAL ARTICLE

Pain during dental care in family health units of Caruaru city, state of Pernambuco*

Dor durante o atendimento odontológico em unidades de saúde da família do município de Caruaru-PE

Etenildo Dantas Cabral[1], Glissia Gisselle Alves[2], Gerlane Caitano de Souza[2]

*Received from the Dentistry Course, Caruaru Association of Higher Education (ASCES). Caruaru, PE.

ABSTRACT

BACKGROUND AND OBJECTIVES: Fear of pain may delay or prevent people going to the dentist, especially families assisted by Family Health Strategies. So, this study aimed at investigating pain perception of dental patients from Family Health Units of the city of Caruaru (UFSC), state of Pernambuco.
METHOD: This is a transversal, analytical and epidemiological study where socio-demographic data and history of 312 patients were collected through standardized personal interviews. Pain intensity was measured by the 21-point numerical scale (from 0 to 10, with 0.5 intervals), where patients themselves checked the number corresponding to perceived pain during treatment.
RESULTS: Pain during treatment was present in 22.1% of the sample and was more frequent in younger patients who only look for the dentist when they feel pain or who always or almost always have felt pain during previous treatments. Mean perceived pain intensity was 4.1 and was statistically higher for patients who usually only look for the dentist when they feel pain. Pain was more frequent during tooth extractions but its intensity has not significantly varied among procedures.
CONCLUSION: Pain during USFC treatment was less frequent as compared to other studies, however with higher intensity; and was more frequent among individuals who only look for the dentist when they feel pain.
Keywords: Dental assistance, Pain measurement, Pain perception, Primary health care.

RESUMO

JUSTIFICATIVA E OBJETIVOS: O medo de sentir dor pode retardar ou impedir a ida de pessoas ao dentista, sobretudo na população assistida pelas Estratégias de Saúde da Família. Portanto, o objetivo deste estudo foi investigar a percepção de dor dos pacientes odontológicos em Unidades de Saúde da Família de Caruaru (USFC), PE.
MÉTODO: Trata-se de um estudo epidemiológico transversal e analítico no qual foram coletados dados sociodemográficos e o histórico de atendimentos de 312 pacientes por meio de entrevista pessoal padronizada. A mensuração da intensidade da dor foi obtida por meio da escala numérica de 21 pontos (de 0 a 10, com intervalos de 0,5), em que o próprio paciente assinalava o número que correspondesse à dor percebida durante o atendimento.
RESULTADOS: A presença de dor durante o tratamento totalizou 22,1% da amostra e foi mais frequente em pacientes mais jovens, que costumam procurar o dentista apenas quando sentem dor, ou que sempre, ou quase sempre, sentiram dor durante tratamentos anteriores. A média de intensidade de dor percebida foi de 4,1 e foi estatisticamente maior em pacientes que costumam procurar o dentista apenas quando sentem dor. A dor esteve mais presente nas exodontias, mas sua intensidade não variou significativamente entre os procedimentos.
CONCLUSÃO: A dor durante o atendimento em USFC ocorreu com menor frequência que em outros estudos, porém com maior intensidade, e os indivíduos que foram mais propícios a senti-la foram aqueles que só procuram o dentista quando estão com dor.
Descritores: Assistência odontológica, Atenção primária à saúde, Medição da dor, Percepção da dor.

INTRODUCTION

Pain is often associated to dental care and many dentists may not pay attention to their patients' pain since some degree of pain during dental visits may be reported by more than 70% of patients[1]. This dental care pain is influenced by the clinical procedure itself, by patients and by dentists' attitudes and working structure[2-5].
Fear of pain during treatment may be one of the major reasons that delay or even prevent the going of many people to the dentist[6]. This, on the other hand, may result in worse oral health conditions, especially in low income populations, which are in general seen by oral health teams of Family Health Strategies[7].
Considering that a painful experience during treatment increases pain perception of future treatments[8], oral health team ability and care and basic attention to control pain during

1. Doctor in Dentistry. Assistant Professor, Federal University of Pernambuco and Caruaru Association of Higher Education (ASCES). Caruaru, PE, Brazil.
2. Dentist by Caruaru Association of Higher Education (ASCES). Caruaru, PE, Brazil.

Submitted in January 05, 2013.
Accepted for publication in April 12, 2013.

Correspondence to:
Etenildo Dantas Cabral, M.D.
Rua Irmã Maria David, 210/1301 – Casa Forte
52061-070 Recife, PE.
E-mail: etenildo@gmail.com

dental treatment will directly affect patients' perception during subsequent visits, including other levels of attention of the health service.

Notwithstanding the above-mentioned importance of pain during dental treatment in basic health attention, the query of scientific articles in Bireme, LILACS, Medline, Cochrane Library, Scielo, BBO and Pubmed databases – without limitation of language and publication period, using the keywords "pain", "dental pain" "dental fear" and "dental anxiety", alone or associated to the words "dentist", "dentistry", "treatment" and "odontology" – has not found any article directly evaluating pain perception of patients during dental treatment in basic attention.

So, this study aimed at investigating pain perception during dental treatment in family health units of the city of Caruaru-PE, which has filled a literature gap and may supply elements both to contribute to dental assistance provided and, as a consequence, oral health of the city population, and to the understanding of the subject in international level.

METHOD

Epidemiological, observational, transversal and analytical trial carried out in the city of Caruaru-PE, Brazil. This city has 29 Family Health Units with Oral Health Teams (USFSB), being 20 located in urban areas[9]. It was exactly for the population of adolescents and adults seen in USFSBs of urban areas of this city from March to July 2011 that this study aimed at reaching its results.

The study has used a conglomerate sample (double stage) where USFSBs were the groups. So, USFSBs were selected and, from them, the patients. To calculate sample size, the statistical program PASS (Power Analysis and Sample Size), version 2005 was used. For this calculation, the following parameters were used: size of target-population considered "infinite", 5% precision, 95% confidence interval and 70% of expected prevalence of painful experiences during treatment[1]. As result, total sample size was 312 patients (representing approximately 3.5% of the total universe of the studied population).

USFSBs were chosen by simple randomized sampling being selected 12 units, or 60%. Each USFSB was followed by a researcher with the number of complete shifts needed to interview 26 patients who met the inclusion criteria (adolescents and adults with psychic-cognitive ability to answer the questions). That is, the first 26 eligible patients of each USFSB who agreed in participating in the study were included.

Data were collected in two moments. The first moment was at the USFSB waiting room, where the Free and Informed Consent Term (FICT) was delivered. Data were collected by means of personal standardized interviews and a form. Still before treatment, sociodemographic data and data of patients' dental treatment history were collected.

The second moment was after treatment, at USFSB waiting room or close to it, according to patients' preference. At this moment, data related to treatment, including pain perception, the intensity of it was obtained with a 21-point numerical scale (from 0 to 10 with 0.5 intervals), where patients themselves would check the number corresponding to perceived pain during treatment. Pilot studies carried out in the preliminary stage of this research have indicated that this scale is easier to understand and to be used by the studied population as compared to the visual analog scale, in addition to being widely used[10].

Data were analyzed by the statistical program SPSS, version 15. In a bivariate analysis, we have tested the association between presence or not of pain and patients' variables (age, gender, education, frequency and primary reason for going to the dentist, in addition to history of pain during dental treatments) and the type of procedure, using Chi-square, Fisher's Exact or Likelihood Ratio tests; we have also tested the difference in pain intensity among patients' variables and types of procedures, using Mann-Whitney or Kruskal-Wallis tests.

We have also carried out a multivariate analysis with linear regression and logistic regression to better understand the influence of dependent variables on the presence or not of pain and its intensity.

This study was carried out according to ethical principles of the Declaration of Helsinki and Resolution 196/96 of the National Health Council, being approved by the Ethics Committee of the Caruaru Association of Higher Education (CEP/ASCES, protocol 135/2010).

RESULTS

Characteristics of the 312 interviewed patients are shown in table 1. It can be observed that most were females (78.5%), aged between 22 and 40 years (47.8%), had from 5 to 9 years of education (47.4%), have reported going to the dentist every semester (37.8%), primary reason for visits was the need for some treatment but not pain (55.8%) and have never felt pain (46.5%) during dental treatment.

As shown in table 2, pain during dental treatment represented 22.1% of the sample. This pain was associated ($p < 0.05$) to age group, primary reason for dental visits and history of pain during dental treatment. Younger patients, those looking for the dentist only when feeling pain, as well as those who always or almost always have felt pain during previous treatments have more frequently referred pain during treatment (27.7%, 35.5% and 36.4%, respectively).

As shown in table 3, mean pain intensity perceived by patients was 4.1. This intensity has varied and was statistically higher (5.6) in individuals who only look for the dentist when they are in pain.

Considering pain intensity in categories, where no pain corresponded to zero, mild pain between 0.5 and 3.0, moderate pain from 3.5 to 6.5, severe pain from 7.0 to 9.5 and unbearable pain corresponding to 10, we have found 77.9%, 10.9%, 6.4%, 2.6% and 2.2%, respectively.

Table 4 shows that restoration was the most common procedure (56.1%); however the procedure with the highest prevalence of pain was tooth extraction (38.5%). More than half the patients feeling pain during extraction have reported tooth removal itself (dislocation and excision of the element) as the cause of pain (60%).

Table 1 – General sample characteristics.

Patients Characteristics	n	%
Gender		
Male	67	21.5
Female	245	78.5
Age group (years)		
Up to 21	101	32.4
22 to 40	149	47.8
41 to 59	51	16.3
60 or above	11	3.5
Education (years)		
Up to 4	48	15.4
5 to 9	148	47.4
10 to 12	109	34.9
13 or more	7	2.2
Primary reason for looking for the dentist		
Routine visit	62	19.9
Need for treatment when there is no pain	174	55.8
Pain	76	24.4
Frequency of visits		
Every semester	118	37.8
Once a year	110	35.2
2 years or more	84	26.9
History of pain during dental treatment		
Never felt pain	145	46.5
Sometimes	123	39.4
Most of the times	26	8.3
Always	18	5.8

Drill was reported by most patients as the primary cause of pain during urgency procedures due to toothache (71.4%). Differences in the number of painful cases among procedures were significant; however differences among procedures in mean pain intensity were not. This result was similar even when procedures were classified as noninvasive (clinical exam, prophylaxis, application of sealant, varnish or fluorine), mildly invasive (restoration, tartar removal, urgency due to toothache and stitch removal) and invasive (tooth extraction and other surgeries), with pain in 2.1%, 24.4% and 38.5%, respectively ($p < 0.001$ for Chi-square test) and mean pain intensity of 3, 4 and 4.6, respectively ($p < 0.9$ for Kruskal-Wallis).

An adjustment of the logistic regression model, with presence or not of pain during treatment as dependent variable, and remaining variables shown in table 2, adding the categorized procedure type variable (noninvasive, mildly invasive, invasive), has shown a result similar to the bivariate analysis. However, in this multivariate analysis, procedure type was not only a significant variable but also the most significant for the model.

In a multivariate analysis with pain intensity as dependent variables and remaining variables used for logistic regression as independent variables, as already described, the significant predictor was just the primary reason for visits. History of pain and age were weak predictors of pain intensity ($p = 0.10$).

Results of multivariate analyses, both for pain presence and intensity, have not changed with the variable use or not of anesthe-

Table 2 – Presence of pain during treatment according to patients' variables.

Patients Characteristics	Presence of Pain				p value
	No		Yes		
	n	%	n	%	
Gender					
Male	55	82.1	12	17.9	$p^1 = 0.876$
Female	188	76.7	57	23.3	
Age group (years)					
Up to 21	73	72.3	28	27.7	
22 to 40	117	78.5	32	21.5	$p^2 = 0.048$
41 to 59	42	82.4	9	17.6	
60 or above	11	100	0	0	
Education (years)					
Up to 4	39	81.3	9	18.8	
5 to 9	110	74.3	38	25.7	$p^2 = 0.163$
10 to12	87	79.8	22	20.2	
13 or more	7	100	0	0	
Primary reason for looking for the dentist					
Routine visit	49	79	13	21	$p^1 = 0.004$
Need for treatment when there is no pain	145	83.3	29	16.7	
Pain	49	64.5	27	35.5	
Frequency of visits					
Every semester	96	81.4	22	18.6	$p^1 = 0.436$
Once a year	85	77.3	25	22.7	
2 years or more	62	73.8	22	26.2	
History of pain during dental treatment					
Never felt pain or sometimes	215	80.2	53	19.8	$p^1 = 0.014$
Most of the times or always	28	63.6	16	36.4	
Total	243	77.8	69	22.1	

p^1: Pearson's Chi-square test, p^2: Likelihood ratio.

sia was included. And for pain intensity, results have not changed when pain was considered in categories (mild or moderate versus severe or unbearable) in logistic regression.

Table 3 – Pain intensity during treatment according to patients' variables.

Patients Characteristics	Pain Intensity		p value
	Mean	Standard Deviation	
Gender			
Male	3.5	3.5	$p^1 = 0.246$
Female	4.2	2.9	
Age group (years)			
Up to 21	4.3	3.3	
22 to 40	4.4	3.1	$p^2 = 0.547$
41 to 59	2.8	1.4	
60 or above	0		
Education (years)			
Up to 4	3.5	2.5	
5 to 9	4.2	3.1	$p^2 = 0.956$
10 to 12	4.3	3.0	
13 or more	0		
Primary reason for looking for the dentist			
Routine visit	2.8	2.9	$p^2 = 0.008$
Need for treatment when there is no pain	3.3	2.1	
Pain	5.6	3.3	
Frequency of visits			
Every semester	3.6	3.2	$p^2 = 0.337$
Once a year	4.8	3.2	
2 years or more	3.8	2.5	
History of pain during dental treatment			
Never felt pain or sometimes	3.8	3.0	$p^1 = 0.056$
Most of the times or always	5.1	2.9	
General Mean	4.1	3.0	

p^1: Mann Whitney, p^2: Kruskal-Wallis.

DISCUSSION

Pain prevalence in this study was different from other publications which have found higher pain prevalence (73.4% and 42.5%)[1,2]. This lower prevalence may be the reflex of basic attention procedures, in general less invasive, which are less associated to pain as compared to more invasive procedures[1,2].

Conversely, a study on general practice private services has found a prevalence of 25% pain during treatment[4]. So there seems to be a temporal trend toward the reduction of this prevalence, maybe as a reflex of technical-scientific advances and improved assistance quality.

As to pain intensity, there are few epidemiological studies in the literature dealing with this variable related to dental procedures in general. When intensity is addressed, it is different among studies. So, the comparison of our study to other publications is limited.

In a way, a possible comparison would be considering just the "more than moderate" pain intensity category (severe or unbearable). In our study, from those feeling pain, 21.7% have reported more than moderate pain; which is higher than other studies where the frequency was 11.6%[2] or at the utmost 10%[4]. This difference might have been influenced by the type of assistance provided to the studied population, that is, that study has evaluated patients assisted by private services[4]. It is known that the nature of the service influences the treatment offered by the dentist[11].

A study has shown that male patients more commonly refer pain during dental treatment, young and adults feel more pain than elderly people and, the higher the level of education, the higher the level of pain[2]. Our study has not found relationship between pain and gender or education, only between pain and age.

Our results have pointed age as determining the presence or not of pain during dental treatment, but not pain intensity. Age variable was significant for the presence of pain, even when all other variables were included and also when variables were combined in different statistical models.

Table 4 – Pain and intensity according to types of dental procedures.

Types of Procedures	Data Related to Each Procedure							
	Frequency		Cases with Pain		Mean Pain Intensity	Primary Reason for Pain		
	n	%	n	%		Patient's Report	n	%
Tooth extraction	26	8.3	10	38.5	4.6	Does not know	1	10
						Anesthesia	3	30
						Tooth removal	6	60
Urgency due to toothache	23	7.4	7	30.4	4.78	Does not know	1	14.3
						Drill	5	71.4
						Water of triple syringe	1	14.3
Restoration	175	56.1	43	24.6	4.14	Does not know	2	4.7
						Drill	35	81.4
						Anesthesia	6	14
Tartar removal	33	10.6	7	21.2	2.92	Scraping	7	100
Stitch removal	5	1.6	1	20	4.0	Stitch removal	1	100
Polishing/Prophylaxis	9	2.9	1	3.0	3.0	Gum injury	1	100
Clinical exam/topic fluorine/sealant/ varnish application	9	12.5	0	0	0	-	-	-

Maybe the relationship between age and pain is not linear, since the significant difference in pain was especially in the age group with 60 years or above, that is elderly people, where no case of pain was reported. This is in line with the findings of a different study[2].

With advanced age, dentine becomes more sclerotic, decreasing sensitivity to cavity preparation, which could justify the fact that elderly people have reported less sensitivity to pain, since more than half the procedures were restorations. In addition, a similar result was found in a study evaluating endodontic treatment[12], that is, age has determined the presence or not of pain during treatment, but not the intensity of pain.

As to history of pain during previous treatments, our study reinforces the idea that previous painful dental experiences directly impact pain of current treatment[2,8], or indirectly impact it due to increased anxiety with regard to the treatment[13]. In fact, it is worth stressing that no USFC used any protocol to decrease stress or anxiety.

Similarly to a previous study[2], it was observed that patients who look for the dentist only when they feel pain report more pain and intensity during treatment. Two factors may have contributed for such results. First, the delay in looking for the dentist may worsen the oral problem implying a more invasive approach, thus with higher probability of discomforts[14], which leads to suppose that early visits do not only prevent oral diseases progression but also minimize discomfort during dental treatments.

Second, the presence of pain before treatment implies the presence of inflammation which produces a huge amount of substances leading to increased excitability of nociceptors and nociceptive afferents (peripheral sensitization), with increased responsiveness to stimuli and decreased activation threshold, and may reach a primary hyperalgesia, which is pain worsening at stimulation of the injury site, or even secondary hyperalgesia, which is increased sensitivity to stimuli far from the injury[15]. Our study has not evaluated previous existing pain duration or sites and extensions of such pain, which could be considered a limitation since those factors may be associated to hyperalgesia[15].

Tooth extraction was the procedure with more reported pain, being this an expected result reported by other studies[2,16] and because it is an invasive procedure[2,9]. One should also highlight urgency treatment due to toothache as the second more frequency of pain during treatment being this result both important for the literature, since no attention has been given to this procedure, and understandable since, as discussed, the presence of pain may be associated to peripheral sensitization and hyperalgesia. It is important to stress that patients looking for treatment with toothache may be those who avoid the dentist for fear. If these patients feel pain during treatment they will further avoid the dentist. So, careful attention should be given by dentists to this type of assistance.

Notwithstanding the importance of the type of procedure for the possibility of patients feeling pain during treatment, this was not true with regard to pain intensity. This is because even in procedures less frequently associated with pain, when pain is present it reaches a relatively high intensity with a considerable frequency. This fact has already been previously identified, at least in a smaller proportion, where 25% of patients receiving mildly invasive procedures have reported pain and one out of 20 have reported moderate/severe pain[2]. This might be associated to the less frequent use of local anesthesia during mildly invasive procedures and the more frequent use of anesthesia during invasive procedures, while no anesthesia worsens pain intensity during mildly invasive procedures.

Unfortunately we had no information about local anesthesia for all procedures, only for half of them, which was a limitation of our study. However, we got information from dentists that local anesthesia was not used for restorations, that is, anesthesia in these cases was reduced. Even so, anesthesia was mentioned as the primary reason for pain in 14% of restorative procedures. It was also mentioned as such for 30% of extractions. Other studies reinforce the idea that local anesthesia is a painful procedure[17]. Some patients report more pain when submitted to local anesthesia than during periodontal surgeries and scraping[18], so local anesthesia was identified as one of the strongest predictors of the presence of pain during treatment[4].

Another important aspect with regard to anesthesia is that it does not seem to be effective. This may be illustrated by the fact that from patients experiencing pain during tooth extraction, 60% have reported that the cause of pain was the extraction itself. Reasons for pain and anesthetic failures, whether anatomic, pathological, pharmacological or technical, such as excessive injection pressure, not waiting for the effect, etc., were not evaluated in this study.

Notwithstanding information and guidance in the literature on how to induce painless anesthesia[19], there is still a lot to be done by dentists and health service managers for the theory to become reality. Researchers, on the other hand, should investigate which non-technical factors are contributing to the unfavorable outcome of local anesthesia.

CONCLUSION

Pain during USFC treatment was less frequent than in other studies, however with higher intensity. Individuals more subject to pain and high intensity pain where those who only look for the dentist when are experiencing pain, indicating that more frequent visits to the dentist minimize discomfort, contributing to a more favorable relationship of patients with dental treatment.

ACKNOWLEDGMENTS

To the Department of Health of the city of Caruaru and to professionals of the Family Health Units who allowed the data collection.

REFERENCES

1. Locker D, Shapiro D, Liddell A. Negative dental experiences and their relationship to dental anxiety. Community Dent Health. 1996;13(2):86-92.
2. Maggirias J, Locker D. Psychological factors and perceptions of pain associated with dental treatment. Community Dent Oral Epidemiol. 2002;30(2):151-9.

3. Rasmussen JK, Frederiksen A, Hallonsten AL, et al. Danish dentists' knowledge, attitudes and management of procedural dental pain in children: association with demographic characteristics, structural factors, perceived stress during the administration of local analgesia and their tolerance towards pain. Int J Paediatr Dent. 2005;15(3):159-68.
4. Tickle M, Milsom K, Crawford FI, et al. Predictors of pain associated with routine procedures performed in general dental practice. Community Dent Oral Epidemiol. 2012;40(4):343-50.
5. Costa RSM, Ribeiro SN, Cabral ED. Fatores determinantes de experiência dolorosa durante atendimento odontológico. Rev Dor. 2012;13(4):365-70.
6. Kanegane K, Penha SS, Borsatti MA, et al. Dental anxiety in an emergency dental service. Rev Saude Publica. 2003;37(6):786-92.
7. Souza TM, Roncalli AG. Oral health in the Brazilian Family Health Program: a health care mode evaluation. Cad Saúde Pública. 2007;23(11):2727-39.
8. van Wijki AJ, Makkes PC. Highly anxious dental patients report more pain during dental injections. Br Dent J. 2008;205(3):142-3.
9. Ministério da Saúde. Sistema de Informação Ambulatorial do SUS (SIA/SUS). Disponível em: http://tabnet.datasus.gov.br. Acesso em: 20/06/2010.
10. Sousa FF, Silva JA. A métrica da dor (dormetria): problemas teóricos e metodológicos. Rev Dor. 2005;6(1):469-513.
11. Cabral ED, Caldas Ade F Jr, Cabral HA. Influence of the patient's race on the dentist's decision to extract or retain a decayed tooth. Community Dent Oral Epidemiol. 2005;33(6):461-6.
12. Segura-Egea JJ, Cisneros-Cabello R, Llamas-Carreras JM, et al. Pain associated with root canal treatment. Int Endod J. 2009;42(7):614-20.
13. Klages U, Kianifard S, Ulusoy O, et al. Anxiety sensitivity as predictor of pain in patients undergoing restorative dental procedures. Community Dent Oral Epidemiol. 2006;34(2):139-45.
14. Armfield JM, Stewart JF, Spencer AJ. The vicious cycle of dental fear: exploring the interplay between oral health, service utilization and dental fear. BMC Oral Health. 2007;14(7):1-15.
15. Sessle BJ. Mecanismos periféricos e centrais da dor orofacial e suas correlações clínicas. In: Alves Neto O, Costa CMC, Siqueira JTT, et al. Dor: princípios e prática. Porto Alegre: Artmed; 2009. p. 189-204.
16. Rousseau WH, Clark SJ, Newcomb BE, et al. Comparison of pain levels during pulpectomy, extractions, and restorative procedures. J Endod. 2002;28(2):108-10.
17. Siviero M, Nhani VT, Prado EFGB, Análise da ansiedade como fator preditor de dor aguda em pacientes submetidos a exodontias ambulatoriais. Rev Odontol da UNESP. 2008;37(4):329-36.
18. Siqueira AMP, Oliveira PC, Shcaira VRL, et al. Relação entre ansiedade e dor em anestesia local e procedimentos periodontais. Rev Odontol UNESP. 2006;35(2):171-4.
19. Kudo M. Initial injection pressure for dental local anesthesia: effects on pain and anxiety. Anesth Prog. 2005;52(3):95-101.

ORIGINAL ARTICLE

Postoperative analgesia: pain control scenario*

Analgesia no pós-cirúrgico: panorama do controle da dor

Luciane Moreira[1], Yvelise de Menezes Truppel[2], Francisco Guilherme de Paula Kozovits[2], Valéria Aparecida Santos[2], Viviane Atet[2]

*Received from the Red Cross Hospital of Paraná (Teaching Hospital, Positivo University). Curitiba, PR.

ABSTRACT

BACKGROUND AND OBJECTIVES: Postoperative pain control, although of recognized importance, is still described as inadequate. So, this study aimed at exposing the scenario of postoperative pain control in patients hospitalized for general abdominal surgery.

METHOD: This is a transversal, quantitative, observational, descriptive and non randomized study carried out through a questionnaire applied to patients hospitalized up to 48 h after abdominal surgery. The questionnaire addresses the following variables: age, gender, surgical procedure, postoperative hours, presence of pain and intensity by the visual analog scale (VAS).

RESULTS: Participated in this study 165 patients of whom 40 have referred pain, being 26 females (28.57%) and 14 males (18.92%). Procedures to which patients were submitted were classified in open and closed, being closed the most common procedures. Open surgeries were among the most painful procedures (colectomy, hiatal hernia repair, choledoctomy, colostomy, gastrostomy) with 100% of pain and laparotomy with approximately 60%. Less painful closed procedure was cholecystectomy (88.33%), and just 11.67% had mild to moderate pain. There has been predominance of mild to moderate pain among males and of moderate to severe pain among females.

CONCLUSION: Pain prevalence and intensity observed in the postoperative period have shown that the control is adequate for laparoscopic procedures; however, it has to be adjusted for patients submitted to open procedures, for senescence and for females.

Keywords: Abdominal surgery, Analgesia, Pain measurement, Postoperative pain.

RESUMO

JUSTIFICATIVA E OBJETIVOS: O tratamento da dor no pós-operatório, apesar de ter importância reconhecida, continua sendo descrito como inadequado. Assim, este estudo teve como objetivo expor o panorama do controle da dor pós-operatória em pacientes internados para cirurgia abdominal geral.

MÉTODO: Estudo transversal, quantitativo, observacional, descritivo e não randomizado, realizado por meio da aplicação de questionário em pacientes internados até 48h após cirurgia abdominal. O questionário abrange as variáveis: idade, sexo, procedimento realizado, horas de pós-operatório, presença de dor e intensidade por meio da escala analógica visual (EAV).

RESULTADOS: Foram entrevistados 165 pacientes; destes, 40 referiram dor, sendo 26 mulheres (28,57%) e 14 homens (18,92%). Os procedimentos aos quais os pacientes foram submetidos classificaram-se em abertos e fechados; os mais realizados foram os fechados. Dentre os mais dolorosos, destacam-se as cirurgias abertas (colectomia, hernioplastia hiatal, coledocotomia, colostomia, gastrostomia), com 100% de dor, e a laparotomia com aproximadamente 60%. Dentre os procedimentos fechados, o que gerou menos dor foi a colecistectomia (88,33%), e apenas 11,67% apresentaram dor leve a moderada. Observou-se a prevalência de dor leve nos adolescentes e de dor intensa na senescência. Houve um predomínio de dor leve a moderada em homens e moderada a intensa nas mulheres.

CONCLUSÃO: A prevalência e a intensidade de dor verificadas no pós-operatório demonstraram que o controle desta está adequado para procedimentos laparoscópicos; entretanto se faz necessária a adequação em pacientes submetidos a procedimentos abertos, na senescência e nas mulheres.

Descritores: Analgesia, Cirurgia abdominal, Dor pós-operatória, Medição da dor.

INTRODUCTION

Pain was defined by the International Association for the Study of Pain (IASP) as "a disagreeable sensory and emotional experience associated to real or potential injuries or described in terms of such injuries. Pain is always subjective and people learn how to use this term according to their experiences". This definition shows that pain is an experience that goes beyond physical aspects and the way patients live their pain should be taken into consideration. Due to its subjective character, pain was defined in 1989 as "what the individual feeling it says it is and exists when the individual feeling it says it exists"[1].

1. Professor of Surgical Clinic, Positivo University; Ophtalmologist, Eye Hospital of Paraná. Curitiba, PR, Brazil.
2. Resident Physicians of the School of Medicine, Positivo University. Curitiba, PR, Brazil.

Submitted in February 14, 2013.
Accepted for publication in June 04, 2013.

Correspondence to:
Yvelise de Menezes Truppel, M.D.
Rua Alameda Doutor Muricy, 819 - Centro
80020-040 Curitiba, PR.
E-mail: lisetruppel@gmail.com

Pain severity is not directly proportional to the amount of injured tissue. Many factors may influence the perception of this symptom, such as fatigue, depression, anger, fear, anxiety, lack of hope and protection feelings. The Brazil with no Pain Project described the concept of "Total Pain", which is made up of the following components: physical, mental, social and spiritual. Due to this multidimensional nature, the use of analgesics is just part of a multiprofessional strategy involving actions on physical, psychological, social and spiritual distress of each patient[1].

Very common in patients submitted to surgical procedures, pain is interpreted as something natural for these patients in spite of being often the most uncomfortable symptom. So, the assistance to other surgical complications, such as fistulae, infection and bleeding, among others, becomes the priority[2].

To adequately manage pain and offer quality assistance to patients, it is critical that pain is systematically evaluated at regular intervals, allowing necessary adjustments to treatment. Pain control therapy should always be multimodal, with the association of two or more agents or peripheral or central analgesic techniques, including non pharmacological methods, because the synergy among different techniques allows the use of fewer drugs, minimizing their side-effects and improving their analgesic activity[3].

Aiming at improving postoperative pain control, analgesia may and shall start even before surgery. Preemptive or preventive analgesia is the administration of drugs or the use of analgesic techniques before incision, favoring patients' faster response and the early recovery of organic functions, since pain, in such situations, may lead to postoperative complications. The best control of pain in response to preventive analgesic therapy is to prevent genesis or conduction of painful stimuli to the central nervous system, thus preventing spinal cord sensitization[3].

Face to the above, this study is justified since postoperative pain control, in spite of its recognized importance and the existence of several pain control drugs and techniques, is still described as inadequate in some situations. It is critical to know the magnitude of the problem to adequately manage pain and offer a quality treatment to patients.

This study aimed at showing the postoperative pain control scenario for patients admitted for general abdominal surgical procedures.

METHOD

With a quantitative, transversal, observational, descriptive and non randomized approach, this study was carried out with hospitalized patients, after abdominal surgery, in the Red Cross Hospital of Paraná, city of Curitiba, from July to September 2012.

Sample was made up of the set of patients interviewed during this period, in a total of 165. Inclusion criteria were: hospitalized patients until the first 48 postoperative hours of abdominal surgery. Exclusion criteria were patients with neurological or visual deficits preventing them from answering the visual analog scale (VAS) or from understanding the questions.

This hospital uses preemptive analgesia consisting of the administration of dipirone, fentanyl, paracoxibe and dexamethasone during anesthetic induction, being doses adjusted according to each patient. In addition, tramadol is administered in the recovery unit when there is pain complaint. After leaving the recovery unit, dipirone is prescribed every 6h and nalbuphine hydrochloride, another opioid derivate, if there is severe pain.

Patients were interviewed by the investigators with a data collection tool about: age; gender; surgical procedure, differentiating between open (laparoscopic) and closed (videolaparoscopic); how many postoperative hours; if during interview they were in pain and which was the intensity, classifying it in mild, moderate and severe, according to VAS. Together with this tool, patients have signed the Free and Informed Consent Term (FICT).

Data were analyzed in percentages and were interpreted in a universal and separate way.

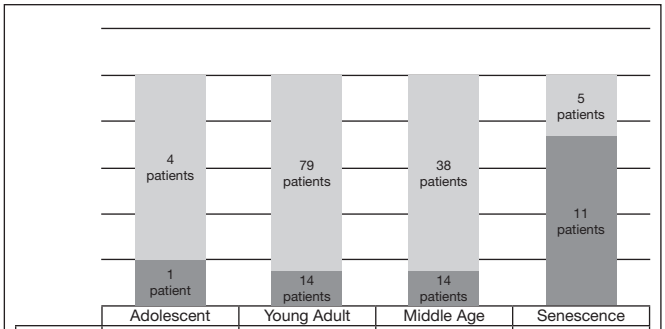
This study was approved by the Research Ethics Committee, Positivo University, process 062/2011.

RESULTS

Between July and September 2012, 165 patients were interviewed. From these, 74 were males and 91 females, corresponding to 44.85% and 55.15%, respectively.

From 91 interviewed females, 28.57% (26) have reported postoperative pain and 71.43% (65) have reported no pain. From 74 interviewed males, 18.92% (14) have mentioned some type of postoperative pain and 81.08% (60) have not.

Patients' age has varied from 18 to 86 years, with mean of 40 years. After collecting the questionnaires it was possible to distribute respondents according to life division used in psychiatry, determining stages of life: adolescence between 12 and 19 years of age, adult phase – divided in young adult (20 to 45 years of age) and middle age (46 to 65 years of age) – and senescence corresponding to individuals above 65 years of age. In total, there were 5 (3.03%) adolescents, 93 (56.36%) young adults, 52 (31.52%) middle age and 15 (9.09%) senescents.



	Adolescent	Young Adult	Middle Age	Senescence
Without Pain	80.00%	84.95%	73.08%	26.67%
With Pain	20.00%	15.05%	26.92%	73.33%

Graph 1 – Life stages versus pain.

In parallel, this distribution by stages of life was related to the presence or not of postoperative pain (Graph 1). The highest percentage of pain was observed among senescent patients, 73.33% (11), while the lowest rate was observed among young adults (15.05% or 14 patients).

Table 1 shows the 11 procedures (distributed in 7 categories) to which interviewed patients were submitted, correlating the percentage of such procedures and mean postoperative hours of each one for the interview.

Table 1 – Types of procedures and mean post-procedure hours.

Procedures	Types	n and %	Mean Postoperative Hours
Cholecystectomy	Closed	60 (36.36)	22
Apenddectomy	Closed	50 (30.30)	22
Bariatric	Closed	29 (17.57)	24
Laparotomy	Open	8 (4.85)	27
Laparoscopy	Closed	6 (3.64)	26
Gastroesophageal reflux	Closed	4 (2.42)	27
Other procedures: colectomy, hiatal hernia repair, choledoctomy, colostomy, gastrostomy.	Open	8 (4.86)	24

Considering all procedures, it was observed that mean postoperative hours at the moment of the interview was 24.5h, with a minimum of 4h and maximum of 48h. Still considering the procedures, most common were closed procedures, among them cholecystectomy with 36.36% (60); and less common were open procedures in a total of 9.7%.

Among most painful procedures shown in table 2 there are open surgeries (colectomy, hiatal hernia correction, choledoctomy, colostomy, gastrostomy), with 100% of pain, and laparotomy with approximately 60%. On the other hand, among closed procedures the less painful was cholecystectomy (88.33% or 53 patients), being that just 11.67% (7) had mild to moderate postoperative pain. Similarly, only 14% of patients (7) undergoing appendectomy and 16.66% (1) laparoscopy have reported pain during the interview, varying from mild to moderate. However, among most painful closed procedures, there are gastroesophageal reflux surgery with 50% (2 patients) and bariatric surgery with 34.48% (10 patients).

Table 2 also shows pain intensity characterized by the 40 patients reporting it during the interview. So, correlating pain intensity and type of surgery, it is observed that most open procedures have triggered postoperative pain: in laparotomy, 62.5% of patients (5) have referred pain, being that 4 have classified it as mild and 1 as moderate; in remaining open procedures, 100% (8) of patients have reported pain, being that 3 have classified it as moderate and 5 as severe. Analyzing

Table 2 – Types of procedures and presence or not of pain.

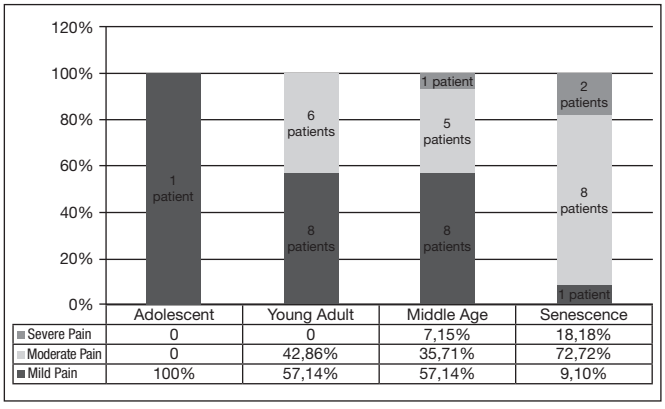
Procedures	Patients W/O pain	Patients WITH pain	
	n (%)	n (%)	Pain Intensity
Cholecystectomy	53 (88.33)	7 (11.67)	Mild – 4 Moderate – 3 Intensa – 0
Apenddectomy	43 (86)	7 (14)	Mild – 5 Moderate – 2 Severe – 0
Bariatric	19 (65.52)	10 (34.48)	Mild – 4 Moderate – 5 Severe – 1
Laparotomy	3 (37.5)	5 (62.5)	Mild – 4 Moderate – 1 Severe – 0
Laparoscopy	5 (83.34)	1 (16.66)	Mild – 0 Moderate – 1 Severe – 0
Gastroesophageal reflux	2 (50)	2 (50)	Mild – 1 Moderate – 1 Severe – 0
Other procedures: colectomy, hiatal hernia repair, choledoctomy, colostomy, gastrostomy.	0 (0)	8 (100)	Mild – 0 Moderate – 3 Severe – 5

Table 3 – Pain intensity and gender (n and %).

Mild pain	Males – 8 (57.14)
	Females – 10 (38.46)
Moderate pain	Males – 5 (35.32)
	Females – 11 (42.30)
Severe pain	Males – 1 (7.14)
	Females – 5 (19.23)

gender and pain intensity it was observed that percentage and numerical difference is small between 14 males and 26 females reporting pain, as shown in table 3. However, there has been predominance of mild to moderate pain among males and of moderate to severe pain among females.

Graph 2 relates pain intensity and stage of life of interviewed patients. There, it is observed that the stage most often reporting mild pain is adolescence, corresponding to 100%



Graph 2 – Pain intensity versus stages of life.

(1 patient); followed by young adults and middle age with 57.14% each (8 patients each), and finally senescence with 9.1% (1 patient). In addition, it is possible to observe that severe pain frequency was directly related to age. There is no report of severe pain among adolescents and young adults, but in middle age this type of pain corresponds to 7.15% (1 patient) and in senescence this value increases to 2 patients or 18.18%.

DISCUSSION

In our study, the prevalence of pain in the first 48 postoperative hours was 24.24% (40 patients), differently from the literature where higher prevalence is found, such as those described by Ashburn (77%)[4], Bassanezi and Oliveira Filho (80%)[2] and Couceiro et al. (46%)[5].

The hospital concerned has a well-established protocol to treat postoperative pain, which may explain the low prevalence found, which is in line with Moizo et al.[6] findings with even lower prevalence (2.2%) in a service which has also established approaches.

It has been described that females have lower pain threshold and tolerance; however it is questioned if this could be due to better females' verbalization and to differences in female endogenous opioid system, which might have lower sensitivity as compared to males and supports our results where 28.57% of females referred postoperative pain as compared to 18.92% of males[5]. Females also refer more severe pain, as found by a different study[7].

The correlation between age and postoperative pain is shown by the literature as inversely proportional[8], which differs from our findings where the upper age extreme has referred more pain as compared to mean age (40 years). This fact could be justified by the higher incidence of depression in senescent populations, which may increase pain frequency and intensity, as shown by a study measuring pain in the elderly[9]. With regard to other age groups, 100% of adolescents and approximately 58% of young and middle age adults have reported mild pain, again differing from the literature, since lower extreme and middle age in general have lower pain scores.

Authors[10] have carried out a pain research in the Clinicas Hospital of Goiás with 40 patients undergoing cholecystectomy. In this study, 16 had severe pain, 15 moderate pain and 9 mild pain. In our study, there were 60 gallbladder removal procedures and just 4 patients had mild pain, 3 moderate pain and none had severe pain, characterizing the procedure inducing the least pain (88%)[10]. Considering such findings and possible comparisons, it is possible to establish a parallel among the types of procedures. In the former hospital, all cholecystectomies were conventional, that is, open procedures; in our study, procedures were all videolaparoscopic, which is in line with the literature where postoperative pain is lower in closed procedures[11]. Similarly, other open procedures have added to results 8 patients with pain, where 3 had severe pain and 5 moderate pain.

With regard to this same topic, one cannot exclude the possibility that different types of procedures – open/laparoscopic or closed/videolaparoscopic – may have interfered with global pain evaluation.

Another influencing factor with regard to pain control is medical teaching and the fact that Red Cross Hospital of Paraná is a teaching hospital where students and residents work. Studies have shown that medical students and newly graduated physicians may have poor knowledge about acute pain, lack of continuous education, lack of experience with pain control protocols and routines, in addition to not being well oriented as to the choice of analgesic methods. So, they look for the most frequently prescribed drug and not for the best for patients, which may result in recovery delay and postoperative chronic pain, interfering with patients' quality of life[5,9,12]. At the same time, chronic pain limits functions and may increase agitation and the risk of emotional stress and mortality, especially among the elderly[9].

There are controversies about the ideal postoperative pain control, but according to our data, it is observed that such control may vary according to age and gender. Still within this context, a multidisciplinary approach (physicians, psychologists, physical therapists, pharmacists and nurses) is needed because it helps patients before and after the surgical procedure and may bring benefits, especially those related to pain and procedure anxiety, as well as with possible complications. As patients are adequately oriented and listened to, there is better control of factors which may interfere with pain intensity[12].

CONCLUSION

Our study results have shown the pain scenario and allow concluding that it is adequate for laparoscopic procedures. Analgesia might have to be adjusted for open procedures, senescence and females, since these groups have shown higher prevalence and intensity of postoperative pain.

The lack of understanding of physicians about acute pain and the lack of continuous education may be causes of inadequate approaches. So, better care with medical education and qualification of multidisciplinary teams may contribute to improve assistance, decrease pain-related complications and patients' distress.

REFERÊNCIAS

1. Sociedade Brasileira para o Estudo da Dor [homepage na internet]. Projeto Brasil sem Dor [acesso em 18 de março de 2012]. Disponível em: www.dor.org.br.
2. Bassanezi BSB, Oliveira Filho AG. Analgesia pós-operatória. Rev Col Bras Cir. 2006;33(2):116-22.
3. Garcia JBS, Issy AM, Sakata RK. Analgesia preemptiva. Rev Bras Anestesiol. 2001;51(5):448-63.
4. Ashburn MA. Future challenges in anesthesia-based acute postoperative pain management. ASA Refresher Courses Anesthesiol. 1999;27.
5. Couceiro T, Valença M, Lima LC, et al. Prevalência e influência do sexo, idade e tipo de operação na dor pós-operatória. Rev Bras Anestesiol. 2009;59(3):314-20.
6. Moizo E, Berti M, Marchetti C, et al. Acute pain service and multimodal therapy for postsurgical pain control: evaluation of protocol efficacy. Minerva Anestesiol. 2004;70(11):779-87.
7. Uchiyama K, Kawai M, Tani M, et al. Gender differences in postoperative pain after laparoscopic cholecystectomy. Surg Endosc. 2006;20(3):448-51.
8. Caumo W, Schmidt AP, Schneider CN, et al. Preoperative predictors of moderate

to intense acute postoperative pain in patients undergoing abdominal surgery. Acta Anaesthesiol Scand. 2002;46(10):1265-71.
9. Andrade FA, Pereira LV, Sousa FA. Pain measurement in the elderly: a review. Rev Lat Am Enfermagem. 2006;14(2):271-6.
10. Sousa CF, Alves Neto O. O uso pré-operatório de gabapentina diminui a dor pós-operatória em pacientes submetidos à colecistectomia convencional. Rev Dor. 2009;10(3)246-9.
11. Rodrigues MA, Oliveira VFF, Poveda VB. Vantagens e desvantagens da colecistectomia por videolaparoscopia. Janus. 2008;5(7):119-28
12. Pereira LV, Sousa FA. Estimation of categories in the description of postoperative pain. Rev Lat Am Enfermagem. 1998;6(4):41-8.

ORIGINAL ARTICLE

Effect of shower bath on pain relief of parturients in active labor stage*

Efeito do banho de chuveiro no alívio da dor em parturientes na fase ativa do trabalho de parto

Licia Santos Santana[1], Rubneide Barreto Silva Gallo[1], Cristine Homsi Jorge Ferreira[2], Silvana Maria Quintana[3], Alessandra Cristina Marcolin[4]

*Received from the Women's Health Reference Center of Ribeirão Preto (MATER). Ribeirão Preto, SP.

ABSTRACT

BACKGROUND AND OBJECTIVES: Labor pain is not only influenced by individual parturients characteristics, but also by their psychological experiences and cultural, ethnic, social and environmental factors. This study aimed at evaluating the effect of shower bath on pain relief during active labor stage.
METHOD: This is a controlled clinical trial of therapeutic intervention type, with 34 parturients admitted to pre-delivery for parturition process assistance, who received shower bath therapy for 30 minutes. Pain was measured by the visual analog scale (VAS).
RESULTS: VAS has shown 80 mm before and 55 mm after therapy with pain relief of patients in active labor with cervix dilatation of 4-5 cm.
CONCLUSION: There has been significant pain intensity decrease by VAS during active labor stage, after shower bath therapy.
Keywords: Labor, Pain, Pain evaluation.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor no trabalho de parto é influenciada não apenas pelas características individuais das parturientes, mas também por suas experiências psicológicas e por fatores culturais, étnicos, sociais e ambientais. O objetivo deste estudo foi avaliar o efeito do banho de chuveiro no alívio da dor, durante a fase ativa do trabalho de parto.
MÉTODO: Trata-se de um ensaio clínico controlado, do tipo intervenção terapêutica, com 34 parturientes, admitidas no pré-parto para assistência ao processo de parturição, que receberam a terapêutica banho de chuveiro, por 30 minutos. Avaliou-se o grau de dor por meio da escala analógica visual (EAV).
RESULTADOS: Pela EAV obteve-se um grau de 80 mm antes e 55 mm depois da terapêutica, havendo uma redução da dor das pacientes em trabalho de parto ativo, com dilatação cervical de 4 a 5 cm.
CONCLUSÃO: Houve redução significativa da intensidade da dor pela EAV na fase ativa do trabalho de parto, após a aplicação da terapêutica do banho de chuveiro.
Descritores: Avaliação da dor, Dor, Trabalho de parto.

INTRODUCTION

With the beginning of hospital obstetric assistance in the first half of last century, delivery became no longer a woman's private event to become an institutionalized event, surrounded by technological innovations aiming at controlling the parturition process, including pain. This shift in the scenario has allowed the use and the improvement of pain relief methods[1].
Labor pain is influenced not only by individual parturient characteristics, but also by their psychological experiences and cultural, ethnic, social and environmental factors[2].
Both pain and anxiety promote noxious effects and increase catecholamine and cortisol release, resulting in increased cardiac output, blood pressure and peripheral vascular resistance. Maternal cardiac output increase is progressive, around 10% to 15% during dilatation, 50% during expulsion and up to 80% above baseline values immediately after delivery. A significant blood volume is also shifted from the uterus to central circulation during contractions, contributing to increase cardiac output[3]. Some studies show 200% to 600% increase in circulating epinephrine and norepinephrine levels during labor without pharmacological analgesia, leading to decreased uterine blood flow and fetal perfusion commitment. In addition, catecholamines affect uterine contractility, contributing to a difficult delivery[1,4-7].
The most popular method to measure pain in the proposed period is the visual analog scale (VAS) – commonly used in

1. Doctorate Student of the Post-Graduation Program, Department of Gynecology and Obstetrics, School of Medicine of Ribeirão Preto, University of São Paulo (FMRP-USP). Master in Gynecology and Obstetrics FMRP-USP. Specialist in Women's Health by the University of Ribeirão Preto (UNAERP) and Physical Therapist, University Tiradentes (UNIT). Aracaju, SE, Brazil.
2. Doctor Professor, Department of Biomechanics, School of Medicine of Ribeirão Preto, University of São Paulo (FMRP-USP). Ribeirão Preto, SP, Brazil.
3. Doctor Professor, Department of Gynecology and Obstetrics, School of Medicine of Ribeirão Preto, University of São Paulo (FMRP-USP); General Director of the Women's Health Reference Center, Ribeirão Preto (MATER). Ribeirão Preto, SP, Brazil.
4. Doctor Professor, Department of Gynecology and Obstetrics, School of Medicine of Ribeirão Preto, University of São Paulo (FMRP-USP). Ribeirão Preto, SP, Brazil.

Submitted in February 26, 2013.
Accepted for publication in April 29, 2013.
Conflict of interests: None

Correspondence to:
Licia Santos Santana, M.D.
Av. Bandeirantes, 3900 – Monte Alegre
14049-900 Ribeirão Preto, SP.
Phone: (16) 3602-2587, Fax: (16) 3633-0946
E-mail: licia2s@hotmail.com

clinical contexts to quantitatively evaluate pain – which corresponds to a 100 mm ruler which may vary from "no pain" to the "worst imaginable pain". Based on the study[8], pain intensity by VAS was evaluated taking as reference score intervals of 0 to 4 mm, which may be considered pain free, from 5 to 44 mm, mild pain, from 45 to 74 mm, moderate pain, and from 75 to 100 mm severe pain.

Both shower and immersion baths act on pain relief of parturients by the influence of water warmed at around 37 to 38º C. Blood flow redistribution promotes muscle relaxation and decreases catecholamine release and, by increasing endorphins, decreases anxiety and promotes parturients' satisfaction[9].

Although there are few studies showing the efficacy of shower bath, it influences pain and labor evolution because it acts on the cardiovascular system promoting peripheral vasodilation and blood flow redistribution, thus improving maternal satisfaction. In muscles, the relaxation effect increases birth canal elasticity and decreases parturients' anxiety, due to decreased catecholamine and increased endorphin release[9-11].

Although shower bath is easy to apply, has no side effects and is of low cost, the international literature has few controlled clinical trials on the use of this therapy to relieve pain during labor, thus justifying the importance of this research which may contribute for the definition of this non-pharmacological resource. This study aimed at evaluating the effect of shower bath on pain relief during active labor stage.

METHOD

This is a controlled clinical trial of the therapeutic intervention type, developed in a maternity assisting low risk parturients, namely the Women's Health Reference Center of Ribeirão Preto-MATER, from August 2011 to July 2012. Sample was made up of 34 parturients admitted in the predelivery and who would meet the inclusion criteria for parturition process assistance. Inclusion criteria were primiparous, literate patients with single fetus in the cephalad position, low risk pregnancy, as from 37 weeks of gestation, cervical dilatation between 4 and 5 cm, with adequate uterine dynamics for this labor stage with spontaneous start, without the use of drugs during the study period, intact membranes without associated risk factors and absence of cognitive or psychiatric problems evaluated by the institution's psychologist during pre-natal evaluation. Exclusion criteria were intolerance to the use of non pharmacological resources.

After admission to pre-delivery, parturients with established inclusion criteria were invited to participate in the study and after accepting the invitation they signed the Free and Informed Consent Term (FICT). Then, all participants were evaluated by VAS and soon after they received shower bath therapy for 30 minutes, with cervical dilatation of 4 to 5 cm, in a temperature of 37 to 39° C checked by a gauged thermometer. After this, patients were again evaluated by VAS.

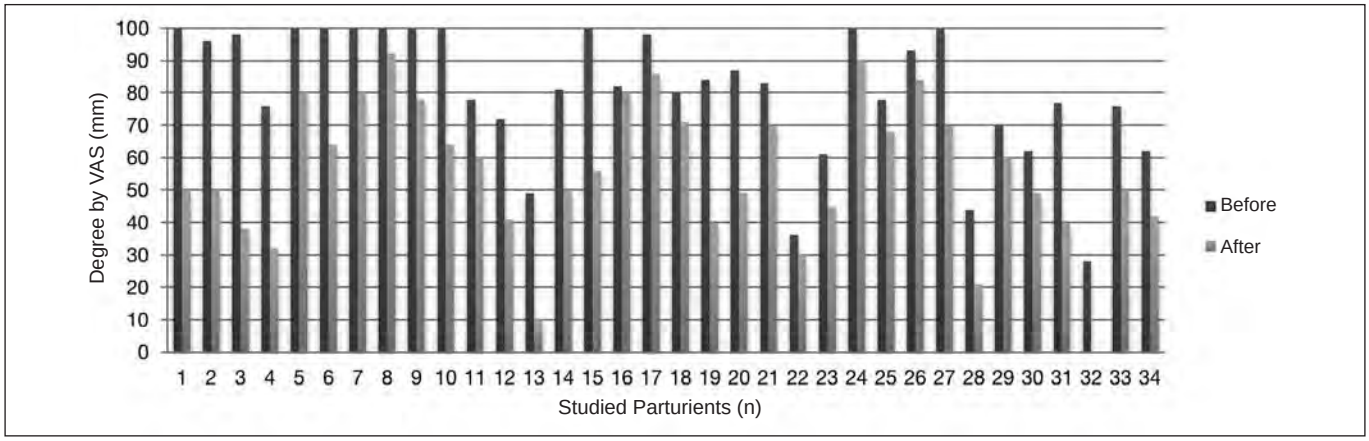
Pain was evaluated by VAS by the assistant physical therapist, who would first explain the scale, subsequently so patients would check their pain at that moment. This procedure was repeated before and after therapy, that is, in a moment between 4 and 5 cm in the beginning of the active labor stage. Excel was used for data statistical analysis and results were presented in mean and standard deviation.

This study was approved by the Research Ethics Committee, Clinicas Hospital, School of Medicine of Ribeirão Preto (HCFMRP) according to process HCRP 9147/2011.

RESULTS

With regard to sociodemographic characteristics of 34 studied primiparous patients, mean age was 20 ± 4 years, and all patients had an escort who remained with them throughout labor until delivery.

Results were obtained from pain evaluation by VAS before intervention and most parturients have measured pain with a mean of 80 ± 20 mm. After intervention, most patients have measured pain with a mean of 55 ± 22 mm, so there has been significant difference of 25 mm when comparing before and after intervention ($p < 0.01$), showing that shower bath decreases pain of active labor stage patients, with cervical dilatation of 4-5 cm (Graph 1).



Graph 1 – Distribution of parturients pain evaluation.

VAS = visual analog scale; n = number; mm = millimeter

DISCUSSION

This study shows that shower bath is a non-pharmacological resource which is very favorable for labor pain relief being effective, without side-effects, easily accepted by patients and with satisfactory results. For this to be applied with the desired results, it is necessary that water temperature is around 37 to 38° C, and that patients remain at least 20 minutes in the shower. Shower bath with warm water is contraindicated for hypotensive patients because initially warm water promotes peripheral vasodilation, blood flow redistribution and, as a consequence, blood pressure decrease[9].

It is known that shower bath with warm temperatures promotes peripheral vasodilation thus redistributing blood flow and inducing muscle relaxation. The pain relief process promotes catecholamines release and increased endorphins, which decreases anxiety and promotes pain relief[11,12].

To evaluate the effect of shower bath on labor pain relief, a study[13] has carried out a randomized and controlled clinical trial with 100 parturients with cervical dilatation of 8 to 9 cm. Pain before and after the resource was measured by VAS. Result was that shower bath was effective in decreasing pain intensity of patients in acute labor stage. These statements are in line with our results.

Aiming at identifying the influence of water immersion on the duration of the first clinical delivery period and on the frequency and duration of uterine contractions, a randomized, experimental clinical trial was carried out with 108 parturients allocated to two groups – control group with 54 parturients following the maternity routine, and 54 in the experimental group submitted to water immersion. Results have shown that contractions duration was statistically shorter in the experimental group and we have concluded that water immersion is an alternative to provide comfort during labor because it relieves parturients' pain[14].

To evaluate the influence of water immersion during labor, authors[15] have carried out a study with 205 primiparous labor patients who were distributed in control group (n = 100) and experimental group (n = 105). The following variables were used to evaluate patients: labor time and duration, uterine contractions before and after water immersion, and cervical dilatation during and after water immersion. They have observed that experimental group patients had faster cervical dilatation after 2 cm, thus having a shorter labor period as compared to the control group. They have concluded that the optimal moment for water immersion is in the early active labor stage.

It is known that in response to labor pain there are effects which may be deleterious for the mother-fetus binomial and so there is the need to relieve pain since such mechanisms may harm the fetus and affect physiological labor progression.

Very strict inclusion criteria make difficult to increase sample size. We suggest that further studies are carried out with larger samples compared to a control group, to check the benefits of this therapy for longer periods.

Further studies are needed to evidence the effects of shower bath therapy in later labor stages as well as its association to other modalities.

CONCLUSION

Based on our results, it is possible to observe that labor pain is severe and highly unpleasant, thus needing to be relieved. Shower bath is an effective therapeutic modality to relief labor pain as shown by this study. So, the use of such resource should be encouraged by health professionals to promote a humanized delivery.

REFERENCES

1. Ferreira CHJ, Payno SM. A eletroestimulação nervosa transcutânea como recurso de alívio da dor no trabalho de parto. Femina. 2002;30(2):83-6.
2. Santana LS, Gallo RBS, Marcolin AC, et al. Avaliação da intensidade da dor na fase ativa do trabalho de parto em primigestas. Rev Dor. 2010;11(3):214-7.
3. Brasil. Ministério da Saúde. Secretaria de Políticas de Saúde. Área Técnica de Saúde da Mulher. Parto, aborto e puerpério: assistência humanizada à mulher. Brasília: Ministério da Saúde; 2001.
4. Lederman RP, McCann DS, Work B Jr, et al. Endogenous plasma epinephrine and norepinephrine in last-trimester pregnancy and labor. Am J Obstet Gynecol. 1977;129(1):5-8.
5. Shnider, SM, Abboud T, Artal R, et al. Maternal catecholamines decrease during labor after lumbar epidural analgesia. Am J Obstet Gynecol. 1983;147(1):13-5.
6. Lederman RP, Lederman E, Work B, et al. Anxiety and epinephrine in multiparous labor: relationship to duration of labor and fetal heart rate pattern. Am J Obstet Gynecol. 1985;153(8):870-7.
7. Mamede FV, Almeida AM, Souza L, et al. A dor durante o trabalho de parto: o efeito da deambulação. Rev Lat Am Enfermagem. 2007;15(6):1157-62.
8. Jensen MP, Chen C, Brugger AM. Interpretation of visual analog scale ratings and change scores: a reanalysis of two clinical trials of postoperative pain. Pain. 2003;4(7):407-14.
9. Gallo RBS, Santana LS, Marcolin AC, et al. Recursos não farmacológicos no trabalho de parto: protocolo assistencial. Femina. 2011;39(1):41-8.
10. Bruggemann OM, Parpinelli MA, Osis MJ. Evidence on support during labor and delivery: a literature review. Cad Saúde Pública. 2005;21(5):1316-27.
11. Cluett ER, Nikodem VC, McCandlish RE, et al. Immersion in water in pregnancy, labour and birth. Cochrane Data Syst Rev. 2004(2):CD000111.
12. Simkin P, Bolding A. Update on nonpharmacologic approaches to relieve labor pain and Prevent Suffering. J Midwifery Womens Health. 2004;49(6):489-504.
13. Davim RMB, Torres GV, Dantas JC, et al. Banho de chuveiro como estratégica não farmacológica no alívio da dor em parturientes. Rev Eletr Enferm. 2008;10(3):600-9.
14. Silva FMB, Oliveira SMJV. O efeito do banho de imersão na duração do trabalho de parto. Rev Esc Enferm USP. 2006;40(1):57-63.
15. Malarewicz A, Wydrzynski G, Szymkiewicz J, et al. The influence of water immersion on the course of first stage of parturition in primiparous women. Med Wieku Rozwoj. 2005;9(4):773-80.

ORIGINAL ARTICLE

Gestational low back pain: prevalence and clinical presentations in a group of pregnant women*

Lombalgia gestacional: prevalência e características clínicas em um grupo de gestantes

Mayra Ruana de Alencar Gomes[1], Rodrigo Cappato de Araújo[2,3,4], Alaine Souza Lima[1], Ana Carolina Rodarti Pitangui[2,3]

Received from the Research Laboratory for Musculoskeletal Rehabilitation and Women's Health (LAPRESM), University of Pernambuco (UPE). Petrolina, PE.

ABSTRACT

BACKGROUND AND OBJECTIVES: Gestational low back pain is a major complaint during gestation being responsible for many negative impacts on the quality of life of pregnant women. This study aimed at determining the prevalence of types of low back pain and their presentations in pregnant women.
METHOD: This is a transversal descriptive study carried out with 21 pregnant women who attended a prenatal program in the city of Petrolina-PE. Patients were evaluated with specific tests to classify low back pain and have answered a questionnaire with sociodemographic and obstetric information. SPSS program's descriptive statistics and confidence interval were used for data analysis ($CI_{95\%}$).
RESULTS: From all evaluated pregnant women, 95.23% [$CI_{95\%}$ 76.18 – 99.88] have reported low back pain during gestation, being that 71.43% [$CI_{95\%}$ 47.82 – 88.72] had it previously to gestation. Most pregnant women, 57.14% [$CI_{95\%}$ 34.02 – 78.18], have reported pain lasting for more than 60 minutes. The combination of low back pain and posterior pelvic pain was observed in 66.65% [$CI_{95\%}$ 43.03 – 85.41] of patients and 28.58% [$CI_{95\%}$ 11.28 – 52.18] had just low back pain.
CONCLUSION: There has been a high prevalence of low back pain among evaluated pregnant women, showing that the use of educational, preventive and rehabilitating measures is critical due to the negative impact of pregnancy-induced changes on quality of life of pregnant women. The inclusion of physical therapists as participants of Family Health Program actions with groups of pregnant women is critical to improve assistance practices.
Keywords: Low back pain, Pain, Physical therapy, Woman's health.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A lombalgia gestacional é uma das principais queixas durante a gestação, sendo responsável por inúmeras repercussões negativas na qualidade de vida da gestante. O objetivo deste estudo foi determinar a prevalência dos tipos de lombalgia e suas características em gestantes.
MÉTODO: Trata-se de estudo transversal descritivo realizado com 21 gestantes que realizavam consulta pré-natal no município de Petrolina-PE. Foi realizado exame físico composto por testes específicos para classificação da lombalgia e aplicado um questionário que abordava informações sociodemográficas e obstétricas. Para análise dos dados, foi aplicada estatística descritiva no programa SPSS e intervalo de confiança ($IC_{95\%}$).
RESULTADOS: Das gestantes analisadas 95,23% [$IC_{95\%}$ 76,18 – 99,88] relataram dor lombar durante a gestação, sendo que 71,43% [$IC_{95\%}$ 47,82 – 88,72] apresentavam-na previamente à gestação. A maioria das gestantes, 57,14% [$IC_{95\%}$ 34,02 – 78,18], relatou sentir dor com duração superior a 60 minutos. A combinação de dor lombar com dor pélvica posterior foi verificada em 66,65% [$IC_{95\%}$ 43,03 – 85,41] das gestantes, e 28,58% [$IC_{95\%}$ 11,28 – 52,18] apresentaram somente dor lombar.
CONCLUSÃO: Observou-se alta prevalência de lombalgia nas gestantes analisadas, demonstrando ser fundamental o emprego de medidas educativas, preventivas e reabilitadoras, devido ao impacto negativo que as alterações advindas da gravidez podem ocasionar na qualidade de vida das gestantes. A inclusão do fisioterapeuta como participante das ações do Programa de Saúde da Família com atuação em grupos de gestantes é fundamental para melhora das práticas assistenciais.
Descritores: Dor, Dor lombar, Fisioterapia, Saúde da mulher.

INTRODUCTION

Gestational low back pain is a major complaint during gestation, being considered a multifactorial symptom[1] affecting the lumbar region which may irradiate to lower limbs[2].
Its etiology is not totally clear and one of the most probable causes for it would be increased uterine weight, increased lordosis, center of gravity changes, muscles laxity and hormonal, mechanical and vascular changes[3]. Other possible causes would be posture changes, pelvic insufficiency and direct pressure of the fetus and gravid uterus on nervous roots of the lumbosacral spine[4]. Added to these factors, low back pain

1. Student of Physical Therapy, University of Pernambuco. Petrolina, PE, Brazil.
2. Assistant Professor of the Physical Therapy Department, University of Pernambuco. Petrolina, PE, Brazil.
3. Professor of the Master Program in Hebiatry, University of Pernambuco. Recife, PE, Brazil.
4. Professor of the Associate Post-Graduation Program in Physical Education, University of Pernambuco/Federal University of Paraíba. College of Physical Education. Recife, PE, Brazil.

Submitted in February 04, 2013.
Accepted for publication in May 31, 2013.

Correspondence to:
Prof. Ana Carolina Rodarti Pitangui
Universidade de Pernambuco, Campus Petrolina, Departamento de Fisioterapia
BR 203 Km 2 S/N – Vila Eduardo
56300-000 Petrolina, PE.
E-mail: carolina.pitangui@upe.br

previous to gestation is also a major risk factor for gestational low back pain[5].

With regard to clinical classification, low back pain is based on three different conditions: lumbar pain, posterior pelvic pain or the combination of both[1]. Lumbar pain would be a symptom present before gestation, intensified during this period with decreased lumbar region mobility at clinical evaluation and pain at palpation of lumbar paraspinal muscles[2].

Posterior pelvic pain would be a low back pain characteristic of gestation, intermittent, with irradiation to gluteus and lower limbs, causing pain and movement blockade during gait and positive posterior pelvic pain provocation test[2].

Approximately 50% of pregnant women have low back pain during gestation[1], being this symptom responsible for many negative repercussions in their quality of life[2], causing absenteeism and decreased productivity and generating major socioeconomic impact[6].

Nevertheless, low back pain is still considered inherent to gestation, being negligible the attention given by health professionals to this symptom[1,2,7]. So, to establish effective preventive and therapeutic measures for its relief, it is critical that physical therapists know how to clinically differentiate it, since these are conditions requiring different approaches[1].

Based on the above and due to the clinical relevance of gestational low back pain for its repercussions on pregnant women's lives and its high socioeconomic impact, this study aimed at determining the prevalence of types of low back pain in a group of pregnant women.

METHOD

This was a transversal descriptive study with a convenience sample of 21 pregnant women between the first and third gestational trimester who participated in a prenatal program of the Health Center of Vila Eduardo, located in the city of Petrolina, PE.

Data were collected by the laboratory of Physical Therapy, University of Pernambuco, Petrolina Campus, between March and July 2010, by interviews and individualized physical evaluation carried out by two previously trained researchers.

Inclusion criteria were volunteers with low risk gestation; age above 15 years; literate; speaking and understanding Portuguese; and oriented in time and space. Exclusion criteria were overweight or obesity, history of lower limbs and/or spinal fracture, injury or surgery, presence of degenerative joint diseases, genitourinary disease and amputations or neuromuscular disorders.

All volunteers were informed about research procedures and have signed the Free and Informed Consent Term (FICT), according to resolution 196/96 of the National Health Council.

Procedures

Initially, patients were briefly familiarized with the research with the presentation of experiment objectives and routine and have signed the FICT.

Then, current weight and height were evaluated with an anthropometric scale, blood pressure was measured and patients were individually interviewed with a structured questionnaire developed by the researchers. The questionnaire was based on scientific literature on the subject and has addressed information about current and pre-gestation sociodemographic and obstetric variables.

For pregnant women reporting low back pain, specific questions were asked about pain frequency, duration and period, practice of physical activities, activities worsening or improving pain and pelvic "block" during gait.

Then, physical evaluation was carried out by palpation of lumbar muscles with patients sitting on a bench with adjustable height. During mobility and lumbar pain provocation test, patients were asked to remain in orthostatic position and to perform flexion, extension, lateralization and rotation of the body, and were asked about presence of pain or discomfort during such movements.

The following specific tests were carried out to check the presence of low back pain and, if so, to classify the type of pain:

- Posterior pelvic pain provocation (PPP): patients were positioned in the supine position with the hip joint of the side to be tested flexed to 90º. The investigator made manual pressure on the knee in the femoral axial sense. Test was considered positive when there was pain complaint in the sacroiliac region of the tested side[8]. This test is a major clinical indicator of gestational low back pain, and has approximately 80% sensitivity and specificity[8,9].
- Passive straight leg raising test: patient was positioned in the supine position and hip joint was passively flexed with extension of the knee of the side to be tested. When patient reported pain, the investigator would slowly lower her leg and then carried out ankle dorsiflexion aiming at stretching the sciatic nerve and reproducing sciatic pain. Test was considered positive when leg raising was painful, indicating sciatic nerve involvement[8,9].
- Patrick: patient was positioned in the supine position with the hip joint of the side to be tested positioned in external rotation, abduction and mild flexion, and ispilateral knee flexed to 90º. The investigator made manual pressure on the knee toward the stretcher. Test was positive when there was pain complaint in the sacroiliac region of the tested side[8].
- Piedallu: Volunteers remained sitting on a bench with abducted legs and knees flexed to 90º. The investigator would locate by palpation the posterior superior iliac spines (PSIS) and asked patients to flex the body; then the alignment between PSIS was evaluated. Test was considered positive when there was unevenness between PSIS[8].

All tests in supine position had a standardized maximum duration of 3 minutes, thus avoiding any discomfort related to great vessels compression by the gravid uterus.

Statistical analysis

Collected data were compiled in an Excel database for further quantitative data analysis. Data were processed and analyzed with the Statistical Package for the Social Sciences (SPSS) program version 16, by double typing. WINPEPI program

was used to calculate the confidence interval ($CI_{95\%}$). Descriptive statistical analysis was used for data presentation. Continuous variables are shown as central and dispersion trend measures, while categorical variables are shown as absolute and relative frequencies.
This study was approved by the Research Ethics Committee, University of Pernambuco, under registration CEP/UPE: 251/2009.

RESULTS

Participated in this study 21 pregnant women with mean age of 23.09 ± 4.06 years. The number of pregnant women in each gestation trimester was equivalent, that is, there were seven pregnant women for each of the three gestational trimesters.
With regard to anthropometric data, table 1 shows means and standard-deviations of descriptive variables: age, pregestational weight, gestational weight, height and body mass index (BMI).

Table 1 – Distribution of evaluated pregnant women according to anthropometric characteristics. Petrolina-PE.

Characteristics	Mean ± SD
Age (years)	23.09 ± 4.06
Pre-gestational weight (kg)	54.65 ± 6.71
Gestational weight (kg)	62.14 ± 9.34
Height (m)	1.59 ± 0.06
Body mass index (kg/m^2)	21.65 ± 2.56

SD = standard deviation.

From evaluated patients, (20) 95.23% [$CI_{95\%}$ 76.18 – 99.88] have reported low back pain during gestation, being that (15) 71.43% [$CI_{95\%}$ 47.82 – 88.72] have reported this pain previously to gestation. Most pregnant women, (12) 57.14% [$CI_{95\%}$ 34.02 – 78.18], reported pain lasting more than 60 minutes, while (8) 38.09% [$CI_{95\%}$ 18.11 – 61.56] have reported pain lasting less than 60 minutes.
As to pain frequency, (11) 52.39% [$CI_{95\%}$ 29.78 – 74.29] of volunteers have stated constant pain and (9) 42.84% [$CIC_{95\%}$ 21.82 – 65.98] intermittent pain. As to the period with higher intensity, (4) 19.05% [$CI_{95\%}$ 5.45 – 41.91] have referred the morning as the predominant period. The afternoon period was reported by (8) 38.09% [$CI_{95\%}$ 18.11 – 61.56] and the same number of pregnant women has referred the night.
Primary activities triggering or exacerbating low back pain were walking or sitting, corresponding to (12) 57.14% [$CI_{95\%}$ 34.02 – 78.18] of cases. Most pregnant women, (9) 42.84% [$CI_{95\%}$ 21.82 – 65.98] have reported that pain would decrease when lying down and the same prevalence has presented movement block episodes during gait. No patient has reported practicing physical activity during gestation.
At physical evaluation, (15) 76.20% [$CI_{95\%}$ 52.83 – 91.78] of patients did not refer pain at lumbar paraspinal region palpation. During lumbar pain provocation test, it was observed that (7) 33.32% [$CI_{95\%}$ 14.59 – 56.97] of patients have reported pain during flexion and (9) 42.84% [$CI_{95\%}$ 21.82 – 65.98] during extension. No patient had decreased lumbar mobility, in spite of the high frequency of pregnant women with low back pain.
With regard to specific tests, table 2 shows the results of PPP, passive straight leg raise and Patrick tests. As to Piedallu test, (9) 42.84% [$CI_{95\%}$ 21.82 – 65.98] of volunteers had positive results suggesting the presence of sacroiliac disorder.

Table 2 – Absolute and relative frequency of results of specific tests of evaluated pregnant women. Petrolina-PE.

Specific Tests	Negative n (%)	Positive Unilateral n (%)	Positive Bilateral n (%)
PPP	33.32% (7)	47.63% (10)	19.05% (4)
Passive str. leg raise	80.95% (17)	4.77% (1)	14.28% (3)
Patrick	28.58% (6)	61.90% (13)	9.52% (2)

PPP = posterior pelvic pain provocation.

As from questionnaire information and specific tests results, it was possible to classify the type of gestational low back pain, being observed that (14) 66.65% [$CI_{95\%}$ 43.03 – 85.41] of pregnant women had combination of lumbar pain and posterior pelvic pain, (6) 28.58% [$CI_{95\%}$ 11.28 – 52.18] lumbar pain only and no pregnant woman had posterior pelvic pain alone.

DISCUSSION

During pregnancy there is pelvic joints relaxation due to hormonal changes, especially due to the action of relaxin, responsible for ligament laxity[10]. Due to increased mobility of such joints, there are increasing demands on stabilizing ligaments and muscles, which may induce pain if such needs are not met[10].
There has been high prevalence of gestational low back pain since 93.23% of patients referred pain, and this is in line with other studies[5].
Most pregnant women in this study have reported afternoon and night as predominant periods of pain lasting more than 60 minutes. It is believed that the prevalence of pain complaints in these periods is related to musculoskeletal overload caused by increased weight[11], maintenance of orthostatic and sitting positions[5], and by the performance of activities throughout the day, which would be responsible for further tiredness and fatigue in these periods. Joint and sacroiliac instability caused by ligament laxity would also be a possible cause of pain during these periods[11].
Similar data to our study were found by Santos and Gallo[12], who observed that most pregnant women reported low back pain especially in the afternoon with worsening of symptoms at night, being observed that 88% of pregnant women had pain lasting one hour or more.
In our study, 71.43% of patients reported low back pain even before gestation, fact that was already expected since low back pain previous to gestation is a risk factor for the symptom during gestation[5,12].

As to low back pain classification, it was observed that 66.65% of patients had a combination of low back pain and posterior pelvic pain and 28.58% low back pain alone. Still, 19.05% of patients had positive results (unilateral and bilateral) for the passive straight leg raise test, indicating possible sciatic nerve compression.

Positive response to PPP and passive straight leg raise test is associated to incapacity at late gestation, being observed less functional impairment in cases of low back pain as compared to posterior pelvic pain, and more severe incapacities in pregnant women with the combination of both types[13].

A previous study[14] has found 5% prevalence of low back pain, 52% of pelvic pain and 25% of the combination of both in pregnant women. However, it has to be stressed that the literature has a diversity of terms and diagnostic criteria to describe gestational low back pain, which are probably responsible for different prevalence rates found for the subject.

A limitation of this study was the lack of sample size calculation, the small sample size and the non evaluation of functional impairment associated to the type of low back pain, remaining as a suggestion for further studies the evaluation of these variables and the inclusion of larger samples. It was also found that it is critical to have new studies about the subject aiming at evaluating the efficacy of early physical therapy interventions for gestational low back pain.

This study has also observed the need for more attention of health professionals to gestation-induced postural changes, due to the implications that such changes may have in the quality of life of pregnant women.

It was also observed in this study that in spite of the high prevalence of gestational low back pain, no participant has reported practicing physical activities, fact which justifies the integration of physical therapists to the Family Health Support Nucleus (NASF).

The inclusion of physical therapists in NASF prenatal program will contribute for the strengthening of Family Health Strategy actions, expanding Basic Health Attention.

Regular practice of physical activities, body awareness exercises, relaxation techniques, educational measures and postural orientation during daily activities are critical for the prevention, decrease or elimination of gestational low back pain[15].

In this sense, physical therapists may develop individual and collective activities for pregnant women groups, based on the adoption of new behaviors and changes in lifestyle. So, the inclusion of such professionals will go beyond rehabilitation assistance, by integrating to their field of action the prevention of diseases, health promotion and recovery, taking into consideration social, economic, cultural and environmental aspects which may interfere with the health-disease process.

CONCLUSION

There has been a high prevalence of gestational low back pain in the group of studied pregnant women and most volunteers had a combination of low back pain and posterior pelvic pain. There has been predominance of pain lasting more than 60 minutes in the afternoon and at night. Face to what has been exposed, it is critical to use educational, preventive and rehabilitating measures for this group, due to the negative impact that gestation-induced changes may have in the quality of life of pregnant women. The inclusion of physical therapists as participants of NASF actions contributes to Basic Health Attention approaches, meeting the goals of the program and improving not only adopted assistance practices, but also the quality of life of pregnant women.

REFERENCES

1. Ostgaard HC, Andersson GBJ, Karlsson K. Prevalence of back pain in pregnancy. Spine. 1991;16(5):549-52.
2. Ferreira CHJ, Nakano AMS. Lombalgia na gestação: etiologia, fatores de risco e prevenção. Femina. 2000;28(8):435-8.
3. Sabino J, Grauer JN. Pregnancy and low back pain. Rev Musculoskelet Med. 2008;1(2):137-41.
4. Ferreira CHJ, Nakano AMS. Lombalgia na gestação. JBM. 1999;77(1):113-8.
5. Martins RF, Silva JLPE. Prevalência de dores nas costas na gestação. Rev Assoc Med Bras. 2005;51(3):144-7.
6. Ferreira CHJ, Pitangui ACR, Nakano AMS. Tratamento da lombalgia na gestação. Fisioter Bras. 2006;7(2):138-41.
7. Pitangui ACR, Ferreira CHJ. Lombalgia gestacional. Femina. 2005;33(10):789-92.
8. Albert H, Godskesen M, Westergaard J. Evalution of clinical tests used in classification procedures in pregnancy-related pelvic joint pain. Eur Spine J. 2000;9(2):161-6.
9. Mens JM, Vleeming A, Snijders CJ, et al. Reliability and validity of the active straight leg raise test in posterior pelvic pain since pregnancy. Spine. 2001;26(10):1167-71.
10. Olsén MF, Gutke A, Elden H, et al. Self-administered tests as a screening procedure for pregnancy-related pelvic girdle pain. Eur Spine J. 2009;18(8):1121-9.
11. Albert HB, Godskesen M, Westergaard JG. Incidence of four syndromes of pregnancy-related pelvic joint pain. Spine. 2002;27(24):2831-4.
12. Santos MM, Gallo AP. Lombalgia gestacional: prevalência e características de um programa pré-natal. Arq Bras Ciên Saúde. 2010;35(3):174-9.
13. Norén L, Ostgaard S, Johansson G, et al. Lumbar back and posterior pelvic pain during pregnancy: a 3-year follow-up. Eur Spine J. 2002;11(3):267-71.
14. Robinson HS, Veierød MB, Mengshoel AM, et al. Pelvic girdle pain-associations between risk factors in early pregnancy and disability or pain intensity in late pregnancy: a prospective cohort study. BMC Musculoskelet Disord. 2010;11:91.
15. Pitangui ACR, Ferreira CHJ. Avaliação fisioterapêutica e tratamento da lombalgia gestacional. Fisioter Mov. 2008;21(2):135-42.

ORIGINAL ARTICLE

Comparison of psychosocial and functional performance variables in a group of chronic low back pain patients*

Comparação entre variáveis psicossociais e de desempenho funcional em um grupo de pacientes com lombalgia crônica

Giovanna de Araújo Fracaro[1], Welds Rodrigo Ribeiro Bertor[1], Lígia Inez da Silva[1], Lana Brandl[1], Gabriela Matté Zanini[1], Marina Zilio[1], Endianara Dall Agnol[1], Bruno Porgorzelski Rocha[1], Alberito Rodrigo de Carvalho[2]

*Received from the Physical Therapy School Clinic and Human Movement Research Laboratory (LAPEMH), State University of Western Paraná (UNIOESTE). Cascavel, PR, Brazil.

ABSTRACT

BACKGROUND AND OBJECTIVES: Low back pain is a major musculoskeletal system problem and generates high costs for the health system. Regardless of etiology, chronic low back pain patients tend to decrease their physical activities routine, thus impairing fitness and mood. So, it is necessary to establish the relationship among variables involved in the etiology of low back pain, which are noxious for patients' performance. This study aimed at comparing the distance covered during a six-minute walk test (6MWT) and the following psychosocial variables: mood perception and level of disability between chronic low back pain and healthy individuals.
METHOD: This was an observational transversal study with volunteers of both genders, sedentary, aged between 30 and 58 years, who were divided in control group (CG) and low back pain group (LG). Volunteers answered a battery of questionnaires, as follows: Oswestry Disability Index and Brunel Mood Scale to determine the level of disability and mood perception, respectively. Then, volunteers made the 6MWT.
RESULTS: LG (25.44 ± 14.3%) had significantly higher levels of disability as compared to CG (1.25 ± 2.1%). It was also observed that LG had significantly higher levels of stress, fatigue and mental confusion as compared to CG.
CONCLUSION: Low back pain patients were no different from their pain-free peers in six-minute walk test performance, depression, anger and vigor mood state. However, they presented higher levels of disability and poorer indices of fatigue, stress and mental confusion mood states.
Keywords: Disability and health, International Functional Classification, Low back pain, Mood disorders.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor lombar é um dos principais problemas do aparelho musculoesquelético e gera alto custo para o sistema de saúde. Independente da etiologia, os portadores de dor lombar crônica tendem a reduzir sua rotina de atividades físicas, o que compromete o condicionamento físico e o estado de humor. Portanto, estabelecer a relação entre as variáveis envolvidas na etiologia da lombalgia prejudiciais ao desempenho entre os seus portadores se faz necessário. O objetivo deste estudo foi comparar a distância percorrida no teste de caminhada de seis minutos (TC6) e as variáveis psicossociais: percepção de humor e nível de incapacidade entre portadores de dor lombar crônica e sujeitos saudáveis.
MÉTODO: Estudo observacional transversal cuja amostra foi composta por voluntários de ambos os sexos, sedentários, com idade entre 30 e 58 anos, dividida em grupo controle (GC) e grupo lombar (GL). Os voluntários responderam a uma bateria de questionários: a saber, o Índice de Incapacidade de Oswestry e a Escala de Humor de Brunel para determinação do nível de incapacidade e da percepção de humor, respectivamente. Em seguida, realizaram o TC6.
RESULTADOS: O GL (25,44 ± 14,3%) apresentou níveis de incapacidade significativamente maiores que o GC (1,25 ± 2,1%). Também se observou que o GL apresentou níveis de tensão, fadiga e confusão mental significativamente mais alto que o GC.
CONCLUSÃO: Portadores de dor lombar crônica não apresentaram diferença, em relação aos seus pares livres de dor, no desempenho do TC6, no estado de humor de depressão, de raiva e de vigor. Contudo, apresentaram maiores níveis de incapacidade e piores índices no estado de humor de fadiga, de tensão e de confusão mental.
Descritores: Classificação Internacional de Funcionalidade, Dor lombar, Incapacidade e saúde, Transtornos de humor.

INTRODUCTION

Low back pain is irregular and intermittent, generating different functional limitation levels and impairing daily activities.

1. Students of the Physical Therapy Course, State University of Western Paraná (UNIOESTE). Cascavel, PR, Brazil.
2. Master in Human Movement Sciences (UFRGS), professor of the Physical Therapy course, State University of Western Paraná (UNIOESTE), linked to the Neuro-Musculoskeletal Rehabilitation Research Group. Cascavel, PR, Brazil.

Submitted in January 06, 2013.
Accepted for publication in May 27, 2013.
Conflict of interests: None.
Sponsoring sources: Physical Rehabilitation Center, UNIOESTE.

Correspondence to:
Alberito Rodrigo de Carvalho, M.D.
Universidade Estadual do Oeste do Paraná (UNIOESTE) – Clínica Escola de Fisioterapia
Rua Universitária, 1619 - Jardim Universitário
85819-110 Cascavel, PR.
Fone: (45) 3220-3157
E-mail: alberitorodrigo@gmail.com

In addition, chronic low back pain patients tend to feel unable to carry out their daily activities and often have a strong belief that any functional activity will worsen pain or cause some physical impairment or limitation. This leads individuals to refuse to perform their common activities, leading to pain, immobilization and pain vicious circle[1].

From the psychosocial point of view, it is observed that individuals with musculoskeletal pain develop the chronic pain syndrome, which is related to fear of performing activities triggering pain and/or generating disease recurrence. This behavior brings physical and psychological disorders which contribute to disease chronicity[3].

Health professionals dealing with chronic low back pain patients should be concerned not only with motor manifestations of such disorder, but also with psychosocial relationships, which involve patients' emotional conditions, characterized by major mood state oscillations, with a feeling of hostility with regard to others and themselves[4].

As from already described data, it seems justifiable to ask whether there are differences between healthy and chronic low back pain individuals with regard to functional tests performance and psychosocial variables which may influence such performance. Answers to these questions would be an important step toward orienting evaluation routines and the development of therapeutic goals in the rehabilitation field.

Primary hypothesis raised by this study is that chronic low back pain patients have poorer functional tests performance as compared to their pain-free peers and also that some psychosocial indicators, such as level of disability and mood states, are worsened in such subjects.

So, this study aimed at comparing the distance covered in the six-minute walk test (6MWT) and the following psychosocial variables: mood perception and disability level between low back pain patients and pain-free individuals.

METHOD

This was an observational transversal study carried out after sample calculation determined by the variable "distance covered in 6MWT", normalized by the predicted distance for the same test according to age, gender, height and body mass of volunteers (WinPepi software version 11.18; power = 0.18; significance level 5%; DC control group (CG) = 0.12; DC low back pain group (LG) = 0.18; difference to be detected = 0.8; n = 9 for each group) with chronic low back pain, of both genders, aged between 25 and 59 years, from the Physical Rehabilitation Center, State University of Western Paraná (UNIOESTE).

Patients were recruited in an intentional and non probabilistic manner to compose LG. CG was made up of individuals without systemic or musculoskeletal, chronic or acute disorders in lower limbs or spine and were paired by age, weight and height with regard to LG. Volunteers from both groups could not be smokers or former smokers for a period less than five years; should not practice systematized and routine physical exercises two or more times a week for at least 30 minutes; should not have visible postural misalignments.

After explaining the objectives and procedures of the study to volunteers, participants were submitted to a screening evaluation to collect anthropometric data and to identify possible non inclusion or exclusion criteria.

For CG, inclusion criterion was availability to participate in evaluations and tests in predetermined days and times.

For LG, inclusion criteria were: individuals with specific low back pain persisting for more than three months, the clinical and physical characteristics of whom would be compatible with evaluation and treatment guidelines proposed by the American College of Physicians and by the American Pain Society, in category 2 (low back pain potentially associated to radiculopathy or spinal stenosis)[5].

Non inclusion and exclusion criteria specific for LG were: individuals with low back pain and history suggesting classification in categories 1 (nonspecific low back pain) and 3 (low back pain potentially associated to other specific spinal cause) of the evaluation and treatment guidelines proposed by the American College of Physicians and by the American Pain Society, which include a small number of patients with severe or progressive neurological deficits or conditions requiring immediate evaluation (such as tumor, infection or cauda equina syndrome), patients with other conditions which may respond to specific treatments (such as ankylosing spondylitis and other rheumatic diseases and/or compression vertebral fractures)[5], as well as patients with acute pain or worsened presentation equal to or above seven by the visual analog scale (VAS).

Non inclusion and exclusion criteria common to both groups were: patients with history of spinal surgery; volunteers with cognitive deficits; pregnant volunteers or individuals with cardiovascular diseases where exercises were contraindicated; volunteers without hemodynamic conditions favorable to perform 6MWT, decompensated hypertensive subjects, history of cardiopathy, pneumopathy and/or neuropathy.

Once the sample was selected, questionnaires were applied to determine the level of disability, mood perception and kinesiophobia, being the latter applied only to LG and used just to characterize this group.

Disability level was determined by the Brazilian Version of Oswestry Disability Index adapted from the original – version 2.0, with recognized reliability (α Cronbach = 0.87; CCI = 0.99)[6]. This is a questionnaire with 10 questions, each one with six possible answers, which reflect the impact of low back pain on individuals' daily and social activities. Volunteers were scored (in absolute values) from zero to five according to the answers given to each question. The first option corresponded to zero and the last to five. So, five was the maximum score for each question and 50 was the maximum score for the questionnaire as a whole. If any question was not answered, total score obtained by the questionnaire was divided by the maximum possible total for the questionnaire, without considering the score of the excluded question. Scores are shown in percentages.

Mood perception was obtained by Brunel Mood Scale

(BRUMS) in a version translated and validated for the Portuguese language[7]. Its validation had good internal consistency with alpha Cronbach values above 0.70, thus being a reliable tool to measure Brazilian mood. This scale provides a fast measurement of mood state through six markers (subscales), as follows: tension (musculoskeletal tension), depression (depressive mood state), anger (hostility), vigor (state of energy, enthusiasm and activity), fatigue (exhaustion, apathy and low level of energy), and mental confusion (stunning).

The higher the score of each subscale, the higher the representation of the evaluated item. Each subscale has four items and each item receives a score varying in integers from zero to four. So, the score of each subscale goes from zero to 16. The scale was delivered in printed sheets to volunteers who checked, for all 24 items of the scale (4 items x 6 subscales), the score that better described what they were feeling at that exact moment with regard to the item: 0 (nothing), 1 (a little), 2 (moderately), 3 (a lot), 4 (extremely). This scale was reapplied in two other moments. Scores of each subscale were individualized for statistical analysis.

Kinesiophobia index for LG, expressed in points, was 41.4 ± 8.9. Kinesiophobia was evaluated by the Brazilian Version of the Tampa Kinesiophobia Scale[3]. This is a self-applicable questionnaire made up of 17 questions addressing pain and intensity of symptoms. Scores vary from one to four being that "totally disagree" corresponds to one point, "partially disagree" corresponds to two points, "partially agree" to three points, and "totally agree" to four points. To obtain the final score, it is necessary to invert the scores of questions 4, 8, 12 and 16. Final score may be at least 17 and at the utmost 68 points, being that the higher the score, the higher the level of kinesiophobia.

Functional capacity was measured by the six-minute walk test (6MWT)[8]. Initially, volunteers remained at rest for five minutes before the test for hemodynamic normalization and then vital signs were collected: heart rate (HR), respiratory rate (RR) and blood pressure (BP). Those with BP above 150/100 mmHg or HR above 110 bpm were excluded from the study. 6MWT was applied in a 30-meter length corridor delimited by a metrically marked strip, in flat surface where volunteers would walk outward and back, many times as necessary, within the time limit of 6 minutes, with standardized verbal stimuli. Volunteers mean HR was monitored by a frequency counter.

Participants were oriented to walk as fast as possible, however without running, until the investigator would request them to stop after six minutes of data collection. They were also asked to slow down or even to stop the test in case of chest pain, respiratory difficulty and discomfort, severe muscle pain, dizziness or nausea. Vital signs were again measured immediately after the test and the distance covered by each one was recorded.

Figure 1 shows the sequence of methodological procedures.

As from anthropometric data collected during screening, predictive distances for volunteers age, gender, height and body mass were calculated and considered as reference values by

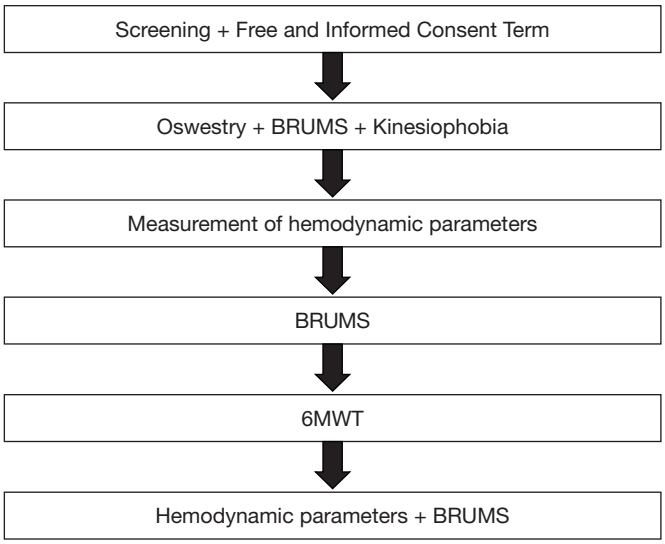


Figure 1 – Sequence of methodological procedures.
Oswestry Disability Index and Brunel Mood Scale.

equations proposed by the literature[9]: males – predicted distance (m) = 7.57 x height [m] – (5.02 x age [years]) – (1.76 x body mass [kg]) – 309 m; females – predicted distance (m) = (2.11 x height [m]) – 5.78 x age [years]) – 2.29 x weight [kg] + 667 m.

Statistical analysis

6MWT data were normalized dividing the test value by the predicted value (covered/predicted distances ratio). Normalization has helped seeing how much the test value got close to predicted value, so that: ratio >1 individual did not reach the predicted value; ratio = 1 test value was equal to predicted value; and ratio > 1 test value was higher than predicted value. The SPSS 15.0 software was used for statistical analysis. Mann-Whitney U test was used for comparisons, with α = 0.05.

The size of the effect for each variable considering power of effect as low (r value from 0.10 to 0.29), medium (r value from 0.30 to 0.49) and high (r value > 0.50) was calculated. The size of the effect is an objective and standardized measure of the magnitude of a given observed effect regardless of statistical significance.

This study was approved by the Human Research Ethics Committee, UNIOESTE, opinion 015/2012.

RESULTS

Final sample was: CG (n = 8) and LG (n = 9). There has been no difference in anthropometric data and age between groups. Table 1 shows mean values with their respective standard deviations and comparative statistics. Mean duration of pain chronicity, in months, for LG was 101.3 ± 99.4, with minimum of 12 and maximum of 348 months.

Although without significant differences in walking ratio

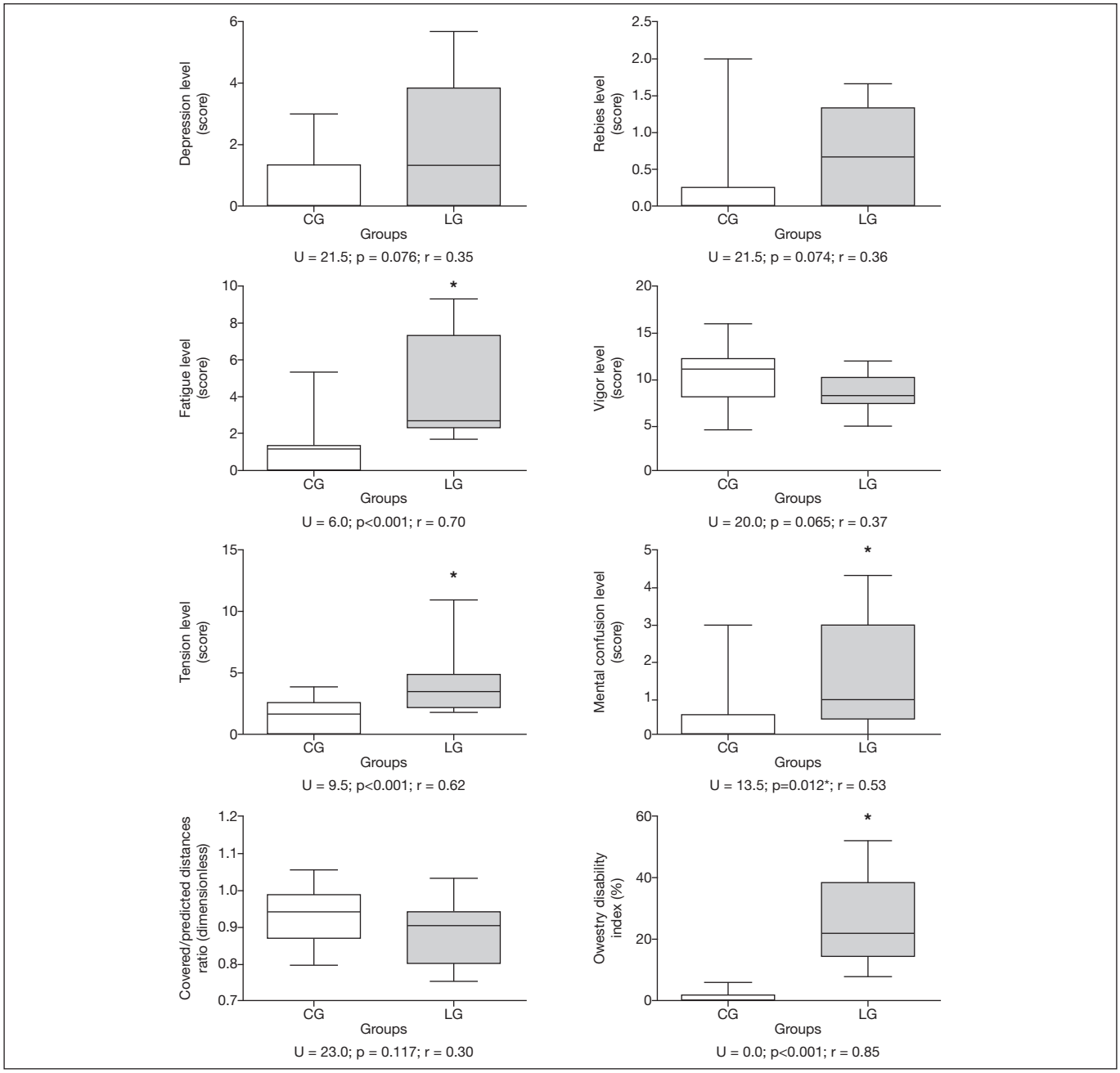
Table 1 – Intergroup descriptive and comparative statistics among variables characterizing the sample.

Variables Comparative Statistics	Groups	Mean	Standard Deviation
Height (cm) T(15) = 0.893; p = 0.385	Control	170.0	8.0
	Low back pain	166.5	7.9
Age (years) T(11.8) = 0.338; p = 0.741	Control	41.5	5.3
	Low back pain	40.1	10.9
Body mass (kg) T(15) = 1.295; p = 0.214	Control	79.7	10.6
	Low back pain	72.1	13.4
Body mass index (kg/m^2) T(15) = 0.763; p = 0.457	Control	27.4	3.4
	Low back pain	25.7	5.5

(predicted/covered), LG volunteers had disability levels significantly higher as compared to CG.

It was also observed that LG had significantly higher levels of tension, fatigue and mental confusion as compared to CG. Graph 1 shows descriptive and inferential statistics for all variables (depression, anger, fatigue, vigor, tension, mental confusion indices, in addition to covered/predicted distances and Oswestry Disability Index).

For all comparisons, the size of the effect (r value) has varied from moderate to high, being high for all significant comparisons and moderate for those without statistical significance.



Graph 1 – Descriptive and inferential statistic of intergroup comparisons for mood state, capacity level and covered/predicted distances ratio variables, as well as size of the effect (r value) for each comparison.

*Statistical difference for LG as compared to CG.

DISCUSSION

The hypothesis of this study was only partially confirmed, since there was no difference between CG and LG in 6MWT performance and in some psychosocial variables (depression, anger and vigor); however, there have been significant differences in other psychosocial variables (disability level, fatigue, tension and mental confusion).

It was expected that LG volunteers would perform 6MWT with poorer results as compared to CG, even because the former had high kinesiophobia scores. Some authors suggest that the fear of feeling pain is significantly related to poor functional performance of chronic low back pain individuals[10]. Another important observation of this study was that, in addition to high kinesiophobia scores, LG had disability levels significantly higher as compared to CG.

A possible explanation for the lack of difference in 6MWT performance between groups is given by Lee et al.[11], who have reported that chronic low back pain individuals tend to walk slower, however, when stimulated, as it is the case with 6MWT, they are able to walk as fast as their pain-free peers.

Although tests to measure low back pain impact on the performance and life of people are important guides for the clinical approach, such tests not always reflect the multiplicity of influencing factors affecting pain. Disability level in our study was measured by a self-reported assessment tool. Wand et al.[12] state that, in spite of self-reported disability and functional capacity measurements based on performance tests being moderately related, they are influenced by different patient characteristics. Self-reported measurements are more influenced by psychological conditions than those based on performance.

When mood and chronic low back pain factors were analyzed, LG participants had more depression, anger, fatigue, tension and mental confusion and less vigor as compared to CG, although only tension, fatigue and mental confusion had statistically significant values. With this, one may infer that symptoms related to chronic low back pain are related to poorer mental health of LG participants, while CG was closer to a positive mental health model. For Sardá Jr., Kupek and Cruz[13], symptoms related to low back pain and to lumbosciatic pain have linear correlation with patients' psychological changes.

Fatigue, one statistically significant sub-item, represents a state of exhaustion, apathy and low level of energy, and may induce attention, concentration, sleep and memory disorders, in addition to irritability. This affects the process of beginning of psychosomatic, physiological and psychic problems[14].

Both tension and mental confusion were significantly higher for LG indicating mood states impairment. It is suggested that chronic low back pain patients have discrepancies among their current condition (as they are at that moment), their ideal condition (how they would like to be), their necessary condition (the one they believe they are forced to be) and their feared condition (the one they are afraid to be).

So, self-discrepancies are understood as differences between the way someone sees himself and how he would like to see himself. These self-discrepancies have been shown to be associated to high levels of depression, anxiety, stress and pain. However, it is believed that each type of self-discrepancy is associated to different physical and behavioral characteristics. Self-discrepancy with regard to feared condition seems to be the most important to determine mood state[15]. Nevertheless, our study has not investigated self-discrepancy characteristics of the sample.

In evaluating sub-item depression, this study has not found a significant result when comparing LG and CG. This result is different from other studies[13,15], which have obtained a relationship between chronic low back pain and depression. A possible theory to explain this result is that Brunel Mood Scale might not identify depression per se, but rather a depressive mood state. It is possible that increasing the frequency of data collection could be a strategy to make the tool sensitive to capture depressive mood state oscillations in a more consistent way.

This study was limited because pain duration was not controlled in the statistical analysis since, as observed from standard-deviation, there has been a high amplitude between the volunteer with the shortest pain duration and the volunteer with the longest pain duration. The primary contribution of this study, which comes only to reinforce what is recommended by other investigators, is that, in the clinical practice, it is necessary a biopsychosocial approach for the treatment of chronic low back pain patients since they present not only physical health, but also mental health weakness, showing that mind and body are inextricably interlinked.

CONCLUSION

Chronic low back pain patients participating in this study were no different from their pain-free peers, in the 6MWT performance, in depression, anger and vigor mood states. However, they had higher levels of disability and poorer fatigue, tension and mental confusion states indices.

REFERENCES

1. Huijnen IP, Verbunt JA, Roelofs J, et al. The disabling role of fluctuations in physical activity in patients with chronic low back pain. Eur J Pain. 2009;13(1):1076-9.
2. Lin CW, McAuley JH, Macedo L, et al. Relationship between physical activity and disability in low back pain: A systematic review and meta-analysis. Pain. 2011;152(3):607-13.
3. Siqueira FB, Teixeira-Salmela LF, Magalhães LC. Análise das propriedades psicométricas da versão brasileira da Escala de Tampa de Cinesiofobia. Acta Ortop Bras. 2007;15(1):19-24.
4. Brandt R, Viana MS, Segato L, et al. Estados de humor de velejadores durante o Pré-Panamericano. Motriz. 2010;16(4):834-40.
5. Chou R, Qaseem A, Snow V, et al. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. Ann Intern Med. 2007;147(7):478-91.
6. Vigatto R, Alexandre NMC, Correa Filho HR. Development of a Brazilian portuguese version of the Oswestry Disability Index. Spine. 2007;32(4):481-6.
7. Hohlfs ICPM, Terry PL, Rotta IM, et al. Development and initial validation of the Brazil Mood Scale. In: 43rd Australian Psychological Society Annual Conference, (Hobart, Tasmania). 2008:23-7.
8. ATS Statement: Guideline for the six-minute walk test. Am J Respir Crit Care Med. 2002;166(1):111-7.

9. Enright PL, Sherril DL. Reference equations for the six-minute walk in healthy adults. Am J Respir Crit Care Med. 1998;158(5 Pt 1):1384-7.
10. Reneman MF, Schiphorts Preuper HR, et al. Are pain intensity and pain related fear related to functional capacity evaluation performances of patients with chronic low back pain? J Occup Rehabil. 2007;17(2):247-58.
11. Lee CE, Simmonds MJ, Etnyre BR, et al. Influence of pain distribution on gait characteristics in patients with low back pain Part 1: Vertical Ground Reaction Force. Spine. 2007;32(12):1329-36.
12. Wand BM, Chiffelle LA, O'Connell NE, et al. Self-reported assessment of disability and performance-based assessment of disability are influenced by different patient characteristic in acute low back pain. Eur Spine J. 2010;19(4):633-40.
13. Sardá J Jr J, Kupek E, Cruz RM. Aspectos psicológicos associados lombalgia e à lombociática. R Ci Hum. 2000;18(28):51-60.
14. Lane AM, Terry PC. The nature of mood: development of a theoretical model. J Appl Sport Psychol. 2000;12(1):16-33.
15. Kindermans HPJ, Huijnen IPJ, Goossens MEJB, et al. "Being" in pain: the role of self-discrepancies in the emotional experience and activity patterns of patients with chronic low back pain. Pain. 2011;152(2):403-9.

ORIGINAL ARTICLE

Impact of manual visceral therapy to improve the quality of life of chronic abdominal pain patients*

Impacto da terapia manual visceral na melhora da qualidade de vida de pacientes com dor abdominal crônica

Barbara Borges Ferraz[1], Marielza R. Ismael Martins[2], Marcos Henrique Dall´Aglio Foss[3]

*Received from the Pain Clinic, Base Hospital, Department of Neurological Sciences, School of Medicine of São José do Rio Preto (FAMERP). São José do Rio Preto, SP.

ABSTRACT

BACKGROUND AND OBJECTIVES: Abdominal pain secondary to functional chronic intestinal constipation (FCIC) affects a substantial number of people, especially females. This study aimed at evaluating the efficacy of manual visceral therapy in patients of a Pain Clinic to confirm this intervention as a tool to improve constipation and increase lumbar mobility and, as a consequence, better quality of life (QL).

METHOD: This is a clinical trial with convenience sample of 20 patients complaining of intestinal function changes and lumbar vertebral mobility restriction. Bio-socio-demographic characteristics were analyzed and the Rome III Criteria questionnaire, Shöeber test, middle finger to floor test and quality of life inventory SF-36 were used to evaluate constipation, lumbar mobility and QL, respectively, before and after receiving manual visceral therapy (MVT).

RESULTS: Patients, especially females, mean age of 38.42 ± 19.23, had significant improvement between evaluation and revaluation, in four SF-36 domains (functional capacity, pain, general health and vitality – $p < 0.05$) and improvement of intestinal constipation and lumbar mobility.

CONCLUSION: MVT proposed and applied to individuals with chronic abdominal pain secondary to FCIC in this study was able to improve intestinal constipation and lumbar mobility, in addition to QL of participants.

Keywords: Abdominal pain, Musculoskeletal manipulations.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor abdominal secundária à constipação intestinal crônica funcional (CICF) afeta uma proporção substancial de pessoas, especialmente mulheres. O objetivo deste estudo foi avaliar a eficácia da terapia manual visceral (TMV) em pacientes que pertencem a uma Clínica de Dor, a fim de comprovar essa intervenção na melhora da constipação e no aumento da mobilidade lombar, e na consequente melhora da qualidade de vida (QV).

MÉTODO: Trata-se de um ensaio clínico, com amostra de conveniência de 20 pacientes com queixa de alteração na função intestinal e restrição da mobilidade vertebral lombar. Foram analisadas as características biossociodemográficas e utilizados o formulário Critério de Roma III, os testes de Schöber e do terceiro dedo ao chão e o questionário genérico de QV SF-36, para avaliação da constipação, da mobilidade lombar e da QV, respectivamente, antes e após receber a terapia manual visceral (TMV).

RESULTADOS: Pacientes, principalmente do sexo feminino, média de idade de 38,42, ± 19,23 apresentaram melhora significativa entre a avaliação e a reavaliação em quatro domínios do SF-36 (capacidade funcional, dor, estado geral de saúde e vitalidade – $p < 0,05$) e melhora da constipação intestinal e da mobilidade lombar.

CONCLUSÃO: A TMV proposta e aplicada nos indivíduos com dor abdominal crônica secundária à CICF deste estudo foi capaz de melhorar a constipação intestinal e a mobilidade lombar, bem como a QV dos participantes.

Descritores: Dor abdominal, Manipulações musculoesqueléticas.

INTRODUCTION

Abdominal pain origin is complex and there is not a single causality model[1]. Several organic causes are related to abdominal pain and in many cases the pathophysiology is related to infectious, inflammatory processes or hollow organs distention/obstruction, in addition to parasitic diseases and intestinal constipation[1,2].

Functional chronic intestinal constipation (FCIC) is a syndrome caused by enterocolonic motility disorders and is highly prevalent in the world population aged above 40 years, with higher incidence among females[3-5].

1. Upgrade Student of Physical Therapy, Pain Clinic, Base Hospital, School of Medicine of São José do Rio Preto (FAMERP). São José do Rio Preto, SP, Brazil.
2. Occupational Therapist, Pain Clinic, Base Hospital, Department of Neurologica Sciences, School of Medicine of São José do Rio Preto (FAMERP). São José do Rio Preto, SP, Brazil.
3. Physical Therapist, Pain Clinic, Base Hospital, Department of Neurological Sciences, School of Medicine of São José do Rio Preto (FAMERP). São José do Rio Preto, SP, Brazil.

Submitted in January 07, 2013.
Accepted for publication in May 31, 2013.

Correspondence to:
Marielza R. Ismael Martins
Departamento de Ciências Neurológicas
Avenida Brigadeiro Faria Lima, 5416
15090-000 São José do Rio Preto, SP.
E-mail: marielzamartins@famerp.br

Some studies[6,7] have shown that cecal or cecum/ascending segment motility may be related to functional colonic diseases, being constipation their primary manifestation. In this context, constipation is a problem often neglected during primary attention and many possible causes and adequate diagnostic tests should be considered[8].

FCIC are frequent in pain clinics because this is a common disorder in cancer patients under opioids for pain control[9].

Face to this, the quality of life of this group is impaired due to abdominal distension and its consequences, regionally characterized by abdominal fullness sensation, continuous or stabbing pain, cramps, psychological discomfort, increased rectal compliance and decreased sensation of rectal content and, not uncommonly, with symptoms in other segments of the body, such as chest, where the expression is constrictive-type pain (splenic angle syndrome), and not the fact of feeling that their intestine is just constipated[9,10].

Pain clinics have several interventions[11], however the effectiveness of most of them has not yet been shown. As a consequence, pain treatment varies a lot. However, it is consensus that each case should be individualized and different resources may allow direct intervention on pain, disability and quality of life (QL).

One of them is manual visceral therapy (MVT) which is evolving since antiquity in Greece in 400 b.C. and Rome in 110 a.C., and shows its importance for the treatment of different syndromes[12].

MVT effect is mechanical, helping "moving forward" the whole content and elongating abdominal muscles. A reflex response to superficial tissue manipulation results in involuntary contraction of such muscles. This stimulation increases bowel movements, helps emptying the stomach, helps glandular secretions, decreases colonic traffic time and increases evacuation frequency. It also relieves constipation-induced discomfort and pain[12,13].

This study aimed at evaluating the effects of MVT on FCIC patients aiming at decreasing pain, improving involved visceral functions and strengthening pelvic organs supporting muscles. This study is justified by the need to provide pain relief and visceral function normalization aiming at improving QL of such patients.

METHOD

This is a clinical and experimental trial presenting pre and post-evaluation without control group. Data were collected from January to October 2012 and, during this period, 20 patients meeting the criteria of belonging to a pain clinic were included, initially complaining of changes in intestinal function and restriction of lumbar vertebral mobility. Data were identified by the Rome III Criteria form[14], which helps evaluating constipation and quantifying this disorder by means of positive criteria and scores. The evaluation consists of patients presenting two or more of such criteria in the last six months, characterizing the presence of intestinal constipation.

Criteria were considered positive when reaching the following cutoff points: (1) evacuation effort in at least 25% of defecations – answer equivalent to "frequently" (question A ≥ 2); (2) hardened or fragmented stools in at least 25% of defecations – answer equivalent to "frequently" (question B ≥ 2); (3) sensation of incomplete evacuation in at least 25% of defecations – answer equivalent to "sometimes" (question C ≥ 1); (4) sensation of anorectal obstruction/block in at least 25% of defecations – answer equivalent to "sometimes" (question D ≥ 1); (5) manual maneuvers to help in at least 25% of defecations – answer equivalent to "sometimes" (question E ≥ 1); and (6) less than three evacuations per week.

Exclusion criteria were female patients in their menstrual cycle, with gravid uterus or under treatment of internal organs. No laxatives to help evacuation were used throughout the treatment and opioids or antidepressants were not being used.

Individuals were characterized through the following variables: demographic (gender, age); socioeconomic (education); weight, abdominal circumference, use of laxatives before the treatment and regular physical activities. All participants have signed the Free and Informed Consent Term (FICT).

Before the technique, it was necessary to identify intervenient factors such as illiopsoas muscle spasm; pain at abdominal palpation; shortening and/or abdominal contractions. Palpation of illiopsoas muscle pathway aims at identifying possible tension nodes.

If such nodes are found, the muscle is released before performing the visceral technique since spasm of this muscle may mask the presentation or the decreased amplitude of lumbar movement. The MVT used in this study has followed the criteria below: tangential pushing, with digital pulp, with slow and gradual pressure, with 45º fingers inclination sliding them from the cecal region, going through ascending colon and then right flexure, transverse colon, left flexure, descending colon and sigmoid; this sequence was repeated approximately 15 times (Figure 1).

Individuals were submitted to nine 20-minute sessions, three times a week. Patients were evaluated in the first and last session. Lumbar mobility tests were performed in the beginning and end of each session.

Schöber[15] and middle finger to floor[16] tests were used to evaluate lumbar mobility where patient, in orthostatic position, anteriorly flex the body. The distance between middle finger and the floor is measured. Test is considered normal when the variation between the measurement in the neuter position and the new measurement in anterior body flexion is five or more cm.

Generic QL questionnaire SF-36 (Medical Outcomes Study 36 – Item Short-Form Health Survey)[17] was used to evaluate, which is a multidimensional questionnaire easy to apply and understand. It consists of 36 items divided in eight domains: functional capacity, physical aspects, pain, general health status, vitality, social aspects, emotional aspects and mental health. Final score may vary from zero to 100 being zero the worst and 100 the best health status.

Results were evaluated by comparing initial and final forms answered by individuals. BioEstat 5.0 software was used for descriptive statistical analysis and ANOVA was the Analysis of Variance.

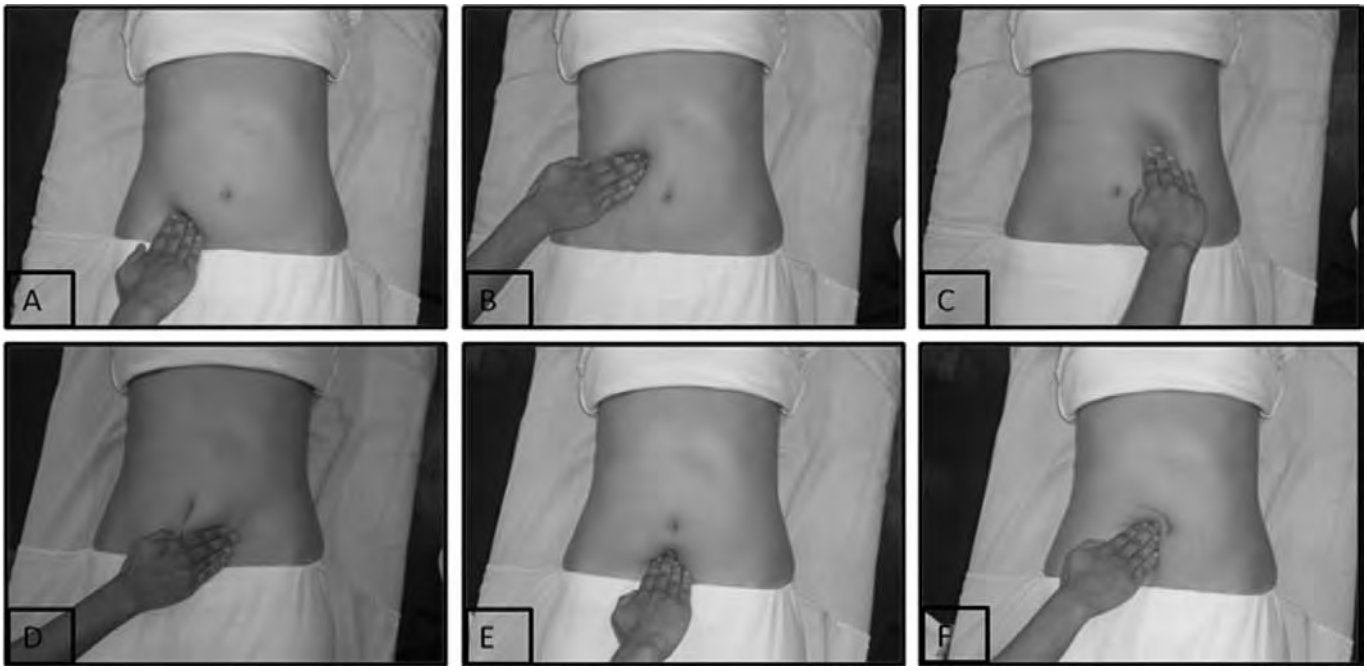


Figure 1 – Sequence of movements of the technique.

A – Cecum toward ascending colon; B – Right flexure toward transverse colon; C – Left flexure toward descending colon; D – Descending colon toward sigmoid; E, F – End of sequence at the sigmoid/rectum.

This study was approved by the Institution's Medical Ethics Committee (CEP 5719/2011- FAMERP).

RESULTS

Mean age was 38.42 years (minimum of 18 and maximum of 65 years) and 79% (n = 15) were females. There has been no sample loss of the 20 evaluated individuals submitted to MVT sessions (Table 1).

With regard to the influence of MVT on the QL of individuals there has been statistically significant improvement ($p < 0.05$) in vitality, functional capacity, pain and general health status. Remaining variables had no statistically significant results (Table 2).

Considering the number of positive Rome III criteria, scores and frequency of evacuations ($p < 0.0003$), all items had statistically significant improvement, showing the efficacy of the therapy (Graph 1).

There has been decreased Rome III criteria prevalence in the revaluation of individuals, as shown in table 3.

Schöber test has shown a statistically positive effect ($p < 0.0001$) considering that just one patient had equal results before and after treatment. The middle finger to floor test was also positive ($p < 0.0001$) in terms of the therapy influencing increased lumbar mobility (Graph 2).

The difference to evacuate (immediate result on the improvement of presented symptoms, helping evacuation) was reported as from the first week of treatment.

During the first sessions, flatulence, nausea, pain and immedi-

Table 1 – Characterization of sample individuals (n = 20)

Variables	Mean and Standard Deviation	%
Age (anos)	38.42 ± 19.23	
Weight (kg)	68.41 ± 15.09	
Abdominal circunference	82.73 ± 14.49	
Practice of physical activity		54.0

Table 2 – Results obtained in the eight domains of the SF-36 questionnaire

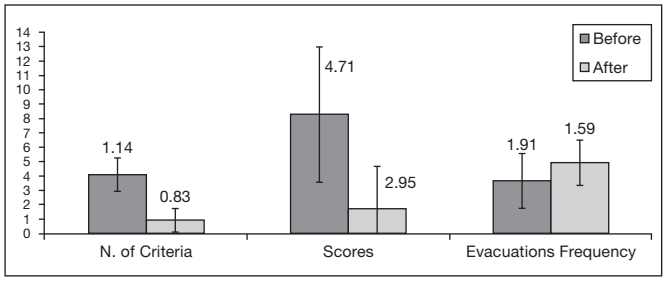
Domains	Initial Evaluation	Revaluation	p value
Functional capacity	68.18 ± 24.52	86.82 ± 14.37	0.048*
Limitation by physical aspects	79.55 ± 24.54	84.09 ± 23.11	0.058
Pain	52.73 ± 15.21	76 ± 15.34	0.038*
General health status	62 ± 33.14	82.18 ± 21.78	0.048*
Vitality	45.45 ± 25.05	62.27 ± 20.05	0.028*
Social aspects	78.27 ± 21.83	81.73 ± 23.61	0.6737
Emotional aspects	78.73 ± 40.22	72.73 ± 34.32	0.071
Mental health	65.50 ± 22.13	72.80 ± 25.50	0.071

*significance level $p < 0.05$. *t* Student test.

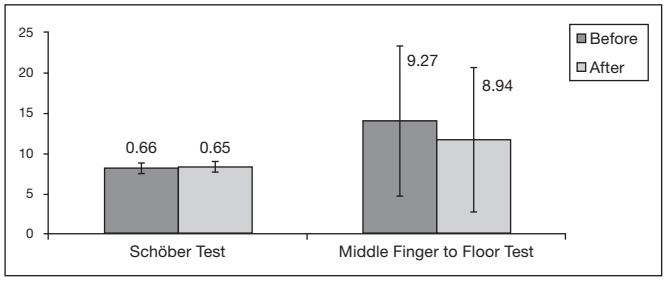
Table 3 – Prevalence of Rome III Criteria in volunteers, before and after treatment.

Criteria	Initial evaluation %	Revaluation %	p value
Evacuating effort	45.45	0	0.035*
Hardened stools	81.81	0	0.001*
Sensation of incomplete evacuation	81.81	36.36	0.042*
Sensation of anorectal obstruction or block	81.81	36.36	0.042*
Manual maneuvers to help evacuation	45.45	0	0.035*
Less than 3 evacuations per week	63.63	18.18	0.042*

Student's *t* test. * significance level $p < 0.05$.



Graph 1 – Means and standard deviations (represented by vertical lines in columns) of data according to Rome III Criteria, before and after treatment.



Graph 2 – Comparative means of Schöber test and middle finger to floor test before and after manual visceral therapy.

ate desire to evacuate were reported. All symptoms have also improved until the third session according to the QL SF-36 questionnaire.

The presence or absence of satisfaction as to abdominal fullness sensation and easiness to perform the finger to floor test were also verbally described by patients during sessions.

DISCUSSION

This study has observed the positive influence of the program with regard to evaluated variables.

Several studies[18-20] confirm such results, reporting manual abdominal therapy as beneficial and confirming the feasibility of this technique to relieve symptoms in chronic pain patients.

With regard to the higher prevalence of females, Oliveira[21] considers that injuries to pelvic muscles and its innervations caused by gestations, gynecological surgeries and genital prolapses may be predictors of FCIC and, as a consequence, of pain. Between young females and females above 40 years of age (menopause), it is understood the impairment of the pelvic floor and of sphincters due to anatomic and physiological changes.

As to the gradual increase in lumbar mobility and flexibility acquired after each session, other studies have observed the positive influence of MVT showing the efficacy of visceral maneuvers to improve intestinal functions with just five sessions lasting approximately 45 minutes[19,22].

In this study, QL has also improved in physical (functional capacity, pain and general health status) and mental (vitality) domains. Some authors[23,24] highlight decreased abdominal pain, increased number of evacuations and improvement in QL of participants of the massage group and suggest that this technique could be offered as an option for FCIC management.

Few studies differ from our study reporting that the technique does not add significant differences if constant laxatives are not associated[24,25]. So, new studies are recommended aiming at proving the efficacy of the therapy for FCIC symptoms, QL of individuals and increased lumbar mobility, in addition to evidencing its real importance and vigor for the treatment, observing the awareness that the individual is the primary health promoting agent.

CONCLUSION

Our data, within experimental conditions used, allow concluding that MVT proposed and applied to individuals with chronic abdominal pain secondary to FCIC has improved intestinal constipation and lumbar mobility, as well as QL of participants. Further studies are needed to increase sample size and improve the understanding of the magnitude of this technique effects on quality of life of these subjects.

REFERENCES

1. Bharucha AE. Constipation. Best Pract Res Clin Gastroenterol. 2007;21(4):709-31.
2. Bannura, G. Constipación crônica pertinaz: um problema quirúrgico? Rev Méd Chile. 2002;130(7):803-8.
3. Müller-Lissner SA, Kamm MA, Scarpignato C, et al. Myths and misconceptions about chronic constipation. Am J Gastroenterol. 2005;100(1):232-42.
4. Collete VL, Araújo CL, Madruga SW. Prevalence of intestinal constipation and associated factors: a population-based in Pelotas, Rio Grande do Sul State, Brazil, 2007. Cad Saude Publica. 2010;26(7):1391-402.
5. Khatri PK, Ali AD, Alzadjali N, et al. Frequency of functional constipation in 3 different populations and its causative factors. J Pak Med Assoc. 2011;61(11):1149-52.
6. Suares NC, Ford AC. Prevalence of, and risk factors for, chronic idiopathic constipation in the community: systematic review and meta-analysis. Am J Gastroenterol. 2011;106(9):1582-91.
7. Lee EJ, Warden S. Qualitative study of quality of life and the experience of complementary and alternative medicine in Korean women with constipation. Gastroenterol Nurs. 2011;34(2):118-27.

8. Irvine EJ, Ferrazzi S, Pare P, et al. Health-related quality of life in functional GI disorders: focus on constipation and resource utilization. Am J Gastroenterol. 2002;97(8):1986-93.
9. Bassotti G, Carlani E, Baldón M, et al. Painful constipation: a neglected entity? Rev Esp Enferm Dig. 2011;103(1):25-8.
10. Forni JE, Martins MRI, Rocha CE, et al. Perfil sociodemográfico e clínico de uma coorte de pacientes encaminhados a uma clinica de dor. Rev Dor. 2012;13(2):147-51.
11. Lamas, SK. Abdominal massage for people with constipation: a cost utility analysis. J Adv Nurs. 2010;66(8):1719-29.
12. Lamas, K. Using massage to ease constipation. Nurs Times. 2011;107(4):26-7.
13. Lakhani E, Nook B, Haas M, Docrat A. Motion palpation used as a post-manipulation assessment tool for monitoring end-feel improvement: a randomized controlled trial of test responsiveness. J Manipulative Physiol Ther. 2009;32(7):549-55.
14. Vanner SJ, Depew WT, Paterson WG, et al. Predictive value of the Rome criteria for diagnosing the irritable bowel syndrome. Am J Gastroenterol. 1999;94(10):2912-7.
15. Macedo CSG, Souza PR, Alves M, et al. Estudo da viabilidade e confiabilidade intra e interobservador da versão modificada do teste de Schöber modificado em indivíduos com lombalgia. Fisioter Pesq. 2009;16(3):233-8.
16. Perret C, Poiraudeau S, Fermanian J, et al. Validity, reliability, and responsiveness of the fingertip-to-floor test. Arch Phys Med Rehabil. 2001;82(11):1566-70.
17. Ciconelli, RM. Tradução para a língua portuguesa e validação do Questionário genérico de avaliação de qualidade de vida SF-36 (Brasil SF-36). Rev Bras Reumatol. 1999;39(3):143-50.
18. McClurg D. Abdominal massage for the alleviation of constipation symptoms in people with multiple sclerosis: a randomized controlled feasibility study. Rev Mult Scler. 2011;17(2):223-33.
19. Carrasco EP, Moreira MR. Eficácia das manobras viscerais na constipação intestinal. Terapia Manual. 2008;6(28):369-73.
20. Sinclair M. The use of abdominal massage to treat chronic constipation. J Body Mov Ther. 2011;15(4):436-45.
21. Oliveira SCM. Constipação intestinal em mulheres na pós-menopausa. Rev Assoc Med Bras. 2005;51(6):334-41.
22. Woordaward S, Norton C, Barriball KL. A pilot study of the effectiveness of reflexology in treating idiopathic constipation in women. Complement Ther Clin Pract. 2010;16(1):41-6.
23. Friedenberg FK, Dadabhai A, Palit A, et al. The impact of functional constipation on quality of life of middle-aged Black Americans: a prospective case-control study. Qual Life Res. 2012;21(10):1713-7.
24. Nogueira GS, Zanin CR, Netinho JG. Intervenção cognitivo-comportamental em individuo com constipação intestinal: relato de caso. Rev Bras Terapia Cognitiva. 2010;6(1):138-54.
25. Lacy BE, Levenick JM, Crowell M. Chronic constipation: new diagnostic and treatment approaches. Therap Adv Gastroenterol. 2012;5(4):233-47.

ORIGINAL ARTICLE

Evaluation of the addition of tramadol on lidocaine-induced motor block regression time. Experimental study in rats*

Avaliação da adição do tramadol sobre o tempo de regressão do bloqueio motor induzido pela lidocaína. Estudo experimental em ratos

Angela Maria Sousa[1], Martim M Cutait[2], Hazem Adel Ashmawi[3]

*Recebido do LIM-08 da Faculdade de Medicina da Universidade de São Paulo. São Paulo, SP.

ABSTRACT

BACKGROUND AND OBJECTIVES: Tramadol blocks somatosensory potentials *in vitro* and may be associated to local anesthetics to improve analgesic quality. This study aimed at evaluating whether tramadol changes lidocaine motor block regression in two different concentrations.
METHOD: Male Wistar rats weighing 250 to 300 g were submitted to sciatic nerve block guided by percutaneous nerve stimulation. Animals were distributed in four groups (n = 5 per group): 2% lidocaine (GI), 0.5% lidocaine (GII), 2% lidocaine/1.25 tramadol (GIII), 0.5% lidocaine/1.25 tramadol (GIV). Partial and total motor block regression times were evaluated.
RESULTS: Al animals had total motor block when awakening from anesthesia, which has totally regressed during the observation period. Total regression time of 2% lidocaine was 41 ± 1.71 minutes, 0.5% lidocaine was 25.26 ± 0.83 minutes, 2% lidocaine/tramadol was 46.06 ± 0.88 minutes and 0.5% lidocaine/tramadol was 36.15 ± 1.18 minutes. The association of 0.5% lidocaine and 1.25 mg tramadol was more effective as compared to 0.5% lidocaine alone. Data are presented in mean ± mean standard error (mse), considering significant $p < 0.05$ using ANOVA followed by Tukey test.
CONCLUSION: Tramadol has effects similar to local anesthetics and, when used as adjuvant of lidocaine, prolongs motor block duration in rats.
Keywords: Lidocaine, Nervous block, Tramadol.

RESUMO

JUSTIFICATIVA E OBJETIVOS: O tramadol bloqueia potenciais somatossensitivos *in vitro* e pode ser associado a anestésicos locais com o intuito de melhorar a qualidade da analgesia. O objetivo deste estudo foi avaliar se o tramadol altera o tempo de regressão do bloqueio motor da lidocaína em duas diferentes concentrações.
MÉTODO: Ratos machos da linhagem Wistar, pesando de 250 a 300 g, foram submetidos a bloqueio de nervo ciático guiado por neuroestimulação percutânea. Os animais foram distribuídos em quatro grupos (n = 5 por grupo): lidocaína a 2% (GI), lidocaína a 0,5% (GII), lidocaína a 2% / tramadol 1,25 mg (GIII), e lidocaína a 0,5% / tramadol 1,25 mg (GIV). Foram avaliados tempo de regressão parcial e tempo de regressão completa do bloqueio motor.
RESULTADOS: Todos os animais apresentavam bloqueio motor completo no momento do despertar da anestesia, que regrediu completamente durante o período de observação. O tempo de regressão completa do efeito da lidocaína a 2% foi 41 ± 1,71 minutos, lidocaína a 0,5% foi 25,26 ± 0,83 minutos, lidocaína a 2% / tramadol foi 46,06 ± 0,88 minutos e lidocaína a 0,5% / tramadol foi 36,15 ± 1,18 minutos. A associação da lidocaína a 0,5% ao tramadol 1,25 mg foi mais eficaz que lidocaína a 0,5% isoladamente. Os dados são apresentados como média ± erro padrão da média (epm). Considerou-se significativo $p < 0,05$ usando a ANOVA seguido do teste de Tukey.
CONCLUSÃO: Tramadol possui efeitos semelhantes a anestésicos locais e, quando usado como adjuvante da lidocaína, prolonga a duração do bloqueio motor em ratos.
Descritores: Bloqueio nervoso, Lidocaína, Tramadol.

INTRODUCTION

Tramadol (1-RS, 2RS)-2-[(dimethyl-amine)-methyl]-1-(3 methoxyphenyl)-cyclohexanol hydrochloride is a central action drug sold as a racemic mixture of two enantiomers [(+) and (-) tramadol]. The methyl group in the phenolic part of the molecule is responsible for the opioid agonist activity and its affinity for μ receptors is approximately 6 thousand times lower than morphine, 100 times lower than dextropropoxyphene and 10 times lower than codeine[1]. After systemic administration, tramadol is demethylated by the P450 cytochrome system in o-desmethyl-tramadol (M1), active metabolite with agonist activity in

1. Team Leader, Cancer Institute of the State of São Paulo. São Paulo, SP, Brazil.
2. Anesthesiologist, Central Institute, Clinicas Hospital, University of São Paulo. São Paulo, SP, Brazil.
3. Professor, University of São Paulo (USP); Supervisor of the Pain Control Team, Central Institute, Clinicas Hospital, University of São Paulo (USP). São Paulo, SP, Brazil.

Submitted in March 25, 2013.
Accepted for publication in June 03, 2013.

Correspondence to:
Angela Maria Sousa, M.D.
Av. Dr Eneas de Carvalho Aguiar, 255, 8º Andar PAMB - Serviço de Anestesia
Cerqueira Cesar
05403-000 São Paulo, SP.
E-mail: angela-sousa@uol.com.br

μ receptors 200 times higher than the original molecule[2]. It has pharmacological effect similar to local anesthetics, blocking action potential conduction in isolated nerves[3]. By spinal route, it suppresses spinal cord somatosensory potentials[4] and after perineural injection it induces total motor block[5]. A previous study has described different motor block intensities by perineural tramadol in sciatic nerve of rats, where motor block induced with 5 mg tramadol was similar to motor block induced with 2% lidocaine[5].

This study aimed at evaluating the possibility of tramadol potentiating duration and intensity of motor block induced by 0.5% and 2% perineural percutaneous lidocaine in the sciatic nerve of rats. Parameter was motor block regression time.

METHOD

Twenty male Wistar rats weighing 250 to 300 g were placed in pairs in cages with 12-hour light-dark cycles. Water and food were supplied ad libitum. Animals were supplied by the Central Vivarium of the School of Medicine, University of São Paulo (FMUSP) and experiments were carried out in FMUSP's LIM-08, after adaptation to the study environment for 30 minutes.

Anesthetic technique: animals were placed in a closed chamber where 4% isoflurane in oxygen was supplied by gauged vaporizer for anesthetic induction – anesthesia was maintained with 1% isoflurane via facial mask to allow sciatic nerve block.

Sciatic nerve block: after being anesthetized, right femur greater trochanter was located by palpation and a 2.5 cm needle without bevel (BBraun, Germany) connected to a Stimuplex nerve stimulator (BBraun, Brazil) to locate the sciatic nerve. The needle was introduced at 1 mm from right femoral shaft, in the notch located between greater trochanter and ischial tuberosity and was then directed to the ischium. A ground electrode was fixed to the right ear and the needle was connected to an electric cable which supplied initial current with 0.6 mA intensity able to promote right thigh muscle contraction, which was progressively increased the greater the proximity to the sciatic nerve. Current was decreased to 0.2 mA observing the muscle contraction response pattern and, with the help of a Hamilton syringe, 50 μL lidocaine (Groups I and II) or tramadol/lidocaine (Groups III and IV) were administered by the previously filled needle lateral extension (15 μL). After drug administration the extension was washed with 15 μL saline.

Motor block evaluation: time for progressive and total motor block regression was recorded and was characterized by observing animals' gait. Values from zero to 3 were attributed to the following criteria: 0 = total absence of motor block, unchanged gait; 1 = minimum motor block, normal gait however with paw inversion; 2 = moderate motor block, animals traction the paw using thigh muscles, but paw is flaccid and does not support the plantar aspect on surface; 3 = total motor block, totally flaccid paw.

Experimental design: animals were distributed in four different study groups. The first group (GI) was submitted to sciatic nerve block with 2% lidocaine. The second group (GII) received 0.5% lidocaine. The third group (GIII) received 2% lidocaine and 1.25 mg tramadol. The fourth group (GIV) received 0.5% lidocaine associated to 1.25 mg tramadol. Motor block duration and intensity were observed in the four groups. Tramadol concentration was based on a previous study, which has observed the presence of minimum motor block with 2.5% tramadol concentration without changing flinching ability.

Statistical analysis

Data are shown as mean ± MSE (mean standard error) of 5 animals from each group and were analyzed by ANOVA followed by Tukey test for multiple comparisons with the help of GraphPad Prism version 5.0 software, considering significant $p < 0.05$.

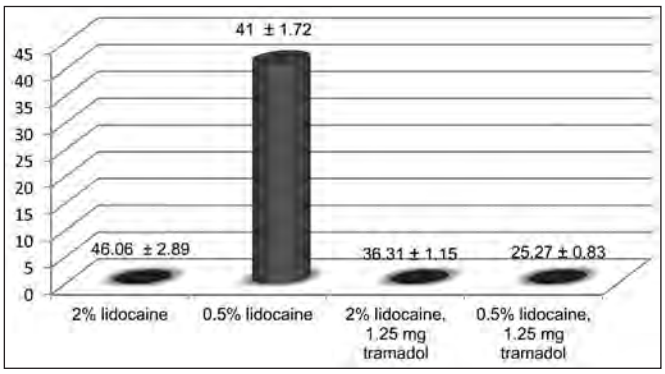
This study was approved by the Research Ethics Committee, School of Medicine, University of São Paulo (protocol 051/2002).

RESULTS

Sciatic nerve was blocked according to the technique described by Sousa et al.[5], in compliance with IASP ethical recommendations for the study of conscious animals[6]. Emergence time of rats after isoflurane withdrawal was similar for the four groups (2.13 ± 0.18, 2.33 ± 0.25, 2.58 ± 0.22, 2.47 ± 0.31 minutes for 2% lidocaine, 0.5% lidocaine, 2% lidocaine/tramadol and 0.5% lidocaine/tramadol) respectively GI, GII, GIII, GIV.

In all groups, animals had total motor block at emergence (degree 3).

Total motor block regression time of 2% lidocaine (41 ± 1.71 minutes) was significantly better than of 0.5% lidocaine (25.26 ± 0.83 minutes) ($p < 0.05$). Tramadol associated to lidocaine has prolonged total motor block regression time of 0.5% lidocaine (36.16 ± 1.19 versus 25.26 ± 0.83 minutes, of tramadol / 0.5% lidocaine and of 0.5% lidocaine, respectively) ($p < 0.05$), but did not significantly change 2% lidocaine total motor block regression time (46.06 ± 2.88 versus 41 ± 1.71 minutes, for tramadol / 2% lidocaine and 2% lidocaine, respectively) ($p > 0.05$) (Graph 1).



Graph 1 – Lidocaine-induced motor block regression time (in minutes) in sciatic nerve of rats.

Table 1 – Motor block duration.

	Emergence Time	Blockade Level 3	Blockade Level 2	Blockade Level 1	Blockade Level 0
2% Lidocaine	128.4 ± 11.2	284 ± 12.78	555 ± 36.84	1147.6 ± 50.18	2460 ± 106.76
0.5% Lidocaine	140.2 ± 15.47	232 ± 6.44	394.4 ± 16.2	693.8 ± 54.3	1516.2 ± 50
2% Lidocaine + tramadol	155 ± 13.22	411.2 ± 21.97*	706.8 ± 30.1	1370 ± 48.6	2764 ± 173
0.5% Lidocaine + tramadol	148.4 ± 19	303 ± 10.4*	816 ± 16	1509 ± 67	2170 ± 69

Tramadol associated to 2% lidocaine has increased intense motor block duration as compared to 2% lidocaine alone; $p < 0.05$.

The addition of 1.25 mg tramadol to 0.5% lidocaine solution has significantly increased the duration of the effect of 0.5% lidocaine alone ($p < 0.05$). ANOVA followed by Tukey test.
Motor block regression time from degree 3 to degree 2, however, was longer in the group receiving 2% lidocaine associated to tramadol (6.85 ± 0.36 minutes) as compared to 2% lidocaine alone (4.73 ± 0.21 minutes) ($p < 0.05$) (Table 1).

DISCUSSION

The administration of anesthetic solutions close to peripheral nerves or neural complexes induces longer anesthesia as compared to neuraxial blocks, depending on physical agent characteristics and the presence or not of vasoconstrictors[7]. Combinations of local anesthetics and adjuvants, such as epinephrine[8], ketamine[9], neostigmine[10], clonidine[11] opioids and dexmedetomidine[12] aim at prolonging analgesia time, allowing the use of local anesthetics in low concentrations and subsequent decrease of drug noxious effects.
Our study has evaluated duration and total regression of motor block induced by different lidocaine concentrations in mixed peripheral nerve, made up of sensory and motor fibers of different diameters with different sensitivities to local anesthetics. According to our results, it is clear that tramadol added to lidocaine has prolonged motor block duration.
Previous studies have reported significant better quality of analgesia with tramadol associated to ropivacaine[13] and intra-articular bupivacaine[14], as well as with lidocaine for brachial plexus block in orthopedic surgeries in humans[15]; however, authors have not mentioned motor block duration. Our study has shown that motor block induced with 0.5% lidocaine, but not with 2% lidocaine, was prolonged by the addition of tramadol.
Such effect might have been caused by tramadol action on perineural adrenergic fibers, prolonging lidocaine action on sciatic nerve fibers[16]. However, the most likely possibility for such effect is the action of tramadol on the kinetics of sodium channel, where it decreases neural excitability[17], the mechanism of which is possibly different from lidocaine[16] and not totally clear. In addition, in vivo, tramadol blocks neural somatosensory potentials conduction[17] and has local anesthetic effect as effective as 2% prilocaine[18]. When directly applied on the sciatic nerve, it dose-dependently blocks neural conduction[3] with lower potency as compared to lidocaine[16], being critical the proximity of neural sheaths for the synergistic effect[19].
We have not found significant increase in total duration of 2% lidocaine effect in this model. However, animals receiving tramadol associated to 2% lidocaine had deep neural block (degree 3) for a longer time as compared to those submitted to 2% lidocaine alone, which could be understood as indirect measurement of motor block intensity. One hypothesis for this phenomenon might have been the participation of tramadol in the early conduction blockade stage, where blockade duration is limited by drug potency.
Clinically, the association of tramadol to loco-regional anesthesia might decrease surgical stress and improve postoperative recovery in humans, due to the physiological advantages of such techniques and to the possibility of early hospital discharge[20]. However, there have been limitations to the technique and the models of our study because it was impossible to measure blockade onset time.

CONCLUSION

Current results allow concluding that tramadol may be used as adjuvant for lidocaine, prolonging motor block recovery time in rats, possibly by mechanisms similar to local anesthetics.

REFERENCES

1. Bamigbade TA, Langford RM. Tramadol hydrochloride: an overview of current use. Hosp Med. 1998 May;59(5):373-6.
2. Raffa RB, Friderichs E, Reinmann W, et al. Opioid and nonopioid components independently contribute to the mechanism of action of tramadol, an 'atypical' opioid analgesic. J Pharmacol Exp Ther. 1992;260(1):275-85.
3. Katsuki R, Fujita T, Koga A, et al. Tramadol, but not its major metabolite (mono-O--desmethyl tramadol) depresses compound action potentials in frog sciatic nerves. Br J Pharmacol. 2006;149(3):319-27.
4. Tsai YC, Chang PJ, Jou IM. Direct Tramadol application on sciatic nerve inhibits spinal somatosensory evoked potentials in rats. Anesth Analg. 2001;92(6):1547-51.
5. Sousa AM, Ashmawi HA, Costa LS, et al. Percutaneous sciatic nerve block with tramadol induces analgesia and motor blockade in two animal pain models. Br J Med Biol Res. 2012;45(2):147-52.
6. Zimmermann M. Ethical guidelines for investigations of experimental pain in conscious animals. Pain. 1983;16(2):109-10.
7. Katz S, Drum M, Reader A. et al. A Prospective, randomized, double-blind comparison of 2% lidocaine with 1:100,000 epinephrine, 4% prilocaine with 1:200,000 epinephrine, and 4% prilocaine for maxillary infiltrations. Anesth Prog. 2010;57(2):45-51.
8. Connelly NR, Freiman JP, Lucas T, et al. Addition of epinephrine to epidural bupivacaine infusions following initiation of labor analgesia with epidural fentanyl. J Clin Anesth, 2011;23(4):265-9.
9. Schnabel A, Poepping DM, Kranke P, et al. Efficacy and adverse effects of ketamine as an additive for paediatric caudal anaesthesia: a quantitative systematic review of randomized controlled trials. Br J Anaesth. 2001;107(4):601-11.
10. Taheri R, Shayeghi S, Razavi SS, et al. Efficacy of bupivacaine-neostigmine and bupivacaine-tramadol in caudal block in pediatric inguinal herniorrhaphy. Paediatr Anaesth. 2010;20(9):866-72.
11. Bazin M, Bonnin M, Storme B, et al. Addition of clonidine to a continuous patient--controlled epidural infusion of low-concentration levobupivacaine plus sufentanil in primiparous women during labour. Anaesthesia. 2001;66(9):769-79.
12. Brummett CM, Padda AK, Amodeo FS et al. Perineural dexmedetomidine added to ropivacaine causes a dose-dependent increase in the duration of thermal antinociception in sciatic nerve block in rat. Anesthesiology. 2009;111(5):1111-9.

13. Günes Y, Seçen M, Özcengiz D, et al. Comparison of caudal ropivacaine, ropivacaine plus ketamine and ropivacaine plus tramadol administration for postoperative analgesia in children. Paediatr Anaesth. 2004;14(7):557-63.
14. Zeidan A, Kassem R, Nahleh N, et al. Intraarticular tramadol-bupivacaine combination prolongs the duration of postoperative analgesia after outpatient arthroscopic knee surgery. Anesth Analg. 2008;107(1):292-9.
15. Kaabachi O, Ouezini R, Koubaa W, et al. Tramadol as an adjuvant to lidocaine for axillary brachial plexus block. Anesth Analg. 2009;108(1):367-70.
16. Mert T, Gunes Y, Ozcengiz D, et al. Comparative effects of lidocaine and tramadol on injured peripheral nerves. Eur J Pharmacol. 2006;543(1-3):54-62.
17. Dalkilic N, Tuncer S, Bariskaner H, et al. Effect or tramadol on the rat nerve conduction: a numerical analysis and conduction velocity distribution study. Yakugaku Zasshi. 2009;129(4):485-93.
18. Altunkaya H, Ozer Y, Kargi E, et al. The postoperative analgesic effect of tramadol when used as subcutaneous local anesthetic. Anesth Analg. 2004;99(5):1461-4.
19. Kumar M, Batra YK, Panda NB, et al. Tramadol added to bupivacaine does not prolong analgesia of continuous psoas compartment block. Pain Pract. 2009;9(1):43-50.
20. Carli F, Kehlet H, Baldini G, et al. Evidence basis for regional anesthesia in multidisciplinary fast-track surgical care pathways. Reg Anesth Pain Med. 2011;36(1):63-72.

Rev Dor. São Paulo, 2013 abr-jun;14(2):134-7

REVIEW ARTICLE

Postoperative cancer pain management by the nursing team*

Gerenciamento da dor no pós-operatório de pacientes com câncer pela enfermagem

Amanda Cristina Prado de Almeida Macedo[1], Flávia Alves Ribeiro Monclús Romanek[2], Maria do Carmo Querido Avelar[3]

*Received from the University of Mogi das Cruzes. Mogi das Cruzes, SP.

ABSTRACT

BACKGROUND AND OBJECTIVES: Cancer pain of patients submitted to surgery should be managed during their whole clinical evolution, taking into consideration their physiological and emotional needs. Based on that, a question was posed: "How is the immediate postoperative pain management of cancer patients by the Perioperative Nursing team?" This study aimed at reflecting about immediate postoperative cancer pain management by the perioperative nursing team.

CONTENTS: This was a literature research with qualitative approach, based on content analysis. Data were collected from Scielo, LILACS and Medline databases, from the Virtual Health Library platform (BIREME). The objectives of the study were complete articles online published by national and international journals in English and Portuguese, indexed from 1999 to 2011 as from Health Sciences Keywords (DECS): "*nursing care", "pain", "postoperative period"* and *"cancer"*, being those considered inclusion criteria.

Information was interpreted according to a hermeneutic view. After organization, the following categories were obtained: "Postoperative cancer pain management represented by (de) humanized and subjective nursing assistance"; "postoperative cancer pain management represented by scales measurements and signs and symptoms"; "Postoperative cancer pain management represented by nursing interventions".

CONCLUSION: Care of cancer patients submitted to surgery requires the development of specific evaluation and therapeutic skills by the perioperative nursing team, who will intermediate humanized pain management.

Keywords: Cancer, Nursing care, Pain, Postoperative period.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor do paciente com câncer que é submetido à cirurgia deve ser gerenciada durante toda a sua evolução clínica, levando em consideração suas necessidades fisiológicas e emocionais, baseando-se nisso, emergiu a indagação: "Como ocorre o gerenciamento da dor no pós-operatório imediato de pacientes com câncer pela equipe de Enfermagem Perioperatória?". O objetivo deste estudo foi refletir sobre o gerenciamento da dor no pós-operatório imediato de pacientes com câncer pela equipe de enfermagem perioperatória.

CONTEÚDO: Foi realizada pesquisa bibliográfica com abordagem qualitativa baseada na análise de conteúdo temática. As fontes para coleta dos dados foram as bases de dados da Scielo, LILACS, e Medline, da plataforma da Biblioteca Virtual em Saúde (BIREME), os objetos de estudo foram artigos disponíveis na íntegra, on-line, publicados em periódicos nacionais e internacionais nos idiomas inglês, português indexados no período de 1999 a 2011 a partir dos Descritores em Ciências da Saúde (DECS): "*cuidado de enfermagem*", "*dor*", "*período pós-operatório*"; "*câncer*"; sendo estes os critérios de inclusão adotados. As informações foram interpretadas segundo a visão hermenêutica. Após organização, obtiveram-se categorias: "O gerenciamento da dor no pós-operatório de pacientes com câncer representado pela assistência de Enfermagem (dês) humanizada e subjetiva"; "O gerenciamento da dor no pós-operatório de pacientes com câncer representado pela mensuração das escalas e dos sinais e sintomas"; "O gerenciamento da dor no pós-operatório de pacientes com câncer representado pelas intervenções de Enfermagem".

CONCLUSÃO: O cuidado destes pacientes exige o desenvolvimento de habilidades específicas de avaliação e terapia pela enfermagem perioperatória, que intermediarão o gerenciamento humanizado da dor.

Descritores: Câncer, Cuidados de enfermagem, Dor, Período pós-operatório.

INTRODUCTION

Immediate postoperative pain management involves pharmacological or non pharmacological care. In case of chronic cancer pain patients, this management receives a holistic approach, since these patients have already potentially being submitted to painful invasive procedures which, together

1. Graduated Nurse by the Nursing Course, University of Mogi das Cruzes (UMC). Mogi das Cruzes, SP, Brazil.
2. Nurse. Master in Nursing. Coordinator of the Nursing Course, Mario Schenberg School (FMS). Professor of the Nursing Course, University of Mogi das Cruzes (UMC). São Paulo, SP, Brazil.
3. Doctor in Nursing; Coordinator of the Graduation Nursing Course, School of Medical Sciences, Santa Casa of São Paulo. São Paulo, SP, Brazil.

Submitted in November 26, 2012.
Accepted for publication in April 24, 2013.

Correspondence to:
Flávia Alves Ribeiro Monclùs Romanek
Rua José de Jesus, 66/53 e 54 – Bloco A – Morumbi
05630-090 São Paulo, SP.
E-mail: flaviaalvesribeiro@hotmail.com

Rev Dor. São Paulo, 2013 abr-jun;14(2):134-7

with the disease, bring distress. So, a large part of patients with such diagnosis experiences pain, which makes extremely important the qualification of health professionals with regard to its management[1].

In considering cancer patients' pain, one should take into consideration physical, emotional and social aspects involving these patients' perception of pain, aiming at implementing approaches related to the holistic management of pain in this special population[2].

The Perioperative Nursing (PE) is being adapted to the care of patients with disease and chronic pain pre-existing the surgical treatment, which requires specific abilities and development of skills of the professionals of this specialty.

Currently, nurses taking care of surgical patients should focus their efforts in the constant evaluation of the presence and intensity of reported postoperative pain, to adequately manage the fifth vital sign[3]. Its management by the PE team is fundamentally based on evaluation, starting with patient admission to the preoperative period throughout the whole surgical experience, aiming at, first, postoperative pain prevention and, second, its adequate management according to the subjectivity and previous history of disease and pain of those patients[3,4].

Efforts should be made to train nursing professionals in the management of painful patients[5].

It is clear the need for further efforts of the nursing team with regard to improving the management of pain as the fifth vital sign. This is emphasized when painful patients have previous history of chronic diseases and limiting or disabling situations such as cancer[6].

Considering the elements to be recognized by the Nursing Team to manage pain, one should stress adequate evaluation tools, interview by nurses, in addition to pharmacological and non pharmacological treatment proposals[1,4,6-8].

As from literature reports, a question has oriented this study: *"How is immediate postoperative cancer pain managed by the Perioperative Nursing team?"*

This study is justified by the gap in the literature with regard to managing the fifth vital sign of cancer patients submitted to surgery.

This study aimed at describing immediate postoperative cancer pain management by PE teams.

CONTENTS

This is a descriptive qualitative study. Data were collected from Scielo, LILACS and Medline databases, from the Virtual Health Library platform (BIREME).

The objectives of this study were complete articles available online, published in national and international journals in English or in Portuguese, indexed from 1999 to 2011 as from Health Sciences Keywords (HSK): "*nursing care", "pain", "postoperative period", "cancer",* which were the inclusion criteria.

Data were collected from October 2011 to February 2012, as from the guiding question: *"How is immediate postoperative cancer pain managed by the Perioperative Nursing team?"* After the categorization process, the following categories have emerged: "Management of postoperative cancer pain represented by the (de) humanized and subjective Nursing assistance", "Management of postoperative cancer pain represented by the measurement with scales and of signs and symptoms" and "Management of postoperative cancer pain represented by Nursing interventions".

Management of postoperative cancer pain represented by the (de) humanized and subjective Nursing assistance

Management, sensitivity and perception of the nursing team are critical for the evaluation and assistance to adequately treat painful patients.

"As from sensitivity and perception, nurses precisely detect pain... provide closeness, interaction with patients"[9].

Qualified professionals to control pain have higher possibilities of assuring a more humanized assistance to patients. The holistic care involving pain management of cancer patients submitted to surgery involves the need for consideration of biological, emotional and behavioral aspects of such patients[5,10]:

"Pain is considered a syndrome resulting from physical and emotional aspects which have to be taken care of"[11].

The consideration exposed by the authors is confirmed by the statement that the development of resilience in the abilities of being, having, being able to and wanting to, contributing for a reflection about cancer patients' assistance[12].

Thus, the humanized care of cancer patients with postoperative pain goes beyond the establishment of evaluation and pharmacological treatment rules:

"A way to evaluate pain is to trust words and behaviors... for a humanized assistance"[6].

To detect cancer patients' pain, nurses have to know how to evaluate, by means of sensitivity and perception, providing interaction between patients and caregivers[9].

The care of cancer patients with pain in the Post-Anesthetic Care Unit (PACU) may be influenced by previous or triggering stimuli which may have consequences:

"Pain management in an individualistic way... discarding evaluation and management protocols contributes to dehumanization"[10].

Cancer pain control should be evaluated in a unique way, being individual for each patient and with responsibility, for the assistance to be adequate.

When dealing with aspects involving pain management teaching as the fifth vital sign, the qualification of professors and students about the subject significantly contributes for pain management[5].

So, in this category, it has been observed that nursing care with regard to pain involves the consideration of the subjectivity of pain perception by cancer patients. In addition to other signs and symptoms, expressions, means of communication and also verbal and non verbal reports of patients in the postoperative period should also be taken into consideration.

Management of postoperative cancer pain represented by the measurement with scales and of signs and symptoms

In this category, it is noticed that all nurses need to be familiar with tools used to measure pain intensity, which requires competence and skills for the assistance of symptoms to relieve pain.

"To measure PO pain intensity, scales and specific treatment evaluation tools are recommended"[8].

Among procedures involving cancer pain management, one should stress the evaluation and attention given to the fifth vital sign, since PACU admission to discharge.

"Clients should be asked whether they have pain from the admission to discharge [...][4].

In case of cancer pain, the more effective is pain evaluation, the better will be the establishment of the analgesic therapy, thus also decreasing admission costs[13,14]. Considering that each patient experiences pain in a different way, nurses should manage pain in a comprehensive way, taking into consideration all economic, biological and emotional factors[2,13,15].

Postoperative pain may be further worsened by assistance complexity demands, such as physical structure, equipment noise and people moving around[16]. In such cases, the knowledge of Oncologic Nursing may help qualifying nurses and may contribute for adequate assistance[12,16].

There is the urgent need to include the teaching of pain in the curricula of health area graduation courses, aiming at and assuring that future professionals know how to take care of chronic pain patients, using all tools to evaluate possible signs and symptoms[5].

So, this category points to the need for the development of nursing skills in the use of postoperative cancer pain evaluation tools, and for the insertion of pain in their qualification curriculum.

Management of postoperative cancer pain represented by Nursing interventions

In this category, it is noticed that knowing how to use different intervention tools, both pharmacological and non pharmacological, helps Nurses to identify the need of each patient with postoperative pain.

Pain may limit patients' daily activities, such as appetite and sleep, thus leading to feelings of abandon, depression and anxiety. Pain management should be a priority to relieve distress and decrease pain[17-19].

"When evaluating PO pain, one should pay attention to emotional aspects, anxiety, daily and social activities, and sleep"[20].

Since pain management involves pharmacological interventions, the perioperative nursing team has to be prepared to handle opioids and other pain relief drugs, that is, the team has to know how to manage such materials. This is paramount for cancer pain management and may imply shorter admission periods with consequent lower costs[14,16].

In addition to what has already been said, it is also important to stress the relationship among nurses, patients and their families for a better adhesion to the proposed treatment. The holistic care involving pain management should be judicious, always aiming at patients' quality of life[21,22].

In patients with leukemia, a study has shown that the nursing team has a very important role in the care to overcome painful therapies patients have undergone and will still undergo[18].

In addition to pharmacological measures, nurses use additional measures, such as physical and emotional comfort of such patients, change in position in case of bedridden patients, care with operative wound dressing, therapeutic listening and humanized care[5].

Pain management and interventions used were considered in this category. Pharmacological and non pharmacological methods represent a support for the treatment of such patients and it is up to nurses to use techniques to assist acute PO pain of cancer patients.

CONCLUSION

It is noticed that the nursing team should be prepared to manage postoperative pain of cancer patients, using available tools and identifying pharmacological and non pharmacological interventions needed for each patient.

REFERENCES

1. Zuardi MH, Barros N. Manejo da dor no câncer. Rev Técnico-Científica do Hospital Conceição. Porto Alegre. 2001;14(1/2):30-4.
2. Palermo TM. Assessment of chronic pain in children: current status and emerging topics. Pain Res Manag. 2009;14(1):21-6.
3. Secoli SR, Moraes VC, Peniche ACG, et al. Dor pós-operatória: combinações analgésicas e eventos adversos. Rev Esc Enferm USP. 2009;43(spe2):1244-9.
4. Sousa FA. Pain: the fifth vital sign. Rev Lat Am Enfermagem. 2002;10(3):446-7.
5. Paula GR, Reis VS, Romanek FARM, et al. Assistência de enfermagem e dor em pacientes ortopédicos na recuperação anestésica, no Brasil. Rev Dor. 2011;12(3):265-9.
6. Pedroso RA, Celich KLS. Dor: quinto sinal vital, um desafio para o cuidar em enfermagem. Texto Contexto Enferm. Florianópolis. 2006;15(2):270-6.
7. da Cruz D de A, Pimenta CA. Evaluation of patients with chronic pain in nursing consultation: proposal of an instrument for nursing diagnosis. Rev Lat Am Enfermagem. 1999;7(3):49-62.
8. Calil AM, Pimenta CA. Pain intensity of pain and adequacy of analgesia. Rev Lat Am Enfermagem. 2005;13(5):692-9.
9. Machado AC, Brêtas AC. Nonverbal communication of elderly patients facing the pain process. Rev Bras Enferm. 2006;59(2):129-33.
10. Lemos S, Miguel EA. Caracterização do manejo da dor, realizado pela equipe de Enfermagem, na unidade de terapia intensiva pediátrica. Cienc Cuid Saude. 2008;7(1): 82-7.
11. da Silva LM, Zago MM. Care for the oncologic patient with chronic pain drom the point of view of the nurse. Rev Lat Am Enfermagem. 2001;9(4):44-9.
12. Sória DAC, Bittencourt AR, Menezes MFB, et al. Resiliência na área da Enfermagem em Oncologia. Acta Paul Enferm. 2009;22(5):702-6.
13. Menossi MJ, Lima RA, Corrêa AK. Pain and the challenge of interdisciplinarity in child care. Rev Lat Am Enfermagem. 2008;16(3):489-94.
14. Gomes ME, Evangelista PE, Mendes FF. Influence of acute pain management service on analgesic drugas cost and consumption in the post-anesthetic recorevey unit. Rev Bras Anestesiol. 2003;53(6):808-13.
15. Rocha LS, Moraes MW. Assistência de Enfermagem no controle da dor na sala de recuperação pós-anestésica. Rev Dor. 2010;11(3):254-8.
16. Gois CF, Dantas RA. Stressors in care at a thoracic surgery postoperative unit: nursing evaluation. Rev Lat Am Enfermagem. 2004;12(1): 22-7.
17. Zuardi MH, Barros N. Manejo da dor no câncer. Rev Técnico-Científica. Porto Alegre. 2001;14(1/2).
18. Kulkamp IC, Barbosa CG, Bianchinil KC. Percepção de profissionais da saúde sobre aspectos relacionados à dor e utilização de opióides: um estudo qualitativo. Ciência & Saúde Coletiva. 2008;13(2):721-31.
19. Sapolnik R. Intensive care therapy for cancer patient. J Pediatr. 2003;79(Suppl 2):S231-42.

20. Miceli AVP. Dor crônica e subjetividade em oncologia. Rev Bras Cancerol. 2002;48(3):363-73.
21. Recco DC, Luiz CB, Pinto MH. O cuidado ao paciente portador de doença oncológica: na visão de um grupo de enfermeiros de um hospital de grande porte do interior do estado de São Paulo. Arq Ciênc Saúde. 2005; 12(2):85-90.
22. Guitiérrez MGR, Bravo MM, Chanes DC, et al. Adesão de mulheres mastectomizadas ao início precoce de um programa de reabilitação. Acta Paul Enferm. 2007;20(3)249-54.

REVIEW ARTICLE

Analgesia during orthodontic treatment with low intensity laser: systematic review*

Analgesia durante o tratamento ortodôntico com o uso do laser de baixa intensidade: revisão sistemática

Kevan Guilherme Nóbrega Barbosa[1], Thaíse Pereira Dantas Sampaio[1], Patrícia Ravena Meneses Rebouças[2], Maria Helena Chaves de Vasconcelos Catão[3], Daliana Queiroga de Castro Gomes[4], Jozinete Vieira Pereira[4]

*Received from the Dentistry Post-Graduation Program, State University of Paraíba. Campina Grande, PB.

ABSTRACT

BACKGROUND AND OBJECTIVES: Pain is a typical symptom during early orthodontic treatment. This study aimed at reviewing the literature on the use of low intensity laser to relieve pain during orthodontic treatment.
CONTENTS: Titles, summaries and articles were searched in the following databases: Pubmed/Medline, Cochrane Library, LILACS and Scielo. Three researchers have independently searched using defined inclusion and exclusion criteria. Eight clinical trials were included and six have observed significant pain relief after therapeutic laser.
CONCLUSION: There are scientific evidences that low intensity laser decreases pain symptoms during dental movements after the placement of orthodontic elastics and after orthodontic adjustments. Its use by dentists is a feasible alternative for inducing less adverse effects as compared to anti-inflammatory analgesics, being indicated for allergic patients, children and patients with systemic impairment. However, there is the need for further scientific investigations using well-defined protocols.
Keywords: Analgesia, Laser, Laser therapy, Low intensity laser, Orthodontics, Pain.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor é um sintoma clínico característico em estágios iniciais do tratamento ortodôntico. O objetivo deste estudo foi rever na literatura o uso da terapia a laser de baixa intensidade na redução da dor durante o tratamento ortodôntico.
CONTEÚDO: Uma busca de títulos, resumos e artigos foram realizadas nas bases de dados Pubmed/Medline, Cochrane Library, LILACS e Scielo. Três pesquisadores realizaram de forma independente uma busca utilizando critérios de inclusão e exclusão definidos. Foram incluídos oito ensaios clínicos, sendo que seis deles verificaram redução significativa da dor após uso do laser terapêutico.
CONCLUSÃO: Existe evidência científica de que o uso do laser de baixa intensidade diminui a sintomatologia dolorosa após colocação de elásticos ortodônticos e após realização de ajustes ortodônticos durante a movimentação dentária. O seu uso por profissionais da área é uma alternativa viável por apresentar menos efeitos colaterais em relação a analgésicos anti-inflamatórios, sendo bem indicado a pacientes alérgicos, crianças e pacientes com comprometimento sistêmico. No entanto, há a necessidade de investigações científicas adicionais que utilizem protocolos bem definidos.
Descritores: Analgesia, Dor, Lasers, Ortodontia, Terapia a laser, Terapia a laser de baixa intensidade.

INTRODUCTION

Pain is a typical symptom during early dental treatment, leading to decreased acceptance and noncompliance with next therapeutic stages, and may even determine treatment interruption[1]. In orthodontics, pain is primarily relieved with nonsteroid anti-inflammatory drugs (NSAIDs)[2]. However, it has to be stressed that NSAIDs should be avoided during orthodontic treatment since they change orthodontic movement mechanism, increasing treatment time[3]. In addition, some patients are allergic and cannot use such analgesic drug[4].
An alternative to analgesic drugs is low intensity laser therapy, used by almost all dental specialties to induce analgesia[5]. A recent review study has compared different analgesic modalities (drugs and low intensity laser therapy) for orthodontic treatment and has shown that, notwithstanding the broad use of

1. Master Students in Dental Clinic, State University of Paraíba; Graduate in Dentistry, State University of Paraíba. Campina Grande, PB, Brazil.
2. Master Student in Dental Clinic, State University of Paraíba; Specialization Student in Orthodontics, Center of Dental Studies and Improvements. Campina Grande, PB, Brazil.
3. Doctor in Dentistry, Federal University of Bahia; Graduation and Post-Graduation Professor, State University of Paraíba. Campina Grande, PB, Brazil.
4. Doctor in Stomatology, State University of Paraíba/Federal University of Bahia; Graduation and Post-Graduation Professor, State University of Paraíba. Campina Grande, PB, Brazil.

Submitted in December 20, 2012.
Accepted for publication in April 22, 2013.

Correspondence to:
Kevan Guilherme Nóbrega Barbosa, M.D.
Rua Paulo Pontes, 260 – Bairro Centenário
58428-210 Campina Grande, PB.
Phones: (83) 3333 5629 / (83) 98327223
E-mail: kevanguilherme@gmail.com

drugs, they may have adverse effects on treatment; authors have also concluded that low intensity laser therapy is a relatively safe alternative needing further attention of the scientific community[4]. Recent studies have investigated the analgesic potential of Gallium-Aluminum-Arsenide (AsGaAl) laser under different protocols, during orthodontic treatment, and have shown promising results[2,6-8]. Alternatives such as acupuncture and hypnosis have been indicated for some cases as pain therapy, being effective in some situations[9]. In orthodontics, however, these alternative therapies have not yet been introduced.

This study aimed at reviewing the use and efficacy of low intensity laser therapy to decrease pain during orthodontic treatment. For such, a systematic review of scientific evidences to date was carried out for the proposed subject.

METHOD

This review has followed a systematized methodology for querying scientific articles on the proposed subject, as follows: Pubmed/Medline, Cochrane Library (Cochrane Registry of Controlled Trials), LILACS and Scielo databases were queried. Three investigators have independently read titles and abstracts. Keywords used were extracted from two electronic dictionaries – Health Sciences Keywords dictionary (DeCC) for the Portuguese language and Medical Subject Headings (MeSH) for the English language. The following keywords were included for Portuguese: *"dor"; "lasers"; "ortodontia"; "terapia a laser"; "terapia a laser de baixa intensidade"*. For English, the respective translations of the keywords were included: "pain"; "lasers"; "orthodontics"; "laser therapy"; "laser therapy, low-level". Boolean operator for each term was "and". Chart 1 shows how keywords were entered to databases.

Chart 1 – Sequence of keywords.

1. Ortodontia "and" Lasers "and" Dor
2. Ortodontia "and" Terapia a Laser "and" Dor
3. Ortodontia "and" Terapia a Laser de Baixa Intensidade "and" Dor
4. Orthodontics "and" Lasers "and" Pain
5. Orthodontics "and" Laser Therapy "and" Pain
6. Orthodontics "and" Laser Therapy, Low-Level "and" Pain

Initial selection was by reading titles and abstracts found by the query, observing the relevance of the proposed subject. Only clinical trials where low intensity laser was used to promote analgesia during orthodontic treatment were included. Languages were Portuguese and English. Experimental studies involving animals and narrative reviews were excluded. Query period ended in October 12, 2012. Figure 1 shows articles inclusion and exclusion criteria.

Data were analyzed as from the development of a questionnaire to collect scientific articles information and then they were displayed in tables for easy visualization. After reading the articles, a comparison was made according to primary variables: significant pain decrease, pain measurement technique, type of method used, ways to evaluate pain and statistical tests used by studies. Secondary variables were: sample size of the test group,

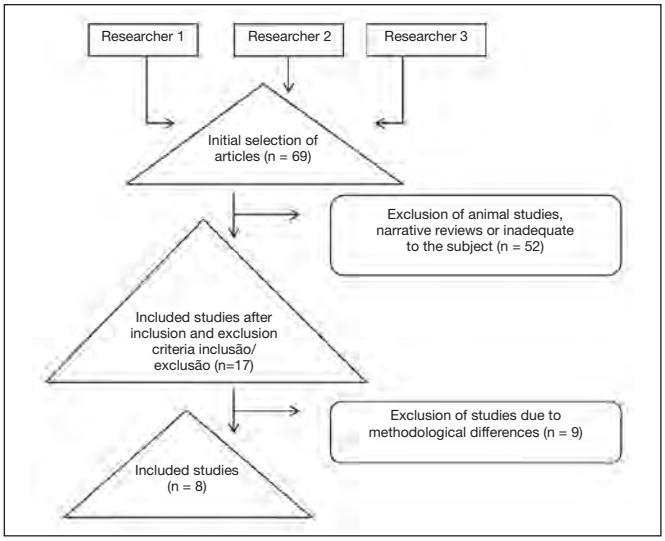


Figure 1 – Flowchart of included and excluded studies.

type of laser, laser wavelength in nanometers (nm), energy density in Joules by square centimeter (J/cm^2) and exposure time per point.

RESULTS

Eight clinical trials were included after selection criteria, being all original scientific articles published from 1995 to 2012 in Orthodontics and Laser Therapy journals. Six out of eight included trials addressed the randomization process. Laser for analgesic purposes was primarily used during orthodontic tooth movement or the placement of orthodontic elastic bands. Placebo and double-blindness were used by most studies. Table 1 shows the studies included in this review.

Laser physical features have varied, but there has been predominance of AsGaAl laser with wavelength above 800 nm, and this range has provided the best analgesic effects. Most frequent dosimetry was in the range of 4-8 J/cm^2. Table 2 shows the specificities of lasers.

Pain was measured by scales, preferably the visual analog scale (VAS). Statistical analysis to test significant differences between groups used non parametric tests. Pain decrease was perceived in seven out of eight studies, with best results with Gallium-Aluminum-Arsenide laser. Table 3 shows the methodology to measure and evaluate pain, in addition to results found.

DISCUSSION

All articles included in this review have investigated laser analgesic action during some orthodontic treatment stage, be it placement of elastic separators[10-12], in the adaptation of fixed appliances[1,2,7] or orthodontic tooth movement during adjustments[6,8]. These are recent studies published by relevant Orthodontics and Laser Therapy journals. All eight included studies had placebo group, however only two had control group. Six

Table 1 – Included studies.

Authors	Journal	Therapeutic Laser Purpose	Sample Size (test group)	Control/ Placebo	Blindness
Lim, Lew and Tay[10]	*American Journal of Orthodontics and Dentofacial Orthopedics*	Decrease pain after placement of orthodontic elastic bands	39	P	Double-blind
Turhani et al.[1]	*American Journal of Orthodontics and Dentofacial Orthopedics*	Decrease pain after fixed appliance	38	P	Blind
Fujiyama et al.[11]	*The Angle Orthodontist*	Decrease pain after placement of orthodontic separators	60	P	Blind
Youssef et al.[8]	*Lasers in Medical Science*	Decrease pain during orthodontic canine movement	15	P	NS
Tortamano et al.[7]	*American Journal of Orthodontics and Dentofacial Orthopedics*	Decrease pain after placement of first orthodontic archwire	20	P,C	Double-blind
Esper, Nicolau and Arisawa[12]	*Lasers in Medical Science*	Decrease pain after placement of orthodontic elastic separator	12	P,C	NS
Bicakci et al.[2]	*Photomedicine and Laser Surgery*	Decrease pain after placement of orthodontic band	19	P	NS
Doshi-Mehta and Bhad-Patil[6]	*American Journal of Orthodontics and Dentofacial Orthopedics*	Decrease pain during orthodontic tooth movement	20	P	Blind

P = placebo, C = control, NS = not specified.

Table 2 – Laser application specificities of included studies.

Authors	Type of Laser	Wavelength (nm)	Energy Density (J/cm^2)	Exposure Time per Point (s)	Number of Applications per Point
Lim, Lew and Tay[10]	AsGaAl	830	0.45–1.8	15, 30 and 60	1 application per point for 5 consecutive days
Turhani et al.[1]	Mini laser 2075	670	NS	30	1 single application per point
Fujiyama et al.[11]	CO_2	NE	NS	30	1 single application per point
Youssef et al.[8]	AsGaAl	809	8	10 and 20	1 application per point with 3, 4 and 7-day intervals
Tortamano et al.[7]	AsGaAl	830	5	16	1 single application per point
Esper, Nicolau and Arisawa[12]	AlGaInP	660	4	25	1 single application per point
Bicakci et al.[2]	AsGaAl	820	7.96	5	1 single application per point|
Doshi-Mehta and Bhad-Patil[6]	AsGaAl	800	8	30	1 application per point with 3, 4 and 7-day intervals in the 1st month, followed by fortnightly applications

nm = manometer; J/cm^2 = Joules by square centimeter; s = seconds; AsGaAl = aluminum-arsenide; AlGaInP = aluminum gallium indium phosphide; CO_2 = carbon dioxide; NS = not specified.

Table 3 – Methodology and pain decrease results.

Authors	Study Method	Pain Measurement Techniques	Evaluation	Statistical Analysis	Pain Decrease*
Lim, Lew and Tay[10]	Laser application (vestibular gingiva) during 5 days in same patients	VAS	Pain evaluation before and after every day	Two-tailed Friedman test	No
Turhani et al.[1]	Laser application in vestibular gingiva in test group and placebo in another group	Pain questionnaire	Pain evaluation after 6h, 30h & 54h	Fisher Exact Test with Bonferroni correction	Yes - after 6h30min
Fujiyama et al.[11]	Laser application (vestibular and palatine gingiva) in test group and placebo in another group	VAS	Pain evaluation after 30s, 6h, 12h & 7 following days	Two-tailed Friedman test	Yes – as from 4th day
Youssef et al.[8]	Laser application (cervical, medial and apical region of tooth) only to the right and placebo to the left	Pain questionnaire	Pain evaluation during 3 stages (after 3, 7 & 14 days)	Man–Whitney test	Yes
Tortamano et al.[7]	Laser application on tooth of the experimental group, placebo to another group and no intervention in controls	VNS	Pain evaluation by questionnaire after 7 days	Two-tailed variance analysis with Bonferroni correction	Yes
Esper, Nicolau and Arisawa[12]	Laser application (cervical and apical region of tooth) in test group, placebo in another group and control in another group	VAS	Pain evaluation after 2h, 24h, 48h, 72h, 96h and 120h	One-tailed Wilcoxon test	No
Bicakci et al.[2]	Laser application (around tooth), placebo application in the opposite side	VAS	Pain evaluation after 5min, 1h and 24h	Man-Whitney test/ Friedman test	Yes - after 24h
Doshi-Mehta and Bhad-Patil[6]	Laser application (medium third of canine and palatine) in one side and placebo in the opposite side	VAS	Evaluation on 1st and 3rd days and 30 days after	Paired t test	Yes

*Statistically significant decrease.
VAS = visual analog scale; VNS = visual numeric scale; s = second; min = minute; h = hour.

studies have shown pain decrease with the use of low intensity laser, however among controlled studies one was positive and one was negative for pain decrease. In one trial where such decrease was not observed this might have been caused by the low energy density used, between 0.45 and 1.8 J/cm^2, which has equated both groups (laser and placebo). This study was one of the first findings on the use of laser to decrease pain after orthodontic adjustment.

Low-intensity laser for orthodontics has been favorable due to analgesic and anti-inflammatory actions and also for acting on biostimulating processes of tissue repair[5]. In addition, they induced above-mentioned actions in wavelengths between 632 and 780 nm, thus being applied to tissues without producing mutations and carcinogenesis[13].

As to laser particularities, there has been a trend to the use of active AsGaAl medium in wavelengths slightly above 800 nm. Used between 800 and 830 nm, AsGaAl laser has shown the best analgesic effects. This active medium is a semiconductor diode with favorable features for a photochemical action of tissue analgesia, in addition to anti-inflammatory action and tissue biostimulation[14,15].

One study has used gaseous carbon dioxide (CO_2) laser, although without specifying wavelength. Although not being always predictable, pain decrease associated to CO_2 laser is frequent[16]. A previous study[17] has suggested that CO_2 laser irradiation decreases early responses to nociceptive stimuli during tooth movement and does not induce periodontal adverse effects.

From included clinical trials, six have mentioned randomization during allocation of group/experimental region and control. Randomization is needed to obtain an equivalent distribution of variables in two groups, thus generating a balance[18]. Only two studies have not reported the randomization method[8,11].

In addition, blindness was another factor observed in included studies, where patients did not know whether they were receiving treatment or placebo. The fact of patients knowing whether they are receiving some therapy or not may psychologically influence them in a positive or negative way, being estimated that the placebo effect induces sensation of relief in 40% of patients who believe are receiving some treatment[9]. However, due to natural pain evolution, which tends to decrease with the adaptation of patients to treatment, a control group without exposure to laser or placebo should be considered important and was observed in just two studies. One of them[12], where no pain decrease was observed, was a preliminary study carried out with a small number of patients, so its conclusions should be carefully analyzed.

A control group without any type of intervention is a good strategy to perceive real pain experienced by patients, since the possibility of a placebo effect is nonexistent or decreased.

Dosimetry, which is the ratio between energy transmitted by a laser emitter and the light beam irradiation surface[15], has shown significant differences among studies. This broad variation of application protocols is possibly due to the attempt to study different ways of using laser during orthodontic treatment. In addition, therapeutic purposes among studies were different. Clinically, a dosimetry with analgesic purposes close to 4 J/cm^2 has been used, although the application protocol is dependent on patients' response[13]. With regard to tissue exposure time, there has been predominance of 15 to 30 seconds. Exposure time of current equipment is directly calculated. The dentist programs the device with the desired energy density and wait for the indication of the application time[15].

Our study has observed that included clinical trials have followed a laser punctual application methodology, using the visual analog scale to measure pain. This scale has already been validated to evaluate pain in experimental studies[19]; however pain perception subjectivity among patients may involve some issues that limit its accuracy[2].

With regard to statistical analyses, the option for non parametric tests in seven studies suggests that pain perception has a non normal distribution among patients. Only one study has used parametric t test. It has to be considered that the use of non parametric tests, although possible, has limitations as compared to equivalent parametric tests for having less statistical power[20].

Studies limitations may be observed in test group sample size, which has varied from 12 to 60 individuals. Sample size for clinical trials is critically important to determine inferences, with difficulties to analyze subgroups when samples are below 30 individuals[21]. Only one study in this review has detailed the procedure to determine sample size[6]. Another limitation was the fact that six out of eight studies had no control group in addition to placebo, with possibility of some patients experiencing the placebo effect.

Low intensity laser therapy, which appears as an alternative to analgesics for patients under orthodontic treatment has shown good analgesic effects, being indicated for its beneficial biological effects and for having less side effects as compared to drugs. However, for being a new subject, there are few scientific articles, especially randomized and adequately controlled clinical trials, to give strong scientific evidences about new therapies.

CONCLUSION

There are scientific evidences that low-intensity laser decreases pain after orthodontic elastic bands placement and after orthodontic adjustments during tooth movement. Best results were found with AsGaAl laser with wavelength between 800 and 830 nm. Low-intensity laser for orthodontics suggests a promising future for dentists since this is an excellent alternative for patients allergic to anti-inflammatory drugs, patients with systemic affections (such as renal affections) and children, due to the non use of pharmacological drugs resulting in fewer side effects. However, there is the need for further scientific investigations using well-defined protocols to allow a comparison among different laser types and application methodologies, as well as to evaluate their efficacy as compared to other available analgesic methods.

REFERENCES

1. Turhani D, Scheriau M, Kapral D, et al. Pain relief by single low-level laser irradiation in orthodontic patients undergoing fixed appliance therapy. Am J Orthod Dentofacial Orthop. 2006;130(3):371-7.
2. Bicakci AA, Kocoglu-Altan B, Toker H, et al. Efficiency of low-level laser therapy in reducing pain induced by orthodontic forces. Photomed Laser Surg. 2012;30(8):460-5.
3. Chumbley AB, Tuncay OC. The effect of indomethacin (an aspirin-like drug) on the rate of orthodontic tooth movement. Am J Orthod. 1986;89(4):312-4.
4. Xiaoting L, Yin T, Yangxi C. Interventions for pain during fixed orthodontic appliance therapy. A systematic review. Angle Orthod. 2010;80(5):925-32.
5. Cavalcanti TM, Almeida-Barros RQ, Catão MHCV, et al. Knowledge of the physical properties and interaction of laser with biological tissue in dentistry. An Bras Dermatol. 2011;86(5):955-60.
6. Doshi-Mehta G, Bhad-Patil WA. Efficacy of low-intensity laser therapy in reducing treatment time and orthodontic pain: a clinical investigation. Am J Orthod Dentofacial Orthop. 2012;141(3):289-97.
7. Tortamano A, Lenzi DC, Haddad AC, et al. Low-level laser therapy for pain caused by placement of the first orthodontic archwire: a randomized clinical trial. Am J Orthod Dentofacial Orthop. 2009;136(5):662-7.
8. Youssef M, Ashkar S, Hamade E, et al. The effect of low-level laser therapy during orthodontic movement: a preliminary study. Lasers Med Sci. 2008;23(1):27-33.
9. Vale NB. Adjuvant and alternative analgesia. Rev Bras Anestesiol. 2006;56(5):530-55.
10. Lim HM, Lew KK, Tay DK. A clinical investigation of the efficacy of low level laser therapy in reducing orthodontic postadjustment pain. Am J Orthod Dentofacial Orthop. 1995;108(6):614-22.
11. Fujiyama K, Deguchi T, Murakami T, et al. Clinical effect of CO_2 laser in reducing pain in Orthodontics. Angle Orthod. 2008;8(2):299-303.
12. Esper MA, Nicolau RA, Arisawa EA. The effect of two phototherapy protocols on pain control in orthodontic procedure – a preliminary clinical study. Lasers Med Sci. 2011;26(5):657-63.
13. Henriques ACG, Maia AMA, Cimões R, Castro JFL. The lasertherapy in Dentistry: properties, indications and current aspects. Odontol Clín-Cient. 2008;7(3):197-200.
14. Holmberg F, Muñoz J, Holmberg F, et al. Uso del láser terapéutico en el control del dolor em Ortodoncia. Int J Odontostomat. 2010;4(1):43-6.
15. Neves LS, Silva CMS, Henriques JFC, et al. Lasers in orthodontics. R Dental Press Orthodon Ortop Facial. 2005;10(5):149-56.
16. Gama SK, de Araújo TM, Pinheiro AL. Benefits of the use of the CO_2 laser in orthodontics. Lasers Med Sci. 2008;23 (4):459-65.
17. Seiryu M, Deguchi T, Fujiyama K, et al. Effects of CO_2 laser irradiation of the gingiva during tooth movement. J Dent Res. 2010;89 (5):537-42.
18. Mariano MTS, Januzzi E, Grossmann E. Scientific evidence-based Orthodontics: incorporating science within clinic practice. R Dental Press Orthodon Ortop Facial. 2009;14(3):107-13.
19. Price DD, McGrath PA, Rafii A, et al. The validation of visual analogue scales as ratio scale measures for chronic and experimental pain. Pain. 1983;17(1):45-56.
20. Rocha HM. Abordagem metodológica na análise de dados de estudos não paramétricos, com base em respostas em escalas ordinais. GEPROS. 2011;6(3):77-91.
21. Miot HA. Tamanho da amostra em estudos clínicos experimentais. J Vasc Bras. 2011;10(4):275-8.

REVIEW ARTICLE

Pain in children with cerebral palsy and implications on nursing practice and research: integrative review*

Dor em crianças com paralisia cerebral e implicações na prática e pesquisa em enfermagem: revisão integrativa

Edna Aparecida Bussotti[1], Mavilde da Luz Gonçalves Pedreira[2]

*Received from the Post-Graduation Course, Paulista School of Nursing, Federal University of São Paulo (EPE-UNIFESP). São Paulo, SP.

ABSTRACT

BACKGROUND AND OBJECTIVES: Due to physical impairment, cerebral palsy (CP) children have pain related to several hospital admissions and multiple knowingly painful procedures. This study aimed at identifying in the literature aspects related to pain in CP children and at evaluating implications for nursing practice and research.

CONTENTS: The keywords *nursing, pain, children* and *cerebral palsy* were queried in Medline, Pubmed, LILACS, Scielo and Cochrane Library databases. Starting date was not limited and final date was October 30, 2011. Among 69 publications, 19 have met the inclusion criteria. The analysis has resulted in four categories: CP children acute pain management; CP children chronic pain management; use of validated tools for pain evaluation; and family participation in CP children's care. Results reflect the complexity of CP children pain management and the need for specialized nursing care and multidisciplinary approach.

CONCLUSION: Notwithstanding the scarcity of publications on this subject, we have identified major aspects of nursing practices for CP children pain management. Faced to complex CP children damages, the evaluation of the painful process should permeate not only the physical dimension, but also psychological, social and spiritual dimensions, which are still seldom discussed in clinical settings. The nursing team should be equipped, should adopt evidence-based practices and translate them into clinical and managerial indicators.

Keywords: Cerebral palsy, Pain, Pediatric nursing.

RESUMO

JUSTIFICATIVA E OBJETIVOS: Em decorrência do comprometimento físico, a criança com paralisia cerebral (PC) é acometida por processos dolorosos, relacionados às diversas internações e múltiplos procedimentos reconhecidos como álgicos. Os objetivos do estudo foram identificar na literatura aspectos relacionados à dor das crianças com PC e avaliar as implicações para a prática e a pesquisa de enfermagem.

CONTEÚDO: Os descritores utilizados foram *nursing, pain, children* e *cerebral palsy* nas bases de dados Medline, Pubmed, LILACS, Scielo e Biblioteca Cochrane. A data inicial não foi limitada e a data final foi 30 de outubro de 2011. Dentre as 69 publicações, 19 atenderam aos critérios de inclusão. A análise resultou em quatro categorias temáticas: manuseio da dor aguda na criança com PC; manuseio da dor crônica na criança com PC; utilização de instrumentos validados para a avaliação da dor; e participação da família no cuidado à criança com PC. Os resultados refletem a complexidade do manuseio da dor em crianças com PC, bem como a necessidade de cuidado especializado de enfermagem e de abordagem multiprofissional.

CONCLUSÃO: Apesar da escassez de publicação referente a essa temática, identificaram-se aspectos importantes da prática de enfermagem mediante a dor da criança com PC. Frente à complexidade de agravos da criança com PC, a avaliação do processo doloroso deve permear não somente a dimensão física, como também as dimensões psicológica, social e espiritual, ainda pouco discutidas na clínica. A enfermagem deve se instrumentalizar, adotar práticas baseadas em evidências e transformá-las em indicadores clínicos e gerenciais.

Descritores: Dor, Enfermagem pediátrica, Paralisia cerebral.

INTRODUCTION

Cerebral palsy (CP) definition is reviewed and modified since 1964 as a function of improved knowledge about this condition. The latest change dates from 2004 and defines CP as a group of posture and movement development disorders leading to limitation of activities, being attributed to non progressive brain disorders during fetal development or childhood. CP motor disorders are often followed by sensory, cognitive, communication and perception disorders, in addition to potential identification of behavioral disorders and epileptic crises[1].

1. Coordinator of Social Accountability, Samaritano Hospital of São Paulo; Doctor Student, Paulista School of Nursing, Federal University of São Paulo (UNIFESP); Member of the Safety and Technology Study Group (SEGTEC), UNIFESP. São Paulo, SP, Brazil.
2. Doctor in Nursing; Assistant Professor of Pediatric Nursing, Paulista School of Nursing, Federal University of São Paulo (UNIFESP); Coordinator and Researcher of the Safety and Technology Study Group (SEGTEC), UNIFESP. São Paulo, SP, Brazil.

Submitted in June 16, 2012.
Accepted for publication in May 06, 2013.
Conflict of interests: None

Correspondence to:
Edna Aparecida Bussotti, M.D.
Rua Ernesto dos Santos, 247 – Jardim Independência
03225-000 São Paulo, SP.
Phone: (11) 9325-6785
E-mail: edna.bussotti@samaritano.com.br

Pre, peri and postnatal periods are considered critical for encephalic development impairment[2].

In developed countries, the incidence of CP is 2 to 3:1000 liveborns, and evidences point to a higher incidence of this morbidity among premature low weight children. In developing countries, the incidence of CP is higher as compared to developed countries[3-5].

In general, CP is classified in three groups: spastic, considered the most common presentation with prevalence of 80% to 90%; dyskinetic, with prevalence of 5% to 10% and ataxic, with prevalence of 2% to 5%[6].

CP is often diagnosed later, when children present motor development delay, persistence of primitive reflexes and abnormal behaviors and postural reactions[2], which result in late children and families follow up and, as a consequence, in the rehabilitation process, thus impairing their quality of life.

In addition, the stigma attributed to CP children is another relevant aspect to be considered, since it may generate discomfort and social isolation of children and their families, negatively impacting their clinical evolution[7,8].

Due to physical impairment, CP children are affected by painful processes, be them related to several hospitalizations and knowingly painful procedures, be it by the level of musculoskeletal impairment leading to movement limitations and inadequate posture[3,9].

Children with neurological deficits are at higher risk for experiencing pain, because they have additional clinical problems which may induce pain; they are often submitted to painful procedures; have idiosyncrasies which may mask the expression of pain; have already some pain indicators, such as change in facial expression and sleep pattern as a function of their condition, which make difficult the evaluation of the painful phenomenon; have their comfort not so valued as compared to other children without neurological deficits[10].

Advances in studies on painful perception of neonates and children reinforce that verbal communication inability does not reflect the absence of pain, which justifies the need for adequate pain relief. This way, all individuals who, for any reason, cannot verbalize their pain, such as children in pre-verbal development stage, those clinically severe and those with some neurological deficit, should be adequately and specifically assisted[11].

In this context, nursing interventions to evaluate pain become critical, in addition to the implementation of pain perception prevention, of proposed treatment and revaluation of applied therapy.

This study aimed at identifying in the literature aspects related to pain in CP children and at evaluating its implications on nursing practice and research.

CONTENTS

This is an integrative literature review on pain in CP children and its implications on nursing practice and research.

Integrative review is a research method which allows the incorporation of evidences to the clinical practice. It also allows the inclusion of different experimental, quasi experimental and non experimental study designs in the investigation. The development of the integrative review is defined by six steps: identification of the subject and selection of the research question; definition of inclusion and exclusion criteria for the studies; definition of information to be extracted from selected studies; evaluation of studies included in the review; interpretation of results; and presentation of the review[12,13]. All six steps were considered in the development of this study.

The research question was defined as: Which nursing strategies may contribute to the management of CP children's pain?

Keywords used in the query were *nursing, pain, children* and *cerebral palsy*. Queried databases were: Medline, Pubmed, LILACS, Scielo and Cochrane Library. Initial date was not limited for the query and final date was October 30, 2011.

Inclusion criteria were texts in English, Portuguese or Spanish, abstract and/or title with questions or words indicating pain management in CP children, as well as actions suggesting some direct or indirect nursing assistance.

The combination of keywords has resulted in a total of 69 texts and after applying inclusion criteria 50 were excluded resulting in a total of 19 texts.

All 19 texts were read in full and descriptive data are shown in table 1 in order of text citation.

As to the origin of studies, eight were developed in the United States, three in Northern Ireland, three in the United Kingdom, two in Spain, one in The Netherlands, one in Canada and one in China.

From 19 recovered texts, five have authorship of other professional categories except for nurses[14-18]. However, direct or indirect nursing actions were identified.

Knowledge areas identified in recovered journals were: Nursing, Medicine, Social Sciences and health professionals in general.

It could be observed that pain in CP children permeates the discussion in different knowledge areas, which makes necessary a multidisciplinary approach.

Primary discussions about pain identified in the texts were consolidated in four categories: management of CP children acute pain; management of CP children chronic pain; use of validated pain measurement tools; and participation of the family in the whole context of CP children care.

ACUTE PAIN MANAGEMENT

Parents, when qualified, are able to evaluate their children's pain, be it related to procedures or to the clinical condition itself, and contribute in an important way for the adequate therapy[16,17].

Among painful procedures, the use of puncture needles was the most mentioned by the studies. Daily situations identified by parents as painful were walking, stretching during rehabilitation, placement of orthosis and daily hygiene activities. In this context, CP children often experience acute pain due to therapeutic procedures, and chronic pain due to problems secondary to CP. One of the most frequent and painful problems is muscle spasm[16].

Surgical procedures, more specifically the postoperative period, were also described as painful. CP children, especially those with more severe neurological deficits, have a higher chance of being submitted to surgical procedures, such as joint luxation correction, application of botulinum toxin, rhizotomy, tenotomy, fasciotomy, correction of scoliosis and other deformities,

Table 1 – Description of selected texts

Authors	Types of Studies and Populations	Objectives
Moberg-Wolff et al.[14]	Experience report	To refine learning and knowledge of family-centered care of children with chronic impairment such as pain, spasticity and cognitive deficit.
Vles[15]	Prospective: 55 CP children between 3 to 18 years of age	To evaluate the reliability and efficiency of the visual analog scale (VAS) to evaluate spasticity management, which is considered painful, before and after botulinum toxin application.
Hadden and Von Baeyer[16]	Descriptive: 43 children between 1 and 19 years of age	To evaluate common behaviors of CP children when in pain.
Geiduschek et al.[17]	Retrospective: 55 CP patients between 3 to 22 years of age	To present the postoperative pain evaluation, as well as clinical management.
Cassidy et al.[18]	Retrospective: 37 children with CP and scoliosis from 11 to 27 years of age (20 without surgery for spinal stabilization and 17 with surgery)	To identify whether children with scoliosis submitted to spinal stabilization surgery have functional gain; to verify whether spinal stabilization surgery helps decreasing the amount of care to these children with regard to caregivers; to verify whether children submitted to spinal stabilization surgery have less pain and lung problems.
Hunt and Franck[19]	Experience Report with five families of CP children from 5 to 16 years of age.	To describe the experience if a CP children unit in the postoperative period, being evaluated with regard to pain with the Paediatric Pain Profile scale (PPP).
Ou et al.[20]	Descriptive, retrospective with documental evaluation: 27 CP children from 3 to 9 years of age.	To compare two surgical techniques with regard to postoperative pain control, time for mobilization in the postoperative period and hospital stay length.
Parkes et al.[21]	Descriptive transversal with home visit and interview: 99 children between 8 and 12 years of age.	To describe the health of CP children (evaluating the presence of pain, motor function, vision, hearing, communication, feeding and use of drugs) and to investigate stress predictors for their parents.
Zier et al.[22]	Randomized, double-blind and placebo controlled: 50 children randomized in two groups (nitrous oxide and midazolam citrate) aged between one and 16 years.	To compare the efficacy of inhaled nitrous oxide and enteral midazolam citrate for sedation of CP children submitted to muscular botulinum toxin A injection, by pain evaluation during the procedure and parents' satisfaction with the comfort of their children after the procedure.
Mckearnan et al.[23]	Literature review.	To observe subjects related to pain experience in cerebral palsy children.
McArthur and Dooley[24]	Experience report. Children with 17 years of age.	To discuss the clinical experience of adequate pain management of cerebral palsy children.
Mason[25]	Experience report	To describe recommendations about adequate pain management in children with neurological deficits.
Villarreal and Johnson[26]	Descriptive	To describe the psychological impact on the family of children with severe neurological deficits, including pain management during daily care.
Roscigno[27]	Literature review	To discuss the significance of pain in spasticity in children with spastic cerebral palsy, as well as possible mechanisms, agreements and limitations of evaluated studies.
Yu et al.[28]	Controlled randomized. 60 children between 2 and 12 years of age divided in two groups (30/30) for intervention (acupuncture) with and without music.	To evaluate the effectiveness of music on the expression of anxiety and pain in cerebral palsy children receiving acupuncture.
Riquelme, Cifre and Montoya[29]	Descriptive transversal by means of interview and observation of two groups from 6 to 35 years of age, with CP (86 participants) and without CP (115 participants),	To verify whether there is difference in pain intensity (using pressure in different body areas) and sensitivity to touch (using a test to evaluate sensitivity with Von Frey with monofilaments) in three age groups (6 to 10; 11 to 17; and 18 to 30 years of age) in individuals with and without CP.
Riquelme and Montoya[30]	Descriptive, transversal with observation of two groups: 5 to 55 years of age with CP and 5 to 42 years of age without CP, by means of interview, touch and pressure application.	To verify whether there is difference in proprioception, sensitivity to touch, pain intensity under pressure using a dynamometer (measures kgf in the pressed site) and somatosensory evoked potential (evaluation of brain wave by means of tactile and painless stimulation in dark environment) in individuals with CP (4 to 14 and 22 to 55 years of age) and without CP (5 to 14 and 22 to 42 years of age).
Donnelly et al.[31]	Descriptive transversal. 251 children from 4 to 25 years of age	To present a protocol to establish the prevalence of orthopedic problems and their impact on pain, motor function, social participation and health of children and adolescents with severe CP.
Dowling[32]	Experience report.	To describe the experience with pain evaluation of cerebral palsy children.

gastrostomy, among others. The postoperative period becomes more complicated for these children, especially for those unable to verbally communicate, being important the qualification of professionals for the adequate assistance of this population[17-26].

It was also observed the importance of the anesthetic process in the perioperative period of children submitted to botulinum toxin injections since this procedure requires several muscle punctures and is referred as painful. A study has compared the use of nitrous oxide and midazolam citrate in two groups of CP children during the toxin application. Sedation level was mea-

sured with the modified numerical scale with scores from zero to four, from the University of Michigan, where the higher the number the deeper the sedation.

Pain was evaluated by nurses using the Face, Legs, Activity, Cry, Consolability scale (FLACC) during the procedure. Results have pointed to the higher efficacy of nitrous oxide with regard to pain intensity during the procedure. When asked about their children's comfort after the procedure, parents have reported being happy with both therapies. Botulinum toxin aims at helping the management of spasticity[22]. It is worth stressing that the study compares sedation and analgesia for the same procedure.

CHRONIC PAIN MANAGEMENT

Another important aspect of chronic pain management reported by the studies was the importance of the evaluation of children's spasticity by the nursing team, since the success of spasmodic pain management depends on the understanding of pain mechanisms. It was also emphasized the importance of including in nursing assistance practices non pharmacological therapies such as heat, cold, physical movement and other exercises as pharmacological treatment adjuvants[27].

It is important to stress that one study has evaluated the use of non pharmacological therapies (acupuncture and music) for chronic pain relief. The study aimed at evaluating the effectiveness of music on anxiety and pain of CP children receiving acupuncture in a specialized clinic. Acupuncture was routinely used in the clinic under musical hearing of children's or parents' preferred songs aiming at knowing whether it would decrease anxiety and pain caused by needling during therapy.

Authors have previously selected 112 songs and, the day before, parents and children would choose 10 to be used during the procedure[28]. Although results have shown higher significance in decreasing anxiety as compared to pain, it is worth highlighting that a single nurse has evaluated anxiety and pain with different scales at the same moment. Other observation for further studies is that the musical selection should be determined by the investigator as from defined criteria related to his/her therapeutic intention.

Important characteristic was observed in the difference in pain perception among individuals with and without CP in different age groups. To recruit CP-free individuals, criteria were age compatible with the CP group and preserved cognitive level to answer simple questions (Yes or No). CP participants had preserved verbal expression.

Test for touch stimulation was Von Frey with monofilaments, often used in chronic pain patients to identify the presence of allodynia. The test used to identify pain was pressure with a dynamometer. No pain evaluation scales were used; confirmation was by participants' verbal expression. After applying pressure in different body regions, it was possible to observe that CP individuals (children, adolescents and adults), showed higher sensitivity to pain as compared to CP-free individuals and, topographically, have reported a higher number of painful body regions during tactile stimulation. CP children had lower sensitivity to painless stimulations and higher sensitivity to painful stimulations as compared to the CP-free group[29,30.]

USE OF VALIDATED PAIN EVALUATION TOOLS

Validated tools are critical for the evaluation of pain (acute or chronic) in CP children. Among studies systematically evaluating pain, the most widely used evaluation tools were Paediatric Pain Profile (PPP), Children's Hospital of Eastern Ontario Pain Scale (CHEOPS), Faces Visual Analog Scale (Wong Baker), Non-Communicating Children's Pain Checklist, Revised Faces Pain Scale, Visual Analog Scale (Williamson) and Face, Legs, Activity, Cry, Consolability (FLACC)[15,16,19,20,22,23,28,31,32]. Three studies have used more than one scale to compare results[15,20,28].

Authors have emphasized that professionals at bedside or giving care to the family should be clinically and scientifically prepared to recognize pain signs and to apply adequate tools. Scales used by the studies presented validity and reliability tests developed by their original authors.

More than evaluating pain, professionals should be sensitized by the pain of others, especially children with severe neurological deficits, since they are unable to verbalize their pain and are at higher risk for having their evaluation underestimated and their pain undertreated, as compared to children without neurological deficits[32].

PARTICIPATION OF THE FAMILY IN THE WHOLE CONTEXT OF CEREBRAL PALSY CHILDREN CARE

All texts selected by this review mentioned the family as integral part of the care-giving process.

CP children are at higher risk for experiencing the impairment of their health, especially in terms of physical functionality, body pain, general perception of health and family well-being, and stress lived during daily activities is a major factor. It is important to recognize the impact of family-centered care with regard to psychological, financial and physical capacity. For such, training programs for professionals are recommended[14,21].

Major implications for the nursing practice are: nursing evaluation of CP children with routine discussions about pain management and psychological disorders which are common; the use of tools which may guide clinical and family evaluation of assisted children with the development of strategies to keep family-centered care, since parents of CP children have a higher need for health professionals support to cope with the daily care of their children[21].

Results have shown a higher number of nursing studies in the area of pain evaluation, especially in the validation of tools/scales for this purpose. In addition, care of children and families was also observed as nursing practice and object of research.

It was also observed in clinical trials a trend toward nurses' participation being limited to the capturing of individuals with the Free and Informed Consent Term and to the management of protocols.

CONCLUSION

The literature recovered by this review was scarce, since the proposed query period was not limited in its initial date and the first text found dates from 1994. So, there are major implications for nursing research, since the survival of increasingly premature children is a reality, which is a risk factor for the increase in the

number of children with disorders, such as CP.

Even so, it was possible to identify important nursing practices with regard to CP children pain. In light of the complexity of disorders to which children and families are subject, pain evaluation should permeate not only the physical dimension, but also psychological, social and spiritual dimensions still seldom discussed in the clinical practice. For such, nurses should be equipped with tools, should adopt evidence-based practices and translate them into clinical and management indicators.

It should be also highlighted that the multidisciplinary work should be considered by the nursing clinical practice as a collaborative resource to manage pain, which requires thorough evaluation and not only directed to the painful focus.

No studies were found about pain management in CP children hospitalized for long periods (residents) or even children under the legal custody of the institution they are in. In such cases, the closest relation of the children is with their caregivers (institution's professional), which is a reality in the Brazilian health system.

Further studies are needed to understand the environment experienced by these children, the professionals' perception faced to prolonged hospitalization periods of children and the impact in their daily practice.

REFERENCES

1. Bax M, Goldstein M, Rosenbaum P, et al. Proposed definition and classification of cerebral palsy. Dev Med Child Neurol. 2005;47(8):571-6.
2. Jones MW, Morgan E, Shelton JE, et al. Cerebral palsy: introduction and diagnosis (part I). J Pediatr Health Care. 2007;21(3):146-52.
3. Nolan J, Chalkiadis GA, Low J, et al. Anesthesia and pain management in cerebral palsy. Anaesthesia. 2000;55(1):32-41.
4. Power R, Mcmanus V, Fourie R. Hardship, dedication and investment: an exploration of Irish mothers commitment to communicating with their children with cerebral palsy. J Psychiatr Ment Health Nurs. 2009;16:531-8.
5. Rotta NT. Paralisia cerebral, novas perspectivas terapêuticas. J Pediatr (Rio J) 2002;78(Supl 1):S48-S54.
6. Parkes J, Hill N. The needs of children and young people with cerebral palsy. Paediatr Nurs 2010;22(4):14-9.
7. Dantas MAS, Collet N, Moura FM, Torquato IMB. Impacto do diagnóstico da paralisia cerebral para a família. Texto Contexto Enferm. 2010;19(2):229-37.
8. Milbrath MV, Soares DC, Amestoy SC, et al. Mães vivenciando o diagnóstico da paralisia cerebral em seus filhos. Rev Gaúcha Enferm. 2009;30(3):437-44.
9. Maranhão MVM. Anestesia e paralisia cerebral. Rev Bras Anestesiol. 2005;55(6):680-702.
10. McGrath PJ, Rosmus C, Canfield C, et al. Behaviors caregivers use to determine pain in non-verbal cognitively impaired individuals. Dev Med Child Neurol. 1998;40(5):340-43.
11. Anand KJS, Aranda JV, Berde CB, et al. Summary proceedings from the neonatal pain – control group. Pediatrics. 2006;117(3):9-22.
12. Whittemore R, Knafl K. The integrative review: update methodology. J Adv Nurs. 2005;52(5):546-53.
13. Mendes KDS, Silveira RCCP, Galvão CM. Revisão integrativa: método de pesquisa para a incorporação de evidências na saúde e na enfermagem. Texto Contexto Enferm. 2008;17(4):758-64.
14. Moberg-Wolff E, Kim CT, Murphy N, et al. Pediatric rehabilitation: 3. Facilitating family-centered treatment decisions. PMR. 2010;2(3):S19-25.
15. Vles GF, de Louw AJ, Speth LA, et al. Visual analogue scale to score the effects of Botulinum Toxin A treatment in children with cerebral palsy in daily clinical practice. Eur J Paediatr Neurol. 2008;12(3):231-8.
16. Hadden KL, von Baeyer CL. Pain in children with cerebral palsy: common triggers and expressive behaviors. Pain. 2002;99(1-2):281-8.
17. Geiduschek JM, Haberkern CM, McLaughlin JF, et al. Pain management for children following selective dorsal rhizotomy. Can J Anaesth. 1994;41(6):492-6.
18. Cassidy C, Craig CL, Perry A, et al. A reassessment of spinal stabilization in severe cerebral palsy. J Pediatr Orthop. 1994;14(6):731-9.
19. Hunt KA, Franck LS. Special needs require special attention: a pilot project implementing the paediatric pain profile for children with profound neurological impairment in an in-patient setting following surgery. J Child Health Care. 2011;15(3):210-20.
20. Ou C, Kent S, Miller S, et al. Selective dorsal rhizotomy in children: comparison of outcomes after single-level versus multi-level laminectomy technique. Can J Neurosci Nurs. 2010;32(3):17-24.
21. Parkes J, McCullough N, Madden A, et al. The health of children with cerebral palsy and stress their parents. J Adv Nurs. 2009;65(11):2311-23.
22. Zier JL, Rivard PF, Krach L, et al. Effectiveness of sedation using nitrous oxide compared with enteral midazolam for botulinum toxina A injections in children. Dev Med Child Neurol. 2008;50(11):854-8.
23. McKearnan KA, Kieckhefer GM, Engel GM, et al. Pain in children with cerebral palsy: a review. J Neurosci Nurs. 2004;36(5):252-9.
24. McArthur L, Dooley F. Pain relief and wound care in a Young woman with special needs. J Woud Care. 2001;10(9):363-5.
25. Mason KJ. Neuromuscular scoliosis: a case of the pediatric patient in the adult intensive care unit. Crit Care Nurs Q. 1998;21(2):64-80.
26. Villarreal P, Johnson CP. Nursing care of children with developmental disabilities having surgery. Semin Perioper Nurs. 1995;4(2):96-111.
27. Roscigno CI. Addressing spasticity-related pain in children with spastic cerebral palsy. J Neurosci Nurs. 2002;34(3):123-33.
28. Yu H, Liu Y, Li S, et al. Effects of music on anxiety and pain in children with cerebral palsy receiving acupuncture: a randomized controlled trial. Int J Nurs Stud. 2009;46(11):1423-30.
29. Riquelme I, Cifre I, Montoya P. Age-related changes of pain experience in cerebral palsy and heathy individuals. Pain Med. 2011;12(4):535-45.
30. Riquelme I**,** Montoya P. Developmental changes in somatosensory processing in cerebral palsy and healthy individuals. Clin Neurophysiol. 2010;121(8):1314-20.
31. Donnelly C, Parkes J, McDowell B, et al. Lifestyle limitations of children and Young people with cerebral palsy: a population study protocol. J Adv Nurs. 2008;61(5):557-69.
32. Dowling M. Pain assessment in children with neurological impairment. Paediatr Nurs. 2004;16(3):37-8.

Rev Dor. São Paulo, 2013 abr-jun;14(2):148-51

REVIEW ARTICLE

Surface electromyography for temporomandibular disorders: systematic review*

Eletromiografia de superfície em disfunção temporomandibular: revisão sistemática

Andersen Ieger Celinski[1], Rafael Schlogel Cunali[2], Daniel Bonotto[3], Aguinaldo Coelho de Farias[4], Paulo Afonso Cunali[5]

*Received from the Federal University of Paraná. Curitiba, PR.

ABSTRACT

BACKGROUND AND OBJECTIVES: Surface electromyography (SE) provides a non invasive evaluation of the bioelectric phenomenon of the evaluated muscle at rest, as well as the comparison with its activity during muscle contraction. This study aimed at evaluating the effectiveness of SE in patients with temporomandibular disorders according to Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) axis I criteria.

CONTENTS: Literature was reviewed as from LILACS, Medline and Scielo databases in the period from January 1987 to February 2012. Randomized controlled clinical trials, clinical trials and clinical tests evaluating signs and symptoms of temporomandibular disorders (TMD) diagnosed according to RDC/TMD were included. Search strategy has resulted in 182 articles of which eight have fulfilled inclusion criteria, being one randomized clinical trial and seven longitudinal studies without randomization criteria. In all studies, SE was the method used to detect and evaluate electric activity of masticatory muscles (body of the masseter and anterior temporal bundle), being somewhat easily applied and following test standards. However, different experimental models and sample selections were used, making difficult the comparison of results.

CONCLUSION: In spite of the limitations of this study, it was possible to observe that although SE should not be used to diagnose TMD, it may help the follow up of TMD treatment evolution.

Keywords: Electromyography, Masseter, Masticatory muscles, Research Diagnostic Criteria, Surface electromyography, Temporal.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A eletromiografia de superfície (ES) permite uma avaliação não invasiva do fenômeno bioelétrico durante o estado de repouso do músculo avaliado bem como a comparação com sua atividade durante a contração muscular. O objetivo deste estudo foi avaliar a efetividade do uso de ES em pacientes diagnosticados com disfunção temporomandibular segundo os critérios *Research Diagnostic Criteria for Temporomandiublar Disorders* (RDC/TMD) eixo I.

CONTEÚDO: A revisão de literatura foi realizada a partir das bases de dados LILACS, Medline e Scielo, cobrindo o período de janeiro de 1987 a fevereiro de 2012. Ensaios clínicos randomizados e controlados, ensaios clínicos e testes clínicos que avaliaram ES, sinais e sintomas de desordens temporomandibulares (DTM) diagnosticados pelo critério RDC/TMD foram incluídos. A estratégia de busca resultou em 182 artigos, dos quais oito preencheram os critérios de inclusão, sendo que um caracterizava um estudo clínico randomizado e sete eram estudos longitudinais sem critérios de randomização. Em todos os estudos, o método utilizado para detectar e analisar a atividade elétrica dos músculos da mastigação (corpo do masseter e feixe anterior do temporal) foi a ES, sendo empregada com certa facilidade e seguindo os padrões para o exame. No entanto, foram utilizados diferentes modelos experimentais e seleção das amostras, causando dificuldades na comparação dos resultados.

CONCLUSÃO: Dentro das limitações deste estudo, foi possível constatar que embora a ES em DTM não deva ser utilizada para diagnóstico, ela pode auxiliar no acompanhamento da evolução dos tratamentos de DTM.

Descritores: Disfunção temporomandibular, Eletromiografia, Eletromiografia de superfície, Masseter, Músculos da mastigação, *Research Diagnostic Criteria*, Temporal.

1. Student of the Specialization Course in Temporomandibular Disorders and Orofacial Pain, Federal University of Paraná (UFPr); Doctor in Prosthesis and Dental Material, *Eberhard KarlsUniversitat – Universitat Klinikum Tubingen*, UKT, Germany; Professor of the Federal Institute of Paraná (IFPR). Curitiba, PR, Brazil.
2. Specialist in Temporomandibular Disorder and Orofacial Pain; Professor of the Specialization Course on Temporomandibular Disorder and Orofacial Pain, Federal University of Paraná (UFPR). Curitiba, PR, Brazil.
3. Professor of the Positivo University; Master in Sciences, Catholic University of Paraná (PUCPR); Professor of the Specialization Course on Temporomandibular Disorder and Orofacial Pain, Federal University of Paraná (UFPr). Curitiba, PR, Brazil.
4. Professor of the Federal University of Paraná; Doctor in Orthodontics, Paulista State University (UNESP); Professor of the Specialization Course on Temporomandibular Disorder and Orofacial Pain, Federal University Paraná (UFPR). Curitiba, PR, Brazil.
5. Professor of the Federal University of Paraná; Doctor in Sciences, Federal University of São Paulo (UNIFESP); Coordinator of the Specialization Course on Temporomandibular Disorder and Orofacial Pain, Federal University of Paraná (UFPR). Curitiba, PR, Brazil.

Submitted in February 27, 2013.
Accepted for publication in May 03, 2013.

Correspondence to:
Paulo Afonso Cunali, M.D.
Rua Cel. Napoleão Marcondes França, 360
80040-270 Curitiba, PR.
Phone: +55 (41) 3322-1234
E-mail: pacunali10@gmail.com

Rev Dor. São Paulo, 2013 abr-jun;14(2):148-51

INTRODUCTION

Temporomandibular disorder (TMD) is a generic term used for a set of musculoskeletal disorders which may affect the masticatory system[1]. The prevalence of TMD signs and symptoms in general population is considered high[2]. Females are more affected by the disease in 5:1 ratio, and between 20 and 50 years of age[2,3]. Current understanding points to TMDs as clinical conditions with multifactorial etiology because one or more factors may contribute for its triggering or perpetuation. Among these factors there are anatomic changes, macrotrauma, microtrauma, occlusal unbalances, parafunctional habits and systemic conditions, such as emotional stress[1,3].

Surface electromyography (SE) provides the non-invasive evaluation of the bioelectric phenomenon with the evaluated muscle at rest, and then compares it to its activity during muscle contraction. This procedure is carried out with electrodes placed on patients' skin, in general bilaterally. Its relatively technical simplicity allows its use in Dentistry and in clinical research[4].

TMDs investigation and evaluation should include behavioral, emotional and psycho-social factors, in addition to normally observed physical changes[5]. The idea of putting together these data to get a standardization of the diagnosis, aiming at further reliability and reproducibility was developed by Dworkin and LeResche[6] by means of a set of diagnostic criteria to investigate TMD. This set was called Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD), translated (history, evaluation questionnaire and clinical evaluation form) and culturally adapted to the Portuguese language (history and evaluation questionnaire) by Pereira et al.[7] and Kominsky et al.[8], respectively.

This study aimed at evaluating, through systematic literature review, the effectiveness of SE for patients with temporomandibular disorders according RDC/TMD axis I criteria[6].

METHOD

The strategy was based on the computerized query of the literature applying keywords to Medline, LILACS and Scielo databases, covering the period from January 1987 to February 2012. Keywords used for the query were crossed in different combinations and were: "surface electromyography", "electromyography", "temporomandibular disorder", "emg", "tmd" and "RDC". Relevant articles were also reviewed with regard clinical SE efficacy as from sensitivity and specificity. Selected articles were submitted to evaluation by two reviewers, respecting inclusion criteria to determine final articles sample, according to their titles and abstracts. Inclusion criteria were:

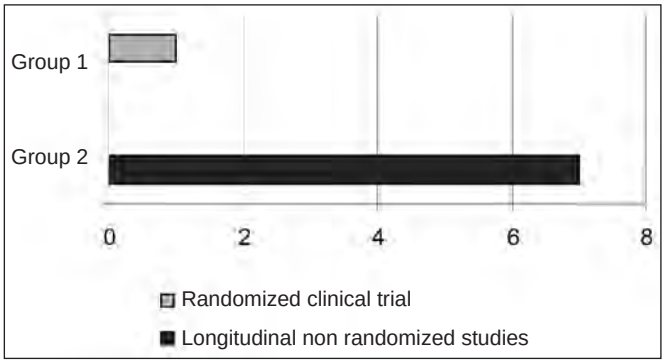
• Studies with humans were masseter muscle and anterior temporal muscle bundle were evaluated by surface electromyography (SE);
• Randomized clinical trials, controlled clinical trials and longitudinal prospective non randomized studies;
• Studies using the RDC/TMD questionnaire as diagnostic criteria;
• Studies in English, Portuguese, Italian, German and Spanish, published within the determined period. So, case reports, case reports follow-up and literature reviews, simple opinions and authors' opinions were excluded.

RESULTS

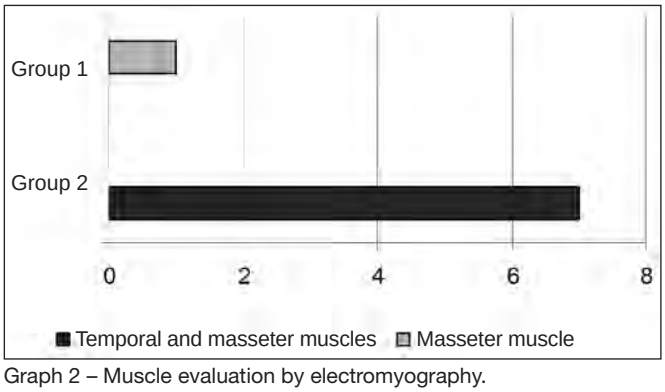
Query strategy has resulted in 182 articles. After applying inclusion/exclusion criteria, eight articles were qualified for final analysis, being the Kappa agreement index between reviewers equal to 1.00. From these studies, one was a randomized clinical trial and seven were longitudinal trials without randomization criteria (Graph 1).

Among selected studies, only one has not analyzed, in combination, muscle electric activity of masseter and temporal muscles. The remaining seven selected studies have evaluated the anterior temporal muscle bundle and the body of the masseter muscle (Graph 2).

Table 1 shows selected studies according to established methodological criteria.



Graph 1 – Studies design.



Graph 2 – Muscle evaluation by electromyography.

Table 1 – Studies based on the evaluation by electomyographic analysis of the activity of masticatory muscles.

Authors	Year	Design	n	TMD	Psychogenic	Control	Evaluated Muscles	Effectiveness of EMG
Tartaglia et al.[12]	2008	L	103	86	17	-	t, m	+
Rodrigues-Bigaton et al.[23]	2010	L	50	31	-	19	t, m	-
Venezian et al.[24]	2010	RCT	48	48	-	-	t, m	+
Botelho et al.[25]	2010	L	30	15	-	15	t, m	+
Tartaglia et al.[26]	2011	L	50	30	-	20	t, m	+
Manfredini et al.[27]	2011	L	72	36	-	36	t, m	-
de Felício et al.[28]	2012	L	60	42	-	18	t, m	+
Ivkovic et al.[29]	2008	L	68	30	-	38	m	+

EMG = electromyography; TMD = temporomandibular disorder; L = longitudinal; RCT = randomized clinical trial; t = temporal muscle; m = masseter muscle.

DISCUSSION

In the search for auxiliary methods to provide better understanding of mechanisms involved with TMD, and to establish a more objective patients' evaluation, the authors decided for the electric evaluation of muscle electric activity, using surface electromyography, aiming at creating reference models and at comparing an asymptomatic healthy function with those situations of system disharmony or dysfunction[9]. SE is an additional evaluation method which allows the observation and quantification of muscle balance, through the electric activity, both in pairs of muscles and between muscles on both sides of the body[10,11].

It is known that the primary parameter to identify TMD patients with regard to pain is its ratio with regard to decreased muscle strength, which may be observed by electromyographic activity, especially during tooth clenching activity[12]. Such findings are in line with the pain adaptation model and its further integration, since pain leads to individual muscle activity changes aiming at limiting movements and at protecting the system against new injuries, by decreasing agonist muscles activity[13,14].

The literature suggests that SEto diagnose TMD has a much lower accuracy than was is proposed by the manufacturers of such devices[15,16]. In addition, recent systematic literature reviews argue that selected studies corresponded to low relevance and low impact trials, in addition to having conflicting final results, possibly due to the summation of many variables such as: inadequate sample and control group selection, insufficient clinical conditions and incorrect use of equipment[17,18]. However, if due precautions are taken and a strict and standardized protocol is used, electromyography may be considered an efficient method to analyze the stomatognathic system, with good reproducibility and additional reference value only during clinical evaluation[11,12,19-22].

The use of RDC/TMD diagnostic criteria is a major factor for standardization and comparison of studies[6]. Our study has found eight articles meeting such criteria. None of them were double-blind. All studies used SE to detect and analyze the electric activity of masticatory muscles (body of masseter and anterior temporal muscle bundle), being relatively easy to use and following the standards of the test. However, different experimental models and sample selections were used, making difficult the comparison of results.

According to some authors, SE evaluation of masticatory muscles allows the objective separation of different TMD subgroups diagnosed according to RDC/TMD criteria. Significant differences are always observed in electromyographic activities and symmetry of activities at rest and during tooth clenching, between TMD and healthy patients[12,18,19,23-28].

The analysis of muscle electromyographic activity has also been used to evaluate TMD treatment efficacy by conventional methods associated or not to support therapies[9,24,25,29]. Low-intensity laser is an example of support therapy for TMD, which may also be relieved with electromyography. Although not promoting changes in electromyographic activity of evaluated muscles, this therapy has decreased observed painful symptoms[24].

Still in line with data found in selected studies, it should be taken into consideration that dentists should not use electromyography or similar tools to diagnose patients who may have masticatory muscles myofascial pain. In addition, such devices should not be used in situations where the aim is an isolated evaluation, or as a complement for decision making and clinical approaches, since such tools do not meet the reliability and validity standards needed for such use[27]. However, it is observed that surface electromyographic evaluation may supply useful information for TMD diagnosis and for the therapeutic planning of the clinical case[28].

It is observed that SE is, in principle, an adequate tool to evaluate neuromuscular function in Dentistry; if used according to specific recommendations and together with patients' history and accurate clinical and physical evaluation, EMG readings may supply objective information which may be well documented, in addition to valid and reproducible data about the functional condition of masticatory muscles of a given patient. Such data may also be compared to a healthy situation and may help the follow up of the treatment through patient's biofeedback[9].

So, the primary parameter to identify patients with TMD-related pain is decreased muscle action, especially during tooth clenching[12]. The literature reports studies which are in line with the pain adaptation model and its further integration, since pain leads to changes in muscle activity aiming at limiting movement and at protecting the system against new injuries by decreasing agonist muscles activity[13,14]. This way, when a sensory stimulation is received, reflex protection mechanisms are activated, triggering a modulation of muscle

activity in the stimulated area which, associated to specific emotional situations, generates further muscle tension and, if associated to parafunctions such as tooth clenching and bruxism, lead to further muscle activity increase, which generates more pain and, consequently, more tension, and so on[30].

CONCLUSION

Considering technological advances in the areas of equipment and techniques, as well as in research resources and research projects about the critical evaluation of the use of SE in cases of temporomandibular disorder, one may conclude, within the limitations of this study, that:

1. SE may be indicated for the follow-up of the effectiveness of a support therapy used for a certain clinical situation;
2. Its effectiveness could have some value as additional research tool to study muscle TMD features;
3. It is a procedure which should not be used as the single diagnostic tool, since it has low specificity and sensitivity;
4. The clinical use of this method to diagnose temporomandibular disorders is uncertain and is currently not recommended.

REFERENCES

1. Okeson JP, De Leeuw R. Differential diagnosis of temporomandibular disorders and other orofacial pain disorders. Dent Clin North Am. 2011;55(2):105-20.
2. Cooper BC, Kleinberg I. Examination of a large patient population for the presence of symptoms and sings of Temporomandibular Disorders. Cranio. 2007;25(2):114-26.
3. Oliveira AS, Dias EM, Contato RG, et al. Prevalence study of sings and symptoms of temporomandibular disorders in Brazilian college students. Braz Oral Res. 2006;20(1):3-7.
4. Castroflorio T, Farina D, Bottin A, et al. Surface EMG of jaw elevator muscles: effect of electrode location and inter-electrode distance. J Oral Rehabil. 2005;32(6):411-17.
5. List T, Dworkin SF. Comparing TMD diagnoses and clinical findings at Swedish and US TMD Center Using Research Diagnostic Criteria for Temporomandibular Disorders. J Orofac Pain. 1996;10(3):240-53.
6. Dworkin SF, LeResche L. Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations and specifications, critique. J Craniomandib Disord. 1992;6(4):301-55.
7. Pereira Jr FJ, Huggins KH, Dworkin SF, et al. Critérios de diagnóstico para pesquisa das desordens temporomandibulares RDC/TMD. Tradução oficial para a língua portuguesa. J Bras Clin Odontol Int. 2004;8:384-95.
8. Komisnky M, Lucena LBS, Siqueira JTT, et al. Adaptação cultural do questionário "Research diagnostic criteria for temporomandibular disorders" axis II para o português. Jl Bras Clin Odontol Int. 2004;4(1):51-61.
9. Emshorff R, Bösch R, Pümpel E, et al. Low-level laser therapy for treatment of temporomandibular joint pain: a double-blind and placebo-controlled trial. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2008;105(4):452-6.
10. Ferario VF, Sforza C, Serrao G. The influence of crossbite on the coordinated electromyographic activity of human masticatory muscles during mastication. J Oral Rehabil. 1999;26(7):575-81.
11. Ferrario VF, Sforza C, Tartaglia GM, et al. Immediate effect of a stabilization splint on masticatory muscle activity in temporomandibular disorder patients. J Oral Rehabil. 2002;29(9):810-5.
12. Tartaglia GM, Moreira Rodrigues da Silva MA, Bottini S, et al. Masticatory muscle activity during maximum voluntary clench in different research diagnostic criteria for temporomandibular disorders (RDC/TMD) groups. Man Ther. 2008;13(5):434-40.
13. Lund JP, Donga R, Widmer CG, et al. The pain-adaptation model: a discussion of the relationship between chronic musculoskeletal pain and motor activity. Can J Physiol Pharmacol. 1991;69(5):683-94.
14. Murray GM, Peck CC. Orofacial pain and jaw muscle activity: a new model. J Orofac Pain. 2007;21(4):263-88.
15. Lund JP, Widmer CG, Feine JS. Validity of diagnostic and monitoring tests used for temporomandibular disorders. J Dent Res. 1995;74(4):1133-43.
16. Greene CS. The role of biotechnology in TMD diagnosis. In: Laskin DM, Greene CS, Hylander WL, editores. TMDs: An evidence-based approach to diagnosis and treatment. Chicago, 1st ed. Quintessence Publishing; 2006. p. 193-202.
17. Klasser GD, Okeson JP. The clinical usefulness of surface electromyography in the diagnosis and treatment of temporomandibular disorders. J Am Dent Assoc. 2006;137(6) 763-71.
18. Suvinen TI, Kemppainen P. Review of clinical EMG studies related to muscle and occlusal factors in healthy and TMD subjects. J Oral Rehabil. 2007;34(9):631-44.
19. Bodéré C, Téa SH, Giroux-Metges MA, et al. Activity of masticatory muscles in subjects with different orofacial pain conditions. Pain. 2005;116(1):33-41.
20. Bevilaqua-Grosso D, Monteiro-Pedro V, Guirro RR, et al. A physiotherapeutic approach to craniomandibular disorders: a case report. J Oral Rehabil. 2002;29(3):268-73.
21. Landulpho AB, E Silva WA, E Silva FA, et al. Electromyographic evaluation of masseter and anterior temporalis muscles in patients with temporomandibular disorders following interocclusal appliance treatment. J Oral Rehabil. 2004;31(2):95-8.
22. Ceneviz C, Mehta NR, Forgione A, et al. The immediate effect of changing mandibular position on the EMG activity of the masseter, temporalis, sternocleidomastoid, and trapezius muscles. Cranio. 2006;24(4):237-44.
23. Rodrigues-Bigaton D, Berni KC, Almeida AF, et al. Activity and asymmetry index of masticatory muscles in women with and without dysfunction temporomandibular. Electromyogr Clin Neurophysiol. 2010;50(7-8):333-8.
24. Venezian G.C, da Silva MA, Mazzetto RG, et al. Low level laser effects on pain to palpation and electromyographic activity in TMD patients: a double-blind, randomized, placebo-controlled study. Cranio. 2010;28(2):84-91.
25. Botelho AL., Silva BC, Gentil FH, et al. Immediate effect of the resilient splint evaluated using surface electromyography in patients with TMD. Cranio. 2010;28(4):266-73.
26. Tartaglia GM, Lodetti G, Paiva G, et al. Surface electromyographic assessment of patients with long lasting temporomandibular joint disorder pain. J Electromyogr Kinesiol. 2011;21(4):659-64.
27. Manfredini D, Cocilovo F, Favero L, et al. Surface electromyography of jaw muscles and kinesiographic recordings: diagnostic accuracy for myofascial pain. J Oral Rehabil. 2011;38(11):791-9.
28. de Felicio CM, Ferreira Cl, Medeiros AP, et al. Electromyographic indices, orofacial myofunctional status and temporomandibular disorders severity: A correlation study. J Electromyogr Kinesiol. 2012;22(2):266-72.
29. Ivkovic N, Mladenovic I, Petkoci S, et al. TMD chronic pain and masseter silent period in psychiatric patients on antidepressive therapy. J Oral Rehabil. 2008;35(6):424-32.
30. Okeson JP, Falace DA. Nonodontogenic toothache. Dent Clin North Am. 1997;41(2):367-83.

Total spinal anesthesia after stellate ganglion block in complex regional pain syndrome patient. Case report*

Raquianestesia total após bloqueio de gânglio estrelado em paciente com síndrome dolorosa complexa regional. Relato de caso

Thiago Robis de Oliveira[1], Eritson Márcio Fernandes de Andrade[2]

*Received from the Pain Treatment Outpatient Service Dr. Josefino Fagundes da Silva, Clinicas Hospital, Federal University of Minas Gerais. Belo Horizonte, MG.

ABSTRACT

BACKGROUND AND OBJECTIVES: Complex regional pain syndrome (CRPS) is a debilitating painful syndrome, with high prevalence in pain management centers. CRPS has several therapeutic options being regional sympathetic block one of the most effective. This study aimed at reporting an uncommon intercurrence of stellate ganglion block in patient with right upper limb CRPS.
CASE REPORT: Female patient, 49 years old, physical status ASA I, admitted for management of severe right shoulder burning pain, associated to trophic changes eight months after local trauma. Diagnosis was CRPS and sympathetic stellate ganglion block was indicated. After monitoring, blockade was induced with 0.5% (8 mL) bupivacaine, evolving, after injection in stellate ganglion topography by paratracheal route, with distal limbs paresthesia, anxiety and severe tachydyspnea. Patient was immediately sedated and intubated, remaining in observation for 135 minutes, being then transferred to the post-anesthetic care unit (PACU). Three days after procedure, patient reported pain decrease from 10 to 3 according to the visual analog scale.
CONCLUSION: Regional blocks are highly effective to manage different pain conditions, including CRPS. This case has shown that, although being uncommon, there might be undesirable effects and the anesthesiologist has to be prepared to adequately support patients in such situations. Adequate understanding of anatomy and of the anesthetic technique decreases the incidence of such effects.

1. Resident Physician (ME_1), Training Center of the Brazilian Society of Anesthesiology (CET/SBA), Social Security Institute of Servers of the State of Minas Gerais (IPSEMG). Belo Horizonte, MG, Brazil.
2. Anesthesiologist, Physician of the Pain Treatment Outpatient Service Dr. Josefino Fagundes da Silva, Clinicas Hospital, Federal University of Minas Gerais (HC-UFMG). Belo Horizonte, MG, Brazil.

Submitted in February 04, 2013.
Accepted for publication in May 10, 2013.
Conflict of interests: None – Sponsorship sources: None.

Correspondence to:
Thiago Robis de Oliveira, M.D.
Rua dos Guaranis, 241/401, Centro
30120-040 Belo Horizonte, MG.
Phone: (31) 8307-5762
E-mail: thiagorobis@gmail.com

Keywords: Complex regional pain syndrome, Pain, Regional block, Spinal anesthesia, Sympathetic block.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A síndrome dolorosa complexa regional (SDCR) é uma síndrome dolorosa debilitante, com prevalência elevada em serviços de tratamento de dor. Apresenta diversas opções terapêuticas, sendo o bloqueio regional simpático uma das mais efetivas. O objetivo deste estudo foi relatar a intercorrência incomum do bloqueio de gânglio estrelado em uma paciente portadora de SDCR no membro superior direito.
RELATO DO CASO: Paciente do sexo feminino, 49 anos, estado físico ASA I, admitida para tratamento de dor no ombro superior direito de forte intensidade, em queimação, associada a mudanças tróficas, após oito meses de traumatismo local. Diagnosticada com SDCR, indicou-se bloqueio simpático em gânglio estrelado. Após monitorização realizou-se bloqueio com bupivacaína a 0,5% (8 mL), evoluindo, após injeção em topografia de gânglio estrelado por abordagem paratraqueal, com parestesia de membros distal, ansiedade e taquidispneia importante. Imediatamente a paciente foi sedada e realizada intubação orotraqueal, permanecendo em observação por 135 minutos. Recuperada, foi levada para a sala de recuperação pós-anestésica (SRPA). Após três dias do procedimento, relatou redução de dor na escala visual analógica, de 10 para 3 pontos.
CONCLUSÃO: Bloqueios regionais já demonstraram eficácia elevada no tratamento de quadros dolorosos vários, incluindo a SDCR. Este caso demonstrou que, apesar de serem incomuns, efeitos indesejáveis podem ocorrer, e o anestesiologista deve estar preparado para o suporte adequado do paciente nessas situações. O conhecimento adequado da anatomia e da técnica anestésica reduz a ocorrência desses efeitos.
Descritores: Bloqueio regional, Bloqueio simpático, Dor, Raquianestesia, Síndrome dolorosa complexa regional.

INTRODUCTION

Complex regional pain syndrome (CRPS) is a debilitating painful syndrome known for more than one century and still today inducing stressful situations. Although recognized for such a

long time[1], its etiology is not totally clear and available management options still fail to improve pain and rehabilitate patients with such syndrome. One therapeutic option is the sympathetic block, being stellate ganglion block indicated for upper limbs CRPS. Although technically easy to induce, stellate ganglion block has some undesirable effects, such as Horner syndrome, hoarseness and, less commonly, total spinal anesthesia.

This study aimed at reporting the uncommon intercurrence of this block, namely total spinal anesthesia, induced in a CRPS patient.

CASE REPORT

Female patient, 49 years old, single, physical status ASA I, leucodermic, referred to the Pain Treatment Outpatient Setting due to severe pain in right upper limb (RUL). Patient reported trauma approximately eight months ago when her right arm was caught by a bus door. Approximately 20 days after the incident, she started presenting severe pain associated to trophic changes ("shinny and warm skin") on trauma region. Referred to several services, she was diagnosed as CRPS type I.

Management to date was based on imipramine (25 mg), 1 tablet/day, clonazepam (2 mg), 1 tablet/day and physical therapy, however without adequate pain control. Admitted to our service, we have observed major movement amplitude limitation (MA) in right upper limb, associated to pain at passive and active manipulation and trophic changes (edema, shinny and warm skin) as compared to contralateral upper limb. Patient had score 10 in 10 by visual analog scale (VAS), characterizing pain as burning, with irradiation to RUL. After confirming clinical diagnosis of CRPS, initial approach was the indication of stellate ganglion anesthetic block and optimization of pharmacological treatment associated to physical therapy.

Three days after consultation, patient was referred to blockade induction, fasting, monitored with cardioscope, digital oxymeter, noninvasive blood pressure with 5-minute intervals and peripheral venous access. Patient was positioned in the supine position and blockade was induced with paratracheal approach. Patient was asked not to cough, speak or swallow and then, perpendicular to skin, a 30 x 8 needle was inserted until the transverse apophysis of the sixth cervical vertebra (Chassainac tubercle) where, after 1 to 2 mm retreat, blood aspiration and negative CSF, 2 mL and then 6 mL of 0.5% bupivacaine without vasoconstrictor were injected.

Approximately 2 minutes after, patient reported progressive distal paresthesia of upper and lower limbs, evolving in the following minutes to severe tachydyspnea, anxiety, aphasia and mydriatic pupils. Monitoring parameters had not significantly changed. Patient was immediately sedated and intubated and was maintained in the operating room for 135 minutes more, without hemodynamic changes. After this period patient was again clinically evaluated, sedation and ventilatory support were withdrawn and patient was referred to the post-anesthetic care unit. Asked about RUL pain she reported VAS of 3/10 at movement and VAS of 1/10 at rest. Remained under observation for 4 hours more, being discharged without sequelae, with orientations after this period. At return, three days later, patient has denied complications reporting VAS in RUL of 2/10 at movement and of 0/10 at rest.

DISCUSSION

First CRPS reports date from 1862 and it was described by Paget still with the name of Causalgia. Many other names have been already suggested for the same presentation, such as reflex sympathetic dystrophy, post-traumatic vasomotor disorder and Sudeck atrophy[1]. In a consensus published in 1994[2] by IASP (International Association for the Study of Pain) and updated in 2006[3], names were standardized and CRPS was defined as: continuous regional pain condition (spontaneous and/or evoked) disproportional to trauma time or degree or other initial injury, in general followed by sensory, motor, vasomotor symptoms or trophic findings. Still in this document, CRPS was classified in types I and II, which differ because type II has real nervous injury not limited to its innervation territory. The etiology is still controversial, but animal and human studies show the importance of the disproportional inflammatory response after injury, associated to major sympathetic system changes, responsible for maintaining chronic neuropathic pain mechanism. Primary clinical manifestations are: burning, deep or piercing pain, sweating/anhydrase, vasomotor changes (skin color and temperature), edema, muscle disorders (weakness, shivering, dystonia or myoclonus). Major treatment options require a multidisciplinary approach involving physical therapy[4], transcutaneous electric nerve stimulation (TENS)[5], psychotherapeutic support[6] and pharmacological options. Most common drugs are: gabapentin, 5% lidocaine patch, opioid analgesics and tricyclic antidepressants. Second line drugs indicated for limited situations are steroids and other anticonvulsants and antidepressants. Sympathetic block is one of the commonest options[7] and more promising results are obtained the earlier the blockade is induced[8]. For upper limbs CRPS (UULL), stellate ganglion blockade is indicated[9] and is aimed at decreasing pain and functionally improving the affected limb. Stellate ganglion is star-shaped and is made by the fusion of the lower cervical ganglion with the first thoracic ganglion. Anatomically, it is anterolateral to C_7 body, lateral to anterior scalene muscle, anterior to subclavian artery, posterior to pre-vertebral fascia and inferior to pulmonary apex. This ganglion may be blocked with anesthetics, opioids and/or steroids and there is also indication to treat phantom limb, trigeminal, cervical or thoracic dermatome post-herpetic neuralgia, and vasospastic disorders. Additional technologies, such as fluoroscopy and ultrasound, are measures to decrease the risk of adverse effects[10]. The prevalence of complications is 1.7 for every 1 thousand blockades[11].

A potentially common adverse effect is Horner syndrome, caused by the propagation of the anesthetic drug through the cervical sympathetic trunk, and hoarseness, caused by recurrent laryngeal nerve block. Bilateral block is avoided due to risk of phrenic nerves block, which may result in bilateral palsy of the diaphragm and in ventilatory intercurrences[12]. Life-threatening complications are usually caused by inadvertent anesthetic injection in nearby arteries (subclavian and vertebral arteries) or

in the subarachnoid space. So, adequate monitoring and venous access are suggested.

Another possible side effect, however uncommon, is total spinal anesthesia after stellate ganglion blockade. According to a study[13] there are three possibilities for this to occur:

• Inadequate needle advance, directly injecting anesthetics in the subarachnoid space through the intervertebral foramen;

• Dura extension, going beyond the nervous root, far from intervertebral foramen. Some cadaver studies show that dura may prolong up to 8 cm with regard to intervertebral foramen;

• Perineural local anesthetics may retrogradely propagate to the subarachnoid space. This mechanism, however, requires longer time and higher doses to be justified.

Anesthesiologists have broadly adopted regional blocks and today their indications are further consolidated, as the case of interventionist CRPS management. However, the adequate understanding of anatomy, anesthetic technique and surveillance with regard to adverse effects are requirements for a good procedure evolution. Although uncommon, the presence of such undesirable effects points to the need for adequate monitoring and readily available materials for support measures when inducing regional blocks.

REFERENCES

1. Cordon FCO, Lemonica L. Síndrome dolorosa complexa regional: epidemiologia, fisiopatologia, manifestações clínicas, testes diagnósticos e propostas terapêuticas. Rev Bras Anestesiol. 2002;52(5):618-27.
2. Merskey H, Bogduk N. Classification of chronic pain. Seattle: IASP Press; 1994.
3. Harden RN, Bruehl S, Stanton-Hicks M, et al. Proposed new diagnostic criteria for complex regional pain syndrome. Pain Med. 2007;8(4):326-31.
4. Dommerholt J. Complex regional pain syndrome: physical therapy management. J Bodywork Mov Ther. 2004;8(4):241-8.
5. Perez RS, Zollinger PE, Dijkstra PU, et al. Evidence based guidelines for complex regional pain syndrome type 1. BMC Neurol. 2010;10(1):20.
6. Beerthuizen A, Stronks DL, Huygen FJ, et al. The association between psychological factors and the development of complex regional pain syndrome type 1 (CRPS1)--a prospective multicenter study. Eur J Pain. 2011;15(9):971-5.
7. Day M. Sympathetic blocks: the evidence. Pain Pract. 2008;8(2):98-109.
8. Yucel I, Demiraran Y, Ozturan K, et al. Complex regional pain syndrome type I: efficacy of stellate ganglion blockade. J Orthop Traumatol. 2009;10(4):179-83.
9. Carron H, Litwiller R. Stellate ganglion block. Anesth Analg. 1975;54(5):567-70.
10. Gofeld M, Bhatia A, Abbas S, et al. Development and validation of a new technique for ultrasound-guided stellate ganglion block. Reg Anesth Pain Med. 2009;34(5):475-9.
11. van Eijs F, Stanton-Hicks M, Van Zundert J, et al. Complex regional pain syndrome. Pain Pract. 2011;11(1):70-87.
12. Cangiani LM, Rezende L, Giancoli N. Bloqueio do nervo frênico após realização de bloqueio do plexo braquial pela via interescalênica: relato de caso. Rev Bras Anestesiol. 2008;58(2):152-9.
13. Bruyns T, Devulder J, Vermeulen H, et al. Possible inadvertent subdural block following attempted stellate ganglion blockade. Anaesthesia. 1991;46(9):747-9.

CASE REPORT

Sympathetic nervous system block to control phantom limb pain. Case report*

Bloqueio do sistema nervoso simpático para tratamento de dor do membro fantasma. Relato de caso

Marcos Fernando Breda de Moraes[1], José Osvaldo Barbosa Neto[1], Thaís Khouri Vanetti[1], Luciana Chaves de Morais[2], Ângela Maria Sousa[3], Hazem Adel Ashmawi[3]

*Received from the Cancer Institute of the State of São Paulo. Clinicas Hospital, School of Medicine, University of São Paulo (HC-FMUSP). São Paulo, SP.

ABSTRACT

BACKGROUND AND OBJECTIVES: Phantom limb sensation is a phenomenon affecting patients submitted to amputation of any limb and this sensation may or may not be followed by pain. This report aimed at presenting a case where sympathetic nervous system block was used as adjuvant to control phantom limb pain.

CASE REPORT: Patient with wrist epidermoid carcinoma, who evolved with phantom limb pain after left forearm amputation. Patient was submitted to conservative treatment and physical rehabilitation, however drug therapy analgesia was insufficient and patient evolved with pain in the amputation stump and sympathetic nervous system-mediated pain. Ultimately, patient was submitted to sympathetic venous block followed by diagnostic thoracic sympathetic chain block with significant pain decrease.

CONCLUSION: Sympathetic nervous system block in this case was induced with venous lidocaine infusion, followed by thoracic sympathetic chain block as therapeutic option for phantom limb pain. This sequence has provided pain relief without adverse effects.

Keywords: Neuropathic pain, Phantom pain, Sympathetic block, Sympathetic venous block.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A sensação do membro fantasma é um fenômeno que acomete pacientes submetidos à amputação de qualquer um dos membros, e essa sensação pode ser acompanhada ou não de dor. Este relato teve por objetivo apresentar um caso no qual o bloqueio do sistema nervoso simpático foi utilizado como adjuvante no tratamento da dor do membro fantasma.

RELATO DO CASO: Paciente portador de carcinoma epidermoide de punho que evoluiu com dor do membro fantasma após amputação do antebraço esquerdo. Foi submetido a tratamento conservador e de reabilitação física, porém a analgesia obtida com terapia farmacológica foi insuficiente e o paciente evoluiu com dor do coto de amputação e dor mediada pelo sistema nervoso simpático. Finalmente, o paciente foi submetido a bloqueio simpático venoso seguido de bloqueio diagnóstico da cadeia simpática torácica com redução significativa da dor.

CONCLUSÃO: Nesse caso foi utilizado o bloqueio do sistema nervoso simpático por meio de infusão venosa de lidocaína, seguido de bloqueio da cadeia simpática torácica como opção terapêutica para dor do membro fantasma. Nessa sequência, foi obtido alívio da dor, sem surgimento de efeitos adversos.

Descritores: Bloqueio simpático venoso, Bloqueio simpático, Dor fantasma, Dor neuropática.

INTRODUCTION

Phantom limb sensation is a phenomenon affecting patients submitted to amputation of any limb and this sensation may or may not be followed by pain. In most cases, the phantom limb has the same size, shape and posture presented by the amputated limb before surgery and may, in up to 20% of cases, evolve with progressive decrease of limb size. This phenomenon is called telescoping[1].

Regardless of the reason for the amputation, up to 80% of patients have phantom limb pain, which may generate an abnormal or anatomically impossible posture. The impact of phantom limb pain goes beyond the impact of the amputation itself or of the presence of phantom sensation. Pain is in general disabling and is usually associated to myofascial pain syndrome in muscles close to the amputated region[1].

The treatment of this painful syndrome is based on pharmaco-

1. Anesthesiologist, Cancer Institute of the State of São Paulo, Clinicas Hospital, School of Medicine, University of São Paulo (HC-FMUSP). São Paulo, SP, Brazil.
2. Anesthesiologist, Doctor by the School of Medicine, University of São Paulo (FMUSP); Supervisor of the Pain Control Team, Cancer Institute of the State of São Paulo, Clinicas Hospital, School of Medicine, University of São Paulo (HC-FMUSP). São Paulo, SP, Brazil.
3. Physician. Professor of the School of Medicine, University of São Paulo (FMUSP); Supervisor of the Pain Control Team, Division of Anesthesiology, Clinicas Hospital, School of Medicine, University of São Paulo (HC-FMUSP). São Paulo, SP, Brazil.

Submitted in February 11, 2013.
Accepted for publication in May 28, 2013.

Correspondence to:
Marcos Fernandes Breda de Moraes, M.D.
Av. Dr. Enéas de Carvalho Aguiar, 255 - 8º A
Serviço de Anestesia - Prédio dos Ambulatórios
05403-000 São Paulo, SP.
E-mail: fbm.marcos@gmail.com

logical management and on the treatment of physical, psychological and behavioral aspects of patients. Surgery may be used, being in general directed to treating amputation stump neuroma. The pharmacological treatment is based on non-opioid analgesics, tricyclic antidepressants (or dual inhibitors), neuroleptics, anticonvulsants, opioids, neuromuscular blockers, ketamine and capsaicin[1].

This report aimed at describing a case where sympathetic nervous system block was used as adjuvant to treat phantom limb pain.

CASE REPORT

Male patient, 65 years old, widower, retired, who started follow up with the Pain Control Group in the postoperative period of left forearm amputation due to partial failure of chemotherapy (CT) + radiation therapy (RT) to treat left wrist and hand epidermoid carcinoma (EC).

In the immediate postoperative period, received patient-controlled analgesia (PCA) with morphine, ketoprofen, dipirone and gabapentin. At hospital discharge morphine was replaced by transdermal fentanyl (TDF) with good pain control, as observed during his subsequent return, although patient had decreased previously prescribed gabapentin dose.

For two months, patient started new RT in axillary region due to left node and had one unscheduled hospitalization due to pain. Differently from postoperative pain, he reported phantom limb pain with intensity 8/10, continuous, burning and in shock and with painful cold sensation. For this reason, gabapentin and RT doses were increased, amitriptyline was introduced and rescue morphine was maintained, obtaining pain relief. Patient also started a physical rehabilitation program oriented by the hospital's Physiatrics Service.

One month after hospital discharge, patient came to the outpatient setting again referring persistence of severe pain in the amputated limb, which has led him to ask for oral rescue morphine in high doses. Opioid rotation from fentanyl to methadone was instituted and rescue morphine dose was increased, being maintained remaining adjuvant drugs.

This change in opioid treatment schedule has provided phantom limb pain relief for approximately six months, when patient lost the pain group follow up, continuing only with radiation therapy in axillary lesion by metastasis of a previous EC.

Patient returned to Pain Control Team follow up due to arterial bleeding in axillary region associated to local infection, which has motivated left shoulder disarticulation and reconstruction with a flap. During this hospitalization period, we decided to change the opioid schedule to oxycodone, to increase gabapentin and amitriptyline doses and to maintain dipirone in usual doses, being this the hospital discharge prescription.

Despite shoulder disarticulation, when returning to the Pain Group outpatient setting, amputation stump remained with exuberant phlogistic signs and at clinical evaluation he presented trigger-points with phantom limb referred pain. Local hyperemia involved the whole axillary region and part of the ipsilateral dorsum.

This evaluation made clear the major participation of amputation stump pain and a possible participation of sympathetic nervous system in pain perpetuation. In addition to antibiotics, stomatotherapy, new RT sessions and new CT cycle with second line drugs, patient had opioid rotation to methadone – for having presented adequate pain control in previous phantom pain episode –, gabapentin dose was increased and amitriptyline was replaced by venlafaxine.

This therapeutic schedule provided poor pain relief, which made the team consider stellate ganglion block, procedure which was immediately discarded because patient had erythematous and infiltrative skin lesion which extended from the shoulder to the puncture site for this blockade.

A serial weekly schedule of sympathetic venous block (SVB) was indicated with 2 mg/kg lidocaine, which has relieved at least 50% of the pain lasting up to three consecutive days.

After three SVB sessions, patient was submitted to diagnostic left thoracic sympathetic block at T_4 with 10 mL of 1% lidocaine, with surprising results. Patient referred that the day of the diagnostic block he had the first night in months where he could sleep without pain and this result has lasted for two days after the procedure. After this period, pain has returned, however with lower intensity.

Thoracic sympathetic chain lesion by radiofrequency was scheduled to be performed three weeks after diagnostic block, however follow up exams have identified disease progression to mediastinum, which made the risk/benefit ratio unfavorable for the intervention.

We decided to maintain methadone (60 mg/day), gabapentin (3600 mg/day), venlafaxine (300 mg/day) and 1.5 g dipirone every 8h, 10 mg rescue morphine every 4h, and chlorpromazine (10 mg) at night, with partial relief. Patient is still being treated with stomatotherapy, CT, RT and psychology.

DISCUSSION

Phantom pain is difficult to treat and is typically triggered by traumatic or atraumatic limb amputation. Its incidence varies from 5% to 85%[2-4], depending on diagnostic criteria. Typically it is burning and shock pain in the amputated limb[4,5]. It should be differentiated from pain in the amputation stump triggered by surgical wound ischemia, local infection, neuroma formation or compression by adjacent structures.

In atraumatic amputations, the lack of adequate postoperative pain control and the presence of severe preoperative pain, a personality with catastrophizing trend[6,7] and postoperative neurotoxic chemotherapy[8,9] are risk factors for the development of phantom limb pain.

There are three primary mechanisms involved with phantom pain: peripheral, medullary and cerebral factors. These factors are responsible for the development of different triggers for this phenomenon, including physical (referred pain), psychological (mind focus on amputation and pain) and environmental (temperature or weather changes) factors[1].

Peripheral consequences of amputation are related to the development of the amputation neuroma. Changes in peripheral nerve induce, in general terms, an increase in ectoptic activities

in this nerve, combined with loss of inhibitory control in dorsal root horn[1].

In central nervous system, phantom pain corresponds to a poorly adapted reorganization of the thalamus and of the cortical representation of somatosensory and motor areas, in such a way that neighbor regions to the somatosensory homunculus end up overlapping the area representing the lost limb. These neuroplastic changes involve both an immediate loss of inhibition of stimuli sent from one area to the other, and the sprouting of new connections along time[1].

In our case, patient had most risk factors for the development of phantom pain. After being submitted to anesthesia with brachial plexus block – possible protective factor[10] -, having had the opportunity to adequately control postoperative pain and having been submitted to pre and post procedure CT, patient evolved with phantom limb pain, which was adequately controlled with gabapentinoids, methadone[11] and amitriptyline.

However, baseline disease recurrence in the amputation stump, as well as its infection, have provided a substract for the worsening of phantom pain associated to stump pain and to sympathetic nervous system-mediated pain, making pain control a challenge.

Notwithstanding maximum dual antidepressant doses, gabapentinoids and opioids rotation, and baseline disease treatment (antibiotics, CT and RT), patient persisted with refractory pain with major worsening of quality of life.

Several studies have suggested that the sympathetic nervous system may play an important role in pain persistence in patients with phantom pain[12-14]. This has led the team to perform a therapeutic test with sympathetic venous block with better results as compared to previous therapy.

The role of sympathetic venous block to treat phantom pain is controversial. A study[15] has compared venous therapy with morphine versus lidocaine for post-amputation pain in 31 patients. Among these patients, some had phantom pain associated to stump pain, others only phantom pain or only stump pain. It was observed that amputation stump pain had satisfactory response with both drugs, while phantom pain has only responded to morphine.

In a Cochrane Library review from 2012, investigating the use of sympathectomy for neuropathic pain management (where phantom pain studies were included), the author has concluded that the evidence of the effectiveness of this technique is weak and that it should only be used in selected patients in whom drug therapy has been ineffective[16].

In our case, the decision for sympathetic nervous block was based on the following criteria: failure of drug therapy, presence of amputation stump pain (with trigger-point) and clinical signs of participation of the sympathetic nervous system in pain mechanism.

However, notwithstanding the good pain relief, this effect was fleeting. We then considered the possibility of thoracic chain sympathectomy by pulse radiofrequency after diagnostic thoracic chain block, intervention which has shown promising results in recent studies[12,13,17].

Sympathetic ganglia feeding upper limbs are located in the intermediate-lateral spinal cord horn between T_2-T_8 and preganglionic fibers travel to the sympathetic chain via white communicating branches. This pathway ascends and communicates with post-ganglionic fibers in T_2, T_3 and the stellate ganglion[18,19]. Usually, thoracic sympathetic block target are T_2 and T_3 ganglia, however due to the presence of skin hyperemia in blockade area, we decided for diagnostic block at T_4.

Thoracic chain sympathectomy with pulse radiofrequency was not performed due to disease progression, because it would increase surgical risk. Currently, patient is being treated with pharmacological and non pharmacological (acupuncture) measures, second line CT and RT for the baseline disease.

In this case where patient with phantom limb pain associated to amputation stump pain and sympathetic nervous system pain maintenance, without improvement with conventional drug therapy, sympathetic nervous system block was used with venous lidocaine, followed by thoracic sympathetic chain block (Figure 1). The conclusion was that, in this scenario, this technique has provided pain relief without adverse effects.

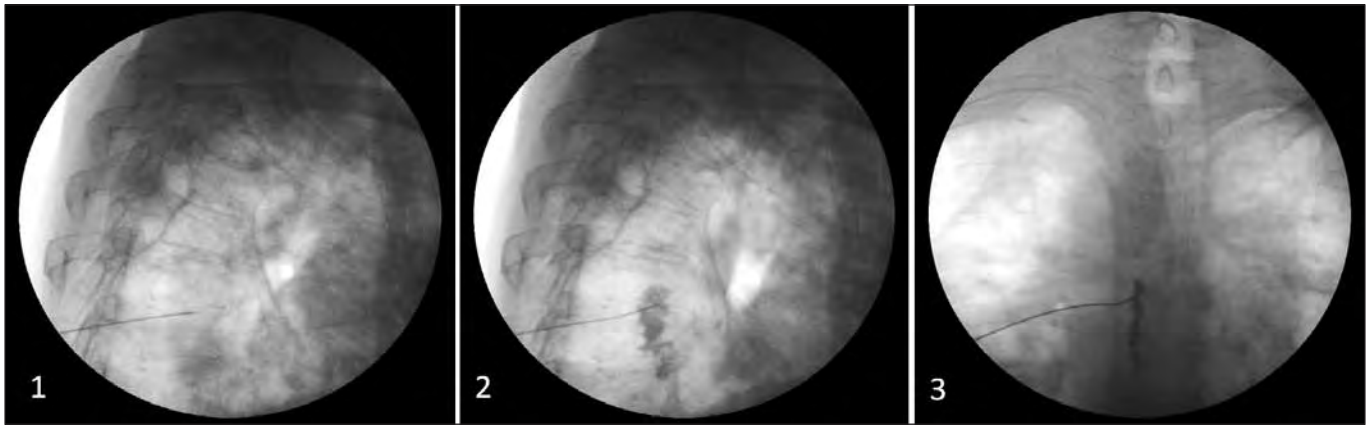


Figure 1 – Thoracic sympathetic chain block.
1 – Radioscopy with lateral view showing needle positioning at T_5 vertebral body level. 2 – Radioscopy with lateral view showing contrast medium spread in thoracic sympathetic chain topography. 3 – Radioscopy with anteroposterior view showing contrast medium distribution in thoracic sympathetic chain topography.

REFERENCES

1. Giummarra MJ, Moseley GL. Phantom limb pain and bodily awareness: current concepts and future directions. Curr Opin Anaesthesiol. 2011;24(5):524-31
2. Jensen TS, Krebs B, Nielsen J, et al. Immediate and long-term phantom limb pain in amputees: incidence, clinical characteristics and relationship to pre-amputation limb pain. Pain, 1985;21(3):267-78.
3. Perkins FM, Kehlet H. Chronic pain as an outcome of surgery. A review of predictive factors. Anesthesiology. 2000;93(4):1123-33.
4. Nikolajsen L, Jensen TS. Phantom limb pain. Br J Anaesth. 2001;87(1):107-16.
5. Ephraim PL, Wegener ST, MacKenzie EJ, et al. Phantom pain, residual limb pain, and back pain in amputees: results of a national survey. Arch Phys Med Rehabil. 2005;86(10):1910-9.
6. Hanley MA, Jensen MP, Smith DG, et al. Preamputation pain and acute pain predict chronic pain after lower extremity amputation. J Pain. 2007;8(2):102-9.
7. Richardson C, Glenn S, Horgan M, et al. A prospective study of factors associated with the presence of phantom limb pain six months after major lower limb amputation in patients with peripheral vascular disease. J Pain. 2007;8(10):793-801.
8. Macrae WA. Chronic post-surgical pain: 10 years on. Br J Anaesth. 2008;101(1): 77-86.
9. Kehlet H, Jensen TS, Woolf CJ. Persistent postsurgical pain: risk factors and prevention. Lancet. 2006;367(9522):1618-25.
10. Gehling M, Tryba M. Prophylaxis of phantom pain: is regional analgesia ineffective? Schmerz. 2003;17(1):11-9.
11. Bergmans L, Snijdelaar DG, Katz J, et al. Methadone for phantom limb pain. Clin J Pain. 2002;18(3):203-5.
12. Cohen SP, Gambel JM, Raja SN et al. The contribution of sympathetic mechanisms to postamputation phantom and residual limb pain: a pilot study. J Pain. 2011;12(8):859-67.
13. West M, Wu H. Pulsed radiofrequency ablation for residual and phantom limb pain: a case series. Pain Pract. 2010;10(5):485-91.
14. Halbert J, Crotty M, Cameron ID. Evidence for the optimal management of acute and chronic phantom pain: a systematic review. Clin J Pain. 2002;18(2):84-92.
15. Wu CL, Tella P, Staats PS, et al. Analgesic effects of intravenous lidocaine and morphine on postamputation pain: a randomized double-blind, active placebo-controlled, crossover trial. Anesthesiology. 2002;96(4):841-8.
16. Straube S, Derry S, Moore RA, et al. Cervico-thoracic or lumbar sympathectomy for neuropathic pain and complex regional pain syndrome. Cochrane Database Syst Rev. 2010;7;(7):CD002918.
17. Agarwal-Kozlowski K, Lorke DE, Habermann CR, et al. Interventional management of intractable sympathetically mediated pain by computed tomography-guided catheter implantation for block and neuroablation of the thoracic sympathetic chain: technical approach and review of 322 procedures. Anaesthesia. 2011;66(8):699-708.
18. Raj PP, Lou L, Erdine S, Staats PS, et al. T2 and T3 sympathetic nerve block and neurolysis. In: Raj PP, Lou L, Erdine S, et al. (editors). Radiographic imaging for regional anesthesia and pain management. 1st ed. Texas, Philadelphia: Churchill Livingstone; 2003. p. 132-7.
19. Yoo HS, Nahm FS, Lee PB, et al. Early thoracic sympathetic block improves the treatment effect for upper extremity neuropathic pain. Anesth Analg. 2011;113(3):605-9.

ERRATUM

Subarachnoid neurolytic blockade in patient with refractory cancer pain. Case report

Bloqueio neurolítico subaracnoideo em paciente com dor oncológica refratária. Relato de caso

José Osvaldo Barbosa Neto, Ângela Maria Sousa, **Silvia Maria Machado Tahantami**, Hazem Adel Ashmawi

Rev Dor. 2013;14(1):76-7

The correct spelling of Dr. Silvia is **Silvia Maria Machado Tahamtani**.

Regards,

José Osvaldo Barbosa Neto