Postoperative pain and analgesia in patients submitted to unruptured brain aneurysm clamping

Dor pós-operatória e analgesia em pacientes submetidos à pinçamento de aneurisma cerebral não roto

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ABSTRACT

BACKGROUND AND OBJECTIVES: Adequate postoperative pain evaluation and management are priorities for quality assistance, especially after neurological surgeries. This study aimed at evaluating postoperative pain of neurosurgical patients submitted to unruptured brain aneurysm clamping.
METHODS: Prospective and descriptive study carried out in a charity hospital of the city of Aracaju, Sergipe, Brazil. Sample was made up of 28 patients submitted to elective craniotomy for unruptured brain aneurysm clamping. Mann-Whitney, Kruskal-Wallis and Dunn-Bonferroni tests were used for inferential analysis. Significance level was 5% throughout the study.
RESULTS: Most patients (78.6%) were females, 64.0% had postoperative pain. There has been significant difference in the number of days with postoperative pain among patients with associated comorbidities (p=0.04) and previous surgery (p=0.01). Most patients had moderate and throbbing headache. There were no adequate pain records and most frequent analgesics were simple analgesics. Opioids prescription was incipient.
CONCLUSION: Systematic pain evaluation should be part of multiprofessional assistance, in compliance with international and national pain institutions recommendations.
Keywords: Analgesia, Aneurysm, Nursing, Pain, Pain measurement.

RESUMO

JUSTIFICATIVA E OBJETIVOS: Avaliação e manuseio adequados da dor pós-operatória são prioridades para uma assistência de qualidade, sobretudo em cirurgias neurológicas. O objetivo deste estudo foi avaliar a dor pós-operatória de pacientes neurocirúrgicos submetidos a pinçamento de aneurisma não roto.
MÉTODOS: Estudo prospectivo e descritivo realizado em um hospital beneficente do município de Aracaju, Sergipe, Brasil. A casuística foi constituída por 28 pacientes submetidos a craniotomia eletiva para tratamento de aneurisma cerebral não roto por meio de pinçamento. Na análise inferencial foram utilizados os testes de Mann-Whitney, Kruskal-Wallis e Dunn-Bonferroni. Foi adotado nível de significância de 5% em todo o estudo.
RESULTADOS: A maioria dos pacientes (78,6%) era do sexo feminino, 64,0% apresentaram dor no pós-operatório. Houve diferença significativa quanto ao número de dias com dor pós-operatória entre os pacientes que tinham comorbidades associadas (p=0,04) e cirurgia anterior (p=0,01). A maior parte dos pacientes apresentou cefaleia de intensidade moderada e pulsátil. Não houve registro adequado da dor nos prontuários, os analgésicos mais utilizados foram analgésicos simples e a prescrição de opioides foi incipiente.
CONCLUSÃO: A avaliação do fenômeno doloroso de forma sistemática deve fazer parte da assistência multiprofissional, conforme as recomendações de instituições nacionais e internacionais da dor.
Descritores: Analgesia, Aneurisma, Dor, Enfermagem, Mensuração da dor.

INTRODUCTION

Pain is a subjective and multidimensional experience affecting most patients submitted to surgical procedures, especially in the postoperative period of aneurysm clamping[1]. It is a health area challenge because it causes physical and emotional distress resulting in physiologic impact adverse to several systems, with repercussion on patients' recovery and general well-being. Although being considered the fifth vital sign, it is still a poorly explored parameter in some health institutions[2-4].
Effective pain control is patient's right which should be assured to prevent postoperative complications and prolonged hospital stay[3,5]. In this sense, effective pain management exists when measurement and evaluation are continuously and systematically performed.

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Nurses, as leaders, should play their role in controlling pain by means of evaluation and orientation to their teams about important aspects of adequate management, in addition to discussing with the multidisciplinary team when the analgesic treatment is not based on patient's evaluation and on national and international guidelines[1,6].

Although there are different scientific evidences related to the effective management of postoperative pain, surgical patients still suffer with inadequate analgesic regimens[7]. Multimodal analgesic therapy has its efficacy recognized for decreasing doses and adverse effects of certain drugs, especially opioids[8]. On the other hand, the practice of oligoanalgesia is still frequent after craniotomy[9].

The study is justified by the need for looking for pain control strategies for patients submitted to aneurysm clamping, respecting the premises of the International Association for the Study of Pain (IASP) and Single Health System (SUS) recommendations.

Our study aimed at evaluating postoperative pain of neurosurgical patients submitted to aneurysm clamping analyzing the variables: location, intensity, duration, aggravating and mitigating factors, as well as at verifying pain records made by the health team on patients' medical charts in the postoperative period and the prevalence of pain during the first post-craniotomy week.

METHODS

This is a prospective, descriptive and exploratory study with quantitative approach, carried out from September 2014 to May 2015, in the intensive care unit and neurosurgery sector of a charity hospital of the city of Aracaju, Sergipe, Brazil.

Sample was made of 28 patients submitted to unrupted aneurysm clamping. After checking the number of patients submitted to craniotomy for aneurysm clamping between September 2013 and March 2014, it was observed that 32 craniotomies were performed for brain aneurysm. After this stage, sample size was calculated[10] and has determined the minimum number of 27 patients as shown in the following model (Figure 1).

Participated in the study patients above 18 years of age, submitted to elective craniotomy due to unrupted brain aneurysm, with Glasgow comma scale score (GCS) equal 15. Evolution to death at any follow-up moment was considered exclusion criteria. Included patients were evaluated in the first seven postoperative days and/or until hospital discharge.

$$N = \frac{Nxn0}{N+n0} \quad \text{Being } n0 = 1/E0^2$$

Where:
N = population size
n = sample size
n0 = sample size approximation
E0 = tolerable sample error
$n0 = 1/(0.05)^2 = 1/0.0025 = 400$

Since N = 32, then:

$$N = \frac{32x400}{32+400} = \frac{12800}{432} = 27$$

Figure 1. Description of sample size calculation

Data collection form had data on patients' socio-demographic and clinical profile. Additionally, there was information about pain presence, location and intensity after surgery, specific questions on postoperative headache characteristics, administered analgesia, pain recording by professionals, in addition to pain numeric visual scale (NVS).

Data were collected by means of patients' medical charts selection. After this stage, documental analysis was performed followed by interviews. Patients were evaluated from the first to the seventh postoperative day and/or until hospital discharge, in cases when patients were discharged before the seventh day.

Pain NVS was used to evaluate pain intensity. Patients were asked to inform pain site, to identify its intensity on the scale and to mention pain aggravating and mitigating factors, as well as headache characteristics.

Pain intensity was evaluated once a day, before and one hour after analgesic administration (routinely prescribed by institution's assistant physician). Patients not receiving analgesia and/or not referring pain were also evaluated one hour after the first evaluation and questioned about the presence of pain.

The study complied with recommendations of Resolution 466/2012, National Health Council, and all patients have signed the Free and Informed Consent Term (FICT).

This study was approved by the Ethics Committee, Universidade Federal de Sergipe (CAAE: 32813114.8.0000.5546).

Statistical analysis

For descriptive analysis, variables were expressed by means of simple frequency and percentage (when categorical) or mean and standard deviation (when continuous or ordinal). Mann-Whitney test (for two independent measures), Kruskal-Wallis test (three or more independent variables) and Dunn-Bonferroni test (multiple comparisons) were used for inferential analysis. Significance level of 5% was adopted to the whole study and software was R Core Team 2015.

RESULTS

Participated in the study 28 patients submitted to aneurysm clamping, who were interviewed until the third postoperative day (POD). Along follow-up, 10 patients were discharged, remaining 18 patients evaluated until the seventh POD.

Most patients were females (78.6%), aged ≥ 45 yeas (67.9%), married (53.6%) and without pathologic background (67.9%). Headache has prevailed in all patients. The number of days with postoperative pain was significantly different among patients with associated comorbidities and those being submitted to surgery. Mean hospitalization time in the intensive care unit was 2.8 days (Table 1).

Table 1. Socio-demographic data and number of days related to the presence of pain in the postoperative period of aneurysm clamping. Aracaju, SE, Brazil, 2015

Variables	n	%	Pain			
			Number days Mean (SD)	p value	% days Mean (SD)	p value
Gender						
Male	6	21.4	2.5 (1.8)	0.81*	36 (26)	0.57*
Female	22	78.6	2.7 (1.6)		44 (23)	
Age						
<45	9	32.1	2.8 (2.0)	0.81*	42 (28)	0.85*
>=45	19	67.9	2.6 (1.5)		43 (22)	
Pathologic background						
Diabetes and hypertension	3	10.7	4.7 (0.6)¶	0.04**	71 (13)¶	0.04**
Hypertension	6	21.4	1.8 (1.2)¶¶		30 (16)¶¶	
No background	19	67.9	2.6 (1.7)¶.¶¶		42 (24)¶.¶¶	
Previous surgery						
Yes	13	46.4	1.9 (1.8)	0.02*	31 (25)	0.01*
No	15	53.6	3.3 (1.2)		52 (17)	

*Mann-Whitney test, ** Kruskal-Wallis Test and ¶.¶¶Subgroups different from 5% for Dunn-Bonferroni test.

Among respondents, 64.0% had postoperative pain. Prevalence of headache was higher in the first POD and lower in the seventh (Figure 2).

Most patients had moderate, pulsing headache located in the frontotemporal (48.0%) and temporal (20.0%) regions. Major symptoms associated to this pain were nausea, vomiting and sleep disturbances (Table 2).

There has been postoperative pain in most follow-up days, however there has been no adequate pain recording on medical charts. Physicians were professionals more adequately recording pain, as compared to nurses. Simple analgesics were most widely used, with incipient prescription of opioids. Prescriptions "as needed" suffered a variation from 3.5% in the first POD to 64.0% in the seventh POD (Tables 3 and 4).

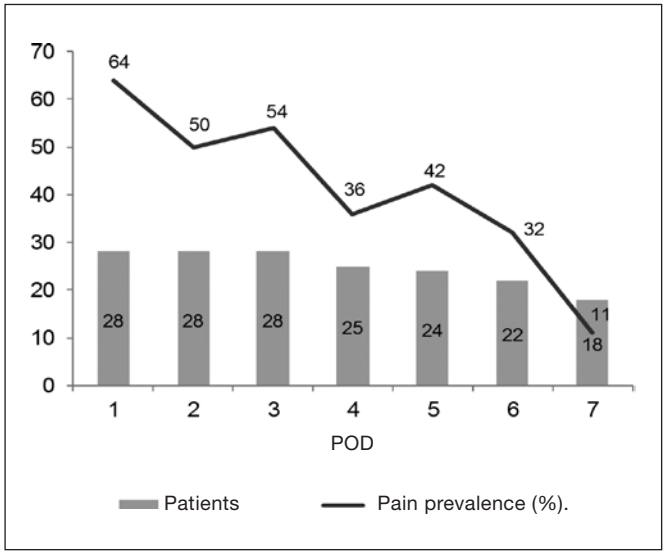

Figure 2. Prevalence of postoperative pain after aneurysm clamping. Aracaju, SE, Brazil, 2015

POD = postoperative days.

Table 2. Presence of postoperative headache according to location, characteristics, intensity, aggravating factors and associated symptoms. Aracaju, SE, Brazil, 2015

Variables	n (%)
Location	
Frontotemporal	36 (47)
Frontal	15 (20)
Temporofrontal	8 (11)
Unilateral	8 (11)
Occipital	4 (5)
Holocranial	2 (3)
Fronto-orbital	2 (3)
Characteristics	
Pulsing	51 (68)
Continuous	3 (4)
Stabbing	2 (3)
Pressing	17 (22)
Tension	2 (3)
Pain intensity	
Mild	30 (40)
Moderate	41 (55)
Severe	4 (5)
Aggravating factors	
Balancing head	32 (55)
Neck movements	20 (35)
Eye movement or palpation	2 (4)
Physical effort	1 (2)
None	2 (4)
Associated symptoms	
Nausea	14 (19)
Vomiting	3 (4)
Sleep disturbances	5 (7)
Photophobia	2 (3)
Sweating	2 (3)
Postural vertigo	2 (3)
Tearing	1 (1)
Increased temperature	1 (1)
None	51 (59)

Table 3. Pain presence and recording in the postoperative period of aneurysm clamping. Aracaju, SE, Brazil, 2015

Variables	Pain presence and recording n (%)						
	1stPOD	2ndPOD	3rdPOD	4thPOD	5thPOD	6thPOD	7thPOD
Pain							
Yes	18 (64)	14 (50)	15 (54)	9 (36)	10 (42)	7 (32)	2 (11)
Professional recording							
Nursing team	4 (50)	5 (71)	5 (71)	4 (100)	7 (100)	1 (50)	1 (100)
Physician	4 (50)	3 (43)	3 (43)	0 (0)	0 (0)	1 (50)	1 (100)

Table 4. Pain intensity and administered analgesics in the postoperative period of aneurysm clamping. Aracaju, SE, Brazil, 2015

Administered drug	Pain intensity Mean (SD)						
	1stPOD	2ndPOD	3rdPOD	4thPOD	5thPOD	6thPOD	7thPOD
Simple analgesics	3.7 (2.5)	2.5 (1.9)	2.2 (2.6)	1 (1.6)	2.3 (3.9)	3 (2.2)	0 (0)
NSAIDs	4.1 (2.0)	2.3 (4.0)	0.8 (1.5)	0 (0)	1.3 (2.3)	9 (0)	2 (0)
Weak opioid	1.8 (2.0)	2.5 (3.3)	1.5 (3)	0.8 (1.3)	1.3 (2.3)	0 (0)	0 (0)
Strong opioid	0 (0.0)	0 (0)	0 (0)	3 (0)	0 (0)	0 (0)	0 (0)
Simple analgesics + NSAIDs	0 (0.0)	1 (1.7)	2.4 (2.2)	2.6 (2.8)	2.9 (3.1)	1.1 (1.8)	0.3 (0.9)

NSAIDs = non-steroid anti-inflammatory drugs.

DISCUSSION

Adequate analgesia and pain relief are patients' unalienable rights, since after aneurysm clamping pain is one of the most prevalent symptoms. So, adequate pain management is critical for postoperative recovery and early return to daily life activities.

Nursing professionals play a critical role in relieving pain of such patients because they are directly related to care throughout the daily assistance cycle, being responsible for helping the choice of analgesics to be administered, when they accurately evaluate pain intensity referred by patients.

Results of our study have shown predominance of females. Such data confirm studies aiming at investigating pain prevalence, intensity and recording in the first week after surgery[11,12]. Possible explanation for such results might be associated to gender differences in terms of risk factors for cardiovascular diseases. Changes going on during females' life cycle, related to hormonal modifications, might have contributed for the development of vascular changes, peaking with the formation of aneurysms.

Mean patients' age was 47.6 years. Studies with patients submitted to craniotomy had similar results[9-11,13]. Chronic, non-communicable diseases are more frequent in the fourth decade of life. It is believed that the preventive access to health attention network, with early diagnosis and timely definite treatment has prevented neurological complications, sequelae and health conditions impairment, thus favoring less hospitalization days for such patients.

Most prevalent pain was moderate headache, being compatible with that described by other authors[14-16]. Another study has shown that after surgical aneurysm treatment, there is higher risk for developing headache[17]. Postoperative headache is a common symptom in post-craniotomy patients, which requires a multidisciplinary approach aiming at decreasing neurological sequelae, hospitalization time and costs. In addition, it may provide better quality of care and satisfaction for patients and their relatives.

Pulsing headache was the most prevalent presentation, with predominance of frontal and frontotemporal regions. A study investigating pos-craniotomy headache has observed that among most frequent characteristics there are those starting in the first postoperative day, located at the same side and place of the surgical incision, and improving along the week[18]. Another study analyzing the incidence of acute post-craniotomy pain has described pulsing headache as prevalent and has shown that pain intensity and location depend on surgical approach[19]. In our study, supratentorial surgeries have prevailed. It is believed that pain location in the frontotemporal region is related to this type of approach and surgical incision location.

Moderate pain was the most prevalent, which requires the use of weak opioids associated to first class opioids, as recommended by the World Health Organization (WHO) analgesic ladder. However, there has been inconsistency in the use of these drugs, which is in disagreement with IASP and WHO premises[20,21]. Similar data were obtained in other studies, where the use of analgesics not providing adequate pain management has prevailed[8,9,15,16].

Pain persistence may induce different neurovegetative and neurologic changes and decrease oxygen supply to tissues. So, it is necessary to adequately manage it to decrease such noxious effects. Inadequately treated acute pain may evolve to chronicity becoming a disease impairing daily life activities and needing a multidisciplinary approach to improve patients' quality of life.

Major pain-associated symptoms were nausea and vomiting. Similar results were found in recent studies aiming at eva-

luating the incidence of nausea and vomiting in the postoperative period of craniotomy[22]. Vomiting impairs patients' neurosurgical recovery because there is intracranial pressure increase, with risks of brain hemorrhages as well as hydroelectrolytic imbalance. So, health professionals should use systematic strategies to prevent such symptoms.

Another pain-associated symptom was sleep pattern changes[23]. This disorder is related to fatigue, depression and mental health disorders and may negatively reflect on patients' prognosis. So, adequate sleep may improve clinical recovery, decrease anxiety and excessive daily sleepiness.

Although there has been pain throughout the postoperative period, medical chart records were incipient. Recent studies have also observed this fact[3,11,24]. Physicians were professionals who adequately recorded pain. As opposed, just one nurse has recorded pain. Documentation of health activities should be part of professional routine, taking into account ethical-medical support assurance. This data is worrisome because lack of records suggests precarious pain evaluation, thus unsatisfactory management.

Nurses should adequately evaluate and record pain, because when they have accurate measurements, they are able to identify divergences with regard to established analgesic therapy, and to question the implementation of adequate analgesia[25].

Prescription "as needed" (A/N) was present in many medical records. This prescription delegates to nurses the responsibility of managing patients' pain, because when there are several analgesics prescribed under this condition, the choice of the analgesic to be administered, in many situations, is performed by the nursing team[25].

Systematic pain evaluation was not present in the study, since nursing team records just reported presence or absence of pain and simple analgesics were the prevailing option even in cases of moderate to severe pain[25].

Due to the magnitude of the painful phenomenon, it is necessary that health professionals be continuously updated to provide their team an effective ongoing education aiming at quality assistance[15,26].

CONCLUSION

Most participants were females, with associated comorbidities such as hypertension and diabetes. Most prevalent pain was moderate and pulsing headache. Simple analgesics were more commonly used and there has been underreporting of pain.

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