

# Postoperative pain in patients submitted to elective craniotomy\*

## *Dor pós-operatória em pacientes submetidos à craniotomia eletiva*

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### SUMMARY

**BACKGROUND AND OBJECTIVES:** Pain is subjective and multidimensional and is common in the postoperative period. This study aimed at identifying intensity and at checking pain records of patients submitted to elective craniotomy.

**METHOD:** This is a descriptive and quantitative study involving 100 patients submitted to craniotomy. Studied variables were age, gender, type of surgery, pain and pain intensity, pain records and the use of analgesics in the postoperative period. Studied variables were submitted to descriptive analysis using central trend measurements, dispersion and ratio analysis.

**RESULTS:** Our study has shown that 59% of patients submitted to craniotomy were females, with mean age of  $44.6 \pm 14.5$  years, 57% were single and had mean ICU and hospital stay of  $2.8 \pm 2.4$  e  $21.8 \pm 16.9$  days, respectively. Brain tumor was diagnosed in

55% of cases and surgery was supratentorial in 90% of patients. Headache was the major postoperative complaint, classified as moderate and continuous by most patients. Most patients had no analgesic medication. Most medical records had no pain recorded by the health team.

**CONCLUSION:** Data show the need for health professionals' improvement to systematically treat and evaluate pain.

**Keywords:** Analgesia, Craniotomy, Pain, Pain measurement.

### RESUMO

**JUSTIFICATIVA E OBJETIVOS:** A dor é uma experiência subjetiva e multidimensional, comum em pacientes submetidos a operações. Os objetivos do estudo foram identificar a intensidade e verificar o registro da dor em prontuário, de pacientes submetidos à craniotomia eletiva.

**MÉTODO:** Estudo descritivo, quantitativo. Foram estudados 100 pacientes submetidos à craniotomia. As variáveis pesquisadas foram idade, sexo, tipo de operação, presença e intensidade da dor, registro da dor e uso de analgésicos no pós-operatório. Realizou-se a análise descritiva das variáveis estudadas, utilizando-se medidas de tendência central, dispersão e análise de proporções.

**RESULTADOS:** Os dados deste estudo demonstram que 59% dos pacientes submetidos à craniotomia eram do sexo feminino, com média de idade  $44,6 \pm 14,5$  anos, 57% eram solteiros, e tiveram uma média de internação na unidade de terapia intensiva (UTI) e no hospital de  $2,8 \pm 2,4$  e  $21,8 \pm 16,9$  dias, respectivamente. Em 55% dos casos o diagnóstico médico foi de tumor cerebral, e o tipo de operação foi supratentorial em 90% dos pacientes. A cefaleia foi a principal queixa no pós-operatório, classificada na maioria das vezes como moderada, do tipo contínua. A maioria

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dos pacientes não recebeu qualquer tipo de medicação analgésica. Na maior parte dos prontuários não havia registro da dor pela equipe de saúde.

**CONCLUSÃO:** Os dados demonstram a necessidade de aperfeiçoamento dos profissionais da saúde para o tratamento e a avaliação da dor de maneira sistemática.

**Descritores:** Analgesia, Craniotomia, Dor, Medição da dor.

## INTRODUCTION

Pain is subjective and multidimensional and is often neglected by health professionals, although being a common symptom in patients submitted to craniotomy<sup>1</sup>. Pain is the fifth vital sign; however there are professionals who are not concerned with pain evaluation, thus its inadequate management is still a clinical problem for admitted patients<sup>2</sup>.

To adequately manage pain strategies have to be implemented, among them institutional analgesic protocols, acute pain services and health professionals' qualification to effectively identify, quantify and manage pain<sup>2</sup>. Research is justified by the lack of studies about this subject.

This study aimed at characterizing and identifying pain intensity in patients submitted to elective craniotomy and at checking the presence of systematic pain intensity recording in their medical charts.

## METHOD

This is a descriptive and quantitative study carried out in the Intensive Care Unit (ICU) and sector of Neurology, Fundação de Beneficência Hospital de Cirurgia (FBHC), reference hospital in craniotomy, located in the city of Aracaju, SE.

Participated in this study 100 patients submitted to craniotomy. Data were collected from September 2010 to October 2011. All stages of the research complied with Resolution 196, from October 10, 1996, from CONEP (National Committee for Research Ethics). All participants or their legal guardians have signed the Free and Informed Consent Term (FICT), as provided by CONEP's Resolution 196/96.

Inclusion criteria were patients submitted to elective craniotomy, included in the first immediate postoperative day, with score of 15 in the Glasgow coma scale (GCS) at evaluation. Exclusion criteria were victims of brain injury (BI), patients below 18 years of age and evolution to death during the evaluation period.

Data collection tools included socio-demographic

variables, health history, pain evaluation sequence, information about vital signs, consciousness level, presence of pain and numerical scale. Pain intensity was classified as: 0 – no pain; 1 to 3 – mild pain; 4 to 7 – moderate pain; and 8 to 10 – severe pain.

Patients were interviewed in two different moments: one hour before administration of the analgesic routinely prescribed by the assistant physician and one hour after the drug action peak. Patients not receiving analgesia and/or not referring pain were also evaluated one hour after the first evaluation and asked about the presence of pain. Patients were evaluated from 1<sup>st</sup> to 8<sup>th</sup> postoperative day (POD) and/or until hospital discharge.

Data were stored and evaluated by the software SPSS (Statistical Package for the Social Sciences), release 20.0. Studied variables were submitted to descriptive analysis using central trend, dispersion and ratio analysis measures.

This study was approved by the Ethics and Research Committee, Federal University of Sergipe, under CAAE - 2678.0.000.107-2010.

## RESULTS

When analyzing tables and interpreting results, it is important to stress that 3 patients were discharged between the 4<sup>th</sup> and 5<sup>th</sup> POD, 6 patients were discharged between the 3<sup>rd</sup> and 4<sup>th</sup> POD, 11 patients between the 4<sup>th</sup> and 5<sup>th</sup> POD, 22 patients between the 5<sup>th</sup> and 6<sup>th</sup> POD, 31 patients between the 6<sup>th</sup> and 7<sup>th</sup> POD, and 53 patients between the 7<sup>th</sup> and 8<sup>th</sup> POD.

Data have shown that 59% of patients submitted to craniotomy were females, with mean age of 44.6 ± 14.5 years, 57% were single and had mean ICU stay of 2.8 ± 2.4 e 21.8 ± 16.9 days, respectively. In 55% of cases the diagnosis was brain tumor, 36% were brain aneurysm, 54% were submitted to brain tumor resection and supratentorial surgery was the procedure for 90% of patients; 40% of surgical procedures lasted from 3 to 4 hours.

Approximately 60% of patients submitted to craniotomy have complained of preoperative pain and headache was the major pain complaint in 91.7% of cases. In 46% of patients pain was severe and 55% of patients have not received analgesics. Among those receiving analgesia, approximately 95.6% received common analgesics and non steroid anti-inflammatory drugs (NSAIDs) for pain relief.

With regard to postoperative pain, in the 1<sup>st</sup> POD 59% of patients have referred pain and major pain complaint

was headache. Although headache incidence would decrease along time, in the 8<sup>th</sup> POD approximately 50% of patients still complained of headache. Surgical incision was also mentioned by patients as major pain site in all evaluation moments. We have also observed that from the 1<sup>st</sup> to the 8<sup>th</sup> POD patients had mild, moderate and severe pain and in most cases pain was classified as moderate and continuous (Table 1). Some patients did not receive analgesics from the 1<sup>st</sup>

to the 8<sup>th</sup> POD, even in the presence of pain (Table 2). Analgesics administered from the 1<sup>st</sup> to the 8<sup>th</sup> POD were common analgesics and NSAIDs, which did not totally control pain for most patients, although pain has decreased in some cases. There has also been a low use of opioids. Pain intensity was not recorded by the health team for most of the time, and physicians were the professionals who recorded pain more frequently (Table 3).

Table 1 – Postoperative pain of patients submitted to craniotomy.

	1 <sup>st</sup> day	2 <sup>nd</sup> day	3 <sup>rd</sup> day	4 <sup>th</sup> day	5 <sup>th</sup> day	6 <sup>th</sup> day	7 <sup>th</sup> day	8 <sup>th</sup> day
Presence of pain	59 (59.0)	39 (39.0)	44 (45.4)	37 (38.9)	36 (40.4)	25 (32.1)	24 (34.8)	18 (38.3)
Pain site								
Headache		23 (59.0)	26 (59.1)	25 (67.6)	20 (55.6)	13 (50.0)	15 (62.5)	9 (50.0)
Incision	12 (20.3)	11 (28.2)	11 (25.0)	7 (18.9)	5 (13.9)	10 (38.5)	4 (16.7)	3 (16.7)
Neck	5 (8.5)	1 (2.6)	1 (2.3)	3 (8.1)	3 (8.3)	1 (3.8)	0 (0.0)	1 (5.6)
Throat	0 (0.0)	1 (2.6)	1 (2.3)	1 (2.7)	0 (0.0)	0 (0.0)	0 (0.0)	1 (5.6)
Eyes	1 (1.7)	1 (2.6)	2 (4.5)	1 (2.7)	2 (5.6)	1 (3.8)	0 (0.0)	0 (0.0)
Other	4 (6.8)	2 (5.1)	3 (6.8)	0 (0.0)	6 (16.7)	1 (3.8)	5 (20.8)	4 (22.2)
Pain intensity								
Zero: no pain	41 (41.0)	61 (61.0)	53 (54.6)	58 (61.1)	52 (58.4)	53 (67.9)	45 (65.2)	29 (61.7)
1 to 3: mild pain	12 (12.0)	11 (11.0)	19 (19.6)	11 (11.6)	12 (13.5)	12 (15.4)	7 (10.1)	8 (17.0)
4 to 7: moderate pain	25 (25.0)	17 (17.0)	15 (15.5)	17 (17.9)	16 (18.0)	7 (9.0)	11 (15.9)	4 (8.5)
8 to 10: severe pain	22 (22.0)	11 (11.0)	10 (10.3)	9 (9.5)	9 (10.1)	6 (7.7)	6 (8.7)	6 (12.8)
Types of pain								
Continuous	45 (76.3)	33 (84.6)	33 (75.0)	31 (83.8)	33 (86.8)	18 (72.0)	23 (95.8)	16 (88.9)
Intermittent	14 (23.7)	6 (15.4)	11 (25.0)	6 (16.2)	3 (7.9)	7 (28.0)	1 (4.2)	2 (11.1)

Table 2 – Analgesia in patients submitted to craniotomy.

	1st day	2nd day	3rd day	4th day	5th day	6th day	7th day	8th day
Received analgesics	53 (53.0)	45 (45.0)	34 (35.1)	39 (41.1)	30 (33.7)	23 (29.5)	18 (26.0)	13 (27.6)
Types of analgesics								
Common/ NSAIDS	41(41.0)	36 (36.0)	28 (28.9)	30 (31.6)	28 (31.5)	17 (21.8)	11 (15.9)	9 (19.1)
Weak opioid	12 (12.0)	9 (9.0)	6 (6.2)	9 (9.5)	2 (2.2)	6 (7.7)	7 (10.1)	4 (8.5)
Pain after DAP	59 (41.0)	39 (61.0)	44 (45.4)	37 (38.9)	37 (41.6)	25 (32.1)	24 (34.7)	18 (38.3)
Pain intensity after DAP								
1 to 3 – Mild pain	12 (12.0)	11 (11.0)	19 (19.6)	11 (11.6)	12 (13.5)	12 (15.4)	7 (10.1)	8 (17.0)
4 to 7 – moderate pain	25 (25.0)	17 (17.0)	15 (15.5)	17 (17.9)	16 (18.0)	7 (9.0)	11 (15.9)	4 (8.5)
8 to 10 – severe pain	22 (22.0)	11 (11.0)	10 (10.3)	9 (9.4)	9 (10.1)	6 (7.7)	6 (8.7)	6 (12.8)

NSAIDs = non steroid anti-inflammatory drugs; DAP = drug action peak.

Table 3 – Pain recording on medical charts of patients submitted to craniotomy.

	1st day	2nd day	3rd day	4th day	5th day	6th day	7th day	8th day
Yes	29 (29,0)	13 (13,0)	11(11,3)	23 (24,2)	17 (19,1)	12 (15,4)	13 (18,8)	7 (14,9)
Professional								
Physician	14 (48,3)	7 (53,8)	7 (63,6)	15 (65,2)	6 (35,3)	7 (58,3)	8 (61,5)	7 (100,0)
Nurse	6 (20,7)	1 (7,7)	1 (9,1)	0 (0,0)	0 (0,0)	0 (0,0)	1 (7,7)	0 (0,0)
Nursing T.	5 (17,2)	1 (7,7)	1 (9,1)	4 (17,4)	5 (29,4)	0 (0,0)	2 (15,4)	0 (0,0)
Nursing A.	2 (6,9)	2 (15,4)	1 (9,1)	4 (17,4)	4 (23,5)	3 (25,0)	1 (7,7)	0 (0,0)
More than one professional	0 (0,0)	0 (0,0)	1 (9,1)	0 (0,0)	2 (11,8)	2 (16,7)	1 (7,7)	0 (0,0)
Others	2 (6,9)	2 (15,4)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)	0 (0,0)

## DISCUSSION

Headache was the major preoperative pain complaint, most of the times characterized as severe. It was also observed that 55% of patients had brain tumors, which increase intracranial pressure (ICP) and, as a consequence, cause several symptoms, especially headache<sup>4</sup>. So, we believe that in this study, brain tumors have contributed to the incidence of preoperative headache. Headache was also the major postoperative pain complaint and most of the times it was classified as mo-

derate. Post-craniotomy headache is a consequence of the surgery and of meningeal irritation, which requires systematic evaluation by the health team to minimize the worsening of the clinical presentation<sup>5,6</sup>. Adequate pain management is a patient's right; however, our data showed a worrisome situation, considering that in the 8<sup>th</sup> POD approximately 40% of patients remained with pain. It is worth stressing that untreated pain brings several systemic changes, among them tachy-

cardia, hypertension, decreased oxygen saturation and physical distress.

The type of surgery seems to be the major factor to determine the severity of pain of patients submitted to craniotomy. In our study, 90% of patients were submitted to supratentorial surgery, similarly to what has been previously described<sup>7</sup>. In addition, the incision was also mentioned by patients as a painful site. Surgical procedures induce the release of inflammation mediators and of algogenic substances, which stimulate neural fiber nociceptors and, as a consequence, increase the transmission of painful impulses. Postoperative pain is in general proportional to the degree of stimulation of free nervous terminations and to the incision size. The larger the tissue injury, the greater the intensity of postoperative pain<sup>8</sup>.

One should also highlight that a significant number of patients did not receive any analgesic drug from the 1<sup>st</sup> to the 8<sup>th</sup> POD, despite reporting pain. Among patients receiving analgesic drugs, these have not controlled pain, considering that for most patients pain persisted in all evaluation moments.

Another important finding was that although moderate pain was present throughout the study, there has been low opioids consumption. This might be related to the fear that opioids may impair neurological evaluation. It is important to mention that there are several methods to control postoperative pain, among them preemptive or preventive analgesia and multimodal therapy, characterized by the use of several drugs with different action mechanisms associated to non-pharmacological methods<sup>9-11</sup>, however patients of our research have not benefited from these techniques. Most medical charts had no information about pain intensity recorded by the interdisciplinary team. When there were records, most of them were made by physicians and, for very few patients, by the nursing team. Nursing is the professional category living in continuous shifts with patients, thus being able to systematically evaluate pain; however, our data have shown that although pain is described as the fifth vital sign, pain recording by the nursing team was scarce<sup>12</sup>. Another study<sup>13</sup> has shown that pain recording on patients' medical charts allows monitoring pain intensity and location. To effectively manage pain, it is necessary a continuous evaluation and measuring process and that such information is made available to the multidisciplinary team for an effective assistance. It is important that health professionals understand the importance of controlling postoperative pain in

patients submitted to craniotomy. Further studies should be carried out to investigate which analgesia is adequate for this type of postoperative period.

## CONCLUSION

Headache was the major pain complaint after craniotomy in this study, and was characterized as severe and moderate, respectively. Postoperative analgesia was not enough to relieve pain and pain intensity records were scarce.

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