Assessment of Post-operative Pain and its Management among Patients undergoing Craniotomy

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Abstract

Pain assessment and its management in patients undergoing craniotomy, especially those with communication barriers, continue to present challenges to nurses. The present study was undertaken to assess the level of post-operative pain suffered by patients after craniotomy, to identify the activities that increase/relieve pain and to find out association between pain score of patients and selected variables. A self-prepared validated questionnaire and Wong Bakers Faces pain scale were used as the tools. The post-operative pain was mild to moderate and decreased from first to third postoperative day. Pain relief was adequate with the combination therapy of non-narcotic analgesics and non-steroidal anti-inflammatory drugs. The study revealed that there was no significant difference between the pain perception and age or gender of the patient. The activities that increased pain were surgical dressing removal and position changing. Nursing staff should focus on assessing and managing post-operative pain to improve quality of nursing care in order to improve the comfort of craniotomy patients.

Pain is an individual, subjective and complex bio-psychosocial process whose existence cannot be proved or disproved. Unrelieved pain is a major psychological and physiological stress for patients (deWitt, 2009). The patient is the best authority on the existence of pain. Therefore, validation of the existence of pain is based on the patient's report that it exists. Pain is one of the most common experiences and stressors in patients undergoing neurosurgeries. Patients undergoing craniotomy may experience frequent and moderate to severe pain postoperatively (Hansen et al., 2011; Kotak et al., 2009; Kincaid & Larn, 2007). Surgical and patient factors may influence the incidence and severity of pain and a multimodal approach (use of a combination of pain control strategies including opioids, non-steroidal anti-inflammatory drugs (NSAIDs), non-pharmacologic interventions) to acute post-craniotomy pain is recommended (Flexman et al, 2010). Despite the growing recognition for analgesic needs in post-craniotomy patients, this remains a poorly studied area in neurological surgery (Hassouneh et al, 2011). Hence the present study was undertaken to assess the level of pain experienced by patients after craniotomy, to identify the post-operative activities that increase/relieve pain and to find out association between pain score of patients and selected variables.

Literature Review

Studies on pain assessment and analgesic usage in neurosurgical patients revealed that frontal craniotomy patients experienced the lowest pain scores, and required significantly less opioid than patients undergoing posterior fossa interventions (Thibault et al., 2007). Age was an independent predictor for intensity of post-operative pain in craniotomy, with lower pain scores observed with increased age (Mordhorst et al, 2010; Thibault et al, 2007). Patients who underwent infratentorial procedures reported more severe pain and received greater quantities of opioid analgesics than those who underwent supratentorial procedures (Kincaid & Larn, 2007). No consensus on pain management after craniotomy could be found in neurosurgical centres in the UK (Kotak et al, 2009). However, the use of scheduled atypical analgesics such as tramadol in addition to narcotics with acetaminophen for the management of post-operative pain after craniotomy might provide better pain control, decrease the side effects associated with narcotic pain medications, encourage earlier post-operative ambulation, and reduce total hospitalisation costs (Rahimi et al, 2010). Studies on pain assessment tools found that a nonverbal pain scale in a trauma/neuro surgery intensive care unit improved patients' ratings of pain experience, improved documentation by nurses and increased nurses' confidence in assessing pain in non-verbal patients (Topolovec-Vranic et al, 2010), and intensive care unit patients' own pain rating could avoid underestimation of pain (Ahlers et al, 2008).

Methodology

This descriptive survey was conducted in the neurosurgical department of a tertiary level referral

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hospital in Kerala, India, This department has a bed strength of 50 including a 37-bedded ward and a 13 bedded intensive care unit. More than 1300 elective adult and paediatric neurosurgical procedures are performed every year in this department. NSAIDs like diclofenac sodium and analgesics like tramadol and acetaminophen are generally prescribed for post-operative pain relief.

Forty adult patients (>18 years) after craniotomy either supratentorial or infratentorial were conveniently selected for this study. Patients who were not able to follow the vernacular language, Malayalam and those who remained on ventilator/not fully conscious were excluded.

Data collection

Formal permission from the authorities and informed consent from the patients were obtained. The tools included Wong Bakers Faces Pain Rating Scale (score 0-10) and a validated questionnaire about pain experiences after craniotomy during the first three post-operative days, including a four-point verbal numerical rating scale ranging from 0 (no pain) to 3 (maximal pain) with three questions (score 0-9). Total pain score was 19. The highest score indicated the highest intensity of pain. Questions about pain aggravating and alleviating activities, post-operative day of maximum pain were also included. In addition, the postoperative use of analgesics (type, dose, and route), age and gender of the patients, type of surgery, and day of surgery were collected from the patients' medical records. A pilot study was done among ten patients to find out the feasibility of the study. Data was collected from September 2010 to October 2010. First assessment was done after 24 hours of surgery. Second and third assessments were carried out on consecutive days after 48 hours and 72 hours of surgery. Most of the patients were shifted to post-operative ward on second or third post-operative day.

Data analysis

Data were analysed using Epi Info version 3.5.1. Paired 't' test was done to assess statistical significance. Probability value of 0.05 or less was the criteria used to conclude statistical significance.

Results

Sample characteristics

Seventy-six patients underwent craniotomies during the data collection period. Out of this 40 (>50%) patients were conveniently selected. The age of the participants ranged from 19 to 74 years (mean, 44.2 ± 12.8 years), had a median of 42.5 years. Out of these 40 patients 22 (55%) were males and 18 (45%) were females. Thirty-five (87.5%) patients had undergone supratentorial and the rest had undergone infratentorial craniotomies.

Characteristics of post-operative pain

The maximum obtainable pain score was 19. The range of pain score (mean ± SD) of patients on first, second and third postoperative day were five to thirteen (8.73 ± 1.94), four to eight (6.25 ± 1.1), and zero to eight (2.93 ± 2.28) respectively. Paired 't' tests showed that the mean pain score on the second post-operative day was significantly less than that of first postoperative day (p=0.000), and the mean pain score on the third post-operative day was significantly less than that of second postoperative day (p=0.000). There was no significant difference in the mean pain according to age (p=0.81) or gender (p=0.5) (Table 1).

All patients reported surgical dressing removal as the activity that caused maximum pain. In addition to this, 18(45%) patients reported that position changing* also induced pain. None of the patients reported pain during physiotherapy, suctioning or any other activities. Thirty-seven (92.5%) patients required analgesics for reducing the pain while the rest reported that pain was tolerable.

Majority (67.5%) of patients reported maximum pain on the first postoperative day. Eleven patients (27.5%) reported maximum pain on the day of surgery while only two (5%) patients reported maximum pain on second post-operative day. None of them reported maximum pain on third post-operative day.

Most of the patients got pain relief from non-narcotic analgesics and NSAIDs. The drugs used were diclofenac sodium, tramadol hydrochloride, or acetaminophen either alone or in combination. Majority of patients received diclofenac sodium + tramadol on the first (72.5%), second (50%) and third (12.5%) post-operative days. One patient (2.5%) didn't require any

Table 1: Mean, Standard deviation and p-values of pain score according to selected variables

Characteristics of patients	Mean	Standard deviation	p value
Post-operative day			
First post-operative day	8.73	1.935	0.000
Second post-operative day	6.25	1.104	
Third post-operative day	2.93	2.280	0.000
Age			
Younger age (< 42.5)	8.80	2.04	0.81
Older age (>42.5)	8.65	1.87	
Sex			
Male	8.56	1.99	0.50
Female	8.94	1.89	

analgesics on the second day while 22 patients (55%) didn't require any analgesics on the third post-operative day.

Discussion

The present study showed that pain after craniotomy was mild to moderate with a progressive decrease from first to third post-operative day. There was no significant difference in acute post-operative pain according to age or gender. The usage of analgesics and NSAIDs also decreased from first to third post-operative day. All the patients were able to give a pain score and majority was positive about daily pain assessment Topolovec-Vranic et al concluded that the implementation of the Non-verbal Pain Scale in a critical care setting improved patients' ratings of their pain experience and increased nurses' confidence in assessing pain in non-verbal patients. Mordhorst et al suggested that majority of patients experienced pain after craniotomy despite conventional pain management emphasising the necessity for improved and individualized pain management in this special group of patients. Thibault et al as well as Kincaid & Larn reported moderate to severe pain after craniotomy and that this pain was often inadequately treated. However, none of the participants in the present study reported severe pain or inadequate pain relief. The combination drugs including tramadol used in the present study might be more effective compared to low dose opioids (Hassouneh et al, 2011; Roberts, 2005). Rahimi et al (2010) also reported the efficacy of tramadol for the management of postoperative pain after craniotomy. The present study found that there was no gender and age difference in pain perception. Similar result regarding gender was reported by Thibault et al. However, age was an independent predictor for post craniotomy pain, with lower pain scores as age increased (Mordhorst et al., 2010; Thibault et al., 2007). In the present study, 27 percent of patients experienced maximum pain on the day of surgery and the patients' pain gradually decreased from first post-operative day to third post-operative day. According to Mordhorst et al, only eleven percent patients experienced maximum pain during the first 24 hours. However, the pain on consecutive post-operative days was not assessed in the study.

Conclusion

The reported pain in patients after craniotomy was mild to moderate and the use of combination drugs like non-narcotic analgesics and NSAIDs provided adequate pain relief. Wong Bakers Faces Pain Rating Scale could be used as an easy tool to assess post-operative pain. Patient's self-report of pain along with assessment using the four-point verbal numerical rating scale was helpful for effective management of pain. The practical knowledge obtained through this study can be used to answer pre-operative queries of patients regarding postoperative pain. The researchers could not find any difference in mean pain score between male and female patients or between younger and older patients. However, for most of the patients, pain gradually decreased from first post-operative day to third postoperative day. Further research using a larger sample size is needed to compare postoperative pain in patients after supratentorial and infratentorial surgery.

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