Patients’ experience of pain after cardiac surgery

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ABSTRACT
Pain after Cardiac Surgery (CS) is the most common patient complaint. However the first 48 h after surgery, when patients’ pain is the most severe, is generally spent in the Intensive Care Unit (ICU). It is almost impossible for patients to report their pain because of their inadequate level of consciousness in the ICU. Many factors alter verbal communication with patients, such as administration of sedative medications, mechanical ventilation, and patients’ changed level of consciousness.

This descriptive study was conducted for the purpose of describing the experience of pain in CS patients in the ICU and determining situations that affect their pain. This research was conducted with 300 adult patients at a Ministry of Health Hospital who stayed in a cardiac surgery ICU post-operatively for a minimum of 48 h, had a sternal incision, chest tube, and required mechanical ventilation. The data were collected from the patients in face-to-face interviews by the researchers following transfer from the ICU to the surgical ward within 48 h of transfer.

Most patients described their pain as aching (n = 177) and throbbing (n = 154). The presence of chest tubes (n = 95), endotracheal tube suctioning (n = 47), change of dressings (n = 27) and the use of air mattresses (n = 20) were also identified as painful experiences for patients.

Based on these results it can be said that CS patients experience pain in the ICU, however they verbalized it with different words and identified different situations that decreased or increased their pain, which shows the subjective and complex nature of pain.

KEYWORDS: cardiac surgery; pain; experience; intensive care nursing

INTRODUCTION
Patients usually have a sternal surgical incision and graft sites following major cardiac surgery. They are generally admitted to an ICU for the first few days after surgery and face many nursing care interventions as part of their treatment. The body, having undergone a major operation, releases many inflammatory markers in response which are known to cause pain (Erdine, 2007; Ferguson, Gilrol, & Puntillo, 1997). The ICU’s environmental factors (constant light and noise), sleeplessness, perceptual limitations and psychological...
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factors, such as anxiety, can intensify the feeling of pain. In addition, various nursing activities can increase patients’ pain including endotracheal tube suctioning, handling of chest tubes, changes of dressings and position, physical therapy, catheterizations and transporting patients. The presence of pain can lead to further complications post-operatively (Milgrom et al., 2004; Puntillo, 1990; Puntillo & Weiss, 1994; Puntillo et al., 1997). When this multidimensional, complex and subjective problem is not correctly defined or treated it becomes a factor which increases the mortality and morbidity of the complex clinical course of ICU patients (Badir & Eti Aslan, 2003; Puntillo, 1990; Shannon & Bucknall, 2003). The reason for this is that the sympathetic response to pain is characterized by an increase in heart rate and cardiac contractility, which increases the myocardial oxygen demands and the workload of the heart (Erdine, 2007; Gelinas, 2007a). In particular CS patients are more likely to have postoperative cardiac complications (Lahtinen, Kokki, & Hynynen, 2006; Milgrom et al., 2004).

Sternal surgical incisions and the presence of intercostal catheters can cause immobility which results in inadequate lung expansion, ineffective coughing, (Arroya-Novao et al., 2008; Puntillo & Weiss, 1994) accumulation of secretions, and hypoxemia can result in atelectasis and pneumonia (Milgrom et al., 2004; Puntillo & Weiss, 1994).

Research has shown that the most severe pain following CS occurs during the initial two postoperative days (Ferguson et al., 1997; Gelinas, 2007a; Puntillo & Weiss, 1994). Due to mechanical ventilation during this period, patients cannot verbalize their pain (Badir & Eti Aslan, 2003; Gelinas, 2007b; Herr et al., 2006; Payen et al., 2001; Puntillo et al., 2004). For this reason, efforts have been made to assess ICU patients’ ‘pain behaviors’ (Gelinas et al., 2006; Payen et al., 2001; Puntillo et al., 2004; Shannon & Bucknall, 2003). However, it is known that many parameters defined as pain behaviors are also indicators of other health problems (Badir & Eti Aslan, 2003; Gelinas, 2007a; Puntillo et al., 2004). It is difficult to assess pain objectively because of its subjective and multidimensional nature. For this reason patients’ verbal pain reports are important in pain assessment (Eti Aslan, Badir, & Selimen, 2003; Gelinas, 2007b; Herr et al., 2006; McCaffery & Pasero, 2004; Payen et al., 2001) but these are not possible in those who are sedated and mechanically ventilated patients.

There are few studies that examine ICU patients’ experience of pain after CS (Gelinas, 2007b; Pozehl, Barnason, Zimmerman, Nieveen, & Crutchfield, 1995; Valdix & Puntillo, 1995). This study was designed to answer the question, how do post-CS patients describe their pain in the ICU and what activities increase or decrease their pain.

METHOD

Study aim

The aim of this study was to describe the quality of post-cardiac surgery patient’s pain and the situations/activities that affect the patient’s pain while in the ICU.

Research questions

1. How do post-cardiac surgery patients define the pain they experience in the ICU?
2. What activities affect pain in post-cardiac surgery patients?

Research design, setting and time

To achieve the study aim, a descriptive design was chosen. This research was conducted in the 60-bed Cardiac Surgery ICU of the Ministry of Health Cardiovascular Surgery Research Hospital which is located on the Anatolian side of Istanbul between June and September, 2007.

Sample

The research sample was comprised of adult patients receiving treatment in the Cardiac Surgery ICU during the time of the study. The sample size was determined by the number of patients admitted to this ICU during 2006 in ICU patients calculating with a 95% confidence interval to arrive at a number of 300 patients. All patients who were 18 years
or older, had a sternal incision, chest tubes, were intubated, did not have a neurologic or psychiatric disorder, did not have chronic pain syndrome, did not have communication problem, could speak Turkish and were in the ICU for at least 48 h.

**Ethical issues**
Permission to conduct the research in the hospital in Turkey was obtained from the Provincial Health Ministry and was approved by the Hospital Ethics Committee. All patients were informed the purpose of the study and signed consent forms. All data were kept confidential.

**The survey questionnaire**
The survey questionnaire was prepared after a review of the current literature (Gelinas, 2007a,b; Hallenberg, Bergbom-Engberg, & Haljamae, 1990; Larsson & Wijk, 2007) and on the knowledge and experience of the research team. The questionnaire consisted of five close-ended questions about the patients’ socio-demographic characteristics (e.g. gender, age, education…) and 12 open-ended questions about the patients’ pain experience. The content validity of the questionnaire was verified by two expert nurses in pain management and ICU nursing, and three expert nurses who work in the Cardiovascular ICU.

**Data collection method**
Data were collected using a face to face interview method within the first 48 h of the patients being transferred from the ICU to the surgical ward. A pilot study was conducted with 23 patients.

**Data analysis**
Data collected in the research were analyzed on a computer using SPSS for Windows 11.0. Packet program and the descriptive statistical methods were used.

**RESULTS**

**Sample description**
The age range for the 300 cardiac surgery patients who participated in this study was 18–75 years and the mean age was 56.22 ± 10.42. The majority of the patients were male (68.7%), married (88.3%), primary school graduates (67.7%) and were actively employed (57.7%). The majority of the patients (91.3%) had the diagnosis of Coronary Artery Disease (CAD), 74.0% had Coronary Artery Bypass Graft (CABG) surgery, 18.7% had Aortic Valve Replacement Surgery, and 7.3% had Mitral Valve Replacement Surgery. All patients had sternal incisions and anesthesia was similar for all patients. They were all on continuous infusions of Phentanyl when they were admitted to the ICU post-operatively and Phentanyl was ceased 1–3 h after their arrival in the ICU. The endotracheal tube was left in for 1 day in 287 of the patients and 2 days in 13 patients. All of the patients had chest tubes and 282 had chest tubes that remained in for 2 days.

**Description of the experience of pain**
A description of the patients’ pain experience is provided in Table 1. Eighty-seven patients did not recall having pain while in the ICU. Of the 300 patients, 177 described their pain as aching, 154 as throbbing, 67 as stabbing, 41 as burning, and 31 as breathlessness. And 20 patients described their pain as an obstacle to free movement (Table 1).

**Activities which increased or decreased pain**
One-third (n = 111) of the patients could not recall what activity caused the most pain in the

<table>
<thead>
<tr>
<th>Pain description</th>
<th>N</th>
<th>%</th>
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<tbody>
<tr>
<td>Aching</td>
<td>177</td>
<td>28.0</td>
</tr>
<tr>
<td>Throbbing</td>
<td>154</td>
<td>23.5</td>
</tr>
<tr>
<td>Stabbing/sharp</td>
<td>67</td>
<td>10.6</td>
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<tr>
<td>Burning</td>
<td>41</td>
<td>6.5</td>
</tr>
<tr>
<td>Breathlessness</td>
<td>31</td>
<td>4.9</td>
</tr>
<tr>
<td>Obstacle to free movement</td>
<td>20</td>
<td>3.2</td>
</tr>
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</table>

*More than one answer was given.*
ICU. The painful activities described by the patients included the presence of chest tubes and movements (n = 95), endotracheal suctioning (n = 47), changes of dressings (n = 27) and their positioning on air mattresses (n = 20) (Table 2). Analgesic medications were identified as pain relieving interventions by 213 (64.5%) of the patients. This was followed by remaining immobile (n = 68) and the removal of the chest tubes (n = 11). Forty patients, who had pain in the ICU, did not recall pain relieving interventions (Table 3).

**DISCUSSION**

The aim of this study was to describe the quality of post CS patient’s pain and situations/activities that increase or decrease the pain while in the ICU. Eighty-seven patients did not recall having pain while they were in the ICU, while 213 patients (71%) recalled having pain in the ICU. The studies that focused on the description on the patients’ pain experience in the ICU after surgery found that 71–94% recalled pain (Puntillo, 1990; Valdix & Puntillo, 1995). In a recent study (Gelinas, 2007b) showed that more than 75% of the patients remembered their pain experiences in cardiovascular surgery ICU. Residual effects of anesthesia, sedative drugs and change in the patients’ level of consciousness may be factors in some patients’ lack of memory of their pain experiences in the ICU.

The findings of this research show that a large percentage of cardiac surgery patients described their pain in the ICU as aching, throbbing and sharp-stabbing. In previous studies, patients described their pain as sharp, stabbing (Puntillo et al., 2001) burning, and throbbing (Gelinas, 2007b) during nociceptive activity such as movement and chest tube removal. These different terms used by patients to explain the quality of pain emphasize the fact that pain is subjective and can only be described by the person who is experiencing it (McCaffery & Pasero, 2004).

Pain is a universal experience and nearly every person experiences pain at some point in their lives (Erdine, Hamzaoglu, Balta, & Domac, 2001). However the way pain is expressed can be affected by the environment and many other factors. ICU patients’ pain perception and expression can be affected by physical, environmental, psychological, social, cultural, and personal factors. People learn ‘how to be a patient’ from the values, judgments and attitudes of the society in which they were raised. For these reasons the way families, society and health professionals perceive pain and the illness state also affects the way patients perceive and express their pain (Badir & Eti Aslan, 2003).

It is very significant that a large percentage of the CS patients used the word ‘aching’ to describe their pain experience in the ICU because pain is a negative response when there is a disturbance in a patient’s physical and psychological wholeness or when these are threatened. In general, it is expressed in behavioral changes, such as shouting, fight-flight response, and excessive bonding to the health system (Erdine, 2007). There have been interesting studies reported on the use of the
same words to describe pain in different cultures. In a study by Pozehl et al. (1995) with CABG patients, the words they used to describe their pain were ‘aching, exhausting’.

In this research 111 patients (37%) could not remember what intervention caused them the most pain in the ICU (Table 2). The lack of memory of what caused the particular pain does not mean that the CS patients did not suffer pain in the ICU. The chest tubes commonly used in cardiac surgery interfere with patients’ movement, sleep and turning over in bed (Hallenberg et al., 1990; Milgrom et al., 2004; Puntillo, 1990). Approximately one-third of the patients in this research \((n = 97; 31.7\%)\) identified the chest tubes as causing the most pain. The chest tubes, which move with every inspiration and exhalation, affect the chest wall and cause unavoidable pain. Studies conducted on this subject support our findings. Miller and Newton (2006) determined that the length of time the chest tubes stayed in increased the severity of the patients’ pain as well as an increase in complaints.

In 36% of studies (57 studies) conducted with intubated patients the major problem identified was pain, and suctioning alone caused discomfort for 30% of the patients (Arroya-Novao et al., 2008). In this research 47 of 300 patients identified endotracheal suctioning as causing the most pain. Our research results show that endotracheal tube suctioning is a significant cause of pain in the ICU. Cardiac surgical procedures, particularly sternotomy procedures, cover a wide area in the thorax, and in most hospitals the suture area is covered with dressings for the first postoperative days. Also, after the removal of the chest tubes the wounds are covered with dressings which need to be changed routinely. Both of these procedures cause pain as indicated by 27 of the 300 patients. This is consistent with the study of Puntillo et al. (2001) in which the patients described dressing change as causing them the most pain.

An interesting finding in this study was the identification of air mattresses, used to prevent pressure sores, as causing the most pain for 20 of the 300 patients. No other studies have reported that air mattresses can be a source of pain for ICU patients. This finding needs to be taken into consideration in the care of ICU patients.

Pain is known to increase the morbidity and mortality of cardiac surgery patients (Badir & Eti Aslan, 2003; Puntillo, 1990; Shannon & Bucknall, 2003). Sixty-four percent the patients stated that analgesic medications decreased their pain. This was followed by remaining immobile \((18.8\%; n = 68\) to alleviate pain (Table 3). Consistent with our findings, another study (Gelinas, 2007b; Lahtinen et al., 2006) revealed that 62% of cardiac surgery patients stated that movement increased their pain. This is consistent with our findings. There are other studies which show that following thoracic and abdominal surgery, in particular, the severity of pain is increased with movement and effective respirations (Lahtinen et al., 2006; Milgrom et al., 2004; Puntillo et al., 2004). The efforts patients use to remain immobile can also cause respiratory complications (Puntillo, 1990; Puntillo & Weiss, 1994). For this reason remaining immobile, particularly for cardiac surgery patients in the ICU, can be a dangerous method of pain relief. Immobility was also identified as a pain indicator in previous studies (Puntillo et al., 1997).

Since 95 of the 300 patients identified their chest tubes as causing them the most pain (Table 2), naturally they would also identify their removal as a painful procedure while also relieving a major source of pain. In this research 11 patients stated that the removal of their chest tubes decreased their pain. A small number (nine patients) identified the nurse attention as factor in decreased pain (Table 3).

**Conclusion**

The findings of this study emphasize that pain is a priority problem for patients in the ICU that needs addressing. Pain is a universal experience but the way pain is expressed can be affected by the environment and many other factors. Cardiac surgery is associated with severe post-operative...
pain which may have serious implications for mortality and morbidity. Critical care patients who are unable to communicate effectively are at high risk of suffering pain. Pain should be routinely monitored, assessed and documented by critical care nurses. The critical care nurses play an important role in pain assessment and management. Understanding the causes of pain and the activities and procedures which diminish pain will enhance the post-operative management of patients who have undergone major cardiac surgery. This study provides guidance for the effective assessment and management of Turkish CS patients’ post-operative pain.

Limitations of research
These research results cannot be generalized to all surgical ICU patients.

References


