

Pain in cardiac surgery and the nursing approach

Kalp cerrahisinde ağrı ve hemşirelik yaklaşımları

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Pain is a universal experience that everybody experiences during some period of their lifetime. However, some diagnostic and treatment procedures in healthcare cause patients to suffer from long-term and severe pain. Cardiac surgery is one of these procedures. In this article, the causes of pain, the effects of pain on the patient and pain relief approaches in cardiac surgery are discussed.

Key words: Cardiac surgery; pain; pain control.

People continue to have pain, one of the oldest known health problems. and it leads patients to seek assistance frequently from health professionals. Pain is prominently associated with surgery, with cardiac surgery noted for causing the most severe pain.^[1-4] It has also been reported that 30-40% of patients having a sternotomy have persistent pain for eight days while 60-70% of them have pain while moving.^[5-9] Despite the numerous studies related to postoperative pain, pain pathophysiology, analgesics, and techniques for applying analgesics, pain is still a reality for many.

This raises the question: Why do cardiac surgery patients feel long-lasting and severe pain? The incision is very large in cardiac surgery which means that there is more trauma and larger tissue destruction. There is also a release of algogenic matter from the cells that died as a result of the tissue trauma. Moreover, each invasive technique applied in cardiac surgery causes pain. Endotracheal intubation during the early days in intensive care may also lead to severe pain, but there is still no extensive study on this subject.

Heart surgery is a stressful process for patients due for several reasons. They fear the possibility of death during surgery and, if they survive, believe their life will be restricted in the future while suffering from constant

Ağrı tüm insanların yaşamlarının herhangi bir döneminde yaşadıkları evrensel bir deneyimdir. Ancak sağlık bakımında bazı tanı ve tedavi uygulamaları hastaların uzun süreli ve şiddetli ağrı çekmelerine neden olmaktadır. Kalp cerrahisi bu uygulamalardan biridir. Bu makalede kalp cerrahisinde ağrı nedenleri, ağrının hasta üzerindeki etkileri ve ağrı geçirme yaklaşımları ele alınmıştır.

Anahtar sözcükler: Kalp cerrahisi; ağrı; ağrı kontrolü.

pain.^[1] It has been stated that the pain after cardiac surgery is the root source of patient problems, but it facilitates other problems as well.^[10]

In recent years, there has been a trend toward discharging patients as early as possible. In general, they are discharged from the hospital one week after open-heart surgery. Therefore, another issue to be considered is the pain which these patients will experience during their convalescence at home.^[11]

Open-heart operations are painful since there is a sternum incision.^[11] All 213 sternotomy patients in a study stated that they experienced much more severe pain than they had expected before the operation, 49% complained of intensive pain, even at rest (reposing period), 78% suffered from coughing, and 62% felt severe pain while moving.^[12] If cardiac surgery patients fail to maintain effective respiration due to pain, it results in respiratory and circulatory complications.^[3,12,13]

Payen et al.^[14] reported that 42% of cardiac surgery patients defined the pain from the chest tube and surgical incision as “the worst pain” while Pozehl et al.^[15] stated that patients described the pain as “suffering” and “tiring”. Sometimes, the pain is so great that they are unable to describe it sufficiently to their caregivers.

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We have observed in our clinical studies that patients try to explain their pain according to their own cultural infrastructure such as “the most painful situation”.

Another problem causing pain in these patients is the internal mammary artery graft widely used in coronary artery bypass surgery (CABG). Patients can experience long-term chest pain from the internal mammary artery harvest due to the destruction of the soft tissues and nerves of the chest wall. Furthermore, in operations for saphenous vein harvesting, pain can be experienced for a couple of weeks after surgery, depending on the leg incision and edema. Brachial plexus neuropathy can also appear, contingent upon sternum retraction and the condition of patients on the operating table. During this phase, they do not feel any discomfort or pain because of being under the effect of general anesthesia; therefore, this neuropathy is only observed in the intensive care unit (ICU).^[11]

Cardiac surgery patients are kept in intensive care during the first hours or days after their operation. This environment increases pain perception because it represses the usual sensory stimuli and reveals the unusual ones. In addition, heart surgery patients have an excessive sleep problem. With repression of sleep, the reticular activation system is persistently stimulated. This leads to an increase in exhaustion and discomfort and causes an enhanced vulnerability to pain.^[1] Also in the ICU, continual exposure of patients to light and noise as well as characteristics of psychological stress, such as restriction in perception and fear of death, can aggravate the sense of pain.^[16-18]

Additionally, some procedures performed in the ICU, for example cannulations, inserting endotracheal and chest tubes, and surgical incisions, stimulate the pain perception of patients.^[1] In open-heart surgery, chest tubes are used during the first days, and they reveal their severe pain in various ways during the presence of the chest tube and its removal. However, different responses have been observed in the way of definition and pain reaction because ethnocultural history has changed nociception.^[19,20] Among heart surgery patients, 45% stated that their worst memory was the pain from the chest tubes and incision when they were in intensive care. Moreover, heart surgery patients feel severe pain during the aspiration of the endotracheal tube and removal of the chest tubes, especially the pleural ones.^[1] In previous studies, it has been reported that patients considered the pain during their stay in the ICU as one of the three most stressful factors they have ever encountered and as one of the worst experiences they have ever had.^[1] In a study carried out for the purpose of analyzing the pain and discomfort of cardiac surgery

patients caused by chest tubes, it was determined that the tubes prevented the them from acting, sleeping, and moving in bed and that patients who were exposed to chest tubes for two days experienced much more intense pain compared with those who were exposed to chest tubes for just one day.^[19,20]

It should be kept in mind that injury care, patient transfers, and changes of position cause pain as well.^[1,21,22] Nurses should be able to ascertain the pain through the physiological parameters and behavioral aspects of the patients since it is not possible for those in intensive care to describe their pain and its severity due to the variations in their level of consciousness and the presence of the endotracheal tube.^[1]

In ICUs, the pain experience of patients is not independent. Particularly where it is not possible for them to assess pain, their experience depends on the diagnosis and intervention of those caring for them. During this phase, the diagnosis of the nurses related to pain has a great effect on the intensive care staff and on analgesic administration. Therefore, the role of nurses in reducing the pain is quite prominent.^[1] If the pain is not relieved after surgery, this may lead to chronic pain problems as well as chronic post-sternotomy pain lasting for one to three years during the postoperative period which observed in 28-40% of patients. It has been reported that the complications, duration of their hospital stay, and re-hospitalization period can all be reduced through effective pain treatment.^[11]

Pain usually acts as an adaptation system. Acute pain warns the person about a defect in a part of an organism or about preventing the defective or injured site from further injury, which seems useful. However, surgical pain, which is a kind of acute pain, is not biologically useful because the stress response to pain during the postoperative phase produces adverse effects in all physiological systems. It delays the recovery of patients; therefore, while pain is sometimes useful, that is not the case with surgical pain. Besides, experiencing pain is undesirable for all patients. Particularly in cardiac surgery, there is evidence showing an increase in morbidity and mortality rates since surgical pain produces a characterized stress response with increases in catabolism.^[13,20,23] Sympathetic nervous system activation causes an increase in the heart rate, in contractility and in heart wall contractions. This stimulates the oxygen consumption and load function of the heart and increases the risk of myocardial ischemia, especially in patients having coronary perfusion deficiency. Also, the sympathetic response to pain with cardiac load function destroys hemodynamic stability. Cardiac surgery patients in particular tend to

have cardiac irritability due to the risk of myocardial ischemia, lack of electrolyte balance, and anxiety. Pain produces cardiac risk in these patients.^[19,20] Furthermore, the localization of surgical intervention and the presence of a supporting apparatus pave the way for possible complications by interfering with the ability to take deep breaths, cough, and walk.^[13,24]

Cardiac operations, chest tubes, deficiency in pulmonary expansion, accumulation of secretions in respiratory tracts, which depend on surface neutral respiration, and inactivity all lead to hypoxemia, atelectasis, and pneumonia.^[3,24] Puntillo and Weiss^[13] determined that as the severity of pain increases, the incidence of atelectasis increases as well in cardiac surgery patients. Today, though there is ever-increasing medical knowledge of pain and its negative effects, pain and its associated problems still exist. Because the degree to which patients suffer from pain depends on many variables, including their past experiences, it is subjective in nature. Because pain varies greatly from one person to another, assessment and treatment is problematic. In the assessment of pain, it is first necessary to rely on patients' descriptions of the pain intensity. However, in cardiac surgery it should be considered that during the first 48 hours when the pain is most severe, patients are unlikely to define their pain orally. Also, it has been suggested in the literature that the assessment of pain should be defined by patients answering with a simple "yes" or "no".^[2] This approach is valid when they are able to respond to the question, but even this kind of simple response may not be possible for those in the ICU. In view of this fact, the number of studies related to understanding and assessing pain symptoms has been gradually increasing.^[14]

Two other reasons for not supplying enough analgesia is that the pain is ignored and there is no scale which adequately assesses pain objectively. This indicates that dealing with pain is not one of the primary goals of health care.^[25]

In studies carried out which aimed at detecting the opinions, concepts, and approaches of physicians and nurses regarding pain, we observed that physicians generally prescribe lower doses of analgesics than patients actually need. This was further complicated by the nurses lowering the prescribed dosage even more.^[1,2,22,25]

Informing patients about the plan to ease their pain and their active participation in treatment are significant factors in relieving or alleviating the pain. The study by Eti Aslan and Badır^[26] relative to the knowledge and belief of nurses about pain reported that 58.6%

of nurses did not know that factors such as insomnia, unknown fear, possible cancer diagnosis, anxiety, and depression increase pain detection, and 82.8% of them did not have enough knowledge about the sensory pain threshold. Therefore, we believe that this lack of understanding and disregard for pain may be caused by their limited knowledge about this subject. In almost 85% of patients, pain can be taken under control through the use of modern analgesics.^[27] Today, the advice given to patients having acute surgical pain is to start using an effective analgesic and then decrease the dosage. The administration of analgesics should be made regularly. Traditional patient instructions like "when needed", "3x1", and "before meals or after meals," have lost their popularity and reliability. Analgesics should be given to patients at certain intervals, especially in cases of surgical pain, and they should be given to ensure continuity when there is no pain.^[27,28] The threshold treatment system suggested by the World Health Organization (WHO) is not suitable for surgical pain because in this system, it is only possible to go through the next step after at least 24 hours have passed. However, surgical pain is the most severe in the first 48-72 hours. Here, the intervention should be to apply the adverse step technique which commences with a high analgesic dosage.

The response of patients to pain is affected by previous pain experience along with cultural and environmental factors.^[23] Postoperative pain, on the other hand, is influenced by psychological, social, cultural, and individual factors as well as physical ones.^[1] A previous study observed that phantom pain occurred in 69% of patients who had experienced pain before while this ratio was only 7% for those who had not experienced pain or for those who had no memory of it. This result shows that the emotional and psychological situation of the patients affects their pain perception. Tension, fear, and stress have a negative effect, but relaxation leads to a reduction in feeling pain. Hence, informing patients about pain control is effective in reducing or alleviating the pain.^[23]

Methods of pain relief in the surgical pain

The following methods can be taught to patients in order to reduce the pain likely to occur while moving, taking deep breaths, and coughing after surgery.^[29]

Suitable physical activity: Patients are told to avoid sudden movements and to move slowly and gently while waiting for the analgesic to take effect. In order to prevent the contraction and atrophy that may occur in parts of the body not affected by the surgical process, they should move these parts frequently. It is essential to know whether patients are taking the analgesic drugs

because they enable them to move more easily. They must be instructed to ask for assistance if they are having difficulty in moving without assistance.^[29]

Protection of the incision site: After thoracic surgery, incision care reduces the pain that occurs while patients are coughing or moving. This can be achieved manually or by using padding. In manual protection, one hand must be under the incision site and the other one must be on it. Later, patients must press slightly on the injury and breathe normally when moving. For padding, alternatively, they can put a small pillow on the incision while holding the pillow manually and then breathe normally and sit or stand in that same position.^[29]

Massage: Although it has been known since ancient times that pain is reduced by means of massaging the skin, its mechanism has only been understood in the last two hundred years. Contracting and stretching the muscles causes pain. The psycho-sedative effect of the massage leads to muscle relaxation and decreased pain. Besides, massage reduces pain perception by increasing the release of endorphins which enhances the pain threshold. According to the gate control theory, pain is perceived through transmission of thick myelin nerve fibers. Surface massage has an important role in removing the pain. In view of this theory, mechanical stimuli injected through the skin prevent pain impulses and promote endorphin secretion.^[30] Despite this known fact, in a study made to assess nurses' care of patients, it was determined that only 28.6% of the nurses working in surgical clinics massaged their patients while another study observed that 67.2% of the nurses performed no massage to relieve their pain.^[31]

Relaxation: Administration of relaxation methods is effective in reducing perceptual pain. Richards and Hubbert^[4] reported in their study that in pain treatment, nurses performed a number of independent techniques, such as relaxation, humor, distraction, hot or cold applications, reducing external stimuli, and changing the position of the patients. There is no extensive research on this subject in Turkey; however, in some local studies, we observed that nurses stick to administering drugs to ease pain.^[26,32]

In conclusion, patients who have had cardiac surgery still suffer from pain. The solution should start with believing in and considering their pain. This should be followed by developing protocols for pain treatment and, lastly, preparing preemptive analgesic protocols for the expected pain. Since the fear and anxiety of patients increases the severity of the pain, it is essential to meet with them during the preoperative period and learn about their past pain experience and their anxieties about surgery to help them cope by

developing a pain management plan.^[1] The American Pain Association suggests that patients participate in pain management.^[11,17] In spite of the developments in the methods used for relieving pain, some patients currently experience no pain relief. Alternative methods for easing pain, besides medication, must be thoroughly investigated in order to take steps to alleviate the pain of cardiac surgery patients.

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