



## Pain after Cardiac Surgery: A Review of the Assessment and Management

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### Abstract

**Objective:** Surgery is among the causes of acute pain. One of the major problems of patients after surgical procedures is postoperative pain. Annually, millions of people throughout the world undergo surgery and experience different intensities of postoperative pain. Due to physiological changes and given the stability of the heart and lung, the management and control of pain is rarely considered as a priority in the care of patients after cardiac surgery. Cardiac surgical patients experience pain due to the surgical incision and between the ribs nerve injury created during the course of the surgery, and irritation and inflammation of the pleura by catheters. Control and management of pain in intensive care units (ICU) are the main tasks in nursing care. The purpose of this review study was the investigation, assessment, and management of pain in patients after cardiac surgery.

**Materials and Methods:** In this study, the literature available on Magiran, Google Scholar, ScienceDirect, and PubMed were collected, and after reviewing, the relevant literature was studied.

**Results:** Although pain is one of the major stressors in patients undergoing surgery, the measures taken for the treatment and care of these patients are associated with experiencing pain. In this regard, all the resources have emphasized the using of guidelines and tools to assess patients' pain. However, in cardiac surgery patients, sufficient attention is not paid to pain control. Patients reported poorly controlled pain and experiences of moderate to severe pain after surgery.

**Conclusion:** Pain is a subjective experience, and in patients who cannot report their pain, it should be considered important. According to numerous studies, pain control is not performed in ICUs. Thus, efforts should be made for appropriate control and reduction of pain, use of valid methods to determine and control pain, and improvement of the quality of the programs.

**Keywords:** Assessment, Control, Heart Surgery, Pain

### Introduction

Pain is the most common cause of help seeking by patients from the medical team. Pain is a subjective personal experience that can only be described by the person who has experienced it. Moreover, pain is an important symptom of a disease and it is associated with most diseases. Perhaps there is no scarier feeling than pain for the patient undergoing medical or surgical treatment (1). After surgery, pain is a common phenomenon. Operations are the causes of acute pain. One of the major complaints of

patients after surgery is postoperative pain. In many patients the pain is not treated adequately (2,3).

Hundreds of millions of people around the world undergo surgery every year one of which is cardiac surgery. Pain affects peace, and physical and mental health of the individual, and increases heart rate, respiratory rate, blood pressure, and sleep disorders (4). Despite the many effective pain relievers, inadequate pain control after surgery is one of the most important postoperative problems. Pain is always a common concern of patients with cardiac

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surgery. Patients are always concerned that, after surgery, pain will prevent them from sleeping and performing different activities. The degree of pain experienced is often higher than that estimated, and thus, pain killers are not prescribed enough (5). Approximately 3/4 of patients who suffer from acute and chronic pain and receive narcotic pain medications still suffer from pain after surgery. Studies showed that 77% of surgical patients in intensive care units (ICU) experience pain (2,6,7). Cultural background affects the meaning of pain and pain treatment. Pain relief is one of the most complex issues related to pain, although its treatment seems simple (8).

The aim of this study was to investigate the experience of pain and its management in cardiac surgery patients.

### Materials and Methods

In this study, the literature available on Magiran, Google Scholar, Science Direct, and PubMed were collected and reviewed.

### Results

Based on the study by Cupples on 53 million surgeries in the United States, 30% of patients experienced mild pain, 30% moderate pain, and 40% suffered from severe pain after surgery (8). In the research by Chung and Lui, the most recognized nursing problem in surgical wards was pain and almost 85% of surgical patients complained of pain (9). Statistical studies showed that the greatest concern of patients who had heart surgery was pain which often affected their sleep. Stress factors in patients in ICUs have shown that pain is the second most prevalent stressor for operated patients (10,11). An important note in the care of these patients is that all the pain experienced by the patients is real, even if there is no apparent cause for the pain. Therefore, pain is based on the patient's belief of its existence. Thus, nurses are responsible for the assessment, management, and treatment of pain. Pain management and control has more benefits than its discontinuation. Therefore, by reducing pain, its possible complications in patients after cardiac surgery can be prevented (12). The surgical incision and between the ribs nerve injury created during the course of the surgery, and irritation and inflammation of the pleura by catheters cause pain after cardiac surgery.

Postoperative pain control is an important task for nurses. Listening and paying attention to verbal and nonverbal expressions of pain by the patient is very important. Due to the specific circumstances of patients after heart surgery, admission of patients to the ICU is necessary for 1 to 3 days. During this time, due to the endotracheal tube suctioning, coughing, and physiotherapy, the pain increases (13). Most nurses believe that cardiac surgery is not very painful. Nevertheless, many studies have shown that a majority of patients (71%) after heart surgery, due to the surgical incision site, experience pain of

moderate to severe intensity (14-16). In the study by Parvan et al., pain and discomfort in patients after coronary artery bypass graft (CABG) surgery was one of the most stressful conditions presented (17). Parvan et al. stated that nurses' understanding of patients' perception of pain was a key factor in strategic decision making regarding the reduction of pain and discomfort (17).

Incidence of chronic pain after heart surgery varies between 21-55%. Pain experienced after cardiac surgery may have visceral, muscular, or neurotic sources (18). Age, duration of surgery, the incision affect pain intensity, and risk factors of chronic pain include depression, psychological vulnerability before and after surgery, major surgery, and operation prolonged more than 3 hours (18). Pain management is more important than pain control. Reduction of pain can be followed by the prevention of possible side effects of pain. A patient with severe pain has trouble breathing, and lung and cardiovascular risks followed by effects on other systems can be expected (19).

Despite recent advances in the quality of education and treatment of pain, patients complain of moderate to severe postoperative pain. Patients who have undergone cardiac surgery have reported pain, due to receiving insufficient doses of analgesic drug (20). Control and treatment of postoperative pain is a complex issue. Although pain control is important after cardiac surgery, studies showed that pain was not adequately controlled in these patients, and in only 30-36% of the patients the maximum dose of the drug was used (21,22). Based on the data obtained from this study, the dose of pain killer prescribed by the doctor and administered by nurses was lower than that actually required by the patient. The reason for this was the fear of drug dependency and respiratory depression. Treatment of pain after cardiac surgery was discussed for 30 years until the issue was studied by Watt-Watson and Stevens and their findings suggested that many nurses believed that heart surgery was not painful (22). As a result of incorrect assessment of pain by nurses, protocols and inappropriate drug use by them, patients' inability or unwillingness to communicate, and the hypothesis that patients should wake early from anesthesia and their blood pressure be stable, pain control is postponed to the next step (21,23-26).

Continuous and periodic pain causes anxiety, fear, depression, sleep deprivation, anger, and lack of confidence in the treatment team regarding their ability and motivation to treat pain. Accurate assessment of pain is determined by intensity, quality, and duration of pain (which is different for each patient). Pain assessment helps in the identification and selection of the best treatment. Curtiss, in her study on orthopedic pain assessment standards, had identified that weakness in the evaluation of pain leads to weak pain management (27). The findings of Carroll et al. showed that hospitals that do not have a specific form for the

assessment of pain were significantly different from hospitals that had the assessment of pain form regarding the satisfaction in both groups of patients (11). Researches from the past 25 years showed that the inability to control pain resulted from incorrect assessment of pain by nurses and inadequate intake of certain medications (28).

The study by Puntillo et al. showed that inadequate pain control was associated with increased sympathetic response and ineffective breathing leading to hypoxia, catecholamine release, and general reaction to stress (29). Nurses can support patients and create a calm environment to help ensure patient comfort. Stein-Parbury and McKinley reviewed 26 articles and reported that 71% of patients complained of severe pain. These patients suffered from delusions, memory impairment, and disorientation. The main complaints of the patients were inability to sleep, inability to distinguish day from night, lack of comfort, and inability to talk. In this paper, the researchers recommended that nursing interventions such as frequently informing patients about their place and time, and helping to reduce the patient's excitement and assuring them by explaining to them (30). The study by Desbiens et al., on pain and satisfaction with pain control in 5176 patients admitted to intensive care units, showed that 49.9% of patients suffered from pain, 14.9% reported high intensity pain, and 14.9% were not satisfied with pain control. The results of this study indicated that factors such as race, age, income, health insurance, and education had no significant effect on pain intensity (31).

Physical activity also has an effect on pain. The study by Yorke et al. on control and management of pain after cardiac surgery in Australia showed that patients who had undergone intra muscular artery (IMA) transplant received morphine significantly more than patients who did not have this transplant. Moreover, 92% of patients felt pain in the chest wound area. Regarding physical activity, cough with 95% followed by physiotherapy (89.2%) and movement (88.2%) had the greatest effects on pain (15).

Pain assessed by nurses was also effective in controlling pain. Puntillo et al. determined the accuracy of nurses in pain evaluation using a numeric pain scale ranging from 0 to 10 (29). They showed that nurses measured lower pain intensity with this scale than the patients, and the patients' pain was at a moderate level. Nonetheless, the selected dose of morphine for patients was more in coordination with the pain assessed by the nurses. The findings showed that the indirect assessment of behavioral and physiological indicators of pain by nurses was not accurate (29,32).

During treatment and pain relief after surgery, a chain of communication exists between the patients' experience, drug application, prescribing of painkillers by physician, and decision making and administration of painkillers by nurses. The main

loop of this chain is the patient. Patient satisfaction is the main goal of the therapy team.

## Discussion

Researchers have come to the conclusion that the best indicator of patient pain is the assessment of the patient. However, patients in the ICUs are generally semiconscious or because they are connected to a ventilator they are unable to communicate and express their pain. Numeric pain intensity scales that show numbers to express the pain (lower to higher) or images that express the pain can be used in order to solve this problem. Paying attention to physiological indicators (increased pulse rate, breathing, sweating, and pale color) and behaviors such as crying, frowning, moaning, and stretching is recommended in patients who are semi-conscious (29,32).

Training before the operation and use of analgesics for pain control before the onset of pain after cutting the chest in heart surgery can reduce pain and the amount of painkillers prescribed after surgery. The results of numerous studies showed that the use of preoperative education in the intervention group in the first 48 hours after surgery decreased the amount of prescribed painkillers (33-35). It should be noted that visible behavioral and physiological indicators of pain may be minimal or not even exist. However, this does not mean that the patient feels no pain (32). The results of the studies by Puntillo et al. (29) and Brouner and Smith (32) showed that nurses' indirect assessment of pain using behavioral and physiological indicators was not accurate.

Lack of patient satisfaction of pain control in ICUs can be attributed to the following reasons: patient's inability to communicate and express pain (due to the low level of consciousness, intubation); nurse's fear of creating dependency on narcotics; and the patient's respiratory depression (21,34). Other factors were also involved in this field including severity of pain, patients' expectations of pain, and the amount of time patients waited for receiving painkillers. When a patient has to wait a long time to receive painkillers or when the pain is more than expected, pain intensity will be increased (26).

The art of nursing in pain management includes simple interventions to create more pain relief for the patient. Interventions, such as changing condition, emotional support for the patient and their family, repeatedly informing the patients about the situation, explaining the clinical practices for the patient, back massage, oral care, providing patients with their favorite entertainment (radio, TV, newspapers, and etc.), providing visiting time opportunities for the patient and their family, are worth mentioning. Patients in the ICU, in addition to disclosing their negative experiences, also reported their positive experiences of feeling secure and confident due to the nurses' presence (30). The nurses should assess patients and provide training based on the individual needs of the patients (36). Higher knowledge of

nurses and doctors regarding the pharmacology of analgesics and tranquilizers may also be recommended. Nurses' and doctors' knowledge about tranquilizers will help them in clinical decision making and controlling pain.

### Conclusion

Given the importance of pain management and control, and treatment of postoperative pain, further studies are necessary in this regard. Patient comfort is a priority in crises; however, this fact is generally overlooked. Based on studies of pain in patients after cardiac surgery, their pain was not appropriately controlled and they experienced intense pain. Inadequate pain control can result in negative patient outcomes. Uncontrolled pain may result in aggravated sympathetic responses, and thus, affect the cardiovascular system. These situations can be improved with the following rules:

1. Increasing the knowledge of physicians and nurses in the field of pharmacology of analgesics
2. Identifying and eliminating the stress factors that underlie anxiety and agitation in patients
3. Assigning time to nursing interventions for patient comfort
4. Providing preoperative patient education

Nurses have a great responsibility for the assessment and necessary measurement of pain. It is clear that all patients have moderate or severe pain after heart surgery and insufficient doses of painkillers are used. Furthermore, uncontrolled acute pain can have immediate or long-term negative consequences for the patient's recovery. Clinical training should include a clear knowledge of patients and nurses in the field of assessment and management of pain. Nursing education programs should emphasize the primary importance of pain relief. Detailed reports include reports on patients' clinical history, continuing studies, protocols for practices, and interventions for the management of pain. The patient education program includes training on how to access the system to request help. Most patients are not aware of their pain intensity and are not able to report their pain. Patients should be taught how and when to express the intensity, quality, duration, and location of their pain.

### Ethical issues

Written informed consents were obtained from the patients for publication of this study. The study has been approved by the local ethics committee.

### Conflict of interests

We declare that we have no conflict of interests.

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