

ORIGINAL RESEARCH

Efficacy of Oral paracetamol-based post-operative analgesia in adult cardiac surgery patients

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ABSTRACT

Background: Following a sternotomy, chest tube insertion, and subsequent leg vein incisions, patients undergoing heart surgery may experience pain in the surrounding areas. The present study was conducted to assess the effectiveness of oral paracetamol-based post-operative analgesia for adult post-cardiac surgery patients post-extubation in the ICU. **Materials & Methods:** 120 adult patients undergoing Off-Pump Coronary Artery Bypass Grafting (CABG) surgery of both genders were divided into 2 groups. When the patients in group I were on a ventilator and sponged the following morning at approximately five in the morning, two 250 mg suppositories of Paracetamol were given to them. Group II patients were given placebos. Pain control was assessed in all patients using a Numeric Rating Scale (NRS) of 0 to 10. **Results:** The mean weight was 70.4 kgs in group I and 75.8 kgs in group II. The mean height was 172.7 cm in group I and 178.5 cm in group II. The ejection fraction was 63.4 in group I and 61.2 in group II. Cardiopulmonary bypass time was 116.8 minutes in group I and 113.5 minutes in group II. The duration of anesthesia was 312.4 minutes in group I and 328.6 minutes in group II. Aortic cross-clamp time was 90.2 minutes in group I and 88.1 minutes in group II and extubation time was 4.3 hours in group I and 5.2 hours in group II. The difference was non-significant ($P > 0.05$). The mean pain score (VAS) at 12 hours was 3.7 in group I and 6 in group II, at 24 hours was 2.5 in group I and 5.2 in group II, at 48 hours was 1.9 in group I and 3.5 in group II and at 72 hours was 1.3 in group I and 2.2 in group II. The difference was significant ($P < 0.05$). Morphine consumption was 55.4 mg in group I and 92.2 mg in group II. Rescue doses of morphine were needed in 13.4 patients in group I and 25.3 patients in group II and PONV was seen in 7.5 in group I and 2.4 in group II. The difference was significant ($P < 0.05$). **Conclusion:** The analgesic effects were excellent, and the patients felt at ease using the procedure. This straightforward post-operative analgesic treatment is very affordable, easy to follow, and has no significant adverse effects.

Keywords: analgesia, Paracetamol, Ejection fraction

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INTRODUCTION

Following a sternotomy, chest tube insertion, and subsequent leg vein incisions, patients undergoing heart surgery may experience pain in the surrounding areas.¹ Postoperative discomfort may result in a variety of adverse consequences, such as heart ischemia, respiratory failure, and thromboembolic complications.² Parenterally provided analgesics such as opioids and nonsteroidal anti-inflammatory drugs (NSAIDs) are used to lessen such discomfort in the early postoperative phase. The adverse effects of these analgesics, however, restrict their usefulness by making it more challenging for patients to recuperate from surgery. Renal failure, bleeding from platelets, and gastrointestinal lesion ulceration have all been related to parenteral NSAIDs such as ketorolac. Similar to morphine, other side effects of opioids include respiratory depression, excessive drowsiness,

biliary spasm, depression of gastrointestinal motility, nausea and vomiting (PONV), and disorientation in elderly individuals.³

Among the nonsteroidal anti-inflammatory drug classes covered by this list of pharmaceuticals are aspirin and acetaminophen (Paracetamol). These analgesic drugs primarily function by preventing prostaglandin and cyclooxygenase synthesis, which are considered important environmental factors in the prevention of pain and hypersensitivity.⁴ Cyclooxygenase (COX) comes in at least two forms now recognized: cyclooxygenase 1 (COX-1), which aids in hemostasis, platelet aggregation, and gastric mucosa protection, and cyclooxygenase 2 (COX-2), which relieves pain, inflammation, and fever. Recently discovered protein COX-3 has been suggested to be primarily responsible for the analgesic effect of acetaminophen.⁵ The present study was

conducted to assess the effectiveness of oral paracetamol-based post-operative analgesia for adult post-cardiac surgery patients post-extubation in the ICU.

MATERIALS &METHODS

The present study consisted of 120 adult patients undergoing Off-Pump Coronary Artery Bypass Grafting (CABG) surgery of both genders. A written consent was obtained from all patients. Patients were divided into 2 groups. When the patients in group I were on a ventilator and sponged the following morning at approximately five in the

morning, two 250 mg suppositories of Paracetamol were given to them. Group II patients were given placebos. After the patients' morning extubations, oral feedings began 45 minutes later. As a preventive measure, 650 mg tabs of paracetamol were started by noon and administered every six hours, regardless of whether pain was present or not. If someone suffered breakthrough pain, they were given 30 ug of fentanyl intravenously. Pain control was assessed in all patients using a Numeric Rating Scale (NRS) of 0 to 10. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Baseline parameters

Parameters	Group I	Group II	P value
Weight (Kgs)	70.4	75.8	0.95
Height (cm)	172.7	178.5	0.89
Ejection fraction	63.4	61.2	0.72
Cardiopulmonary bypass time (min.)	116.8	113.5	0.61
Duration of anesthesia (min.)	312.4	328.6	0.94
Aortic cross-clamp time (min.)	90.2	88.1	0.76
Extubation time (hours)	4.3	5.2	0.13

Table I shows that the mean weight was 70.4 kgs in group I and 75.8 kgs in group II. The mean height was 172.7 cm in group I and 178.5 cm in group II. The ejection fraction was 63.4 in group I and 61.2 in group II. Cardiopulmonary bypass time was 116.8 minutes in group I and 113.5 minutes in group II. The duration

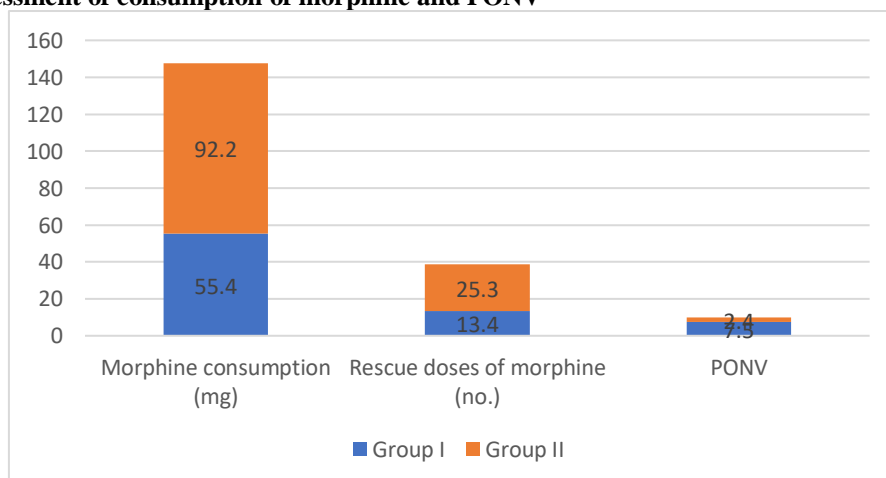
of anesthesia was 312.4 minutes in group I and 328.6 minutes in group II. Aortic cross-clamp time was 90.2 minutes in group I and 88.1 minutes in group II and extubation time was 4.3 hours in group I and 5.2 hours in group II. The difference was non-significant (P> 0.05).

Table II Comparison of pain (VAS)

Time	Group I	Group II	P value
12 hours	3.7	6	0.05
24 hours	2.5	5.2	
48 hours	1.9	3.5	
72 hours	1.3	2.2	

Table II shows that the mean pain score (VAS) at 12 hours was 3.7 in group I and 6 in group II, at 24 hours was 2.5 in group I and 5.2 in group II, at 48 hours was 1.9 in group I and 3.5 in group II and at 72 hours was 1.3 in group I and 2.2 in group II. The difference was significant (P< 0.05).

Graph I Assessment of consumption of morphine and PONV



Graph I shows that morphine consumption was 55.4 mg in group I and 92.2 mg in group II. Rescue doses of morphine were needed in 13.4 patients in group I and 25.3 patients in group II and PONV was seen in 7.5 in group I and 2.4 in group II. The difference was significant (P< 0.05).

DISCUSSION

Pain is an unpleasant emotional and sensory experience associated with a potential or current tissue injury. Following medical therapy (such as surgery), postoperative discomfort may occur, which triggers stress responses at the physiological and biochemical levels.⁶ In addition to being a major clinical, social, and economic problem, pain is also a major worldwide public health issue.⁷ Post-surgical pain is typically perceived by patients as nociceptive discomfort. Surgical trauma is known to induce hyperalgesia and peripheral and central sensitization, which, if addressed, can lead to chronic postoperative pain after surgery.^{8,9} The present study was conducted to assess the effectiveness of oral paracetamol-based post-operative analgesia for adult post-cardiac surgery patients post-extubation in the ICU.

We found that mean weight was 70.4 kgs in group I and 75.8 kgs in group II. The mean height was 172.7 cm in group I and 178.5 cm in group II. The ejection fraction was 63.4 in group I and 61.2 in group II. Cardiopulmonary bypass time was 116.8 minutes in group I and 113.5 minutes in group II. The duration of anesthesia was 312.4 minutes in group I and 328.6 minutes in group II. Aortic cross-clamp time was 90.2 minutes in group I and 88.1 minutes in group II and extubation time was 4.3 hours in group I and 5.2 hours in group II. Gousheh et al¹⁰ evaluated whether paracetamol, at least in the initial few hours following surgery, can effectively relieve pain when used alone. Thirty ASA class I patients, ages 18 to 50, who were candidates for laparoscopic cholecystectomy were gathered and split into two equal groups at random. Ten minutes after the onset of anesthesia, group B received a placebo and group A (the paracetamol group) received one grain of paracetamol. Based on the patient's compliance and pain score of greater than three, 0.1 mg/kg of morphine was given intravenously. Within the first six hours following surgery, a pain score and the amount of opioids taken were noted. The visual analog scale was used to measure the patient's pain. Group A had a lower pain score, although there was no discernible difference in the groups' morphine usage throughout the first six hours postoperatively.

We observed that the mean pain score (VAS) at 12 hours was 3.7 in group I and 6 in group II, at 24 hours was 2.5 in group I and 5.2 in group II, at 48 hours was 1.9 in group I and 3.5 in group II and at 72 hours was 1.3 in group I and 2.2 in group II. Petterson et al¹¹ conducted a study on eighty patients who were receiving cardiopulmonary bypass along with coronary artery bypass grafting. Two groups of patients were randomly assigned to receive either tablets or intravenously administered 1 g of acetaminophen every six hours during the postoperative phase following extubation. Starting with the administration of acetaminophen throughout the ICU stay and continuing until nine in the morning the following day, the total amount of opioids

administered during the study period was measured. There was a recorded incidence of postoperative nausea and vomiting (PONV). Using a visual analog scale (VAS) ranging from 0 to 10, pain was measured. Due to missing data, three patients—two from the oral group and one from the intravenous group—were not included. Compared to the oral treatment group, which received 22.1 +/- 8.6 mg of opioids, the intravenous group received 17.4 +/- 7.9 mg. PONV prevalence and VAS scores did not differ. During the first hours after extubation, 50 of 77 patients reported VAS scores >3 with no difference between groups.

We found that the morphine consumption was 55.4 mg in group I and 92.2 mg in group II. Rescue doses of morphine were needed in 13.4 patients in group I and 25.3 patients in group II and PONV was seen in 7.5 in group I and 2.4 in group II. Among the 113 patients in Cattabriga et al.'s¹² study, 56 were given paracetamol and 57 were given a placebo. One-g intravenous study drug was injected 15 minutes prior to surgery's conclusion and then every six hours for a total of 72 hours. The two groups' baseline characteristics were the same. Patients who got paracetamol experienced much reduced pain at rest 12, 18, and 24 hours after the procedure ended; at this point, there was no difference in pain between the two groups. A deep inhale revealed that the difference became noticeable only after 12 hours. Even though the difference did not achieve statistical significance, the group using paracetamol needed less cumulative morphine than the placebo group (48 mg vs. 97 mg).

CONCLUSION

The authors found that the analgesic effects were excellent, and the patients felt at ease using the procedure. This straightforward post-operative analgesic treatment is very affordable, easy to follow, and has no significant adverse effects.

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