ORIGINAL ARTICLE

Outcome of Multimodal Preemptive Analgesic with Intravenous Paracetamol, Tramadol and Lignocaine Combination on Postoperative Analgesia

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Abstract:

Background: Post-operative pain management is very important as it is a critical component of perioperative outcomes in different surgeries. Till now, opioid is the only drug used widely, but there are side effects like respiratory depression and longer hospital stays. Preemptive multimodal analgesia may reduce the perioperative analgesic dose and side effects. This study aimed to investigate the effect of preemptive intravenous paracetamol, tramadol, and lignocaine combination on postoperative analgesia.

Methods: This observational study was carried out in the Department of Anaesthesia, Intensive Care and Pain Medicine, Shaheed Suhrawardy Medical College, Dhaka. Patients aged 18-65 years with with ASA-I and ASA-II scheduled for general anesthesia for various surgery were included. All study participants were infused a combination of 15 mg/kg intravenous paracetamol, tramadol 50 mg, and 40 mg lignocaine 10 minutes before surgery. The hemodynamic status, post-operative analgesic consumption, duration of analgesia and any adverse effects were documented.

Results: A total of 60 patients were enrolled in this study. The mean age was 41.5 ± 11.8 years, and the male-to-female ratio was 1:1.8. The average duration of surgery was 83.60± 11.38 minutes. Approximately 35 (58.3%) patients required pethidine at different time periods during the postoperative period. The average total dose was 70.85±12.68 mg. The mean duration of post-operative analgesia was 6.40± 2.38 hours. The hemodynamic status was within the physiological limit during the perioperative period. There were fewer side effects recorded in the post-operative period.

Conclusion: Preemptive multimodal analgesia with a combination of intravenous paracetamol, tramadol and lignocaine is effective in patients undergoing different surgeries under general anaesthesia.

Keywords: Preemptive analgesia, Multimodal, Paracetamol, Tramadol, Lignocaine, Postoperative analgesia

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Introduction

Post-operative pain is basically an acute pain which is typically associated with neuro-endocrine stress response which is proportional to the intensity of pain[1]. It is complex in nature in the first 24 hours and intensity is high[2]. According to the ASA practice

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guideline, in the post-operative period acute pain is defined as pain after a surgical procedure[3]. Pain relief is a human right which is recognized by IASP[4]. Poorly managed pain in the post-operative can lead to complications and prolong rehabilitation and may be associated with the development of chronic pain with the reduction in quality of life[5]. Effective post-operative pain control improves patient outcome and pain related complications[6]. So appropriate analgesic therapy which needs standard protocol, increasing awareness and effort to improve is often required. This is best accomplished with a multimodal preemptive analgesic approach[7]. Various routes (oral, intravenous, neuro-axial and regional), agents (opioids Vs Non opioids), modes (patients controlled Vs as needed) are studied for the treatment of post-operative pain[8]. Systemic opioids are regarded as the gold standard for the treatment of post-operative pain. Their uses are limited by their side effects[9].For effective post-operative pain management to overcome the problem regarding side effects of opioids the adjunctive administration of analgesic that act via different mechanism is recommended. Growing evidence directs towards preemptive multimodal approaches to accelerate recovery and can avoid opioids related side effect. Preemptive analgesia is based on administration of an analgesic before a painful stimulus is generated so as to prevent the subsequent rebound mechanism. Regional analgesia with local anesthetics and high dose of morphine inhibits stress response to pain[10]. However it cannot be applied without side effects and needs skilled manpower. Continuous research is going to find better analgesic technique with the aim of reducing dose of opioid with effective post-operative pain control. For this reason preemptive multimodal analgesia with intravenous paracetamol, intravenous tramadol and intravenous lignocaine are used. This study was conducted to assess the status of combined preemptive analgesia on post-operative pain control.

Methods

This observational study was conducted in Shaheed Suhrawardy Medical College Hospital, Dhaka. Patients aging 18-65 years with ASA-I and ASA-II needed general anesthesia were included. The exclusion criteria were BMI >35 kg/m^2, uncontrolled DM, hypertension, renal/hepatic insufficiency, drug abuse, psychiatric diseases, known case of long term opioid users. Informed written consent was taken before surgery. A multiparameter monitor was attached to the patient to record baseline heart rate, non-invasive blood pressure, O_2 saturation and ECG. After securing 18 G cannula, a preemptive analgesic was given 10 minutes before induction. A combination of 15mg/kg intravenous paracetamol, 50 mg tramadol and 40 mg lignocaine were injected. Then, after pre-oxygenation, general anaesthesia with endotracheal intubation was done with fentanyl 2microgram/kg, propofol 2mg/kg, and suxamethonium 1.5mg/kg. Patients were monitored at regular intervals. Before extubation, 30 mg Ketorolac injection was given to every patient. At the post anaesthesia care unit (PACU), the visual analogue scale (VAS) score was used to measure the intensity of pain and VAS score > 4 was considered to give rescue analgesic (pethidine 1 mg/kg). The time of first analgesic requirement, and any adverse effects were documented in a data sheet.

Statistical analysis

SPSS (Statistical Package for Social Sciences) for Windows (version 23) was used to perform statistical analysis. Quantitative and qualitative variables were expressed as mean ± standard deviation and proportion or percentages, respectively. The results were presented using tables and/or figures.

Results

A total of 60 patients were included in this study. The mean age was 41.5 ± 11.8 years, the mean BMI was 26.6± 2.2 kg/m^2, and male-to-female ratio was 1:1.8. The average duration of surgery was 83.60± 11.38 minutes. (Table I)

Table I: Demographic and clinical baseline characteristics (N=60)

Variable	Value (n=60)
Age(years)	41.5 ± 11.8
Gender	
Female	39 (65%)
Male	21 (35%)
BMI	26.6± 2.2
Duration of surgery (minutes)	83.60± 11.38

Data were presented as mean±SD and percentages.

Figure 1 depicts the different surgeries included in this study. Figure 2 shows the trends of pulse rate, systolic and diastolic blood pressure and SpO_2 in different time intervals.

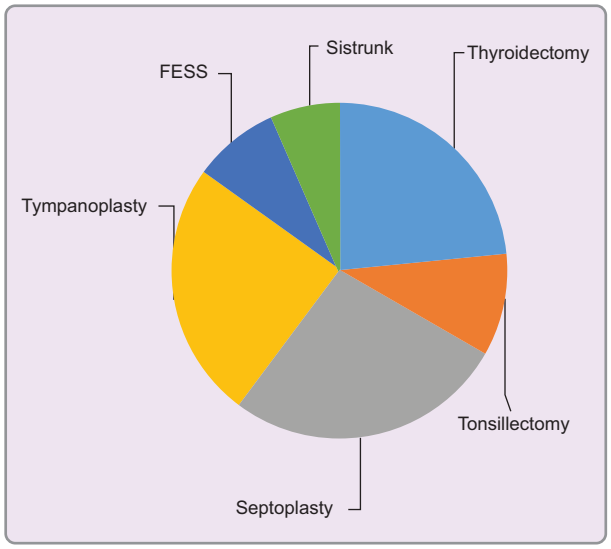

Figure 1: Variation of surgeries in the study

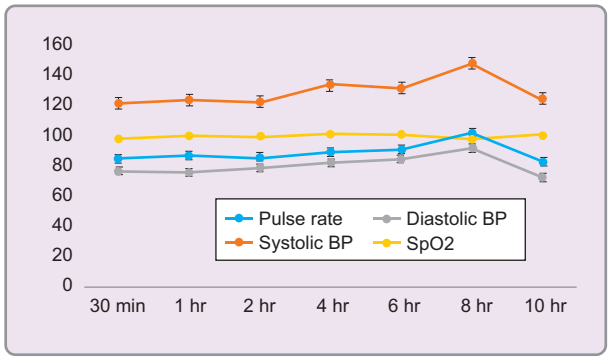

Figure 2: Trends of hemodynamics during the perioperative period

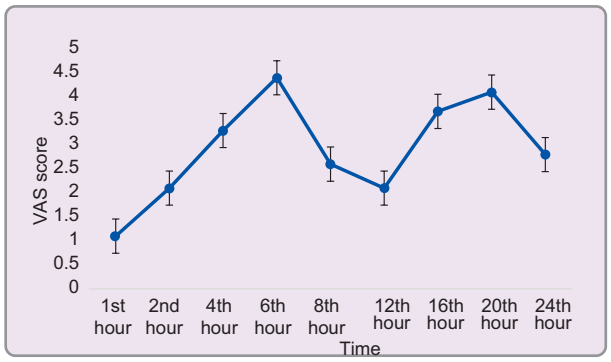

Figure 3: VAS score during postoperative period

After assessing VAS score during postoperative period, it was observed that VAS score was high in 6th postoperative hour. (Figure 3)

Table II: Postoperative opioid consumption in 24 hours of the study participants (N=60)

Variables	Value
Number of patients required opioid	35 (58.3%)
Total dose of pethedine (mg)	70.85±12.68
Time of first analgesic requirement	6.40± 2.38 hours

Data presented as frequency and percentage and Mean±SD

Approximately 35 (58.3%) patients required pethidine during the postoperative period. The average total dose was 70.85±12.68 mg. The average time to first analgesic requirement was 6.40± 2.38 hours. (Table II)

Table III: Frequency of adverse effects

Adverse effects	Value (n=60)
Sore throat	7 (12%)
Vertigo	4 (7%)
Nausea	3 (5%)
Vomiting	2 (3%)
Headache	3 (5%)

Data were presented as frequency (within parentheses, percentage over column total)

The frequency of adverse effects was shown in Table III. Nineteen patients out of 60 (32%) had adverse effects.

Discussion

The fact that postoperative pain is highly variable and involves several pain components. Pain is one of the factors that changes quality of life after an operation. Perioperative side effects with the use of opioids may delay recovery and discharge with postoperative hyperalgesia and increased opioids consumption. The goal for postoperative pain management is to reduce pain and discomfort. Although the mainstay of postoperative analgesia is opioid based. Increasing more evidence exists to support a preemptive multimodal approach with the intent to reduce opioid side effects like nausea,

vomiting, pruritus, sedation, respiratory depression, ileus etc[11,12].

In our combination, we used tramadol, which has mixed opioid and non-opioid activities, it has recently been recommended as the first-line drug for post-surgical pain because it does not cause significant respiratory depression, sedation, and constipation[13]. Another drug, intravenous paracetamol, has been included, and its safety has been established for children[14]. Intravenous lignocaine has also been shown to have analgesic, antihyperalgesic, and anti-inflammatory properties[15]. Use of lignocaine showed safety in the peri-operative period and decreased intra-operative anesthetic requirement, lower pain scores, decreased post-operative analgesic requirements, as well as faster return of bowel function and decreased length of hospital stay[16].

In spite of advances in multimodal preemptive analgesia, the insufficiency of traditional acute pain management may be partially explained by the ongoing use of opioid. The mixture available to treat postoperative pain as preemptive analgesia, combination of paracetamol, tramadol, lignocaine and magnesium sulfate is one of them[17].

In the current study, most of the patients were female and the mean age was 41.5 ± 11.8 years. No obese patients were included. The dose selected in this study was somewhat varied from other studies due to demographic variation[9,16-18].

During postoperative period, it was observed that VAS score was high in 6th postoperative hour. Thirty-five patients out of 60 (58.3%) required pethidine during the postoperative period. The mean dose of pethedine dose was 70.85±12.68 mg. The timing of the rescue analgesic requirement varied among the participants. The average duration of post-operative analgesia was 6.40± 2.38 hours.

In our study, the hemodynamic status was within the normal physiological limit during the perioperative period. There was a mild to moderate increase in pulse, BP at 8 hours due to pain. Thereafter, it became normal due to the administration of a rescue analgesic.

This study included different surgeries that provoke different types of painful surgical stimuli. The mean duration of surgery was 83.60± 11.38 minutes. There were adverse events documented in the postoperative period. Sore throat is the most frequent adverse event. It may be due to the site of operation being close to the larynx, or cuff volume may be high.

The technique of "opioid sparing anesthesia" (OSA) allows little usage of opioids in the multimodal regimens[19]. The combination used in this study may be considered a useful technique to manage post-operative pain effectively without increasing side effects and hemodynamic alterations.

Conclusion

The use of intravenous paracetamol, tramadol, and lignocaine effectively increases the duration of the pain-free period in the post-operative period. There are minimal side effects with fewer deviations of hemodynamics from the normal limit. Further clinical trials are needed to evaluate the safety and efficacy of this combination before recommending it as a preemptive analgesia technique.

Declaration

Author contributions
Conception and development of the idea: MSH
Writing: MSH, SA
Data analysis: MSH, SAB, MSRK
Data collection: MSH, ASMRH
Review and Editing: MSH, MRUK
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