



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(9): 251-255
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www.thepharmajournal.com

Received: 02-06-2023
Accepted: 04-07-2023

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Optimizing postoperative analgesia in acute pain management after open hernia surgery

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Abstract

Post-operative pain is a prevalent occurrence following surgery, often remaining undiagnosed and undertreated in numerous cases. The goal here is to examine if appropriate combination of analgesics is given according to the pain score in the management of postoperative pain and to observe prescribing patterns of analgesics in patients after open hernia surgery. Patient data, encompassing variables such as age, gender, duration of stay and pain score, was obtained from the medical records department. Additionally, information regarding the medication administered during the hospitalization periods and after the discharge was included. The purpose of this study is to examine which class of analgesics serves as the better option for relieving the pain in patients when compared to other medications after the open hernia surgery. In the present study, it was concluded that the most prescribed combination therapy was Paracetamol along with Tramadol followed by Paracetamol with Diclofenac. This particular approach demonstrated significant efficacy when compared to the other prescribed combinations.

Keywords: Hernia, postoperative pain, hernioplasty, pain score, postoperative management, Tablet (Tab), injection (INJ), Verbal Pain Intensity Scale (VPIS), Nonsteroidal anti-inflammatory agents (NSAID's).

1. Introduction

Post-operative pain is a prevalent occurrence following surgery, often remaining undiagnosed and undertreated in numerous cases. One crucial aspect of the post-surgery periods is effectively managing and recovering from pain. To achieve this, selecting an appropriate pain management strategy is essential. The pain intensity (severity) is typically measured using Verbal Pain Intensity Scale (VPIS). On VPIS, a score of "0" indicates no pain, "1" signifies mild pain, "2" represents moderate pain, "3" indicates severe pain, "4" signifies very severe pain and "5" represents the worst possible pain.^[1] Pain is perceived as an unpleasant sensation that varies in severity. Successful postoperative pain control can be achieved by rational use of analgesic with the help of healthcare resources and patient's satisfactions.^[2] Adequate and effective pain control in the postoperative period promotes patient comfort and satisfaction, facilitates early mobilization, accelerates recovery, reduces the likelihood of developing neuropathic pain and deep vein thrombosis and overall decreases healthcare cost.^[3] The failure to provide adequate postoperative analgesia include poor pain assessment, inadequate education, irrational fear of adverse event of analgesic drugs and insufficient adequately trained staffs. Analgesics are medications which are used to alleviate pain and inflammation. They can be categorized into two main groups: Opioids (such as tramadol and tapentadol) and nonsteroidal anti-inflammatory agents [NSAID's] (such as paracetamol and etoricoxib). Tailoring postoperative analgesia according to the patient's pain score, enhances its effectiveness. The most commonly administered medications for pain management are analgesics which include both NSAID's and opioids. NSAID's are valuable in reducing the need for and administration of opioids, thereby mitigating opioid-related side effects^[4]. Despite advancements in pain management over the years, opioids remain the primary stay of postoperative pain therapy in many settings. Opioids bind to receptors in the central nervous system and peripheral tissues, modulating the effect of the nociceptors. They can be administered orally, trans dermally, parenterally, or rectally^[5].

The optimized usage of these medications has paved the way for better management of pain. Each patient is unique in his or her perception of pain allowing for many combinations in the treatment of pain. The goal of postoperative pain management is to alleviate pain while keeping side effects to a minimum.

2. Materials and Methods

2.1 Materials studied: This study included patients who had received analgesic drugs for pain management following open hernia surgery in the general surgery department during the study period, while also meeting the inclusion and exclusion criteria.

2.2 Aim and Objective

The primary objective of this study is to examine if appropriate combination of analgesics is administered based on the pain score for managing postoperative pain. Additionally, the study aims to observe prescribing patterns of analgesics in patients after open hernia surgery.

2.3 Sample size

The study by Ghosh S, Gupta SK, titled "NSAID's Preferred Over Opioid as Post-Operative Analgesic: A Prospective, Observational Prescribing Pattern Study in a Tertiary Care Hospital of Eastern India" (Ann. Int. Med. Den. Res. 2019) is used as primary reference.

Sample size was collected using expected proportion (p) as 65%, confidence level (1- α) as 95%, absolute precision (d) as 7%. The sample size was obtained 200 using the formula.

$$N = Z^2_{1-\alpha/2} p(1-p) / d^2$$

3.1.1 Gender

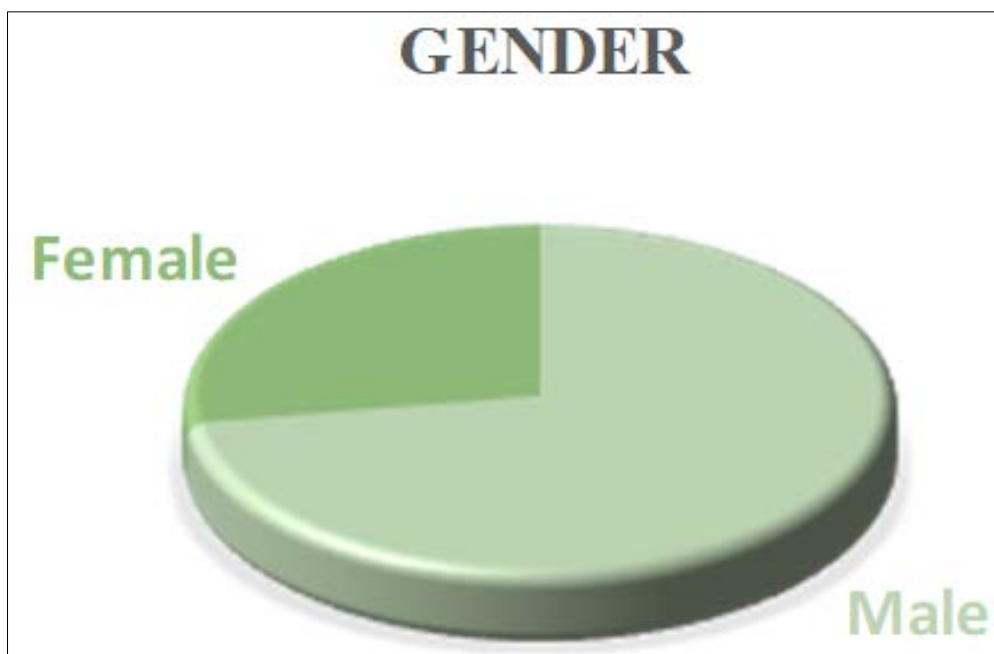


Fig 1: Distribution based on gender

A retrospective analysis was conducted on a total of 200 postoperative hernia cases, consisting of 145 males and 55 females. Males accounted for 72.5% and females represented

2.4. Criteria for eligibility

The study included patients who underwent open hernia surgery and were admitted in the department of general surgery. Both male and female patients above the age of 18 years who were on analgesics were considered eligible.

The patients excluded from this study were patients who did not undergo surgery and paediatric patients.

2.5 Study procedure

A retrospective study was conducted in the department of general surgery over a period of 6 months in which data from January 2019- January 2022 was collected after the approval of Institutional Ethics Committee at Pushpagiri Medical College Hospital. The selection of patient was based upon the inclusion and exclusion criteria. Patient's data collection form was utilized to record the demographic details of the patient (Age, sex, duration of stay), pain score, medications. Throughout the study, the confidentiality of the patient's data was strictly maintained. The study aims to assess the analgesics administered to patient for postoperative pain management following open hernia surgery and examine whether the appropriate combination of analgesics is provided to reduce the pain score in postoperative pain management.

3. Results

3.1 Patient demographic characteristics

27.5%.

3.1.2 Age group

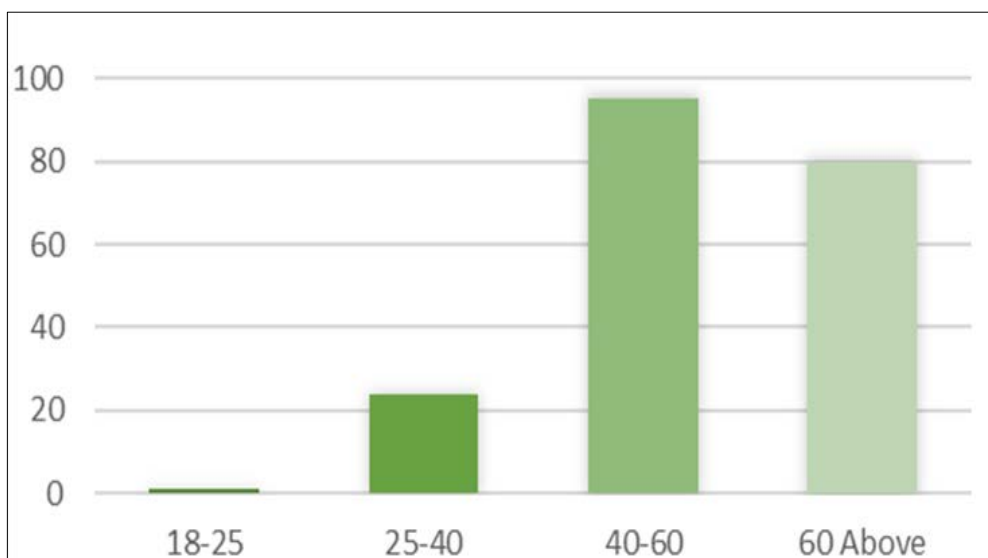


Fig 2: Distribution based on age group

Regarding the distribution of patients by age group, out of the 200 patients included in the study, 80 was in the age group greater than 60 years. Additionally, 95 patients fell into the age group of 40-60 years, while 24 patients belonged to the age group of 25-40 years. Only one patient was in the age

group of 18-25 years. These findings indicate that the middle-aged group had the highest susceptibility to hernia.

3.1.3 Duration of study

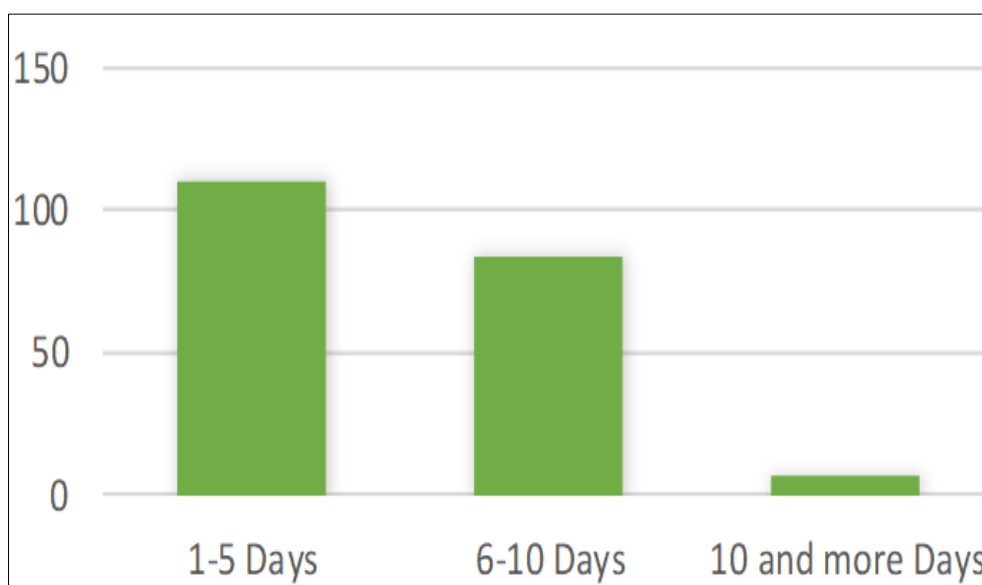


Fig 3: Distribution based on duration of stay

Drugs used	No. of patients prescribed with
INJ paracetamol	162
INJ tramadol	117
Diclofenac suppository	23
Tab Tapentadol	21
Tab Diclofenac	12
Tab Piroxicam	4

Among the 200 patients, it was observed that 110 patients had a hospital stay of 0-5 days, while 84 patients stayed for 6-10 days. Additionally, 6 patients had a stay of more than 10 days. These findings indicates that the majority of patients had to remain hospitalized at least 5 days.

3.2 Prescribing trends observed for post-operative analgesics in hernia patients

Table 1. Distribution based on patients prescribed with post-operative analgesics

In the treatment plan Inj. Paracetamol emerges as the most prescribed drug. It functions as both an antipyretic (reduces fever) and analgesic (relieves pain), which helps in decreasing pain that occurs after the surgery in hernia. The second most prescribed drug is Inj. Tramadol. However, Tramadol administration can lead to an emetic effect. To mitigate this

disadvantage, it is suggested to administer Inj. Ondansetron. It blocks the action of chemicals in the body that triggers nausea and vomiting, thereby reducing the emetic effect of Tramadol.

3.2.1 Combination drugs used in management of post-operative patients

Table 2: Distribution based on patient's combination drugs prescribed for post-operative analgesics

Drugs used	No. of patients prescribed with
TAB. Paracetamol	94
Tab. Etoricoxib	47
Tab. Tapentadol	23
Tab. Tramadol	15
Tab. Serratiopeptidase & Diclofenac	11
Tab. Piroxicam	1

In the above table, the most commonly used combination drug was Paracetamol along with Tramadol, which was given to 66 patients out of the total 200 patients. The second most prescribed combination drugs were Paracetamol, Tramadol and Diclofenac suppository, which was given to 19 patients. These combination therapies were given based on the specific needs and pain score of the patients, aiming to provide effective pain relief and manage postoperative discomfort.

3.3 Drugs prescribed for postoperative hernia patients at the time of discharge

Table 3: Distribution based on drugs prescribed for postoperative hernia patients at the time of discharge.

Combination of drugs	No. of patients prescribed
Paracetamol + Tramadol	66
Paracetamol + Tramadol+ Diclofenac Supp	19
Paracetamol + Diclofenac	11
Tramadol + Diclofenac Supp	5

During discharge the most commonly prescribed drug was Paracetamol, followed by Etoricoxib (COX-2 inhibitor). Paracetamol, a centrally acting analgesic, but lacks peripheral anti-inflammatory effects, making it suitable for pain relief but not for addressing inflammation. One of Paracetamol's major advantages over other NSAID's is its lack of interference with platelet function making it safer for patients with a history of peptic ulcers or asthma. On the other hand, Etoricoxib is a cyclooxygenase-2 (COX-2) enzyme inhibitor that is effective in managing moderate to severe pain. It reduces the risk of ulcer formation in stomach since it is a COX-2 inhibitor, but it is not suitable for patients with cardiovascular risk.

3.4 Pain score of post-operative patients

From the above given table, we can infer that 97 patients (with pain score 0) were prescribed with single drug. 66 patients (with pain score 1) were prescribed with different combinations. This observation suggests that patients were indeed prescribed medications in accordance with their pain scores. The healthcare professionals involved in the treatment likely tailored the medication regimen based on the severity of pain reported by the patients. This personalized approach to prescribing medications based on pain scores is a crucial aspect of effective pain management in postoperative patients.

Table 4: Pain score of post-operative patients

Pain score	No. of patients prescribed	
	Single drug	Combination drugs
0	97	0
1	2	66
2	0	25
3	0	8
4	0	2

4. Discussion

In this retrospective study involving 200 patients who underwent open hernia surgery, our objective was to examine the administration of appropriate combination of analgesics based on the pain score and analyze the prescribing trends of analgesics. The data was collected from the Department of General Surgery at Pushpagiri Medical College & Research Sciences and it was organized, tabulated and described with the help of tables and graphs.

The findings of this study indicates that NSAID's were the most commonly prescribed medications, followed by opioids which was similar to the study done by Swamy RM, *et al.* [2] The preference for NSAID's is attributed to their high efficacy and better safety profile compared to other analgesics. In this study, the main route of administration for NSAID's (Paracetamol) was intravenous for the first two days followed by oral administration. Paracetamol, a stable IV form of acetaminophen has advantages over other NSAID's, such as not interfering with platelet function and being safe for administration for patients with a history of peptic ulcers or asthma [5]. Paracetamol acts through the cyclooxygenase (COX) pathway, similar to NSAID's, by inhibiting the production of prostaglandins (PGE₂, PGI₂), which are lipids with hormone-like actions produced primarily at sites of tissue damage or infection, thus reducing pain.

The next most prescribed medication in this study were opioids which was similar to the study done by Swamy RM, *et al.* [2] Opioid analgesics produce analgesia by acting at multiple levels of the nervous system, including inhibiting neuro transmitter release from primary afferent terminals in the spinal cord and activating descending inhibitory controls in the mid brains. Opioid have the unique ability to reduce both the sensory and affective components of pain, while NSAID's does not significantly effect on the emotional aspects of pain [3].

In this study, the most affected age group is middle aged men (40-60 years) with the majority of hospital stays ranging from 1-5 days. Here, the most prescribed medication in the post-operative medication chart was Inj. Paracetamol followed by Inj. Tramadol. Upon verbal confirmation of pain reduction, the intravenous administration of paracetamol was switched to oral route. Verbal scores were converted to numerical scores for data analysis. Furthermore, if the pain still persists in the patient, paracetamol tablets will be provided during discharge. The most commonly prescribed combination therapy was Inj. Paracetamol with Inj. Tramadol followed by Inj. Paracetamol with Inj. Diclofenac. This combination was found to be effective compared to other prescribed combinations.

The majority of patients reported a pain score of 0, and this was confirmed by the data written from post-operative ICU. Most of the patients were given medications with respect to their pain scores and the discharge occurred once pain relief was achieved.

In the discharge medication, the most prescribed drug was

Tab. Paracetamol followed by Tab. Etoricoxib. Patients with pain score 0 were advised to take Tab. Paracetamol as needed.

5. Conclusions

In conclusion, our study found that in single drug therapy, Inj. Paracetamol was the most prescribed drug while the combination of Paracetamol and Tramadol was the most prescribed in combination therapy. Also, medication was prescribed based on patient's pain score.

Postoperative pain, a commonly experienced symptom among patients who has undergone open hernia surgery, depends upon the characteristics of the selected patients. This pain can be effectively managed using non-opioid analgesics such as paracetamol and diclofenac. The combination of paracetamol with tramadol should be reserved for patients who do not achieve sufficient pain reduction with NSAID's alone. NSAID's like paracetamol and diclofenac is suitable for postoperative pain management in patients as it is cost-effective and has fewer adverse effects. In mild pain, single analgesics, preferably non-opioid is commonly used while moderate to severe pain may require two or more analgesics, preferably one opioid in nature. It is highly advisable to prescribe drugs using their generic names rather than brand names to promote rational prescription of analgesics, considering factors such as appropriate dispensing, cost, safety, and efficacy.

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