Original Article

An observational study to evaluate the prescription pattern of analgesics used in the perioperative period in a tertiary care hospital

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Abstract

Background and Aims: Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage. There are limited observational prescription pattern studies of analgesics in perioperative period in tertiary care hospitals for which this study was carried out in orthopedic, general surgery, and plastic surgery departments. The primary aim was to study the prescription pattern of analgesics in the perioperative period with the secondary aim to study the specific use of opioids and pain relief using the Visual Analog Scale (VAS).

Methods: A total of 250, 250, and 100 patients were taken from orthopedic, general surgery, and plastic surgery departments, respectively. The analgesics commonly used in preoperative, intraoperative, and postoperative period were observed. The use of opioids in the perioperative period, the number of fixed drug combinations used, the number of generic drug prescription, and pain relief postoperatively were also observed. The analysis was done using descriptive statistics.

Results: Total analgesics prescribed were 1168, 117, and 369 in orthopedic, general surgery, and plastic surgery departments, respectively, and were maximum in the intraoperative period. Most commonly used analgesic in the preoperative and postoperative period was paracetamol and that in intraoperative period was fentanyl. Nonsteroidal anti-inflammatory drugs (NSAIDs) were mainly prescribed by the general surgery department in postoperative period. The amount of pain in postoperative period after treatment with analgesics was mild to moderate as per the VAS.

Conclusion: This study revealed that in preoperative and postoperative period, the most common analgesic used is paracetamol. In the intraoperative period, maximum patients received fentanyl. Diclofenac is an established NSAID used in the management of acute and chronic pain states. In our study, we found that the usage of paracetamol was more than NSAIDs and the usage of opioid was maximum during intraoperative period.

Keywords: Analgesics, opioids, perioperative, prescription pattern

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INTRODUCTION

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage.[1,2] Pain can be classified based on the duration of symptoms: acute and chronic pain.[3]

Surgical pain is a nociceptive type of pain. One of the common types of acute pain is perioperative pain. Intraoperative pain is pain that occurs during the surgical operation. Postsurgical pain results from a complex response to tissue trauma that stimulates the sensitivity of the central nervous system.[4-6]

The prevalence of postoperative pain globally is 50%–75%.[5] Acute postoperative pain converts into persistent postoperative pain in 10%–50% of postoperative patients.[7] Acute postoperative pain leads to complications such as immobilization, delayed healing, delayed recovery, and if not treated properly, it leads to chronic pain which can impair quality of life, and therefore, effective pain management is essential in the postoperative period.

Major barriers in pain management are deficit in knowledge related to pain management, incomplete documentation of medications given to treat pain, and uncommon practice of using pain assessment methods.[8] Breaking the barriers through strong knowledge regarding adverse effect profile of the analgesics prescribed and the inclusion of assessment tools such as the Visual Analog Scale (VAS) can lead to better outcomes in pain management.

The prescription pattern study has been done to capture the current trend of drug usage in the perioperative period by surgeons and anesthesiologists. This study will give an insight regarding the prevailing practices of pain management during the perioperative period. It is such studies which unfold conundrums in pain management during the perioperative period which one can resolve by making amendments at institution level for benefit of patients. The other aim to investigate if the usage of opioids in perioperative pain management was with a scientific rationale. Opioid being the most potent class among analgesics while prescribing them, the doctors face challenges due to strict laws regarding its storage and procurement. As the practice of pain management in perioperative period is very crucial, the study gives an insight regarding the present pain management practices followed at a tertiary care hospital which handles high volume of patients.

METHODS

The study (Project Number – EC/184/2015) was started after approval from the Institutional Ethics Committee of our tertiary care hospital. Six hundred patients were enrolled over the period of 1 year. The sample size was considered after determining the quantum of surgeries conducted per year in the hospital. The study was conducted for a duration of 1 year. The inclusion criteria were patients >18 years–<75 years, either male or female undergoing anesthesia for a surgical procedure, and exclusion criteria were patients with any psychiatric disorder and not willing to give consent. Written informed consent was obtained from patients. Each patient was assigned a study number, and demographic details of the patient were noted. Patient's notes after the surgery by anesthetists and surgeons were noted and analyzed to know the prescription pattern of analgesics in the perioperative period. The preoperative period considered was 24 h prior to surgery and postoperative period considered was up to 24 h after surgery. The patients who were operated and completed 24 h after surgery were selected and the entire data were captured at single point of time which was 24 h postsurgery. Prescription indicators and study variables considered for the analysis were the drugs prescribed by generic name, drugs prescribed in an injection form, number of drugs prescribed from hospital formulary, and fixed-dose combinations prescribed and opioids prescribed. Data were analyzed using descriptive statistics.

RESULTS

The results have been depicted in different headings:

Demographic and general data

Patients taken from orthopedic, general surgery, and plastic surgery were 250, 250, and 100, respectively. A total of patients taken were 600. The percentage of males in orthopedic, general surgery, and plastic surgery departments was 46.8%, 80.4%, and 91% with the mean age of 47.92 ± 16.55 years, 39.96 ± 12.75 years, and 30.66 ± 10.52 years, respectively.

Orthopedic Department

In the preoperative period, 44.8% of the patients received paracetamol, 18% of the patients did not receive any analgesic, and 15.2% of the patients received fixed dose combination (FDC) of diclofenac and paracetamol. In the postoperative period, 97.6% of the patients received paracetamol, 65.2% of the patients received tramadol, and 3.2% of the patients received diclofenac [Figure 1].

General Surgery Department

In the preoperative period, 75.6% of the patients received paracetamol, 22.8% of the patients did not receive any

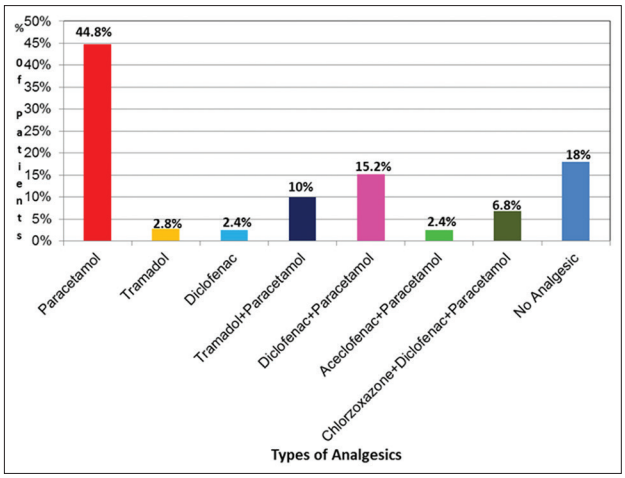

Figure 1: Percentage of patients who received different types of analgesics in Orthopaedic Department in preopertive period

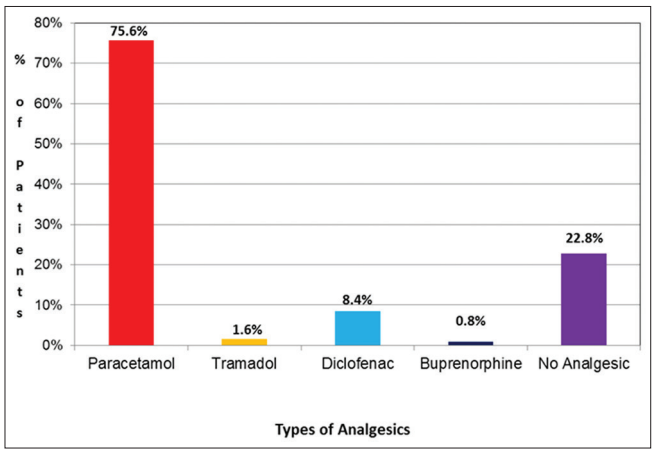

Figure 2: Percentage of patients who received different types of analgesics in General Surgery Department in preoperative period

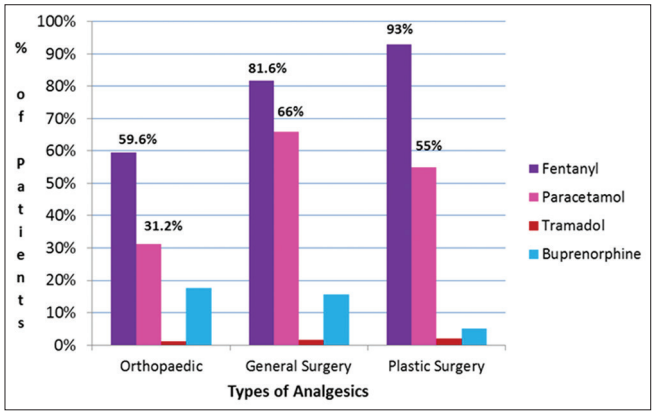

Figure 3: Percentage of patients who received different types of analgesics in intraoperative period

analgesic, and 8.4% of the patients received diclofenac. In the postoperative period, 92.8% of the patients received paracetamol, 33.2% received tramadol, and 31.2% of the patients received diclofenac [Figure 2].

Plastic Surgery Department

In the preoperative period, 37% of the patients in the plastic surgery department received FDC of paracetamol and diclofenac, 17% of the patients received paracetamol, and 46% of the patients did not receive any analgesic. In the postoperative period, 92.8% of the patients received paracetamol, 1% used diclofenac, while 60% used a combination of paracetamol and diclofenac.

In all the three departments, the most commonly used analgesic was fentanyl in the intraoperative period. Second, the most commonly used drug intraoperatively was paracetamol. Other drugs used intraoperatively were tramadol and buprenorphine [Figure 3].

Prescription indicators

All the drugs were prescribed by their generic name in the perioperative period except paracetamol. The percentage of paracetamol prescribed by generic name was 91.77% in all the three departments.

Percentages of encounters with injections prescribed including intravenous (IV) injection, spinal injection, and regional block were 77.39%, 89.52%, and 66.93% in the departments of orthopedics, general surgery, and plastic surgery, respectively.

All the drugs prescribed in preoperative period and postoperative period in all the three departments were from the hospital formulary. However, in the intraoperative period, 71.62%, 59.04% and 54.19% drugs in the department of orthopedics, general surgery, and plastic surgery, respectively, are from the hospital formulary.

In the department of orthopedics, 40.82% of analgesics in the preoperative period and 0.90% of analgesics in the postoperative period were in the form of FDCs. None of the analgesics in the intraoperative period were prescribed in the form of FDCs [Table 1].

In the department of general surgery, only 0.4% of analgesics were prescribed in the form of FDCs in the preoperative period, while no analgesics were prescribed in the form of FDCs in the postoperative period [Table 1].

In the Department of Plastic Surgery, 68.51% of the analgesics prescribed were in the form of FDCs in preoperative period and 53.57% in the postoperative period. None of the analgesics used during intra-operative period were prescribed as FDCs [Table 1].

Percentages of opioids prescribed in the orthopedic department were 3.21%, 37.14%, and 39.29% in

Table 1: Total prescriptions of analgesics in peri-operative period (orthopedics, surgery and plastic surgery)

Total prescriptions of analgesics in perioperative period	Orthopaedics (1168)	Surgery (1117)	Plastic surgery (369)
Total prescriptions of analgesics in preoperative period	218	218	54
Total prescriptions of analgesics in intraoperative period	525	498	203
Total prescriptions of analgesics in postoperative period	425	401	112

Table 2: Visual analog scale score in postoperative period

Departments	VAS score, mean±SD
Orthopedic surgery	4.34±0.75
General surgery	4.06±1.09
Plastic surgery	3.88±0.79

VAS=Visual Analog Scale, SD=Standard deviation

preoperative, intraoperative, and postoperative period, respectively.

Percentages of opioids prescribed in the general surgery departments were 2.75%, 49.59%, and 22.44% in preoperative, intraoperative, and postoperative period, respectively.

In the plastic surgery department, opioids prescribed were 49.59% in the intraoperative period only. No opioids were prescribed in preoperative and postoperative period in this department. The amount of pain in postoperative period after the treatment with analgesics was mild to moderate as per the VAS across all the three departments. Pain assessment tool such as the VAS was not used in clinical practice. This scale was used only during the study to assess the pain status of the patients [Table 2].

DISCUSSION

Perioperative period is very stressful and painful for the patient. Response and tolerance to pain differs from one patient to another; therefore, pain therapy should be individualized. There are no set guidelines which are followed by clinicians while treating perioperative pain. Discrepancy in pain management is a norm because it can vary with the type of setup, type of surgery, clinician's experience with the analgesics, marketing forces, and availability in public sectors. Numerous obstacles in pain management and growing rate of chronic pain in spite of a variety of analgesics available were the important driving factors for conducting prescription audit.

About 44.8% of the patients in the orthopedic department received paracetamol during the preoperative period. Choudhury and Bezbaruah conducted a study to analyze prescribing pattern of analgesics in the orthopedic in-patient department at a tertiary care hospital in Guwahati, Assam, Northeast India and found that diclofenac (nonsteroidal anti-inflammatory drugs [NSAID]) was the most commonly prescribed drug to patients.[9] The second most commonly prescribed analgesic was the combination of nonopioid and NSAID in the above-mentioned study which was similar to our finding.

In this study, it was found that few patients did not receive any analgesic in the preoperative period. Residents many times do not document practices because of the heavy patient load. Critical patients are directly posted for surgery as soon as they arrive for emergency services; therefore, as such no preoperative period notes were found in these patients. Patients who underwent an elective surgery for chronic painful disease condition required preoperative analgesia.

In the orthopedic department, a combination of paracetamol and tramadol was predominantly used in the postoperative period which helped in controlling excruciating pain after complex orthopedic surgeries. The pain control was perceived through the results of VAS. Majority of the patients in the postoperative period in the general surgery department received paracetamol. Diclofenac and tramadol used were at par with each other in the general surgery department. A study carried out by Kumarasingam *et al*. in South India was a drug utilization pattern of analgesics in the postoperative period in three departments which were orthopedics, general surgery, and obstetrics and gynecology in a tertiary care hospital.[10] The findings of Kumarasingam *et al*. showed that diclofenac was the most commonly used analgesic in the postoperative period followed by paracetamol.[10]

In the postoperative period, the most important aspect is controlling pain with the usage of appropriate analgesics. Shahid *et al*. have done a comparative study of IV paracetamol and IV tramadol for postoperative analgesia in laparotomies; it was found that IV paracetamol was being used exclusively to relieve postoperative pain.[11] Adverse drug reactions emerging with the use of IV paracetamol were <1 in 10,000 patients.[11]

A study revealed that pain relief is achieved in postoperative period with IV tramadol (50 mg), and it is repeated again if required after half an hour.[11] It produced analgesia similar to morphine (5 mg) or clonidine (150 μg).[11] Tramadol is a synthetic, centrally acting, weak opioid, and has effects on serotonergic and noradrenergic neurotransmission. It has both opioid and nonopioid properties which act synergistically in contributing to analgesia.[12]

IV paracetamol is safer than tramadol with lesser postoperative nausea and vomiting. The findings of Sinatra *et al*.[11,13] were that IV paracetamol used in orthopedic surgeries was superior compared to tramadol in controlling surgical pain. Nikoda *et al*.[11,14] found that analgesia was achieved in the postoperative period after IV infusion of paracetamol with single dose of 1 g. Paracetamol caused a decrease in the intensity and duration of pain, and the IV formulation of paracetamol should be considered as one of the significant elements of multimodal analgesia in achieving rapid postoperative pain relief.[11] De Oliveira *et al*.[15,16] analyzed 11 prospective randomized clinical trials assessing 740 patients who received a 1 g single dose of IV paracetamol before or during surgery compared to patients who did not receive paracetamol. The results indicated that there was a decrease in pain at rest and at movement during the first 4 h postsurgery and reduced the consumption of opioids in the first 24 h.[15]

NSAIDs are used in postoperative period, and their usage has reduced the requirement of opioids which resulted in a decrease in number of adverse effects. It is used in parenteral form in postoperative patients. Its adverse effects include high risk of gastrointestinal bleeding and nephrotoxicity, such events occur specifically in patients in which NSAIDs are administered for more than 5 days. Diclofenac is an established NSAID used in the management of acute and chronic pain states.[17] Diclofenac in oral form has limited efficacy in treating acute postoperative pain.[18] A meta-analysis on NSAID's effect on the postoperative renal function of 1459 healthy individuals revealed that the use of NSAID led to a very transient decrease in creatinine clearance postsurgery. The rate of peptic ulcers and upper gastrointestinal tract bleeding varies depending on the usage of different kinds of NSAIDs.[19,20] Fentanyl is most commonly used analgesic in the intraoperative period. Enhanced recovery after surgery society recommends that short-acting opioid such as fentanyl is used intraoperatively, instead of morphine, because it is less likely to cause adverse effects such as nausea during recovery and respiratory depression due to its shorter half-life. In spite of the maximum usage of fentanyl, it is not available in hospital formulary due to strict laws and storage issues. Fentanyl should be available in hospital formulary because it is very cumbersome for patients to purchase it from outside as it is available only in selected pharmacies, cost is an issue for very poor patients, and there are certain prerequisites for the procurement of fentanyl. There is poor accessibility and availability of opioids in India due to strict rules and regulations.[21]

Amendment of NDPS Act 2014 constituted a list of essential narcotic drugs (ENDs) which were opioids approved by the Drug Controller General of India. The list of ENDs includes morphine, methadone, codeine, hydrocodone, oxycodone, and fentanyl. It also defined Recognized Medical Institutions (RMIs) with criteria for stocking and dispensing opioids for medical use. Institutes that fulfill the specified criteria and want to procure END's have to apply to the state drug controller and Food and Drug Administration. The authorization of the RMIs is for the period of 3 years.[22] Tertiary care hospitals should fulfill all the set criteria to procure fentanyl for the benefit of the patients in pain.

Maximum fixed-dose combinations were prescribed in plastic surgery compared to other departments. Advantages of prescribing fixed-dose combinations are that compliance is maintained, workload of nursing staff reduces, and a combination of two drugs with reduced doses and different mechanism of action decreases the chances of adverse effects.

CONCLUSION

This study revealed that in preoperative and postoperative periods, the most common analgesic used was paracetamol. Paracetamol scores best over other analgesics with respect to safety. It has provided mild-to-moderate pain relief in combination with other analgesics. In the intraoperative period, maximum patients received fentanyl which is a very efficacious analgesic but not available in hospital formulary. The usage of pain assessment tools such as the VAS gives an overview of pain status; hence, analgesics can be titrated accordingly for optimum pain control.

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Conflicts of interest

There are no conflicts of interest.

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