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Original Research

Pattern Of Analgesic Use In Post-Operative Pain Management In Adults Undergoing Laparotomy Surgery

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ABSTRACT

Aim: The objective of this study was to document the pattern of drug use for postoperative pain and to ascertain the patient characteristics and analgesics used postoperatively that influence the numerical rating scale (NRS) score on the first postoperative day.

Materials and methods: After taking clearance from institutional ethical committee, prospective observational study was conducted in the department of general surgery. The hospital serves a diverse population of patients from various geographic regions, including urban and rural areas, as well as various socioeconomic strata. The investigation included 100 patients who met the eligibility criteria.

Results: Of the 100 patients recruited, 61 (61) were female and 39 (39%) were male. Of the patients recruited, 46 (46%) were from the department of OBG, while 54 (54%) were from general surgery. The average age of the patients who were recruited was 38.26 ± 15.88 years. Thirty patients (30%) had a prior surgical history. The surgery was elective in 59 (59%) patients and had been indicated as an emergency in 41 (41%) patients. Out of the 100 patients, 4 (4%) had diabetes and 4 (4%) had hypertension. Tramadol was the most frequently prescribed drug, followed by Pethidine, ParentralParacetamol and Diclofenac, which were also frequently prescribed for post-operative pain management. Regarding the comparison of the characteristics of patients who experienced minimal pain with those who experienced moderate to severe pain. The number of females experiencing severe pain was higher than that of males; however, this disparity was not statistically significant. There was a statistically significant difference (p=0.01) between the number of patients in the surgery department who experienced moderate to severe pain and those in the OBG department. A greater number of patients who underwent elective surgery experienced severe to moderate pain than those who underwent emergency surgery (p=0.031).

Conclusion : On the first day following surgery, nearly one-third of patients reported experiencing severe pain, despite the use of opioids and combination analgesics. Newer modalities, such as epidural analgesia, were utilised sparingly, and patient-controlled analgesia was not implemented.

Keywords: Analgesics, Laparotomy, Numerical rating scale
Keywords: Osteonecrosis, CT, MRI

INTRODUCTION

Pain is a sensory and emotional experience that is unpleasant and associated with actual or potential tissue injury, as defined by the International Association for the Study of Pain. Acute pain, which is classified as post-operative pain, is a typical and anticipated reaction to medical procedures.[1]

Chronic pain can develop as a result of inadequate postoperative pain management, necessitating extended rehabilitation. The improvement of patient outcomes following surgeries is significantly influenced by the

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implementation of optimal post-operative pain management. Inadequate pain management can lead to prolonged hospital stays and increased patient morbidity. Additionally, inadequate postoperative pain management may result in complications such as delayed wound healing, atelectasis, and deep vein thrombosis.[2,3]

An intensified stress response to surgical procedures can be one of the physiological consequences of undertreated severe post-operative pain. This can initiate a sequence of metabolic, endocrine and inflammatory processes that may result in organ dysfunction. In order to prevent these potential physiological complications, it is crucial to effectively manage postoperative pain. Analgesics are effective in the management of postoperative pain by selectively alleviating pain sensation without significantly influencing consciousness. The mechanisms of action, side effects, and indications of various analgesics, which are classified into distinct categories, are subject to variation. The analgesic requirement may vary among patients due to the subjective nature of pain perception. It is essential to select an analgesic that has a low potential for tolerance, dependence, and drug addiction, as well as a favourable safety profile and high efficacy. Worldwide, non-opioid analgesics are the preferable choice due to their favourable risk-benefit profile. It has been demonstrated that the combination of non-opioid analgesics or them with opioid analgesics is effective in the management of pain.[4,5]

Severe postoperative pain is frequently disregarded and inadequately managed, in contrast to acute painful conditions that are promptly addressed. Effective postoperative pain management is multifaceted, comprising patient satisfaction, functional ability restoration, morbidity reduction and briefer hospital stays. The optimal management of postoperative pain remains a challenging endeavour, despite the development of new analgesics, innovative drug delivery techniques, and minimally invasive surgeries, as well as advancements in the understanding of pain pathways and mechanisms.[6,7]

The aim of this study was to ascertain the patient characteristics and analgesics used postoperatively that influence the numerical rating scale (NRS) score on postoperative day 1 and to document the pattern of drug use for postoperative pain.

MATERIALS AND METHODS

The department of general surgery conducted a prospective observational study after receiving clearance from the institutional ethical committee. The hospital serves a diverse population of patients from various geographic regions, including urban and rural areas, as well as various socioeconomic strata. The study's sample size was 100 patients who met the eligibility criteria.

Inclusion criteria

- Adult subjects, who had undergone a laparotomy and had a stay of at least one-day post operatively.

Exclusion criteria

- Patients with cognitive impairment.
- Patients who were critically ill or intubated were excluded.

The current investigation was a prospective observational study. Up to three days following the surgery, we recorded the NRS score for pain and collected data on patient characteristics, surgery and anaesthesia details, and the analgesics prescribed. This data was gathered using a structured case report form. By contacting all consenting eligible patients, selection bias was reduced.

STATISTICAL ANALYSIS

Descriptive statistics were implemented to evaluate patient characteristics, including age, gender and co-morbidities. The frequencies and mean± of categorical variables (such as NRS score, speciality, duration of surgery and anaesthesia) were reported.Continuous variables such as age, were represented by the standard deviation. The categorical variables were compared using the Chi-squared test.

RESULTS

Of the 100 patients recruited, 61 (61) were female and 39 (39%) were male. Of the patients recruited, 46 (46%) were from the department of OBG, while 54 (54%) were from general surgery. The average age of the patients who were recruited was 38.26 ± 15.88 years. Thirty patients (30%) had a prior surgical history. The surgery was elective in 59 (59%) patients and had been indicated as an emergency in 41 (41%) patients. Out of the 100 patients, 4 (4%) had diabetes and 4 (4%) had hypertension. (Table 1)

The treating surgeon and the anaesthetist collaborated to prescribe analgesics for postoperative pain management, thereby guaranteeing a thorough clinical consultation. Tramadol was the most frequently prescribed drug among the numerous analgesic options. ParentralParacetamol and Diclofenac were also frequently prescribed for postoperative pain management after Pethidine. (Table 2)

Regarding the comparison of the characteristics of patients who experienced minimal pain with those who experienced moderate to severe pain. The author discovered that a greater number of females experienced severe pain than males; however, this disparity was not statistically significant. There was a statistically significant difference (p=0.01) between the

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number of patients in the surgery department who experienced moderate to severe pain and those in the OBG department. A greater number of patients who underwent elective surgery experienced severe to moderate pain than those who underwent emergency surgery (p=0.031). (Table 3)

Table 1: Characteristics of patients at baseline

Characteristic	N = 100
Age [Mean (SD)]	38.26 (15.88)
Females [n (%)]	61 (61)
Obstetrics and gynaecology [n (%)]	46 (46)
Females from surgery department [n (%)]	33 (33)
Hypertension [n (%)]	4 (4)
Diabetes mellitus [n (%)]	4 (4)
Previous history of surgery [n (%)]	30 (30)
Emergency surgery [n (%)]	41 (41)

Table 2: Analgesics used on post-operative day 1-3

Drug	Day 1 (%)	Day 2 (%)	Day 3 (%)
Tramadol	39 (39)	13 (13)	17 (17)
Pethidine	37 (37)	26 (26)	12(12)
Parenteral paracetamol	29 (29)	18 (18)	13 (13)
Diclofenac	14(14)	12 (12)	7 (7)
Epidural	13 (13)	6 (6)	-
Oral paracetamol	8 (8)	15 (15)	14 (14)
Lornoxicam	2(2)	1 (1)	1 (1)
Etoricoxib	3 (3)	3 (3)	2 (2)
Nimesulide	1 (1)	1 (1)	1(1)
Diclofenac + serratiopeptidase	-	28 (28)	22 (22)
Tramadol + paracetamol	4 (4)	5 (5)	5 (5)

Table 3: Comparison of severity of pain on day 1 with patient characters

Variable		Mild N = 20 (20)	Moderate and severe N=80 (80%)	P value
Gender	Male	9(45)	24 (30)	0.113
	Female	11(55)	56(70)	
Age		34.32 (7.44)	36.24 (14.24)	0.532
Department	Surgery	14(70)	35 (43.7)	0.01
	OBG	6(30)	45 (56.2)	
Nature of Surgery	Emergency	8 (40)	32 (40)	0.031
	Elective	12(60)	48 (60)	
Duration of anaesthesia	In hours	2.44(1.22)	2.02(1.01)	0.343
Surgical category	Category I	9 (45)	20(25)	0.244
	Category II	2 (10)	5 (6.25)	
	Category III	9(45)	55(68.7)	
Analgesic	Opioid	12 (60)	60 (75)	1.000
	Non-opioid	2 (10)	20(25)	

DISCUSSION

Despite substantial advancements in postoperative analgesia, the prevalence of postoperative pain remains high, resulting in protracted hospitalisation and significant morbidity, particularly in resource-constrained settings. As a result, there is an urgent need for a systematic investigation into the use of analgesics for postoperative pain management, with the objective of effectively alleviating postoperative discomfort. The objective of this study was to evaluate the analgesic usage patterns for postoperative pain, investigate their safety, and evaluate their efficacy based on pain assessment scores and patient satisfaction scores.[8]

The mean age of the patients in the current investigation was 32 years, with 161 (64.4%) females and 89 (35.6%) males. The mean age of the patients were 32 years. This is lower than the reported value in the majority of other studies. **Vallano A et al[9]** conducted a multicentre drug

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utilisation study in Spain on the management of post-operative pain after abdominal surgery. The median age was 58 years, with a range of 14-91 years. Out of the total, 13% were over the age of 70, and 547 (55%) were men. The mean age of inpatients in Italian hospitals (ITOSPOP) was 61.1 (20.9) years, with a range of 6 to 99 years, in a survey conducted to ascertain the prevalence of pain and predictors of pain. The survey included 422 males (47.3%) and 470 females (52.7%).[10] The reason for the lower mean age in the current study may be due to the fact that it is a single-center study. The OBG department accounted for 46.4% of the included patients, with a mean age of 29.4 years and a median age of 27 years.

LSCS (34%), meshplasty (18%), appendectomy (9.6%), exploratory laparotomy for surgical indication (8.4%) and total abdominal hysterectomy with bilateral salpingooophorectomy (6%) were the surgical procedures that were found to be more common in the current study across both departments. However, **Vallano A et al[9]** reported that the most frequently performed surgical procedures were inguinal hernia repair (315 patients, 32%), cholecystectomy (268 patients, 27%), appendectomy (140 patients, 14%), bowel resection (137 patients, 14%), and gastric surgery (58 patients, 6%). Obstetric indications for laparotomy were not addressed in this investigation.

The most frequently administered analgesic on the first day following surgery was tramadol injection (39%). NSAIDs (60.0%) were the most frequently used analgesic class in ITOSPOP, in contrast to the current finding. Ketorolac was the most frequently used analgesic.[10] The analgesic that was utilised most frequently was metamizole (68%), according to **Vallano A et al[9]**. Metamizole is not authorised for use in India. The author also monitored patients for three days following the surgery and discovered that the majority of patients were transitioned to oral NSAIDs, such as paracetamol and diclofenac, on the second and third postoperative days.

On the second day following surgery, the most frequently prescribed oral analgesic was a fixed dose combination of diclofenac and serratiopeptidase (28% on day 2) and (22% on day 3). A systematic review of the evidence available for the use of serratiopeptidase was conducted by **Bhagat S et al[11]**. The existing scientific evidence for serratiopeptidase is insufficient to support its use as an analgesic or health supplement, according to their review of a total of 9 RCTs.

In the present study, paracetamol was the analgesic prescribed for postoperative pain alleviation, as caesarean section was the most prevalent surgical procedure. Nevertheless, epidural analgesics were not utilised in the fields of obstetrics and gynaecology, and their utilisation was limited to the surgery department (12.4%). Ulrike et al. conducted a study in Germany on 446 hospitals to investigate the prevalence of acute pain services. They discovered that epidural analgesia (EA) was used in nearly all departments (96.9%) and that 75.6% of the departments performed EA on general wards.[12] In the current investigation, the anaesthetist on call provided refills of analgesics to patients who were on epidural analgesics, while Germany implemented acute pain services (APS). The most frequently employed analgesia modality by the APS in Singapore was patient-controlled analgesia (PCA), as determined by **Phua DSK et al[13]**. This tendency was observed in 2004-07, while the previous trend, which occurred in 1998-2003, involved the utilisation of neuraxial blockade.[14] The proliferation and availability of PCA devices have contributed to this shift in trend in recent years.

In the present investigation, the use of rescue analgesics, which were defined as analgesics used in excess of those prescribed, was found to be extremely restricted (2%). This was in agreement with the results of another study conducted in Spain, which revealed that rescue analgesic was administered to 57 (3.3%) of the 993 patients who were recruited for the study.[15]

The author discovered that the pain score on day 1 was influenced by male gender, emergency surgery, department (surgery) and tramadol in a univariate analysis. Multivariate analysis did not identify these variables as statistically significant. **Vallano A et al[9]** discovered no discernible correlation between the analgesics that were administered and the pain severity on the first day. In the same study, they discovered that the following factors were associated with a high prevalence of pain at the time of the interview: age (younger patients), gender (women), surgery (presence), type of clinical ward (orthopaedic surgery and rehabilitation), type of hospital (large centres), and number of prescribed analgesics (more analgesics are prescribed). Nevertheless, there was no correlation between the number of years of education and the presence of a cancer diagnosis. **Constantini M et al[16]** conducted a study that revealed that females reported substantially higher levels of pain ($p<0.001$). Additionally, a linear association was observed between pain and the number of days since surgery, while age and education did not exhibit any correlation.

CONCLUSION

On the first day following surgery, nearly one-third of patients reported experiencing severe pain, despite the use of opioids and combination analgesics. Newer modalities, such as epidural analgesia, were utilised sparingly, and patient-controlled analgesia was not implemented.

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