

**A Hospital-Based Assessment of the Drugs and Multimodal Drugs Used in the Post-Operative Pain Management in Elective Laparotomies**Nikhil Kumar<sup>1</sup>, Sanjay Kumar<sup>2</sup><sup>1</sup>Assistant Professor, Department of General Surgery, Shree Narayan Medical Institute & Hospital, Saharsa, Bihar, India<sup>2</sup>Associate Professor, Department of General Surgery, Sri Ramkrishna Institute of Medical Sciences and Sanaka, Hospital, Durgapur, West Bengal, India

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Conflict of interest: Nil

**Abstract:****Aim:** The study was conducted to record the drug used for postoperative pain in elective laparotomies and to determine the effectiveness of multimodal analgesics used.**Methods:** The present study conducted in the Department of General Surgery, Shree Narayan Medical institute & Hospital, Saharsa, Bihar, India for period of 10 months and all patients who underwent elective laparotomy were provided details about the study and method. Informed written consent was obtained. Detailed history of the patient, condition, surgery performed, analgesics used were documented. NRS score was calculated. A sample size of 100 patients fulfilling eligibility criteria was taken for the study.**Results:** A total of 100 patients were included among which 45 (45%) were female and 55 (55%) were the male patients. The patients who underwent elective laparotomies were 42 (42%) patients were in the age group of 40-50 years. The 20 different types of surgeries were recorded. The most common surgery performed in our study was open appendectomy which included 20 (20%) patients followed by open cholecystectomy (for carcinoma gall bladder and other indications) which included 8 (8%) patients. Most common was general anaesthesia with transverse plane block which was used in 36 (36%) patients, followed by general anaesthesia with quadratus lumborum block which was used in 20 (20%) patients. Most common mode of analgesia used was combined analgesia. Injection tramadol 50 mg in 100 ml normal saline with continuous epidural bupivacaine in 50 (50%) patients followed by injection diclofenac AQ 75 mg in 100 ml N.S with continuous epidural in 30 (30%) patients. NRS score was recorded for all the 100 patients on postoperative days 1, 2 and 3. Severity of pain gradually reduced from post-operative days 1-3 with the use of various analgesics.**Conclusion:** Multimodal analgesia was used in most of the patients for management of post-operative pain combined analgesia was better mode of pain management method than a single analgesic.**Keywords:** Post-operative pain, Multimodal analgesia, Numerical rating scale, elective laparotomies.

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**Introduction**

Pain continues to be a significant problem following laparotomy.[1,2] In this era of fast track surgery, the ERAS (enhanced recovery after surgery) group has suggested that a multimodal rehabilitation programme with epidural analgesia, short laparotomy, early feeding and early mobilisation improve outcomes after elective colonic surgeries.[3] Pain is subjective, and it is modified by developmental, behavioural, personality factors. Post-surgical pain is initially of acute it may be nociceptive, inflammatory or neuropathic in nature. It is a common postoperative complication. Post-operative pain may progress to chronic pain leading to prolonged rehabilitation and recovery. Poorly controlled pain is associated with poor mobility, prolonged hospital stays, and

increased complication rates. Emergency laparotomy is a common intra-abdominal procedure, with generally poor outcomes[4] and this group is demanding with time and resources. There is a paucity of data concerning outcomes in this group and there is still less data concerning pain management following emergency laparotomies. A national survey of epidural use, conducted by Walton et al. in the UK in 2006, revealed that fewer anaesthetists would administer an epidural before an emergency laparotomy; and still, fewer would use it intraoperatively.[5] Pain assessment scales were-Numerical rating scale (NRS), visual analog scale (VAS), defence and veterans pain rating scale (DVPRS), Adult non-verbal pain scale (NVPS), pain assessment in

advanced dementia scale (PAINAD), Behavioural pain scale (BPS) and critical-care pain observation tool (CPOT). Commonly used to evaluate pain intensity, the visual analogue scale, verbal rating scale and numerical rating scale are valid, reliable and appropriate for use in monitoring postoperative pain in patients who are able to self-report.[6]

Post-surgical pain is initially of acute it may be nociceptive, inflammatory or neuropathic in nature. It is a common post-operative complication. Post-operative pain may progress to chronic pain leading to prolonged rehabilitation and recovery. Poorly controlled pain is associated with poor mobility, prolonged hospital stays, and increased complication rates.[7]

Commonly used to evaluate pain intensity, the visual analogue scale, verbal rating scale and numerical rating scale are valid, reliable and appropriate for use in monitoring postoperative pain in patients who are able to self-report.[6]The study was conducted to record the drug used for postoperative pain in elective laparotomies and to determine the effectiveness of multimodal analgesics used.

**Materials and Methods:** The present study conducted in the Department of General Surgery, Shree Narayan Medical institute & Hospital, Saharsa, Bihar, India for period of 10 months and all patients who underwent elective laparotomy were provided details about the study and method. Informed written consent was obtained.

Detailed history of the patient, condition, surgery performed, analgesics used were documented. NRS score was calculated. A sample size of 100 patients fulfilling eligibility criteria was taken for the study.

**Inclusion criteria:** For the study was all the patients who had undergone an elective laparotomy and had a stay of at least 3 days post operatively were included in the study.

**Exclusion criteria:** Patients with cognitive impairment, critically ill and intubated patients, patients under the age of 18 were excluded in the study.

**Ethical approval:** The study was approved by the institutional Ethics committee.

**Statistical analysis:** The collected data were analysed with IBM SPSS Statistics for Windows, version 23.0. (Armonk, NY: IBM Corp). To describe about data descriptive statistics frequency analysis, percentage analysis was used for categorical variables and the mean and SD were used for continuous variables. To find significance in categorical data Chi-Square test was used similarly if the expected cell frequency is less than 5 in 2×2 tables then the Fisher's Exact was used. In both the above statistical tools probability value 0.05 is considered as the significant level.

## Results

**Table 1: Age distribution**

Age (Years)	N (%)
20-30	7
30-40	23
40-50	42
50-60	20
60-70	8
<b>Gender</b>	
Male	45 (45)
Female	55 (55)

A total of 100 patients were included among which 45 (45%) were female and 55 (55%) were the male patients. The patients who underwent elective laparotomies were 42 (42%) patients were in the age group of 40-50 years.

**Table 2: Surgery details**

Type of surgery	N
Gastrectomy	6
Gastrojejunostomy + truncal vagotomy	4
Open cholecystectomy with CBD exploration	7
Open partial nephrectomy	3
Whipple's procedure	3
Lap converted to open cholecystectomy	2
Open appendectomy	20
Open cholecystectomy (carcinoma gall bladder and other indications)	8
Right hemicolectomy	4
Left hemicolectomy	3
Exploratory laparotomy (tuberculosis abdomen)	7

Hydatid cyst of the liver (excision of the cyst)	3
Splenectomy	2
Lateral pancreaticojejunostomy	4
Tran-shiatal esophagectomy	2
Ileocecal resection and anastomosis (ileocecal tuberculosis)	7
Ileocecal resection and anastomosis (other indications)	5
Abdominoperineal resection	2
Abdominal wall reconstruction	1
Exploratory laparotomy for other indications	7

The 20 different types of surgeries were recorded. The most common surgery performed in our study was open appendectomy which included 20 (20%) patients followed by open cholecystectomy (for carcinoma gall bladder and other indications) which included 8 (8%) patients.

**Table 3: Anaesthesia details**

Type of anaesthesia	N
General anaesthesia (propofol)	22
Spinal anaesthesia (bupivacaine in hyperbaric solution)	16
GA+TAP [general anaesthesia+ transversus abdominis planeblock (propofol with bupivacaine)]	36
GA+QL [general anaesthesia+ quadratus lumborum block(propofol with bupivacaine)]	20
SA+TAP (spinal anaesthesia + transversus abdominis planeblock)	6

Most common was general anaesthesia with transverse plane block which was used in 36 (36%) patients, followed by general anaesthesia with quadratus lumborum block which was used in 20 (20%) patients.

**Table 4: Analgesics (Intravenous with epidural) used on post-operative day 1-3**

Type of analgesic (Intravenous + epidural)	N, POD1 (<6 hours)	N, POD2(24-48 hours)	N, POD3(48-72 hours)
Inj. tramadol 50 mg/ml in 100 ml NS (tid)	14	4	2
Inj. diclofenac aq. 75 mg in 100 ml NS	3	32	1
Inj. pct 100 ml (tid)	3	2	Nil
Inj. Tramadol 50 mg in 100 ml NS (tid) + continuous epidural (bupivacaine)	50	22	7
Inj. Diclofenac aq. 75 mg/ml in 100 ml NS(tid) + continuous epidural (bupivacaine)	30	10	3

Most common mode of analgesia used was combined analgesia. Injection tramadol 50 mg in 100 ml normal saline with continuous epidural bupivacaine in 50 (50%) patients followed by injection diclofenac AQ 75 mg in 100 ml N.S with continuous epidural in 30 (30%) patients.

**Table 5: NRS (Numeric Rating Scale) score on post-operative days 1-3**

NRS score	N (%), POD 1	N (%), POD 2	N (%), POD 3
Mild (1-3)	20 (20)	32 (32)	44 (44)
Moderate (4-6)	32 (32)	40 (40)	28 (28)
Severe (7-10)	48 (48)	28 (28)	8 (8)
No pain	Nil	Nil	20 (20)

NRS score was recorded for all the 100 patients on postoperative days 1, 2 and 3. Severity of pain gradually reduced from post -operative days 1-3 with the use of various analgesics.

### Discussion

Pain at movement remains a significant issue following emergency laparotomies. Results of the audit reveal that opioids remain the mainstay of pain management following these surgeries. The choice of pain management is not linked to the time of surgery, patient factors including ASA physical grading and p-Possum scores.

Worldwide emergency laparotomies are associated with poor outcomes and prolonged hospital stay.[8,9] There is a lack of standardised protocol for this vulnerable group and there is a need to develop an enhanced recovery programme for these patients.[10]

A comprehensive bundle including preoperative optimisation, surgical intervention and postoperative care can potentially improve outcomes in this group of patients and needs attention.[11]

A total of 100 patients were included among which 45 (45%) were female and 55 (55%) were the male

patients. The patients who underwent elective laparotomies were 42 (42%) patients were in the age group of 40-50 years. The 20 different types of surgeries were recorded. The most common surgery performed in our study was open appendectomy which included 20 (20%) patients followed by open cholecystectomy (for carcinoma gall bladder and other indications) which included 8 (8%) patients. Drugs with different mechanisms of action are then combined to produce synergistic effects, allowing use of lower doses, thus reducing the burden of side-effects from single-drug strategies. When given prophylactically, intravenous paracetamol is associated with reduced postoperative nausea and vomiting, postulated to be due to superior pain control. [12] Observational cohort study of 9264 patients undergoing elective or emergency gastrointestinal surgery reported that use of NSAIDs was not associated with major complications, acute kidney injury or postoperative bleeding after propensity score matching and adjusting for confounding factors.[13]

Most common was general anaesthesia with transverse plane block which was used in 36 (36%) patients, followed by general anaesthesia with quadratus lumborum block which was used in 20 (20%) patients. Most common mode of analgesia used was combined analgesia. Injection tramadol 50 mg in 100 ml normal saline with continuous epidural bupivacaine in 50 (50%) patients followed by injection diclofenac AQ 75 mg in 100 ml N.S with continuous epidural in 30 (30%) patients. Patient factors can play a role in decision making and include contraindications for the use of certain drugs/ procedures, co-morbid conditions, intraoperative haemodynamic instability and alteration of laboratory parameters.[5] To understand patient factors in our study, we looked at stratification scores including ASA and p-Possum. The subjective nature of ASA assessment and its association with interobserver variability limits its use as a predictor of mortality when used alone;[14,15] hence, in addition to ASA scores p-Possum score was used for risk stratification. Though the predictability of p-Possum would vary as per the health system, with countries offering consultant delivered services, there is an overestimation of mortality by p-Possum.[16,17] NRS score was recorded for all the 100 patients on postoperative days 1, 2 and 3. Severity of pain gradually reduced from post-operative days 1-3 with the use of various analgesics. NRS scoring system was used to measure the degree of pain in our study. Vallano et al used visual analogue scale (VAS) to measure the degree of pain.[18] Considering the heterogeneity of patients presenting for emergency surgery, the decision-making process must not be influenced by the time of the surgery but be based on objective

risk stratification score.[19,20] Multimodal analgesia involves choosing drugs that act on different parts of the anatomical pain pathways. In general, analgesic medications act by inhibiting ascending pain signals, either in the periphery or centrally in the spinal cord and brain and facilitating descending inhibitory spinal pathways.

### Conclusion

Multimodal analgesia was used in most of the patients for management of post-operative pain combined analgesia was better mode of pain management method than a single analgesic. Regional techniques for pain management in emergency laparotomies are less preferred, opioids are the mainstay. Lack of experience is essentially not the primary reason for regional techniques not gaining popularity as airway and haemodynamics take precedence over pain management. Pain management in patients undergoing emergency exploratory laparotomy needs a thorough re-evaluation.

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