

## A Prospective Observational Evaluation of Post-Op Pain Management in Elective Laparotomies

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Conflict of interest: Nil

### Abstract

**Aim:** The aim of the present study was to analyze the post-operative pain management in elective laparotomies in a tertiary care centre.**Methods:** This prospective observational study conducted in the Department of General Surgery, Darbhanga Medical College and Hospital, Darbhanga, Bihar, India for the period of one year. All patients who underwent elective laparotomy were provided details about the study and method. Informed written consent was obtained. A total of 200 patients were included. Detailed history of the patient, condition, surgery performed, analgesics used were documented. NRS score was calculated.**Results:** A total of 200 patients were included among which 40 (40%) were female and 120 (60%) were the male patients. The patients who underwent elective laparotomies were aged between 20-70 years and 80 (40%) 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 42 (21%) patients followed by open cholecystectomy (for carcinoma gall bladder and other indications) which included 18 (9%) patients. Most common was general anaesthesia with transverse plane block which was used in 76 (38%) patients, followed by general anaesthesia with quadratus lumborum block which was used in 42 (21%) patients. Most common mode of analgesia used was combined analgesia. Injection tramadol 50 mg in 100 ml normal saline with continuous epidural bupivacaine followed by injection diclofenac AQ 75 mg in 100 ml N.S with continuous epidural. 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. Due to different multimodal analgesics used in different institutions patients experienced different degrees of pain, hence we need a standard protocol for a best pain management method.**Keywords:** analgesia, NSAID, transdermal patch, laparotomies

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### Introduction

Emergency laparotomy is a common intra-abdominal procedure, with generally poor outcomes [1] and this group is demanding with time and resources. Pain continues to be a significant problem following laparotomy. [2,3] Pain control is one of the important roles of anesthesiologists. Modern-day anaesthesia practise extends beyond the operation theatre (OT).

The anaesthesiologist plays a major role in relieving pain postoperatively, which can be done in modern-day practise with the help of peripheral nerve blocks. 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. [4]

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 post-operative complication. [5] Post-operative pain may progress to chronic pain leading to prolonged rehabilitation and recovery. 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). [6]

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. [7] Numerical rating scale-Pain assessment scale where 0 is considered no pain to 10 which is considered as worst imaginable pain. [8]

The aim of the present study was to analyze the post-operative pain management in elective laparotomies in a tertiary care centre.

### Materials and Methods

This prospective observational study conducted in the Department of General Surgery, Darbhanga Medical College and Hospital, Darbhanga, Bihar, India for the period of one year. All patients who underwent elective laparotomy were provided details about the study and method. Informed written consent was obtained. A total of 200 patients were included. Detailed history of the patient, condition,

surgery performed, analgesics used were documented. NRS score was calculated.

### Inclusion Criteria

- Patients who had undergone an elective laparotomy
- Had a stay of at least 3 days post operatively

### Exclusion Criteria

- Patients with cognitive impairment, critically ill and intubated patients
- Patients under the age of 18 years

### Statistical Analysis

The collected data were analysed with IBM SPSS Statistics for Windows, version

25.0. (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. In both the above statistical tools probability value 0.05 is considered as the significant level.

### Results

**Table 1: Age distribution**

Age (Years)	No. of patients (%)
20-30	12 (6)
30-40	48 (24)
40-50	80 (40)
50-60	44 (22)
60-70	16 (8)
<b>Gender</b>	
Male	120 (60)
Female	80 (40)

A total of 200 patients were included among which 40 (40%) were female and 120 (60%) were the male patients. The patients who underwent elective laparotomies were aged between 20-70 years and 80 (40%) patients were in the age group of 40-50 years.

**Table 2: Surgery details**

Type of surgery	N
Gastrectomy	14
Gastrojejunostomy + truncal vagotomy	6
Open cholecystectomy with CBD exploration	16
Open partial nephrectomy	4
Whipple's procedure	10
Lap converted to open cholecystectomy	6
Open appendectomy	42
Open cholecystectomy (carcinoma gall bladder and other indications)	18
Right hemicolectomy	10
Left hemicolectomy	8
Exploratory laparotomy (tuberculosis abdomen)	12
Hydatid cyst of the liver (excision of the cyst)	8
Splenectomy	2
Lateral pancreaticojejunostomy	6
Tran-shiatal esophagectomy	4
Ileocecal resection and anastomosis (ileocecal tuberculosis)	12
Ileocecal resection and anastomosis (other indications)	8

Abdominoperineal resection	6
Abdominal wall reconstruction	2
Exploratory laparotomy for other indications	6

The 20 different types of surgeries were recorded. The most common surgery performed in our study was open appendectomy which included 42 (21%) patients followed by open cholecystectomy (for carcinoma gall bladder and other indications) which included 18 (9%) patients.

**Table 3: Anaesthesia details**

Type of anaesthesia	N
General anaesthesia (propofol)	40
Spinal anaesthesia (bupivacaine in hyperbaric solution)	36
GA+TAP [general anaesthesia+ transversus abdominis planeblock (propofol with bupivacaine)]	76
GA+QL [general anaesthesia+ quadratus lumborum block(propofol with bupivacaine)]	42
SA+TAP (spinal anaesthesia + transversus abdominis planeblock)	6

Most common was general anaesthesia with transverse plane block which was used in 76 (38%) patients, followed by general anaesthesia with quadratus lumborum block which was used in 42 (21%) 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)	20	8	4
Inj. diclofenac aq. 75 mg in 100 ml NS	8	38	2
Inj. pct 100 ml (tid)	3	2	Nil
Inj. Tramadol 50 mg in 100 ml NS (tid) + continuous epidural (bupivacaine)	50	25	10
Inj. Diclofenac aq. 75 mg/ml in 100 ml NS(tid) + continuous epidural (bupivacaine)	34	12	5

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

**Table 5: NRS score on post-operative days 1-3**

NRS score	N (%), POD 1	N (%), POD 2	N (%), POD 3
Mild (1-3)	36 (18)	68 (34)	92 (46)
Moderate (4-6)	68 (34)	84 (42)	52 (26)
Severe (7-10)	96 (48)	48 (24)	16 (8)
No pain	Nil	Nil	40 (20)

Severity of pain gradually reduced from post-operative days 1-3 with the use of various analgesics.

### Discussion

Accessibility to ultrasound in the OT has made these procedures relatively hassle-free. Peripheral nerve blocks have better pain control effects than non-steroidal anti-inflammatory drugs (NSAIDs) and opioids. Knowledge about the pain generator and anatomical knowledge of the nerves that conduct pain from a particular area help block the pain pathway at different sites. Pain is defined by the IASP (International Association for the Study of Pain) as "an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage. [9] Surgical techniques cause tissue damage and, hence, cause pain. Though laparoscopic surgeries are minimally invasive, patients may develop acute

pain postoperatively, which might interfere with rehabilitation. Pain perception varies from person to person; in patients with a low pain threshold, it is difficult to manage with opioids and NSAIDs even at the maximum dose. Besides this, the opioids and NSAIDs cause delayed recovery, gastritis, nausea, and vomiting, making the patient more intolerant. Opioids are the main step of intra-operative and postoperative pain management. Ultrasound-guided transverse abdominis plane block (TAPB), oblique subcostal transverse abdominis plane block (OSTAPB), and erector spinae plane block (ESPB) effectively reduce the consumption of opioids and NSAIDs both in the intra-operative and post-operative periods. [10-12]

A total of 200 patients were included among which 40 (40%) were female and 120 (60%) were the male patients. The patients who underwent elective laparotomies were aged between 20-70 years and 80 (40%) 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 42 (21%) patients followed by open cholecystectomy (for carcinoma gall bladder and other indications) which included 18 (9%) patients. Most common was general anaesthesia with transverse plane block which was used in 76 (38%) patients, followed by general anaesthesia with quadratus lumborum block which was used in 42 (21%) patients. Most common mode of analgesia used was combined analgesia. Injection tramadol 50 mg in 100 ml normal saline with continuous epidural bupivacaine followed by injection diclofenac AQ 75 mg in 100 ml N.S with continuous epidural. Severity of pain gradually reduced from post-operative days 1-3 with the use of various analgesics. 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. [13] 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. [14] 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. [15]

In another study conducted by Routray et al., it was concluded that rescue analgesic paracetamol consumption was lower in the ESPB group and the time to the first rescue analgesia request was longer in the ESPB group. This difference was found to be statistically significant; the results of which are persistent to the findings of the present study. [16] In a study conducted by Ozdemir et al., it was concluded that intraoperative and postoperative fentanyl requirements were lower in ESPB and the time to first rescue analgesic need was longer in ESPB. The numerical rating scale (NRS) scores were also lower in ESPB in comparison to OSTAPB. [17] Sahu et al. in their RCT compared the efficacy of ESPB and OSTAPB at T7 but did not find any significant difference in intraoperative opioid requirement between the groups, whereas there was a statistically significant difference in the mean VAS between the groups, which remained significantly lower in the ESP group during the first 24 hours as compared to OSTAPB. They concluded that ESPB was a superior block for laparoscopic cholecystectomy in comparison to OSTAPB. [18]

## 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. Due to different multimodal analgesics used in different institutions patients experienced different degrees of pain, hence we need a standard protocol for a best pain management method.

## References

1. Sauders DI, Murray D, Pichel AC, Varley S, Peden CJ, on behalf of the members of the UK Emergency Laparotomy Network. Variations in mortality after emergency laparotomy: The first report of the UK emergency laparotomy network. *Br J Anaesth* 2012; 109:368-75.
2. Ahmed A, Latif N, Khan R. Post-operative analgesia for major abdominal surgery and its effectiveness in a tertiary care hospital. *J Anaesthesiol Clin Pharmacol* 2013; 29:472-7.
3. Singh PK, Saikia P, Lahakar M. Prevalence of acute post-operative pain in patients in adult age-group undergoing inpatient abdominal surgery and correlation of intensity of pain and satisfaction with analgesic management: A cross-sectional single institute-based study. *Indian J Anaesth* 2016; 60:737-43.
4. King PM, Blazeby JM, Ewings P, Longman RJ, Kipling RM, Franks PJ, et al. The influence of an enhanced recovery programme on clinical outcomes, costs and quality of life after surgery for colorectal cancer. *Colorectal Dis* 2006; 8:506-13.
5. Prakash et. al. A Prospective Study of Post-operative Pain Treatment in Elective Laparotomies Performed in a Tertiary Care Hospital. *Int. J. Pharmaceutical and Clin Research* 2021; 13(4); 509-515
6. Niranjana A.K, Kumar S. Post-Operative Pain Management in Elective Laparotomies in a Tertiary Care Facility: A Prospective Observational Assessment. *Int. J. Pharmaceutical and Clin Research* 2022;14( 8);128-134
7. Breivik H, Borchgrevink PC, Allen SM, Rosseland LA, Romundstad L, Hals EKB et al. Assessment of pain. *Br J Anaesth.* 2008;101: 17-24.
8. Nithya T, Rajagopalan S. Prospective analysis of post-operative pain management in elective laparotomies in a tertiary care centre. *International Surgery Journal.* 2021 Oct 28;8 (11):3291-6.
9. Guyton CA, Hall JE: Somatic sensations, pain, headache and thermal sensations. *Textbook of Medical Physiology.* Saunders, Philadelphia; 48:598-605.
10. Tran TM, Ivanusic JJ, Hebbard P, Barrington MJ. Determination of spread of injectate after ultrasound-guided transversus abdominis plane

- block: a cadaveric study. *British journal of anaesthesia*. 2009 Jan 1;102(1):123-7.
11. Chen CK, Phui VE. The efficacy of ultrasound-guided oblique subcostal transversus abdominis plane block in patients undergoing open cholecystectomy: case study. *Southern African Journal of Anaesthesia and Analgesia*. 2011 Jan 1;17(4):308-10.
  12. Hannig KE, Jessen C, Soni UK, Børglum J, Bendtsen TF. Erector spinae plane block for elective laparoscopic cholecystectomy in the ambulatory surgical setting. *Case reports in anesthesiology*. 2018 Apr 1;2018.
  13. Kehlet H, Dahl JB. The value of "multimodal" or "balanced analgesia" in postoperative pain treatment. *Anesthesia & Analgesia*. 1993 Nov 1;77(5):1048-56.
  14. Apfel CC, Turan A, Souza K, Pergolizzi J, Hornuss C. Intravenous acetaminophen reduces postoperative nausea and vomiting: a systematic review and meta-analysis. *Pain®*. 2013 May 1;154(5):677-89.
  15. "Safety of nonsteroidal anti-inflammatory drugs in major gastrointestinal surgery: a prospective, multicenter cohort study." *World journal of surgery*. 2017; 41: 47-55.
  16. Routray SS, Mohanty R, Pradhan K, Pani S: Evaluation of efficacy of ultrasound guided erector spinae plane block and oblique subcostal transversus abdominis plane block for postoperative analgesia in laparoscopic cholecystectomy. *Panacea J Med Sci*. 2020,10:125-131.
  17. Ozdemir H, Araz C, Karaca O, Turk E. Comparison of ultrasound-guided erector spinae plane block and subcostal transversus abdominis plane block for postoperative analgesia after laparoscopic cholecystectomy: a randomized, controlled trial. *Journal of Investigative surgery*. 2022 Apr 3;35(4):870-7.
  18. Sahu L, Behera SK, Satapathy GC, Saxena S, Priyadarshini S, Sahoo RK. Comparison of Analgesic Efficacy of Erector Spinae and Oblique Subcostal Transverse Abdominis Plane Block in Laparoscopic Cholecystectomy. *Journal of Clinical & Diagnostic Research*. 2021 Sep 1;15(9).