

A Prospective Observational Evaluation of Post Operative Pain Management in Open Suprapubic Cystolithotomy for Bladder Stone

Ajeet Kumar¹, Bhartendu Kumar², Albin Jose³

¹SMO, Department of General Surgery, SKMCH, Muzaffarpur, Bihar, India

²Professor & HOD, Department of General Surgery, SKMCH, Muzaffarpur, Bihar, India

³Junior Resident, Department of General Surgery, SKMCH, Muzaffarpur, Bihar, India

Received: 05-12-2023 / Revised: 14-01-2024 / Accepted: 24-01-2024

Corresponding Author: Dr. Ajeet Kumar

Conflict of interest: Nil

Abstract

Aim: The aim of the present study was to record the drug used for postoperative pain in elective laparotomies and to determine the effectiveness of multimodal analgesics used.

Material & Methods: A prospective observational study for a period of 15 months in 100 patients who underwent elective laparotomies from the Department of General Surgery.

Results: Out of 100 patients, 40 were female and 60 were male. They were 20–70 years old when they had elective laparotomies. 40 patients were 40-50. Recorded were 20 surgical kinds. Open appendectomy and open cholecystectomy were the most prevalent surgeries in our research. Four forms of anesthesia were employed. General anesthesia with transverse plane block was most prevalent, followed by quadratus lumborum block. Combination analgesia was most prevalent. Injection tramadol 50 mg in 100 ml normal saline with continuous epidural bupivacaine, then diclofenac AQ 75 mg in 100 ml N.S. On day two, 52 patients switched to oral analgesics, mostly aceclofenac, paracetamol, and serratiopeptidase. All 100 patients had NRS scores on postoperative days 1, 2, and 3. Pain decreased from post-operative days 1-3 with analgesics.

Conclusion: Utilizing dual analgesia proved to be a superior approach for managing pain compared to using a single painkiller. As a result of the use of various multimodal analgesics at different institutions, patients have reported varying levels of pain. Therefore, it is necessary to establish a standardized protocol for the most effective pain management technique.

Keywords: Post-operative pain, Multimodal analgesia, Numerical rating scale.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Of all the stones found in the urinary system, around 5% are bladder stones. [1] In adults, causes such as a blocked bladder outlet, a persistent infection, or an intravesical foreign body are frequent, but in children, the illness is more common owing to inadequate nutrition, particularly in underdeveloped nations. Struvite or calcium oxalate dihydrate are the primary ingredients in BS in industrialized nations, while ammonium acid urate is the primary ingredient in poorer nations. [1-4] Bladder stones occur in males at a rate of 10:1 to 4:1. Among children in poor nations, the peak incidence occurs at three years of age, whereas among adults, it peaks at sixty. [5-9]

Valvular calculus, which translates to "urolith in bladder," makes up around 5% of all calculi found in the urinary system. [10] Although some occurrences of bladder stones may not cause any noticeable symptoms, the majority of cases do. [11,12] Surgical removal of bladder stones is

possible using either endoscopic techniques or open cystolithotomy. [13]

There is a higher risk of postoperative discomfort, longer hospital stays, and wound scarring with open cystolithotomy compared to endoscopic treatments. [14] When dealing with bigger bladder stones, one endoscopic option is percutaneous suprapubic cystolithotripsy, which is a safe, minimally invasive technique. This method avoids the drawbacks of both open surgery and urethral manipulations. [15] The goal of all endoscopic treatments is to remove all stones as quickly as possible while minimizing the risk of problems and the length of time the patient spends in the hospital. [16]

Personality, behavior, and developmental stages all have a role in shaping how we experience pain. Acute nociceptive, inflammatory, or neuropathic pain often follows surgery. This problem often occurs after surgery. Prolonged rehabilitation and

recuperation may be required if post-operative discomfort develops into chronic pain. Difficulty moving about, longer hospital stays, and more complications are all symptoms of poorly managed pain. [17] The following pain assessment tools were used: the Numerical Rating Scale (NRS), the Visual Analog Scale (VAS), the Defense and Veterans Pain Rating Scale (DVPRS), the Adult Nonverbal Pain Scale (NVPS), the Pain Assessment in Advanced Dementia Scale (PAINAD), the Behavioural Pain Scale (BPS), and the Critical Outcomes from Trauma (CPOT). For patients who can self-report their pain levels after surgery, valid, reliable, and commonly used pain assessment tools include numerical rating scales, verbal rating scales, and visual analogue scales. Therefore, the purpose of this research was to document the medication used to alleviate postoperative pain in elective laparotomies and to assess the efficacy of the multimodal analgesics that were administered.

Material & Methods

A prospective observational study for a period of 15 months in 100 patients who underwent elective laparotomies from the Department of General Surgery SKMCH, Muzaffarpur, Bihar, India

Inclusion Criteria

The research included all patients who underwent an elective laparotomy and stayed for a minimum of three days after the operation.

Exclusion Criteria

Patients under the age of 18, those in severe illness, and those with cognitive impairment were not included in the research.

Methods

Every patient who had a planned surgical procedure called laparotomy was given comprehensive information regarding the research and the specific surgical technique. Written permission was acquired after providing the necessary information. Comprehensive documentation was made on the patient's medical history, condition, the surgical procedure performed, and the analgesics administered. The NRS score was computed.

Statistical Analysis

The collected data were analysed with IBM SPSS Statistics for Windows, version 23.0. In both the above statistical tools probability value 0.05 is considered as the significant level.

Results

Table 1: Age and gender distribution

Age (Years)	No. of patients
20-30	5
30-40	25
40-50	40
50-60	22
60-70	8
Gender	
Male	60
Female	40

A total of 100 patients were included among which 40 were female and 60 were the male patients. The patients who underwent elective laparotomies were aged between 20 and 70.40 patients were in the age group of 40-50 years.

Table 2: Surgery details

Type of surgery	N
Gastrectomy	3
Gastrojejunostomy + truncalvagotomy	2
Open cholecystectomy with CBDexploration	5
Open partial nephrectomy	3
Whipple's procedure	5
Lap converted to opencholecystectomy	4
Open appendectomy	18
Open cholecystectomy (carcinoma gallbladder and other indications)	10
Right hemicolectomy	5
Left hemicolectomy	3
Exploratory laparotomy (tuberculosisabdomen)	6
Hydatid cyst of the liver (excision of thecyst)	4
Splenectomy	2
Lateral pancreaticojejunostomy	4

Tran-shiatal esophagectomy	3
Ileocecal resection and anastomosis(ileocecal tuberculosis)	6
Ileocecal resection and anastomosis (otherindications)	5
Abdominoperineal resection	4
Abdominal wall reconstruction	2
Exploratory laparotomy for otherindications	6

The 20 different types of surgeries were recorded. The most common surgery performed in our study was open appendectomy followed by open cholecystectomy.

Table 3: 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)	60	6	2
Inj. diclofenac aq. 75mg in 100 ml NS	70	2	1
Inj. pct 100 ml (tid)	60	2	Nil
Inj. Tramadol 50 mgin 100 ml NS (tid) + continuous epidural (bupivacaine)	61	25	9
Inj. Diclofenac aq. 75mg/ml in 100 ml NS (tid) + continuous epidural (bupivacaine)	63	13	7

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 4: Analgesics (Oral with transdermal patch) used on post-operative day 1-3

Type of analgesic (Oral + transdermal patch)	N (%),POD1 (<6 hours)	N (%), POD2 (24-48 hours)	N (%),POD3 (48-72 hours)
T. Aceclofenac + PCT + Serratiopeptidase(tid)	Nil	20	8
T. Aceclofenac+ PCT(tid)	Nil	12	6
T. PCT 650 mg (tid)	Nil	3	2
T. Ultracet (bd)	Nil	10	3
Diclofenac transdermal patch + T. Ultracet	Nil	2	1
Fentanyl transdermalpatch + T. ltracet	Nil	5	3

By the second day 52 patients were shifted to oral analgesics most common drug used was the combination of aceclofenac, paracetamol and serratiopeptidase.

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

NRS score	N (%),POD 1	N (%),POD 2	N (%),POD 3
Mild (1-3)	18	34	46
Moderate (4-6)	35	42	26
Severe (7-10)	47	24	8
No pain	Nil	Nil	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

When there is real or prospective harm to the tissues, the result is an unpleasant sensory and emotional experience known as pain. After surgery, a lot of

people experience a lot of discomfort. [18,19] Personality, behavior, and developmental stages all have a role in shaping how we experience pain. Acute nociceptive, inflammatory, or neuropathic pain often follows surgery. This problem often occurs after surgery. Prolonged rehabilitation and recuperation may be required if post-operative discomfort develops into chronic pain. Difficulty moving about, longer hospital stays, and more

complications are all symptoms of poorly managed pain. [20] pain assessment scales were used, including the following: numerical rating scale (NRS), visual analog scale (VAS), defense and veterans pain rating scale (DVPRS), adult non-verbal pain scale (NVPS), Pain assessment in advanced dementia scale (PAINAD), behavioral 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. [21] A total of 100 patients were included among which 40 were female and 60 were the male patients. The patients who underwent elective laparotomies were aged between 20 and 70.40 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 followed by open cholecystectomy. Four different types of anaesthesia were used. Most common was general anaesthesia with transverse plane block followed by general anaesthesia with quadratus lumborum block. 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. By the second day 52 patients were shifted to oral analgesics most common drug used was the combination of aceclofenac, paracetamol and serratiopeptidase. 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. 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. [22] 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. [23]

In the study conducted by Vallano et al [24] the more common surgical procedures were inguinal hernia repair (315 patients, 32%), cholecystectomy (268, 27%), appendectomy (140, 14%), bowel resection (137, 14%), and gastric surgery (58, 6%). Current ERAS guidelines for elective colorectal

surgery recommend thoracic epidural analgesia (EA) for open surgery but not for laparoscopic procedures. Recommendations appear surgery-specific, as thoracic EA is recommended as in the past decade, new abdominal truncal blocks, including transversus abdominis plane (TAP) and rectus sheath blocks, have grown in popularity. [25,26] The TAP block provides analgesia by blocking the seventh to 11th intercostal nerves (T7-T11), the subcostal nerve (T12), and the ilioinguinal and iliohypogastric nerves (L1-L2). 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

The majority of patients who had pain after surgery were given a combination of analgesics rather than just one kind of medication. We need a common protocol for the optimal pain management strategy since patients' pain levels varied depending on the multimodal analgesics utilized in various institutions.

References

1. Schwartz B.F. The vesical calculus. *Urol Clin North Am.* 2000; 27: 333.
2. Halstead SB. Epidemiology of bladder stone of children: precipitating events. *Urolithiasis.* (2016) 44:101-8.
3. Zafar MN, Ayub S, Tanwri H, Naqvi SAA, Rizvi SAH. Composition of urinary calculi in infants: a report from an endemic country. *Urolithiasis.* (2018) 46:445-52.
4. Meiouet F, El Kabbaj S, Daudon M. Pediatric urolithiasis in morocco: composition of 432 urinary calculi analyzed by infrared spectroscopy. *Prog Urol.* (2019) 29:173-82.
5. Schwartz BF, Stoller M. Th. vesical calculus. *Urol Clin North Am.* 2000;27(2):333-46.
6. Yoshida O, Okada Y. Epidemiology of urolithiasis in Japan: a chronological and geographical study. *Urol Int.* 1990;45(2):104-11.
7. Halstead, S.B. Epidemiology of bladder stone of children: precipitating events. *Urolithiasis.* 2016;44: 101.
8. Takasaki, E. Chemical compositions of 300 lower urinary tract calculi and associated disorders in the urinary tract. *Urol Int.* 1995; 54: 89.
9. Naqvi, S.A. Bladder stone disease in children: clinical studies. *J Pak Med Assoc.* 1984; 34: 94.
10. Sorokin I, Mamoulakis C, Miyazawa K, Rodgers A, Talati J, Lotan Y. Epidemiology of stone disease across the world. *World J Urol.* 2017;35(9):1301-20.
11. Arunkajohnsak N, Taweemonkongsap T, Leewansangtong S, Srinualnad S, Jongjitaree

- K, Chotikawanich E. The correlation between demographic factors and upper urinary tract stone composition in the Thai population. *Heliyon*. 2020;6(8):e04649.
12. Moe OW. Kidney stones: pathophysiology and medical management. *Lancet*. 2006;367(9507): 333- 44.
 13. Schwartz BF, Stoller ML. The vesical calculus. *Urol Clin North Am*. 2000;27(2):333-46
 14. Leslie SW, Sajjad H, Murphy PB. Bladder Stones. In: *StatPearls*. Treasure Island (FL): StatPearls Publishing; 2022.
 15. Torricelli FC, Mazzucchi E, Danilovic A, Coelho RF, Srougi M. Surgical management of bladder stones: literature review. *Rev Col Bras Cir*. 2013;40(3):227-33.
 16. Kittanamongkolchai W, Vaughan LE, Enders FT, Dhondup T, Mehta RA, Krambeck AE et al. The changing incidence and presentation of urinary stones over 3 decades. *Mayo Clin Proc*. 2018;93(3):291-9.
 17. Wu CL, Fleisher LA. Outcomes research in regional anesthesia and analgesia. *Anesth Analg*. 2000;91(5):1232-42.
 18. Gerbershagen HJ, Pogatzki-Zahn E, Aduckathil S, Peelen LM, Kappen TH, van Wijck AJ, Kalkman CJ, Meissner W. Procedure-specific risk factor analysis for the development of severe postoperative pain. *Anesthesiology*. 2014 May 1;120(5):1237-45.
 19. Maier C, Nestler N, Richter H, Hardinghaus W, Pogatzki-Zahn E, Zenz M, Osterbrink J. The quality of pain management in German hospitals. *Deutsches Ärzteblatt International*. 2010 Sep;107(36):607.
 20. Wu CL, Fleisher LA. Outcomes research in regional anesthesia and analgesia. *Anesthesia & Analgesia*. 2000 Nov 1;91(5):1232-42.
 21. Breivik H, Stubhaug A, Hals EK, Rosseland LA. Why we publish negative studies—and prescriptions on how to do clinical pain trials well. *Scandinavian Journal of Pain*. 2010 Apr 1;1(2):98-9.
 22. 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.
 23. STARSurg Collaborative, Abbas Z, Abburu S, Abd Ghaffar MK, Abdelhadi M, Abdikadir HR, Abdulmajid A, Abid H, Abid A, Abuhussein N, Abul MH. Safety of nonsteroidal anti-inflammatory drugs in major gastrointestinal surgery: a prospective, multicenter cohort study. *World journal of surgery*. 2017 Jan;41(1):47-55.
 24. Postoperative Analgesia Study Group of the Spanish Society of Clinical Pharmacology Coordinating Centre and Data Analysis: Antonio Vallano,, Aguilera C, Arnau JM, Baños JE, Laporte JR. Management of postoperative pain in abdominal surgery in Spain. A multicentre drug utilization study. *British journal of clinical pharmacology*. 1999 Jun;47(6):667-73.
 25. Gustafsson UO, Scott MJ, Hubner M, Nygren J, Demartines N, Francis N, Rockall TA, Young-Fadok TM, Hill AG, Soop M, De Boer HD. Guidelines for perioperative care in elective colorectal surgery: Enhanced Recovery After Surgery (ERAS®) Society recommendations: 2018. *World journal of surgery*. 2019 Mar 15; 43:659-95.
 26. National Institute of Academic Anaesthesia (NIAA) Health Services Research Centre. Perioperative Quality Improvement Programme Annual Report 2018-19. NIAA: London, 2019.