

**Assessment of Post Operative Pain Management in Open Suprapubic Cystolithotomy for Bladder Stone: An Observational Study**Amit Ranjan<sup>1</sup>, Mukesh Jaysawal<sup>2</sup>, Khursheed Alam<sup>3</sup><sup>1</sup>Senior Resident, Department of Surgery, Government Medical College and Hospital, Bettiah, Bihar, India<sup>2</sup>Senior Resident, Department of Surgery, Government Medical College and Hospital, Bettiah, Bihar, India<sup>3</sup>Assistant Professor and HOD, Government Medical College and Hospital, Bettiah, Bihar, India

Received: 08-12-2023 Revised: 16-01-2024 / Accepted: 27-02-2024

Corresponding author: Dr. Mukesh Jaysawal

Conflict of interest: Nil

**Abstract****Aim:** The aim of the present study was to record the drug used for postoperative pain in suprapubic cystolithotomy and to determine the effectiveness of multimodal analgesics used.**Material & Methods:** A prospective observational study for a period of 12 months in 100 patients who underwent suprapubic cystolithotomy from the department of general surgery**Results:** A total of 100 patients were included among which 40 were female and 60 were the male patients. The patients who underwent suprapubic cystolithotomy 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. 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:** 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:** Post-operative pain, Multimodal analgesia, Numerical rating scaleThis 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**

Bladder stones constitute approximately 5% of all urinary tract stones. [1] This disease is more prevalent in children, especially in developing countries due to poor nutrition and in adults it is commonly due to bladder outlet obstruction, chronic infection and the presence of an intravesical foreign body. In developed countries the main components of BS are struvite or calcium oxalate dihydrate, while in developing countries the main component is ammonium acid urate. [2,3,4] The male female ratio of bladder stones is 10:1 to 4:1. The incidence peaks at three years in children in developing countries, and 60 years in adulthood. [5,6,7,8,9]

Vesical calculus means "urolith in bladder" and accounts for nearly 5% of urinary system calculus. [10] Bladder stones are usually symptomatic; but in

a few cases, they can also be asymptomatic. [11,12] Open cystolithotomy and endoscopic modalities are the available methods for the removal of bladder stones. [13]

Open cystolithotomy is associated with more postoperative pain, prolonged hospital stays and wound scar as compared to endoscopic procedures. [14] Among endoscopic modalities, percutaneous suprapubic cystolithotripsy is a minimally invasive, safe and effective procedure especially for the management of larger bladder stones. [15] Both the demerits of urethral manipulations and open surgery are eliminated in this procedure. All endoscopic procedures aim to achieve complete stone-free state in the shortest possible time, with a short hospital stay and minimal complications. [16]

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. 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. [17] Pain assessment scales were-Numerical rating scale (NRS), visual analog scale (VAS), defence and veterans pain rating scale (DVPRS), Adult nonverbal 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. Hence the aim of study was to record the drug used for postoperative pain in suprapubic cystolithotomy and to determine the effectiveness of multimodal analgesics used.

**Material & Methods**

A prospective observational study was conducted by the Department of Surgery, Government Medical College and Hospital, Bettiah, Bihar, India for period of 12 months. 100 patients who fulfilling eligibility criteria was taken for the study.

**Inclusion Criteria**

For the study was all the patients who had undergone suprapubic cystolithotomy 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.

**Methods**

All patients who underwent suprapubic cystolithotomy 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.

**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 2x2 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 and gender distribution**

Age (Years)	No. of patients
20-30	5
30-40	25
40-50	40
50-60	22
60-70	8
<b>Gender</b>	
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 suprapubic cystolithotomy 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 (tuberculosis abdomen)	6
Hydatid cyst of the liver (excision of the cyst)	4
Splenectomy	2
Lateral pancreaticojejunostomy	4
Transhiatal esophagectomy	3
Ileocecal resection and anastomosis (ileocecal tuberculosis)	6
Ileocecal resection and anastomosis (other indications)	5
Abdominoperineal resection	4
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 followed by open cholecystectomy.

**Table 3: Anaesthesia details**

Type of anaesthesia	N
General anaesthesia (propofol)	25
Spinal anaesthesia (bupivacaine in hyperbaric solution)	20
GA+TAP [general anaesthesia+ transversus abdominis plane block (propofol with bupivacaine)]	32
GA+QL [general anaesthesia+ quadratus lumborum block (propofol with bupivacaine)]	15
SA+TAP (spinal anaesthesia + transversus abdominis plane block)	3

Four different types of anaesthesia were used. Most common was general anaesthesia with transverse plane block followed by general anaesthesia with quadratus lumborum block.

**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)	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 mg in 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 5: 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 transdermal patch + T. Ultracet	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 6: 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

Pain is defined as an unpleasant sensory and emotional experience arising from actual or potential tissue damage. Many patients suffer from severe pain after surgery. [18,19] 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. 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. [20] 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. [21] A total of 100 patients were included among which 40 were female and 60 were the male patients. The patients who underwent suprapubic cystolithotomy 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

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. Schwartz B.F. The vesical calculus. *UrolClin 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 ML. The vesical calculus. *UrolClin 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):10-411.

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.