DOI: 10.7860/JCDR/2026/80215.23364

Original Article

Surgery Section

Laparoscopic-assisted Transversus Abdominis Plane Block versus Conventional Periportal Infiltration for Postoperative Pain Management after Elective Laparoscopic Cholecystectomy: A Prospective Interventional Study

S VINITH BALAJI[1], K THINAGARAN[2], M SURENDHAR[3], M REEGAN JOSE[4], MOHANA VAMSI[5], ARAFATH IQBAL[6]

ABSTRACT

Introduction: Managing postoperative pain is critically important for recovery following Laparoscopic Cholecystectomy (LC). While conventional periportal infiltration with local anaesthetics is commonly used, the laparoscopic-assisted Transversus Abdominis Plane (TAP) block is gaining attention for its potential to provide superior analgesia and reduce opioid requirements.

Aim: To compare the efficacy of laparoscopic-assisted TAP block versus conventional periportal infiltration in reducing postoperative pain, opioid requirement, and hospital stay in patients undergoing elective LC.

Materials and Methods: The present prospective interventional study was conducted on patients scheduled for elective LC in the Department of General Surgery at SRM Medical College Hospital and Research Centre (SRM MCHRC), Tamil Nadu, India, from September 2024 to February 2025. The subjects were randomly divided into two groups: Group A (n=40) underwent laparoscopic-assisted TAP block, while Group B (n=40) underwent conventional periportal infiltration (control group). Postoperative pain was assessed using the Wong Baker FACES Pain Rating Scale (WBFPS) at 3, 6, and 12 hours after surgery. Rescue analgesia requirement, total opioid consumption within the first 24 hours after surgery, and Length of Hospital Stay (LHS) were recorded. Independent t-tests were used to compare continuous variables between the two groups, with $p<0.05$ considered statistically significant.

Results: The mean age of participants in Groups A and B was 43.5±14.5 years and 41.3±13.0 years, respectively. Group A comprised 22 females (55%) and 18 males (45%), while Group B included 20 females (50%) and 20 males (50%). Patients in the TAP block group demonstrated significantly lower pain scores at 3, 6, and 12 hours postoperatively compared to the control group ($p<0.05$). The time to first rescue analgesia was significantly prolonged in Group A (7.7±1.7 hours) compared to Group B (2±0.8 hours, $p<0.001$). Consequently, patients in the TAP block group required lower doses of opioid analgesics within the first 24 hours. The mean LHS was significantly shorter in Group A (2.0±0.7 days) compared to Group B (3.7±1.2 days, p=<0.001).

Conclusion: The laparoscopic-assisted TAP block is markedly superior to periportal infiltration in managing postoperative pain following LC. It provides more effective pain control, reduces opioid consumption, and shortens hospital stay, making it an important component of multimodal analgesia.

Keywords: Analgesia, Laparoscopy, Length of stay, Opioid analgesics

INTRODUCTION

Laparoscopic Cholecystectomy (LC) is currently considered one of the most commonly performed surgical procedures worldwide [1]. Compared to conventional open surgery, it offers several advantages, including smaller incisions, shorter recovery time, and reduced hospital stay. However, despite these benefits, many patients experience moderate to severe postoperative pain, particularly during the first 24 hours after surgery [2]. If inadequately managed, this pain can impede early mobilisation, prolong hospital stay, and increase the risk of complications such as deep vein thrombosis and pulmonary complications. Therefore, effective pain management is a crucial component of postoperative care to enhance recovery and patient satisfaction [3,4].

Traditionally, postoperative pain management has relied heavily on opioid analgesics. Although effective, opioids are associated with several adverse effects, including oversedation, nausea, vomiting, and respiratory depression. These side effects may negate the advantages of minimally invasive surgery by increasing hospital stay and overall healthcare costs [5]. Consequently, there has been growing interest in opioid-sparing strategies, including the use of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) and local anaesthetic techniques. Among these, local anaesthetic infiltration at laparoscopic port sites is a commonly employed and straightforward method for providing somatic analgesia. This technique involves administering local anaesthetics around the trocar insertion sites to block somatic pain. While it is easy to perform and requires no specialised equipment, its analgesic effect is often short-lived and may not adequately address all components of postoperative pain [6].

Increasing evidence supports the use of the TAP block as part of multimodal analgesia for postoperative pain management [7]. The TAP block involves the administration of local anaesthetic into the fascial plane between the internal oblique and transversus abdominis muscles, thereby blocking the sensory nerves supplying the anterior abdominal wall. It affects the thoracic intercostal nerves (T7-T12), iliohypogastric nerve, ilioinguinal nerve, and lumbar nerves (L1-L3)

via their lateral cutaneous branches [8]. This technique has been shown to provide effective analgesia following abdominal surgeries such as LC [9]. Although both periportal infiltration and TAP block are recognised as effective methods for managing postoperative pain after LC, most previous studies have evaluated these techniques independently rather than through direct comparison [10-12]. This lack of head-to-head comparison limits clinicians' ability to determine the most effective and practical analgesic approach for routine surgical practice. Therefore, the present study aims to compare the effectiveness of laparoscopic-assisted TAP block with conventional periportal infiltration in patients undergoing elective laparoscopic cholecystectomy.

MATERIALS AND METHODS

The present prospective interventional study was conducted in the Department of General Surgery at SRM Medical College Hospital and Research Centre (SRM MCHRC), Tamil Nadu, India, from September 2024 to February 2025. The study received ethical approval from the Institutional Ethics Committee (Clearance No. SRMIEC-ST0924-1465). All participants provided written informed consent in accordance with the Declaration of Helsinki, ensuring ethical compliance.

Inclusion and Exclusion criteria: Individuals aged 18-65 years, of either gender, classified as American Society of Anesthesiologists (ASA) physical status I or II, and scheduled for elective laparoscopic cholecystectomy were eligible for inclusion. Patients with contraindications to regional anaesthesia, a history of previous abdominal surgery that could alter anatomical landmarks, chronic pain conditions, severe hepatic or renal impairment, or those who declined to participate were excluded.

A convenience sampling method was employed. All eligible patients presenting during the study period and meeting the inclusion criteria were enrolled until the desired sample size was achieved.

Randomisation and group allocation: Patients fulfilling the inclusion criteria were allocated into two groups using simple randomisation with computer-generated random numbers. Allocation concealment was ensured using the sealed envelope method. Group A (n=40): Received laparoscopic-assisted TAP block; Group B (n=40): Received conventional periportal infiltration.

Study Procedure

Group-A: Laparoscopic-assisted TAP block

In Group A, patients received a laparoscopic-assisted TAP block following induction of general anaesthesia. Initially, 7 mL of local anaesthetic (from a total of 20 mL) was infiltrated at the umbilical port site immediately before skin incision. After creating pneumoperitoneum through the umbilical port, the TAP block was administered under direct laparoscopic visualisation using a 22-gauge needle at four anatomical points:

- **Bilateral subcostal region:** 10 mL of 0.25% bupivacaine was infiltrated between the anterior axillary and midclavicular lines.
- **Bilateral triangle of Petit:** 15 mL of 0.25% bupivacaine was administered above the iliac crest along the mid-axillary line on each side.

Correct needle placement was confirmed by visualising the needle traversing the extraperitoneal space without breaching the parietal peritoneum. Proper deposition within the fascial plane was further verified by the appearance of Doyle's bulge, indicating adequate spread beneath the transversus abdominis muscle.

Following the TAP block, periportal infiltration was performed using 3 mL and 7 mL of bupivacaine at the 5-mm and 10-mm incision sites, respectively. After completion of port placement, an additional 10 mL of bupivacaine was administered intraperitoneally over the gallbladder and into the subhepatic region prior to dissection.

- **Group-B (Conventional periportal infiltration):** In Group B, following completion of the surgical procedure and prior to skin closure, 20 mL of 0.5% bupivacaine was infiltrated at the port sites (5 mL per port). No TAP block or intraperitoneal local anaesthetic was administered.

Postoperative monitoring and pain management: Following extubation, all patients were transferred to the Post Anaesthesia Care Unit (PACU) for routine postoperative monitoring. All patients received intravenous paracetamol 1000 mg every six hours for postoperative analgesia. Intramuscular tramadol was administered as rescue analgesia when required, and the time to first analgesic request was recorded.

Study outcomes: Postoperative pain was assessed using the Wong-Baker FACES Pain Rating Scale (WBFPS) at predefined intervals: preoperatively and at 3, 6, and 12 hours postsurgery [13]. Total analgesic consumption was calculated as the cumulative dose of tramadol administered during the first 24 hours postoperatively. Time to first rescue analgesia was defined as the interval between the end of surgery and administration of the first dose of rescue analgesic. Length of hospital stay was recorded in hours, from admission to discharge.

STATISTICAL ANALYSIS

Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as mean±Standard Deviation (SD). The independent t-test was used to compare continuous variables between groups, and the Chi-square test was employed for categorical variables. A p-value of <0.05 was considered statistically significant. Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) version 29.

RESULTS

The mean age of participants in Groups A and B was 43.5±14.5 years and 41.3±13.0 years, respectively. Group A included 22 females (55%) and 18 males (45%), while Group B comprised 20 females (50%) and 20 males (50%) [Table/Fig-1]. The mean operative duration was significantly shorter in Group A (54.6±10.5 minutes) compared to Group B (60.6±10.2 minutes), with a statistically significant difference (p=0.011) [Table/Fig-2]. Total analgesic consumption was significantly lower in Group A (100.5±50.6 mg) than in Group B (230.0±87.6 mg), with a p-value of 0.004 [Table/Fig-3].

[Table/Fig-4] compares Wong-Baker FACES pain scores between Groups A and B at preoperative, 3-hour, 6-hour, and 12-hour intervals. No significant difference was observed in preoperative pain scores between the two groups (Group A: 8.8±1.0; Group B: 8.9±0.8; p=0.623). However, postoperatively, Group A demonstrated significantly lower pain scores at 3 hours (4.7±1.0 vs. 5.6±0.8; p<0.001), 6 hours (2.6±0.9 vs. 3.4±0.9; p<0.001), and 12 hours (0.6±0.9 vs. 1.6±0.8; p<0.001). These findings indicate that the laparoscopic-assisted TAP block significantly reduces postoperative pain compared with conventional periportal infiltration at all assessed time points.

DISCUSSION

This investigation sought to assess the efficacy of the laparoscopic-assisted TAP block compared with conventional periportal infiltration for alleviating postoperative pain in patients undergoing elective LC. The results clearly favoured the laparoscopic-assisted TAP block, with Group A demonstrating superior outcomes across all evaluated parameters, including operative duration, length of hospital stay, postoperative pain scores, total analgesic consumption, and time to first request for analgesia.

The mean operative duration was significantly shorter in Group A (54.6±10.5 minutes) compared with Group B (60.6±10.2 minutes; p=0.011). These findings are consistent with those reported by El-Dawlatly AA et al., (2009), who observed a mean operative time

Demographic characteristics		Group A N=40	Group A %	Group B N=40	Group B %	Total N=80	Total %	Chi-square value	p-value
Age (years)	<20	2	5	2	5	4	5	1.466	0.69
	20-40	14	35	17	42.5	31	38.8		
	41-60	21	52.5	16	40	37	46.3		
	61-80	3	7.5	5	12.5	8	10		
Gender	Female	22	55	20	50	42	52.5	0.201	0.654
	Male	18	45	20	50	38	47.5		
Body Mass Index	Underweight	10	25	5	12.5	15	18.8	2.898	0.408
	Normal	18	45	24	60	42	52.4		
	Overweight	10	25	9	22.5	19	23.8		
	Obesity class I	2	5	2	5	4	5		
Co-morbidities	Cardiac disease	4	10	4	10	8	10	0.086	0.993
	Diabetes Milletus	8	20	7	17.5	15	18.8		
	Hypertension	3	7.5	3	7.5	6	7.5		
	None	25	62.5	26	65	51	63.8		
ASA grade	I	25	62.5	27	67.5	52	65	0.22	0.639
	II	15	37.5	13	32.5	28	35		

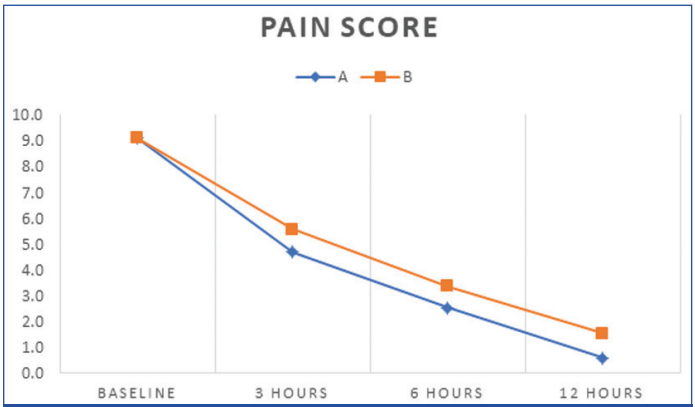
[Table/Fig-1]: Distribution of demographic characteristics of study participants.

Characteristics		Mean	Std. Deviation	T-value	p-value
Operative time (minutes)	A	54.6	10.5	-2.592	0.011*
	B	60.6	10.2		
Duration of hospital stay (days)	A	2.0	0.7	-8.157	<0.001*
	B	3.7	1.2		

[Table/Fig-2]: Comparison of procedure time and duration of hospital stay between groups.

Characteristics		Mean	Std. deviation	T value	p-value
Total analgesic consumption (mg)	A	100.5	50.6	-2.791	0.004*
	B	230.0	87.6		
Time to first analgesic requirement (hours)	A	7.7	1.7	14.76	<0.001*
	B	2	0.8		

[Table/Fig-3]: Comparison of total analgesic consumption.



[Table/Fig-4]: Comparison of Wong-Baker Faces pain scores between groups.

of 55±11 minutes in patients receiving an ultrasound-guided TAP block [14]. Similarly, Bhalekar P et al., (2018) reported an operative time of 56.1±6.2 minutes in the subcostal TAP block group [15]. In contrast, Matam R et al., (2023) documented a shorter mean operative time of 41.1±4.7 minutes, which may be attributed to the use of ultrasound guidance [16].

Longer operative times reported in other studies, such as those by Elamin G et al., (92.4 minutes) and Bhataraj PR et al., (89.7±18.6 minutes), may be explained by variations in technique, institutional protocols, or surgeon experience [11,17]. It is also noteworthy that the present study utilised a laparoscopic-assisted technique, which allows enhanced visualisation and potentially faster block placement, thereby contributing to the reduced operative duration.

The present findings further demonstrate that patients receiving the TAP block experienced a shorter length of hospital stay compared with those who underwent periportal infiltration. This observation is consistent with studies by Tekeli AE et al., (2020) and Khoja HR et al., (2021), both of which reported reduced hospital stays associated with TAP block use [18,19]. Additionally, Singh RR et al., (2016) reported a mean hospital stay of 3.68±1.07 days following periportal infiltration, which closely corresponds to the duration observed in Group B of the current study, supporting the reliability of these results [20].

Reduced hospital stay not only facilitates faster recovery and earlier mobilisation but also decreases the overall burden on healthcare resources. The superior analgesic efficacy of TAP blocks likely plays a crucial role in enabling these benefits.

Postoperative pain scores at 3, 6, and 12 hours were significantly lower in the TAP block group, confirming the superior analgesic efficacy of this technique. These findings are consistent with those of Şahin AS et al., who reported significantly lower Visual Analogue Scale (VAS) scores in patients receiving higher-volume TAP blocks at 20 minutes, 12 hours, and 24 hours postoperatively [21]. Similarly, Ravichandran NT et al., reported significantly reduced pain scores in the TAP block group at 6 and 24 hours postoperatively, with VAS scores at rest decreasing from approximately 4.5 to 2.3, and during movement from 6.0 to 3.5 ($p<0.05$) [22].

The improved analgesia associated with TAP blocks may be attributed to the broader blockade of thoracolumbar nerves innervating the anterior abdominal wall, resulting in more effective and prolonged pain relief compared with the relatively superficial analgesia provided by periportal infiltration [11]. Supporting this, Alexander DJ et al., also observed significantly improved pain scores in patients receiving TAP blocks compared with controls [12].

Furthermore, patients in the TAP block group required a lower total dose of analgesics and demonstrated a longer duration before the first request for rescue analgesia. These findings align with those reported by Bhalekar P et al., (2018) and Saliminia A et al., who similarly noted reduced analgesic requirements and prolonged analgesic duration in patients receiving TAP blocks [15,23].

Clinically, reducing opioid consumption is highly desirable, as opioids are associated with adverse effects such as sedation, nausea, vomiting, and respiratory depression. Minimising opioid use

can therefore improve patient comfort, facilitate early ambulation, and enhance overall postoperative recovery.

Limitation(s)

The present study was conducted at a single centre and included a relatively small sample size. Additionally, postoperative pain was assessed only up to 12 hours, and longer-term outcomes such as functional recovery, activity levels, and chronic pain were not evaluated. Future studies involving larger, multicentre cohorts with extended follow-up periods are warranted to validate these findings and to assess the cost-effectiveness of laparoscopic-assisted TAP block techniques.

CONCLUSION(S)

The findings of the present study indicate that the laparoscopic-assisted TAP block is more effective than conventional periportal infiltration for managing postoperative pain in patients undergoing laparoscopic cholecystectomy. Owing to its superior analgesic efficacy and the ease of administration under direct laparoscopic visualisation, the laparoscopic-assisted TAP block represents a valuable component of multimodal analgesia in LC. Its use may facilitate early mobilisation, reduce postoperative complications, and support enhanced recovery protocols.

Acknowledgement

The authors would like to acknowledge the Department of General Surgery at SRM Medical College Hospital and Research Institute for their technical support in conducting the present study. No financial or material support was received for this research, and the authors declare no conflicts of interest.

REFERENCES

[1] Molfino S, Botteri E, Baggi P, Totaro L, Huscher M, Baiocchi GL, et al. Pain control in laparoscopic surgery: A case-control study between transversus abdominis plane-block and trocar-site anesthesia. Updates Surg. 2019;71(4):717-722.
[2] Bisgaard T, Schulze S, Christian Hjortsø N, Rosenberg J, Bjerregaard Kristiansen V. Randomized clinical trial comparing oral prednisone (50 mg) with placebo before laparoscopic cholecystectomy. Surg Endosc. 2008;22(2):566-72.
[3] Anil A, Kaya FN, Yavaşcaoğlu B, Mercanoğlu Efe E, Türker G, Demirci A. Comparison of postoperative analgesic efficacy of intraoperative single-dose intravenous administration of dexketoprofen trometamol and diclofenac sodium in laparoscopic cholecystectomy. J Clin Anesth. 2016;32:127-33. Doi: 10.1016/j.jclinane.2016.02.020.
[4] Bakan M, Umutoglu T, Topuz U, Uysal H, Bayram M, Kadioglu H, et al. Opioid-free total intravenous anesthesia with propofol, dexmedetomidine and lidocaine infusions for laparoscopic cholecystectomy: A prospective, randomized, double-blinded study. Braz J Anesthesiol. 2015;65(3):191-99. Doi: 10.1016/j.bjane.2014.05.001.
[5] Buvanendran A, Kroin JS. Multimodal analgesia for controlling acute postoperative pain. Curr Opin Anaesthesiol. 2009;22(5):588-93.
[6] Alexander JI. Pain after laparoscopy. Br J Anaesth. 1997;79(3):369-78.
[7] McDonnell JG, O'Donnell BD, Farrell T, Gough N, Tuite D, Power C, et al. Transversus abdominis plane block: A cadaveric and radiological evaluation. Reg Anesth Pain Med. 2007;32(5):399-404.
[8] Barczynski M, Herman RM. A prospective randomized trial on comparison of low-pressure (LP) and standard-pressure (SP) pneumoperitoneum for laparoscopic cholecystectomy. Surg Endosc. 2003;17(4):533-38.
[9] Rafi AN. Abdominal field block: A new approach via the lumbar triangle. Anaesthesia. 2001;56(10):1024-26.
[10] Tihan D, Totoz T, Tokocin M, Ercan G, Koc Calıkoglu T, Vartanoglu T, et al. Efficacy of laparoscopic transversus abdominis plane block for elective laparoscopic cholecystectomy in elderly patients. Bosn J Basic Med Sci. 2016;16(2):139-44. Doi: 10.17305/bjbms.2016.841.
[11] Elamin G, Waters PS, Hamid H, O'Keeffe HM, Waldron RM, Duggan M, et al. Efficacy of a laparoscopically delivered transversus abdominis plane block technique during elective laparoscopic cholecystectomy: A prospective, double-blind randomized trial. J Am Coll Surg. 2015;221(2):335-44. Doi: 10.1016/j.jamcollsurg.2015.03.030.
[12] Alexander DJ, Ngoi SS, Lee L, So J, Mak K, Chan S, et al. Randomized trial of periportal peritoneal bupivacaine for pain relief after laparoscopic cholecystectomy. Br J Surg. 1996;83(9):1223-25. Available from: https://doi.org/10.1046/j.1365-2168.1996.02336.x.
[13] Garra G, Singer AJ, Taira BR, Chohan J, Cardoz H, Chisena E, et al. Validation of the Wong-Baker FACES Pain Rating Scale in pediatric emergency department patients. Acad Emerg Med. 2010;17(1):50-54. Doi: 10.1111/j.1553-2712.2009.00620.x.
[14] El-Dawlatly AA, Turkistani A, Kettner SC, Machata AM, Delvi MB, Thallaj A, et al. Ultrasound-guided transversus abdominis plane block: Description of a new technique and comparison with conventional systemic analgesia during laparoscopic cholecystectomy. Br J Anaesth. 2009;102(6):763-67. Doi: 10.1093/bja/aep067.
[15] Bhalekar P, Gosavi R, Mutha S, Mahajan V, Phalgune D. Efficacy of ultrasound-guided subcostal transversus abdominis plane block for analgesia after laparoscopic cholecystectomy. Indian Anaesth Forum. 2018;19(2):73-77.
[16] Matam R, Chawla V, Trivedi S, Bhardwaj A, Singh S. Ultrasound-guided transversus abdominis plane block versus intraperitoneal instillation of bupivacaine after laparoscopic cholecystectomy - A randomized control trial. J Med Sci Health. 2023;9(2):169-176.
[17] Bhatarai PR, Bhatarai B, Sah BP, Rahman TR, Ghimire A, Adhikary S. Comparison of postoperative analgesic effectiveness of combined intraperitoneal instillation and periportal infiltration of bupivacaine with intraperitoneal instillation or periportal infiltration alone for laparoscopic cholecystectomy. J Soc Anesthesiol Nepal. 2014;1:59-64.
[18] Tekeli AE, Eker E, Bartin MK, Oner MO. The efficacy of transversus abdominis plane block for postoperative analgesia in laparoscopic cholecystectomy cases: A retrospective evaluation of 515 patients. J Int Med Res. 2020;48(8):300060520944058. Doi: 10.1177/0300060520944058.
[19] Khoja HR, Kunchagi DK, Joshi PK, Om P. Efficacy of laparoscopic guided transversus abdominis plane block in postoperative analgesia requirement in elective laparoscopic cholecystectomy. Int Surg J. 2021;8(3):925-29. Available from: https://www.ijsurgery.com/index.php/isj/article/view/7106.
[20] Singh RR, Bansal D, Singh M, Shah AS. Randomized controlled study of effectiveness and timings of bupivacaine at port site in managing pain after laparoscopic cholecystectomy. Int Surg J. 2016;3(4):1837-43. Available from: https://www.ijsurgery.com/index.php/isj/article/view/106.
[21] Şahin AS, Ay N, Şahbaz NA, Kocabaşş Akay M, Demiraran Y, Derbent A. Analgesic effects of ultrasound-guided transverse abdominis plane block using different volumes and concentrations of local analgesics after laparoscopic cholecystectomy. J Int Med Res. 2017;45(1):211-19. Doi: 10.1177/0300060516682883
[22] Ravichandran NT, Sistla SC, Kundra P, Ali SM, Dhanapal B, Galidevara I. Laparoscopic-assisted Transversus Abdominis Plane (TAP) block versus ultrasonography-guided transversus abdominis plane block in postlaparoscopic cholecystectomy pain relief: Randomized controlled trial. Surg Laparosc Endosc Percutan Tech. 2017;27(4):228-32. Available from: https://journals.lww.com/surgical-laparoscopy/abstract/2017/08000/laparoscopic_assisted_tranversus_abdominis_plane.4.aspx.
[23] Saliminia A, Azimaraghi O, Babayipour S, Ardavan K, Movafegh A. Efficacy of transversus abdominis plane block in reduction of postoperative pain in laparoscopic cholecystectomy. Acta Anaesthesiol Taiwan. 2015;53(4):119-22. Doi: 10.1016/j.aat.2015.07.003.

PARTICULARS OF CONTRIBUTORS:
1. Junior Resident, Department of General Surgery, SRM Medical College Hospital and Research Institute, Chennai, Tamil Nadu, India.
2. Professor and Head, Department of Surgery, Tagore Medical College and Hospital, Chennai, Tamil Nadu, India.
3. Junior Resident, Department of General Surgery, SRM Medical College Hospital and Research Institute, Chennai, Tamil Nadu, India.
4. Assistant Professor, Department of General Surgery, SRM Medical College Hospital and Research Institute, Chennai, Tamil Nadu, India.
5. Junior Resident, Department of General Surgery, SRM Medical College Hospital and Research Institute, Chennai, Tamil Nadu, India.
6. Junior Resident, Department of General Surgery, SRM Medical College Hospital and Research Institute, Chennai, Tamil Nadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
S Vinith Balaji,
Junior Resident, Department of General Surgery, SRM Medical College Hospital and Resaerch Institute, Kattankulathur, Chennai, Tamil Nadu, India.
E-mail: vb020797@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Aug 05, 2025
- Manual Googling: Oct 25, 2025
- iThenticate Software: Oct 27, 2025 (3%)

ETYMOLOGY: Author Origin

EMENDATIONS: 6

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Apr 27, 2025**
Date of Peer Review: **Aug 06, 2025**
Date of Acceptance: **Oct 29, 2025**
Date of Publishing: **May 01, 2026**