SAR Journal of Surgery

Abbreviated Key Title: *SAR J Surg*
Home page: https://sarpublication.com/journal/sarjs/home
DOI: https://doi.org/10.36346/sarjs.2026.v07i04.001

ISSN 2707-7748 (P)
ISSN 2709-6912 (O)

Original Research Article

Surgical Outcomes of Concurrent Laparoscopic Groin Hernia Repair and Laparoscopic Cholecystectomy: A Retrospective Observational Study

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Article History: | Received: 16.05.2026 | Accepted: 04.07.2026 | Published: 06.07.2026 |

Abstract: Laparoscopic cholecystectomy (LC) and Total Extraperitoneal (TEP)/Transabdominal Preperitoneal (TAPP) repair have established themselves as standard and popular surgeries for gallstone disease and groin hernia, respectively. However, their concurrent performance for co-existing gallstone disease and groin hernia has seldom been studied. This retrospective observational study was conducted at the Department of General and Laparoscopic Surgery, Dr. L H Hiranandani Hospital, Mumbai, India, from March 2008 to July 2025. Over 18 years, 24 patients with co-existing gallstone disease and primary or recurrent groin hernia underwent concurrent LC and TEP/TAPP repair in a single sitting. The outcomes studied included duration of surgery, intra- and postoperative complications including mesh infection, duration of hospital stay, hernia recurrence, time to resume normal activity, and treatment cost. The mean age of the patients was 66 ± 9.7 years (range 50–87 years), and the average duration of surgery was 55 ± 10 minutes (range 40–75 minutes). There was no conversion to open surgery. The mean postoperative hospital stay was 1.5 ± 0.5 days. Four (16.67%) patients developed small seromas on day 10, all of which resolved with conservative management within six weeks. No patient experienced significant haemorrhage, superficial or deep surgical site infection, mesh infection, or hernia recurrence. Patients resumed normal activity within an average of 5 days. Concurrent treatment reduced the total cost by 25% compared to performing both procedures separately. These findings suggest that concurrent LC and TEP/TAPP is a safe, practical, and cost-effective procedure in carefully selected patients.

Keywords: Cholecystitis, Cross-infection, Groin hernia, Mesh infection, Recurrence, Surgical site infection.

INTRODUCTION

Laparoscopic cholecystectomy (LC) has become the definitive surgical modality for the management of symptomatic gallstone disease and ranks among the most frequently performed laparoscopic operations globally [1]. Its adoption into routine surgical practice is supported by robust evidence demonstrating advantages over open cholecystectomy, including diminished postoperative pain, reduced length of hospital stay, expedited functional recovery, and higher patient satisfaction. Extensive literature has validated the safety and effectiveness of LC across a wide spectrum of clinical scenarios, ranging from uncomplicated cholelithiasis to inflammatory conditions of the gallbladder [2]. Moreover, its utility has been extended to selected emergency presentations, highlighting its role beyond elective surgical settings [3].

Progress in perioperative management, anaesthetic techniques, and laparoscopic equipment has further enhanced surgical outcomes, allowing LC to be safely conducted as a day-care procedure in many institutions [4]. Current clinical guidelines increasingly recommend early laparoscopic intervention for acute cholecystitis, thereby challenging the earlier preference for delayed surgery and underscoring the advantages of prompt operative management [5]. Although newer modalities such as single-incision and robotic-assisted cholecystectomy continue to evolve, the conventional

multiport laparoscopic approach remains the most commonly employed due to its proven safety profile, reproducibility, and cost-effectiveness.

Similarly, the management of inguinal hernia has witnessed a significant transition toward minimally invasive strategies. Laparoscopic inguinal hernia repair, utilizing either the totally extraperitoneal (TEP) or transabdominal preperitoneal (TAPP) technique, has gained popularity owing to favourable early postoperative outcomes. Large-scale reviews have reported benefits such as reduced postoperative discomfort, earlier return to normal activities, and a lower incidence of wound-related complications when compared with open Lichtenstein repair [6]. Nevertheless, both laparoscopic approaches are associated with a steep learning curve, and surgical results are strongly influenced by surgeon experience [7]. Long-term follow-up studies indicate similar recurrence rates between TEP and TAPP repairs, with the choice of technique largely guided by surgeon expertise and institutional practice patterns [8].

The simultaneous occurrence of symptomatic gallstone disease and inguinal hernia is relatively frequent, particularly among middle-aged and older individuals. Managing both conditions during a single surgical sitting offers several potential benefits, including the avoidance of multiple anaesthetic exposures, fewer hospital admissions, and a shorter overall recovery period. Despite these theoretical advantages, the combination of LC with laparoscopic inguinal hernia repair has historically been met with caution. Concerns related to mesh contamination, infection risk, extended operative duration, and increased perioperative complications have limited its routine adoption.

More recently, emerging evidence has indicated that performing LC in conjunction with laparoscopic inguinal hernia repair may be both feasible and safe in appropriately selected patients [9]. Published studies have demonstrated low rates of mesh-associated complications, comparable to those observed following standalone hernia repair [10]. Additionally, combined procedures have been shown to reduce cumulative hospitalization, lower overall healthcare costs, and enhance patient convenience [11]. This study was therefore designed to assess the safety and feasibility of concurrent laparoscopic cholecystectomy and laparoscopic inguinal hernia repair (TEP and TAP), with a particular focus on perioperative outcomes and mesh-related complications.

MATERIALS AND METHODS

This retrospective observational study was conducted at the Department of General and Laparoscopic Surgery, Dr. L.H. Hiranandani Hospital, Mumbai, India from March 2008 to July 2025. The study population comprised patients who had undergone LC and TEP/TAPP in the same sitting for concurrent gallstone disease and groin hernia. Since, this was a retrospective study, prior clearance from the Institutional Ethics Committee was not applicable.

Inclusion Criteria

- Absence of acute cholecystitis-no tenderness in the right hypochondriac region with a normal liver profile and normal total leukocyte count;
- Absence of obstructed and/or strangulated hernia;
- Absence of any known coagulation disorders;
- Medically fit and stable patients {American Society of Anaesthesiologists (ASA) I, controlled ASA II and III}.

Exclusion Criteria

- Acute cholecystitis;
- Obstructed/strangulated ventral hernia;
- Acute urinary tract infection;
- Patients with known coagulation disorders.

Study Procedure

A total of 24 patients were included in present study, all operated on by a single surgeon. All patients were assessed for fitness for surgery on an outpatient basis. The specific preoperative investigations included urinalysis, an Ultrasonography (USG) scan of the abdomen, liver profile, and a complete blood count, in addition to other routine biochemical investigations.

Operative Technique

The surgeries were performed under general anaesthesia for all patients. They were placed in a supine position with both upper limbs tucked in by the side of the patient to facilitate the TEP/TAP part of the surgery. Two monitors (one on the patient's right and the other on the foot end – ipsilateral foot end in case of those with unilateral inguinal hernia and near the foot of the side of the larger hernia in case of bilateral inguinal herniae) were used. A prophylactic antibiotic of second-generation cephalosporin (Cefuroxime 1.5 gm) was administered intravenously to each patient just before the start of surgery.

Separate trolleys were prepared for the two procedures, meaning that two sets of Maryland forceps, laparoscopic scissors, and graspers were kept ready on separate trolleys at the outset. In all patients, TEP/TAP was performed first, followed by the LC.

The TEP is the preferred surgical approach of the authors for the treatment of inguinal hernia, whether unilateral or bilateral (n=20). The authors performed TAP only in those patients of inguinal hernia who were very short statured with a relatively very large hernia or those who had a very large incarcerated hernia that did not reduce even after taxis under general anaesthesia (n=4). Both TEP and TAP were performed with the standard 3 trocar approach with optimum triangulation. In the TEP approach, an extraperitoneal trocar was

inserted in the subumbilical area by blunt entry. The space was then developed by telescopic dissection. After this, the 2 working trocars on either side of the optic trocar were inserted under vision. Then the sac/s were dissected and mesh optimally placed over the defects as part of the standard dissection, while safeguarding the cord structures. Once the TEP was completed, the umbilical and right lateral trocars were inserted intraperitoneally. The left lateral trocar was removed and the site suture closed. Pneumoperitoneum was established and the epigastric and right sided upper trocar was inserted. Then a standard 4 trocar LC was performed. The gall bladder was retrieved in a plastic bag carefully taking due care to avoid spillage. The same process was followed in the 4 patients who underwent TAP + LC. The TAP was performed first followed by the LC.

Statistical Analysis

The statistical analysis was conducted using the Statistical Package for the Social Sciences (SPSS) version 22.0 software. Proportions, percentages, and means were calculated.

Table 1: Patient demographics

Patient characteristics	**n (%)**
Total number of patients	24
M: F	24:0
Mean age (range)	66.6 ± 9.7 years (range 50-87 years).
Average duration of surgery (range)	55 ± 10 minutes (range 40-75 minutes)
Average hospital stays	1.5 days
Average time to resumption of normal activities	5 days
Reduction of cost by concurrent approach	25 %
Mean follow-up period (range)	112.29 months (17-226 months)
Surgical Approach	
TEP	20 (83.33%)
TAPP	04 (16.67%)
Types of repairs (Overall)	
Unilateral	14 (58.33 %)
Bilateral	10 (41.67 %)
TEP repair	n =20
Unilateral	11 (55%)
Bilateral	9 (45 %)
Left sided unilateral	7 (63.64%)
Right sided unilateral	4 (36.36 %)
TAPP repair	n =4
Unilateral	3 (75 %)
Bilateral	1 (25 %)
Left sided unilateral	1 (33 %)
Right sided unilateral	2 (66.67%)

A total of 24 patients were included in the study, all of whom were male. The mean age was 66.6 ± 9.7 years (range: 50–87 years). The mean operative duration was 55 ± 10 minutes (range: 40–75 minutes). The average postoperative hospital stay was 1.5 days, and the mean time to resumption of normal daily activities was 5 days. A cost reduction of 25% was achieved with the concurrent surgical approach. The mean follow-up period was 112.29 months (range: 17–226 months).

The totally extraperitoneal (TEP) approach was performed in 20 patients (83.33%), while the transabdominal preperitoneal (TAPP) approach was used in 4 patients (16.67%). Overall, unilateral repair was done in 14 patients (58.33%) and bilateral repair in 10 patients (41.67%).

Among patients undergoing TEP repair (n = 20), unilateral repair was performed in 11 patients (55%) and bilateral repair in 9 patients (45%). Of the unilateral TEP repairs, 7 (63.64%) were left-sided and 4 (36.36%) were right-sided. In the TAPP group (n = 4), unilateral repair was done in 3 patients (75%) and bilateral repair in 1 patient (25%). Among unilateral TAPP repairs, left-sided hernia was seen in 1 patient (33.33%) and right-sided hernia in 2 patients (66.67%). Co-morbid conditions were present in some patients, including hypertension [n =7 (29.17%)], diabetes mellitus [n=4(16.67%)], Hypothyroidism [n=2 (8.33%)], ischaemic heart disease [n = 1 (4.17%)] and chronic obstructive pulmonary disease [n = 1 (4.17%)]. The patient demographics of the present study is summarised (Table 1).

No intraoperative or early postoperative complications were observed. There were no cases of early significant haemorrhage, seroma, or bile leak. Late postoperative complications were minimal, with seroma occurring in 4 patients (16.67%), all of which were managed conservatively. No cases of haematoma, mesh

infection, surgical site infection, or hernia recurrence were noted during the follow-up period. The presence of associated co-morbidities did not result in increased perioperative or postoperative complications.

DISCUSSION

Laparoscopic cholecystectomy has matured into a highly standardized surgical technique with well-established safety and consistently reproducible outcomes [1]. A substantial body of evidence has confirmed its efficacy across a broad range of gallbladder disorders, encompassing both elective procedures and carefully selected acute presentations [2, 3]. Ongoing refinements in perioperative care and operative methods have further reinforced its position as a dependable minimally invasive intervention [4, 5]. These attributes make LC well suited for combination with other laparoscopic procedures in appropriately selected patient populations.

Similarly, laparoscopic inguinal hernia repair performed via the totally extraperitoneal (TEP) or transabdominal preperitoneal (TAPP) approach has demonstrated superior early postoperative outcomes compared with open techniques, particularly in terms of reduced pain and faster recovery [6]. However, the effectiveness of these approaches is highly dependent on surgeon proficiency, reflecting the recognized learning curve associated with laparoscopic hernia repair [7]. Long-term follow-up studies have shown comparable recurrence rates between TEP and TAPP repairs, permitting flexibility in the choice of technique based on individual surgeon expertise and institutional preference [8].

Despite the proven safety of each procedure when performed independently, concerns have traditionally surrounded their concurrent execution, chiefly due to the potential risk of mesh infection. As cholecystectomy is categorized as a clean-contaminated operation and the possibility of bile leakage or gallbladder perforation has been viewed as a potential source of prosthetic contamination. Although infrequent, mesh infection represents one of the most serious complications of hernia surgery and often necessitates mesh explantation, resulting in significant morbidity.

The findings of the present study align with recent evidence suggesting that these concerns are largely theoretical in the context of elective surgery [9]. Multiple published series have reported that mesh infection rates following combined laparoscopic cholecystectomy and hernia repair are exceedingly low and comparable to those observed after isolated hernia repair [10]. In our cohort, no increase in mesh-related complications was noted, supporting the safety of this combined approach when meticulous operative technique and appropriate perioperative antibiotic coverage are employed. Furthermore, the use of the TEP approach may confer an additional safety advantage by positioning the mesh within the preperitoneal plane, distant from the intraperitoneal field.

Another commonly raised issue is the potential for increased operative duration and prolonged exposure to anaesthesia. Although combined procedures inevitably extend operating time, this must be balanced against the cumulative operative risk and total anaesthetic exposure associated with two separate surgeries. In our experience, the modest increase in operative time did not result in higher perioperative morbidity and was counterbalanced by the benefits of a single hospital admission and a unified postoperative recovery period.

From the patient's standpoint, simultaneous surgery provides several advantages, including avoidance of repeat hospitalizations, reduced psychological burden, and a more rapid return to normal activities. These benefits are particularly relevant in resource-constrained settings, where economic considerations and limited access to healthcare may significantly influence management decisions [11]. Enhanced patient convenience and satisfaction further strengthen the justification for a combined surgical strategy.

At the healthcare system level, performing combined procedures may lead to more efficient resource utilization by decreasing the number of admissions, operative sessions, and inpatient bed occupancy. Although much of the available evidence originates from observational studies rather than randomized controlled trials, the consistency of reported outcomes supports the feasibility of this approach when undertaken by experienced surgical teams.

In summary, simultaneous laparoscopic cholecystectomy and totally extraperitoneal inguinal hernia repair can be safely performed in carefully selected patients without an increased risk of perioperative or mesh-related complications. When carried out by experienced surgeons with strict adherence to established surgical principles, this combined approach offers significant clinical, economic, and patient-centred advantages.

A review of literature on published case series on the present topic, over the last 10 years is summarised (Table 2).

Table 2: Review of Literature

Authors	Year of Publication	Type of Study / No. of Patients / Combinations	Incidence of Mesh Infection	Conclusion(s)
Piludaria K, Patel H, Rathod GH, *et al*., [12]	2025	Retrospective study /unspecified / Lap ventral hernia mesh repair + LC	NIL	Feasible; no mesh infection
Doluweera D, Silva O, Seneviratne SL, *et al*., [13]	2025	Systematic review / 199 pts / Laparoscopic inguinal hernia repair + LC	NIL	Safe; no mesh infection
Claus CMP, Ruggeri JRB, Ramos EB, *et al*., [14]	2021	Case series / 46 pts / Laparoscopic inguinal hernia repair + LC	NIL	Feasible; no mesh infection
Quezada N, Maturana G, Pimentel F, *et al*., [15]	2019	Case series / unspecified / TAPP + LC	NIL	Feasible; no SSI/mesh infection
Hayakawa S, Hayakawa T, Inukai K, *et al*., [16]	2018	Case series / 17 patients / TAPP hernia repair + LC	NIL	Feasible.
Arafat S, Alsabek MB [17]	2017	Case reports / 2 patients / TAPP hernia repair + LC	NIL	Feasible + safe

LIMITATIONS

It has a small sample size, and retrospective design. Larger randomised studies are required to establish the findings of the present study. Additionally, it was conducted at a single centre by a single surgeon, which limits the generalisability of the results to other settings. The long follow up period may have introduced recall bias in the present study. Furthermore, the absence of a control group creates a potential for bias in the results. In the absence of a control group, it is difficult to determine the true efficacy of the procedure.

CONCLUSIONS

With appropriate case selection, concurrent LC and TEP/TAPP are practical, cost-effective, and safe procedures. Larger studies on the subject in the future will further validate the findings of the present study.

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