



ORIGINAL RESEARCH PAPER

General Surgery

BAG RETRIEVAL OF GALL BLADDER IN LAPAROSCOPIC CHOLECYSTECTOMY: IMPACT ON PORT SITE SURGICAL INFECTIONS.

KEY WORDS: Laparoscopic cholecystectomy, specimen bag, port-site surgical infection, retrieval of gall-bladder.

Dr Anup Kumar Sarkar

Junior Resident, Department Of General Surgery, HMCH, BBSR.

Dr Deepak Kumar Das

Asst. Professor, Department Of General Surgery, HMCH, BBSR.

Dr Chandan Swarup Mohapatra

Junior Resident, Department Of General Surgery, HMCH, BBSR.

Dr Abhisek Jenamani

Junior Resident, Department Of General Surgery, HMCH, BBSR.

ABSTRACT

Background: Different methods of retrieval of gall bladder specimen from the abdominal cavity have been used since the introduction of laparoscopic cholecystectomy. Numerous studies have shown the benefits of specimen bag retrieval over direct removal. Our study is aimed at evaluating efficacy of specimen bags in prevention of port site surgical infections in histopathologically proven cholecystitis. **Methods:** This retrospective study was conducted at Hi- Tech Medical College and Hospital, Bhubaneswar, for a period of 1 year from January 2023 to January 2024. Data was collected regarding demographics of patient, use of a specimen bag, port site surgical infections and final Histopathology report of Gall bladder specimen. **Results:** There were 170 histopathologically proven cholecystitis during our study period. Specimen bag was not used for gallbladder retrieval [Group A] in 44.1% (n = 75) patients. Specimen bag was used in majority of the patients [Group B] 45.9% (n = 95). Overall wound infection rate was 11.8% (20 cases), with 75% (n = 15) being in the patient group where no specimen bag was used. **Conclusion:** In this study it has been observed that epigastric port specimen retrieval without bag resulted in more port site wound infection and use of specimen bag was associated with less port site infections.

INTRODUCTION:

The gallbladder, located on the visceral inferior surface of the liver, is primarily affected by gallstones, the most prevalent biliary pathology. Laparoscopic cholecystectomy has emerged as the preferred treatment for symptomatic cholelithiasis over the past 15-20 years (19). This procedure, performed through two, three, or four ports (ranging in size from 5 to 10mm), is selected based on the surgeon's discretion, expertise, and familiarity.

However, laparoscopic cholecystectomy poses risks such as intra-abdominal stone spillage, implantation, and port-site contamination during gallbladder specimen retrieval (1). To mitigate these risks, particularly in cases of infected gallbladders or suspected malignancies, gallbladders were retrieved using an improvised 'endobag' fashioned from a surgical glove in this study. The aim was to propose a safer and more cost-effective method for gallbladder retrieval through the epigastric port in laparoscopic cholecystectomy, with a comprehensive analysis of the benefits, drawbacks, and complications associated with both techniques.

METHODOLOGY:

This study employed a Randomized Parallel group design, comparing two patient groups who underwent distinct procedures at the Department of Surgery, Hi-Tech Medical College & Hospital, Bhubaneswar, between January 1, 2023, and January 31, 2024, with ethical approval. The cohort consisted of 170 patients with histopathologically confirmed cholecystitis who underwent laparoscopic cholecystectomy.

Patients were divided into Group A (n=75) who underwent conventional laparoscopic cholecystectomy using a four-port technique, 10mm umbilical port for telescope, 10 mm working epigastric port and two 5 mm working ports in mid clavicular line and anterior axillary line with patient in 30° reverse trendelenberg with right side up position. In this group, the gall bladder was extracted through epigastric port

without bag. The 10 mm (fascial defects) were closed with 'O' vicryl with reverse cutting needle. 5 mm ports and skin closed with 2-0 polyamide. Group B (n=95) where a similar procedure was performed with the addition of using a sterile gloves endobag for gallbladder retrieval through epigastric port.

Exclusion criteria included patients with obstructive jaundice and carcinoma gallbladder. Informed written consent was obtained from all participants, and demographic data, clinical examination, routine laboratory investigations, and fitness for general anesthesia were documented. Data analysis was conducted using SPSS version 29.

RESULTS:

In our study involving a total of 170 patients, 45.9% (n = 95) in Group B had a retrieval bag used, while 44.1% (n = 75) in Group A we did not utilize a retrieval bag. Table 1 presents the demographic data of these patients, indicating a mean age of 44.3 years and a male to female ratio of approximately 1:2.1 (55 males and 115 females). The overall wound infection rate was high at 11.8% (20 cases), with 15 cases occurring in patients where no retrieval bag was used. Retrieval bag rupture was documented in four cases (4.21%).

In cases of acute inflammation (approximately 6%, n = 10), the gallbladder was decompressed through the epigastric port site inside the endobag before retrieval. Among the recorded wound infections in Group A (15 cases, 8.8%), the majority were superficial (86.7%, n = 13) and treated with oral antibiotics. Two (13.3%) deep wound infections were recorded in Group A, requiring wound collection drainage. In Group B, all 5 cases were superficial SSI.

Histological examination revealed no malignancy in any of the specimens removed. Table 2 provides a comparison of the wound infection with respect to time needed for GB retrieval between the two groups.

Table 1 : Demographics

	Number of patients	Age (years)	Male	Female
All patients	170	Mean = 44.3	32.4% (n = 55)	67.6% (n = 115)
No retrieval bag used	75	Mean = 42.6	13.2% (n = 25)	21.7% (n = 25)
Retrieval bag used	95	Mean = 49.5	17.6% (n = 30)	52.9% (n = 90)

Table 2: Stratification Of Wound Infection With Respect To Operative Time.

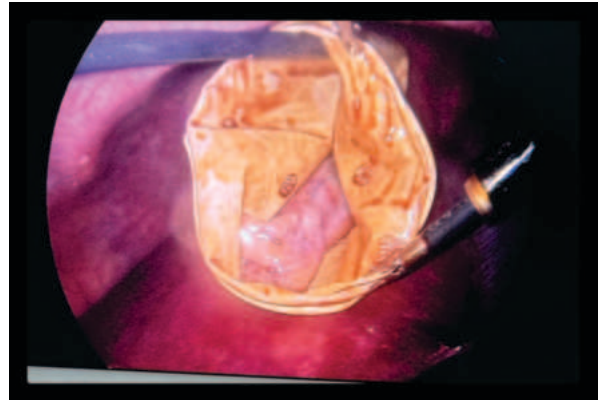
	Bag not used	Bag used	Relative Risk	P- value
Sup SSI	13	5	3.3	0.02
Deep SSI	2	0	6.3	0.2
Time for Extraction	5 mins	12 mins	7 mins extra time required when bag used	

DISCUSSION

In laparoscopic cholecystectomy, gallbladder retrieval is difficult and time taking task. In spite of different methods studied to simplify the retrieval of gall bladder safely out of the abdomen, problems during the same have not been rectified completely and generally fascial incision extension is required. Thus risk of bleeding, with consequent hematoma and infection as well as a potential area for port site incisional hernia [14]. There are varied opinions related to gall bladder extraction through umbilical or epigastric 10 mm port and with or without endobag. In laparoscopic cholecystectomy, the gallbladder perforation with intra peritoneal stone spillage ratio reaches up to 36% [13]. In some cases, perforation occurs during the gall bladder traction due to which bile and gall stones are spilled intra peritoneally. When the port site is contaminated with bile or gall stones, SSIs develops. Perforation of Gall bladder (10-40%) and spillage of gall stones(6-30%) are the two most common problems encountered during dissection (75%) and retrieval of gallbladder (25%) in laparoscopic cholecystectomy [2, 15]. Infected bile and gall stone implantation in the tissues of the abdominal wall at port sites of retrieval leading to discharging sinus or abscess is a rare entity [4, 16, 7], but is a source of increased morbidity to the patient. In our study, we retrieved gall bladder specimen safely through 10mm epigastric port using improvised glove endobag in group-B patients, while in group-A through same port without bag. The gall bladder rupture was found in 13.3% in group A and 2.1% in group B while spillage of stones/ port impaction in 6.6% in group-A and 2.1% in group-B patients. However, incidence of gall bladder spillage ranges from 6% to 30% in reports [6].

Reports state that an excellent method to avoid complications of gall stone spillage and port site SSIs is to use specimen bag [1][5]. Golash in a series of 772 patients of Laparoscopic cholecystectomies extracted the gall bladder through the umbilical port without using specimen bag, reported a high incidence of port site SSIs with spillage of gall stones [3]. In our present study, 5.2% of our patients of group-B developed epigastric port infection despite using bag, probably due to contamination of external surface of bag; and 20% of our Group-A patients developed epigastric port SSIs. Due to all our patients having cholecystitis, total infection rates in our study were high as compared to other studies.

Literature reports 5% umbilical port infections in patients with acutely inflamed gall-bladder specimen despite of using endobag for its retrieval [11]. Another study reported port site SSIs rate of 1.02% and port site hernia rate of 1.38% [17]. A rare complication of port-site infection due to stones implanted during retrieval resulting in discharging sinus has been reported [1]. Every diligent effort should be made to remove spilled gall stones; but, conversion to open surgery is not required as the reported rate of complications for lost stones is less than 1% [2, 15].



GALL BLADDER IN THE GLOVES ENDOBAG BEFORE RETRIEVAL



GALL BLADDER RETRIEVAL FROM THE EPIGASTRIC PORT THROUGH GLOVES ENDOBAG

CONCLUSION:

Both techniques for gallbladder retrieval through the epigastric port, with and without an gloves endobag, present their respective advantages and drawbacks. Our study revealed that gallbladder retrieval without an endobag led to a higher incidence of wound infections compared to using endobags. However, it's important to note that all cases in our study were histologically confirmed as cholecystitis, and most infections were superficial and managed conservatively. On the other hand, using an endobag for retrieval posed challenges such as difficulty in specimen extraction leading to increased operative time. The potential need for fascial incision extension, was found to be same in both groups with same range of post-operative discomfort. Ultimately, the decision to use an endobag or not rests with the surgeon, but we suggest considering endobag retrieval, especially in acute cases and those with risk factors for wound infections.

Limitation Of Study:

Other confounding variables such as diabetes and skin conditions can contribute to infections in such cases. Our study lacked specific information regarding these confounders. It's imperative to consider these factors in future single or multicenter studies focusing on port site wound infections.

DISCLAIMER:

This abstract has not been previously presented or published at any conference. It constitutes a segment of postgraduate dissertation research. The study received approval from the Institutional Ethics Committee.

Conflict Of Interest: None.

Funding Disclosure: None.

REFERENCES:

1. Ali SA, Siddiqui FG. Implanted gallstones at port site (A Case Report). *World J Min. Access. Surg.* 2013;2:11-14.
2. Brockmann JG, Kocher T, Senninger NJ, Schurmann GM. Complications due to gallstones lost during laparoscopic cholecystectomy: An analysis of incidence, clinical course and management. *Surg. Endosc.* 2002; 16:1226-1232.
3. Golash V, Rahman S. Railroading removal of gall bladder in laparoscopic cholecystectomy. *J Minim. Access. Surg.* 2006;2(1):31-32.
4. Hand AA, Self ML, Dunn E. Abdominal wall abscess formation ten years after laparoscopic Cholecystectomy. *JSLs.* 2006;10(1):105-10
5. Helme S, Samdani T, Sinha P. Complications of spilled gallstones following laparoscopic cholecystectomy, a case report and literature overview. *J Med. Case Reports.* 2009; 3:8626.
6. Kang KJ, Lim Tae Jin. Tip for microlaparoscopic cholecystectomy, easy removal of the gallbladder after laparoscopic cholecystectomy using the three-port technique. *Surg. Laparosc. Endos. Percutan. Tech.* 2003; 13:118-120.
7. Kumar TS, Saklani AP, Vinayagam R, Blackett RL. Spilled gall stones during laparoscopic cholecystectomy, a review of the literature. *Postgrad. Med. J.* 2004;80:77-79.
8. Leggett PL, Churchman-Winn R, Miller G). Minimizing ports to improve laparoscopic cholecystectomy. *Surg. Endosc.* 2000; 14:32-36.
9. Irkorucu O, Tascilar O, Emre AU, Cakmak GK, Ucan BH, Comert M. Missed gallstones in the bile duct and abdominal cavity: A case report. *Clinics (Sao Paulo).* 2008;63:561-564.
10. Machado MAC, Herman PA. Simple technique for removal of gall-bladder during micro laparoscopic cholecystectomy. *Surg. Endosc.* 2004; 18:1289-1290.
11. Memon AI, Ali SA, Soomro AG et al. A safe and inexpensive technique of retrieval of gallbladder specimen after laparoscopy. *Sci. J. Med Science.* 2013; 2(11):219-224.
12. Memon MR, Arshad S, Rafiq S, Bozdar AG and Shah SQA. Port-site hernia: A serious complication of laparoscopy. *Rawal. Med. J.* 2011;36(1):14-17.
13. Mohiuddin K, Nizami S, Fitzgibbons RJ jr et al. Predicting iatrogenic gall-bladder perforation during laparoscopic cholecystectomy: A multi-variate logistic regression analysis of risk factors. *ANZ. J Surg.* 2006;76:130-132.
14. Sanz-Lopez R, Martinez RC and Nunez PJR et al. incisional hernias after laparoscopic vs open cholecystectomy. *Surg. Endosc.* 1999; 13:922-924.
15. Sathesh-Kumar T, Saklani AP, Vinayagam R and Blackett RL. Spilled gallstones during laparoscopic cholecystectomy: A review of literature. *Postgrad. Med. J.* 2004;80:77-79.
16. Shahzad K, Mian MA, Rehman JU. Early complications of laparoscopic cholecystectomy for calculus cholecystitis. *Pak. Armed. Forces med. J.* 2007; 4:20-25.
17. Sharma D, Patel K, Anchalia MM. Study of cases of complications at port site. *Int. J Sci. & Research (online).* 2013;2(12):2319-7064.
18. Woodfield JC, Rodgers M, Windsor JA. Peritoneal gallstones following laparoscopic cholecystectomy: An analysis of incidence, clinical course and management. *Surg. Endosc.* 2004; 18:1200-1207.
19. Zehetner J, Shamiyeh A, Wayand W. Lost gallstones in laparoscopic cholecystectomy: All possible complications. *Am. J Surg.* 2007; 193:73-78.