DOI: 10.7860/IJARS/2018/32069:2356

Original Article

Surgery Section

A Comparison of Benefits and Complications of Extraction of Gallbladder in an Endobag Using a Drain Bag Versus Direct Extraction

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ABSTRACT

Introduction: The retrieval of gallbladder in an endobag, causes less spillage of contents, less infection and trauma, with smaller incisions leading to less post operative pain with more rapid recovery and early return to work. This was compared with the direct retrieval of gallbladder through the 10 mm port. A drain bag was used as an endobag which is an easily available and a cheaper alternative with similar effectiveness.

Aim: To compare the complications of extraction of gallbladder in an endobag v/s direct extraction through 10 mm port in laparoscopic cholecystectomy in terms of operative time, port site infection, port site pain, port site hernia, port site malignancy and cosmesis.

Materials and Methods: A prospective study to compare benefits and complications of extraction of gallbladder in an endobag using a drain bag versus direct extraction through the 10 mm epigastric port in 100 patients divided randomly in two groups of 50 patients each on the basis of draw after surgical assessment and confirming the diagnosis of cholelithiasis.

Results: With the use of an endobag, mean operative time taken was 53.40 min as compared to 57.90 min taken in procedure without using an endobag and there was no spillage of stones and bile, no port site spillage or port site hernia. Mean hospital stay was of 2.52 days and only 2% patients had port site infection as compared to 2.94 days and 8% patients had port site infection.

Conclusion: An endobag for retrieval of gallbladder during laparoscopic cholecystectomy was found better than the direct extraction of gallbladder. A sterile drain bag used as an endobag is a simple and cost effective method and can be used instead of the endobag.

Keywords: Cholecystectomy, Cholelithiasis, Gallbladder retrieval, Spillage, Sterile drain bag

INTRODUCTION

After laparoscopic cholecystectomy, extraction of the gallbladder is a time consuming and difficult job. Although, several techniques and methods are suggested to facilitate the retrieval of gallbladder safely, problems occurring during retraction have not been completely remedied and generally widening of the port site is required. This increases the risk of bleeding, haematoma and infection as well as leaving a risky area for incisional hernia [1]. One of the major complications after laparoscopic procedure is port site herniation. Serious complications like bowel obstruction due to incarceration into the fascial defect at the port site may develop. Cases of Richter`s hernia that occurred at a port site after laparoscopic surgery have been reported and incidence found to be 0.2% to 3% [2].

During laparoscopic cholecystectomy, gallbladder perforation is a common problem, which results in lost gallbladder stones and spillage of its contents. Complications may range from intra abdominal and subcutaneous abscesses and fistulas to liver abscess, staphylococcal bacteraemia. Broncholithiasis, empyema, granulomas, bowel obstruction and hernia have been also reported [3]. Port site infections, sometimes seen in laparoscopic cholecystectomy, are usually superficial and respond to local measures. This is mostly seen at the trocar site of gallbladder extraction due to surgical site infection [4].

The infected specimen should be removed in an endobag in order to prevent wound infection and accidental spillage of contents or occult malignant cells and minimising contamination of abdominal cavity and wound tract [5]. Scattering of stones and specimen into the abdominal cavity

can be avoided and may prevent serious infection [6]. Spilled gallbladder stones have been reported to be recovered after two years of surgery, from supra umblical port presented as a chronic discharging sinus, suggesting an endobag technique simple, safe and economical with fewer complications [7]. An improvised endobag made from the cuff of surgical glove has been used [8].

In this study we are using sterile drain bags as endobags. These consist of the inner sterile plastic packing of drain tubes, commonly used in surgical procedures. The motive of this study is to find out the better method for the extraction of gallbladder on a routine basis as it compares the benefits and complications of extraction of gallbladder in an endobag versus direct extraction through 10 mm port along with the use of a simple drain bag as an endobag as a cost effective method.

MATERIALS AND METHODS

This prospective study was conducted over a period of two years between 2013-15 in the Department of Surgery, at Government Medical College, Patiala, Punjab, India. Total 100 patients of either sex, who were admitted to the surgical ward during study period were considered for the study. The admission was done after confirming the diagnosis and assessment of the surgical status of the patients after taking history, examination and investigations were taken up for the study. The ethical clearance was taken from the ethical committee prior to the study and informed consent was obtained from all the patients. The sample size was determined by the average number of laparoscopic cholecystectomies performed in the surgery unit during the study time.

All patients diagnosed to be having cholelithiasis were included in the study and those having a mass felt on examination, were excluded out.

All patients were randomly assigned into two groups, Group A and B consisting 50 patients each divided on the basis of draw of lots.

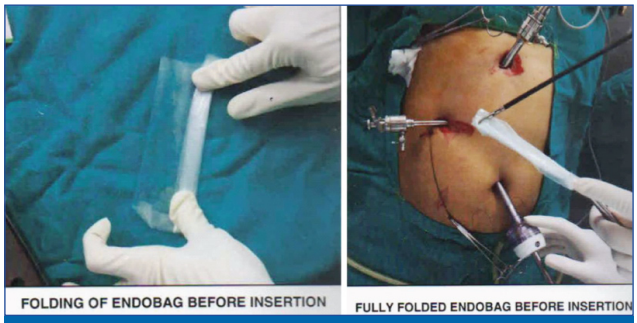
Group A: Extraction of gallbladder in an endobag in 10 mm port.

Group B: Direct extraction of gallbladder without an endobag in 10 mm port.

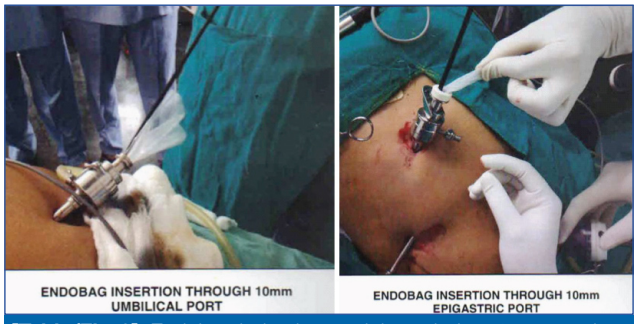
Operative procedure: After overnight fasting and giving premedication thirty minutes before surgery, all patients were operated under general anaesthesia using four ports. Laparoscopic cholecystectomy was performed in which, gallbladder was removed from liver bed with monopolar cautery. The gallbladder was extracted in a sterilised endobag through 10 mm port either in epigastric port or umbilical port in Group A [Table/Fig-1-6] and extracted without endobag through 10 mm port either in epigastric port or umbilical port in Group B. Bigger specimen of gallbladder first fragmented into small pieces in an endobag then retrieved through 10 mm port either in epigastric port or umbilical port. Operative time from onset of procedure to the closure of wound was noted down.

Postoperative assessment regarding temperature, pulse, BP, postoperative pain was noted. After surgery postoperative complications were reported for the first week, after one month and three months.

[Table/Fig-1]: Showing simple drain bag being used as an endobag.

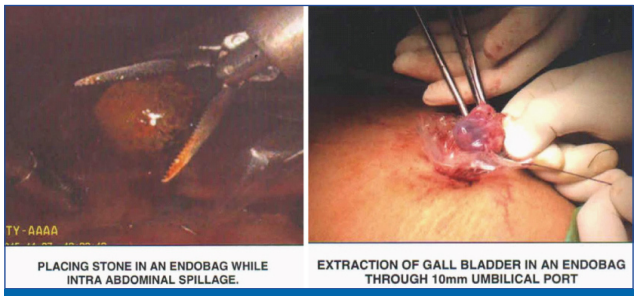


[Table/Fig-2]: Folding of endobag.

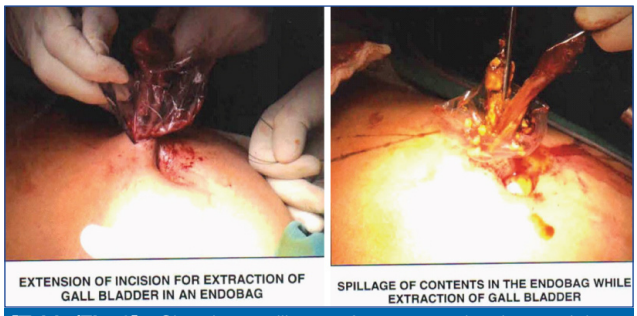


[Table/Fig-3]: Endobag being inserted through the 10mm port into the peritoneal cavity.

[Table/Fig-4]: Placing and extracting the gallbladder in an endobag.



[Table/Fig-5]: Placement of stones into the endobag followed by extraction of gall bladder.



[Table/Fig-6]: Showing spillage of contents in the endobag, preventing port site contamination.

STATISTICAL ANALYSIS

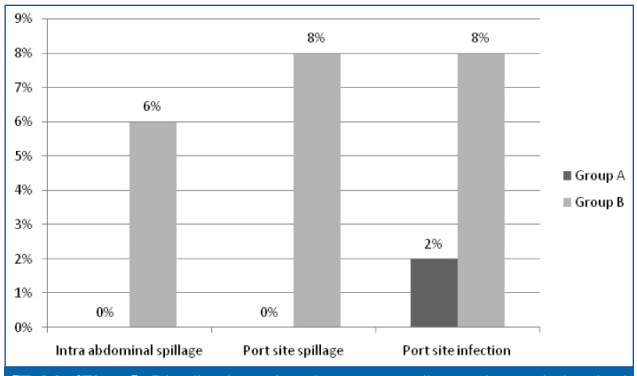
The findings noted down for the patients in two subgroups were compared and results were evaluated at end of study. SPSS software version 10.0 was used to analyse the data. Chi square test was used for analysis and probability value of less than 0.05 was considered as significant.

RESULTS

Mean age of the patients was 44.5 years with 94 (94%) females. The minimum hospital stay was one day and maximum stay was three days in Group A patients with a mean hospital stay of 2.52 days. The minimum hospital stay in Group B patient was two days and max stay was four days with a mean hospital stay of 2.94 days. Statistical analysis showed the difference to be insignificant (p-value 0.142). Total 40 (80%) patients had multiple stones in Group A and 10 (20%) patients were having single stones. In Group B 30 (60%) patients were having multiple stones and 20 (40%) patients were having single stones. Three patients had empyema in Group A patients and one was having mucocoele. Two patients in Group B were having empyema and two were having mucocoele. The statistical analysis showed that difference in these groups was insignificant (p-value 0.465).

In Group A 2 (4%) patients required extension of incision for extraction of GB and multiple stones were also present in this Group A whereas, in Group B there was no incidence of extension of incision. The statistical analysis showed that difference was insignificant (p-value 0.153) here. The mean operative time taken in Group A was 53.40 minutes and in Group B, it was 57.90 minutes. The max time in both Group A and Group B was 90 minutes. The statistical analysis showed that difference was insignificant between the two groups (p-value 0.125). In Group A in 35 (70%) of patients no drain was placed and in 2 (4 %) of patients in drains was removed on day 1 and 13 (26%) on day 2. In 21 (42 %) of patients in Group B drain was removed on 2nd day. The statistical analysis showed that difference between the two groups was insignificant (p-value 0.233).

In Group A there was no spillage of stones and bile but in Group B patients 3 (6%) patients had spillage of stones and bile [Table/Fig-7]. The statistical analysis showed the difference to be insignificant (p-value 0.079). In Group A patients, no port site spillage was present but in Group B, 4 (8%) of patients showed port site spillage [Table/Fig-7]. The statistical analysis showed that difference was significant (p-value 0.04). No patients presented with the port site malignancy in both the groups. In Group A 1 (2%) of the patient had port site infection and 4 (8%) patients had port site infection in Group B. It was related to the port site spillage as 4 (8%) patient in Group B had port site spillage [Table/Fig-7]. The statistical analysis showed that difference between two groups was insignificant (p-value 0.169).



[Table/Fig-7]: Distribution of patients according to Intra abdominal spillage, port site spillage and port site infection in group A and B.

Port site pain in Group A was present in 2 (4%) patients, while 4 (8%) of the patients in Group B. The pain was related to port site infection and spillage and present in 1 (2%) and 0 (0%) respectively in Group A and 4 (8%) and 5 (10%) respectively in Group B. The statistical analysis showed that difference between the two groups was insignificant (p-value 0.4). In Group A, no patient presented with port site hernia. In Group B, 1 (2%) patient presented with port site hernia which was related to the port site infection seen in 4 (8%) of patients in Group B. The statistical analysis showed that difference between both the groups was insignificant (p-value 0.315).

DISCUSSION

Postoperative hospital stay: In the present study, mean

duration of postoperative hospital stay in Group A was 2.52 days as compared to 2.94 in Group B. The difference was statistically highly significant. The hospital stay is also affected by the drain placement in patients [9]. Patients with drain generally stayed for longer period in the hospital as compared to the patients without drain (p-value 0.005).

The mean hospital stay was 1.96-2.08 in the study by Singh DP et al., the criteria for discharge from the hospital were drain removal and asymptomatic state of the patient. Nusral TZ et al., reported that the patients with mandatory drainage stayed longer in hospital [10]. Similarly, Riskin DJ et al., reported prolonged hospital stay and delayed discharged in drained group [11]. Stevens KA et al., reported a mean total stay as low as 2.6 days [12]. The statistical data in these studies is comparable with the present study.

Postoperative complications: In this study there was no case of postoperative bleeding, peritonitis or ileus.

Studies	Operative Time (Mean)
Kirshtein B et al., [13]	In drain group 42.5 mins In undrain group 37 mins
Makama JG and Ameh EA [14]	37 mins
Present Study	In group A-53.40 mins In group B-57.90 mins

[Table/Fig-8]: comparison of mean operative time of the present study with other studies.

Operative time: The mean operating time in Group A was 53.40 minutes and in Group B was 57.90 minutes. The maximum time taken in both Group A and B was 90 minutes. The results were comparable with other studies [Table/Fig-8].

Removal of drain: The drain generally was removed when the nature of the fluid is non bilious ,serous and volume was less than 50 mL on postoperative day 1 and less than 30 cc on day 2nd postoperative day. The statistical analysis showed that the difference between the two groups is insignificant.

In a study by Singh DP et al., drain was removed in 82 % patients within two post operative days [9]. Nine patients in this study had drain for more than two days.

Gurusamy KS et al., showed that drains helps to reduce the postoperative nausea and vomiting [15].

Uchiyama A et al., reported a reduced but not statistically significant incidence of postoperative nausea and vomiting in drained group as compared to without drainage group [16].

Intra-abdominal spillage: Intra-abdominal spillage can be controlled by the use of endobag so that intraoperative and postoperative morbidity due to spillage of stones and bile can be reduced. The results of our study are comparable to other studies [Table/Fig-9].

Port site spillage: In our study no port site spillage was present in Group A patients and 8% patients in Group B had

Studies	Laparoscopic Cholecystectomy	Bile Leak	Spilled Stones
Kimura T et al., [17]	110	29 (26.3%)	3 (2.7%)
Rice DC et al., [18]	1059	306 (28.9%)	103 (9.7%)
Diez J et al., [19]	3686	627 (17%)	254 (6.9%)
Schafer M et al., [20]	10174		581 (5.7%)
Memon MA et al., [21]	856		106 (12.3%)
Sarli L et al., [22]	1127		131 (11.6%)
Present Study	100	Group A - 0% Group B - 6%	

[Table/Fig-9]: Comparison of intra-abdominal spillage in present study to other studies.

port site spillage. The endobag was used in Group A patients for the retrieval of gallbladder. The statistical analysis showed difference is significant (p-value 0.041). In a study done by Memon AI et al., port site spillage was 0.88% [7].

In a study by Jones DB et al., conducted on 1059 patients who underwent laparoscopic cholecystectomy, 29% had spillage of bile alone or spillage of bile and gallstone [23].

Intraoperative gallbladder perforation was seen in 29% patients. Being more common in men, it was associated with increasing age, body weight, and the presence of omental adhesions.

Port site malignancy: In this study there was no case reported of port site malignancy. In Group A endobag was used for retrieval of gallbladder.

In a study done by Katz SC et al., the incidence of port site malignancy was 0.2%. Port site recurrence after laparoscopic cholecystectomy was found in two cases even when the specimen was retrieved in an endobag [24].

In study done by Z'graggen K et al., port site recurrence of carcinoma was seen in 14% patients. The incidence was similar in patients with primary tumour confined to the gallbladder (T1/T2) or locally advanced (T3/T4) [25].

In a study done by Wu JS et al., increased wound implantation at carbon dioxide pneumoperitoneum pressure at 10 mmHg was seen in cases of intra operative tumour spillage [26].

Port site infection: In present study, port site infection in Group A was 2%. In Group B it was 8%; as 10% patients in Group B had port site spillage. The results are comparable with other studies [Table/Fig-10].

Port site pain: In a study by Lomato D et al., in which, 5-mm trocars were replaced with 2-mm trocars, significant reduction of postoperative pain scores and analgesic requirements after lap cholecystectomy were seen [31].

A study conducted by Bisgaard T et al., found reduced incisional pain at smaller port sites six hours postoperatively [32].

Study	Port site infection
Singh DP et al., [9]	4%
Memon JM et al., [27]	5.11%
Den Hoed PT et al., [28]	5.3%
Shindholimath W et al., [29]	6.3%
Colizza S et al., [30]	<2%
Present Study	Group A - 2% Group B - 8%

[Table/Fig-10]: Comparison of port site infection in present study to other studies.

In this study 4% patients in Group A had port site pain whereas, in Group B 8% patients had port site pain. The statistical analysis showed that difference between the two groups was insignificant. The results in these studies are comparable.

Port site hernia: Port site hernia occurred in some patients who came for follow-up after laparoscopic cholecystectomy. No patient presented with port site hernia in Group A. In Group B, 1 patient had port site hernia (2%). It was related to port site infection as 8% of patients had port site infection in Group B. Our results were comparable with other studies [Table/Fig-11]. Not performing the fascial closure at the port site and large sized stone may be cause for increased incidence of hernia. In our study there was no mortality. In both the groups the overall cost of the operation and cosmesis was the same.

Study	Port site hernia incidence
Memon AI et al., [7]	3.66%
Uslu HY et al., [33]	5.4%
Coda A et al., [34]	0.38%
Present Study	Group A : 0% Group B : 2%

[Table/Fig-11]: Comparing port site hernia incidence in our study versus other studies.

LIMITATION

The sample size studied in the study was small, so more studies with a bigger sample size should be undertaken, to stamp the regular use of endobag in laparoscopic cholecystectomies as well as use of a drain bag as an endobag for its cost effectiveness.

CONCLUSION

Endobag should be used for the extraction of gallbladder as it better than the direct extraction of the gallbladder as it prevents spillage of stones and bile. It also reduces the incidence of port site infection and port site hernia, without taking any addition time during surgery or prolonging the hospital stay. Moreover, a simple drain bag can be used as an endobag as a simple and cost effective alternative.

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FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Publishing: **Jan 01, 2018**