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A Comparative Study of Gall Bladder Retrieval Using Suction Drain Bag As Endobag Versus Direct Extraction In

Elective Laparoscopic Cholecystectomy In A Government Hospital, Our Experience.

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Abstract

Background: Laparoscopic method is the gold standard approach for cholecystectomy in the present scenario. Laparoscopic cholecystectomy is one of the most common procedures done worldwide. Most common complications encountered during dissection and removal of gall bladder is gall bladder perforation and spillage. 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. The present study was undertaken to compare the advantages of retrieval of gall bladder with endobag versus direct extraction through the 10 mm port. A suction drain bag was used as an endobag which is an easily available and a cheaper alternative with similar effectiveness.

Objective: To evaluate the safety, operative time, port site pain and incidence rates of port site infections, port malignancy and port hernia with use of endobag for retrieval of gallbladder specimen.

Materials and Methods: Prospective comparative study was conducted in the department of general surgery, ESIC

medical college and PGIMSR from June 2017 to June 2019 to compare benefits and complications of extraction of gallbladder in an endobag versus direct extraction through the 10 mm epigastric port in 200 patients with symptomatic cholelithiasis.

They were divided into group A and group B of 100 each. **Results:** With the use of an endobag, mean operative time taken was 49.30 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,no port site malignancy or port site hernia. With use of endobag, mean hospital stay was of 3.52 days and only 1% patients had port site infection as compared to 4.05 days and 8% patients had port site infection, without use of endobag.

Conclusion: An endobag for retrieval of gallbladder during laparoscopic cholecystectomy was found better than the direct extraction of gallbladder.

Keywords: Laparoscopic cholecystectomy, suction drain endobag, port malignancy,Gallbladder specimen retrieval.

Introduction

Laparoscopic cholecystectomy introduced in 1987, is considered worldwide the "gold standard" in the surgical

treatment of symptomatic cholelithiasis and acute cholecystitis because it offers well-known and more definite advantages in comparison with open cholecystectomy. Laparoscopic cholecystectomy has revolutionized the surgical treatment for gall bladder stones and may be performed by single, two, three or four port (3,5 and 10mm size) technique depending on the surgeon's choice. Laparoscopic cholecystectomy is also reported to have an edge over open cholecystectomy due to shorter hospital stay, early return to work and overall low cost.^[1]

At the end of the procedure, proper positioning of instruments (rail roading) and orientation are required for retrieval of gallbladder specimen [2].Gall bladder perforation and spillage are the common complications encountered during dissection and removal of gall bladder, however there has been increasing reports of infectious complications due to unretrieved stones and spillage of bile^[3]. During dissection the gallbladder off its liver bed and it's retrieval without endobag, intraperitoneal spillage of bile and gallstones and later implantation of gallstones, are documented complications. In order to prevent above complications, gallbladder specimen and the spilled gallstones are retrieved in an endobag. Distended gallbladder that are packed with stones always create a problem during their retrieval from the abdomen. Gallbladder removal in these cases requires a needle decompression, stone fragmentation and stone removal from the gallbladder near the port site or enlargement of the one of the fascial incision to facilitate gallbladder retrieval, which causes more postoperative port site pain. This also increases the risk of bleeding, hematoma and infection as well as leaving a risky area for incisional hernia^[4].

Gall bladder removal can be completed simply and safely when a retrieval bag is used ^[5]. The device should be strong, leak proof, resistant to tear and should have a sufficient capacity to cope with the largest gall bladder and stone load.

This comparative study is undertaken to compare the retrieval of gall bladder during laparoscopic cholecystectomy with endobag versus without endobag. In this study we are using sterile drain bags as endobags consisting of the inner sterile plastic packing of drain tubes, commonly used in surgical procedures. The aim 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.

Materials and Methods

This prospective study was conducted over a period of two years from June 2017 to June 2019 at Department of General Surgery, ESIC Model Hospital attached to ESIC Medical College, Bangalore. The sample size was determined by the average number of laparoscopic cholecystectomies performed in department of General Surgery during the study time.

A total of 200 patients of both sexes with symptomatic cholelithiasis, who were admitted in surgery department on elective basis were included in the study. All subjects underwent thorough clinical examination, routine and specific investigational procedures and fitness for surgery was obtained. After obtaining informed and written consent regarding the study, 200 patients were divided equally and randomly into two groups involving 100 each. Group A: Gall bladder retrieval with endobag made out of sterile suction drain cover, in 10mm port.

Group B: Gall bladder extraction without endobag in 10 mm port.

Inclusion Criteria

- 1. All patients with Ultrasonography proven cholelithiasis.
- 2. Patients who were fit for surgery.

Exclusion Criteria

- 1. Subjects with associated liver/ renal pathology.
- 2. Subjects with associated psychiatric disorders.



Fig 1: Sterile suction drain cover being used as an endobag



Fig 2: Intraoperative image of spilled stones being extracted using endobag



Fig 3:Specimen extraction using an endobag



Fig 4: Specimen retrieval using an endobag



Fig 5: Specimen extracted using an endobag

Technique

After overnight fasting, all patients were given general anesthesia and underwent laparoscopic cholecystectomy using four port technique.

After separation of gall bladder from the liver bed, an endobag made out of sterile suction drain cover was inserted inside the abdominal cavity and the gall bladder with any spilled stones were put inside the endobag and was retrieved through the 10mm epigastric port in group A(Fig 2-6)

Whereas, in cases belonging to group B the gall bladder was extraction was done directly without use of endobag through 10mm epigastric port. The operative time was noted down in each case.

Post operatively the patients were monitored and were followed up at 1week, 1 month and 4 months interval to look for any complications like port site infection, port site malignancy and port site hernia.

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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 20.0 was used to analyse the data. Chi square test was used for analysis and p value of less than 0.05 was considered as statistically significant.

Results

Age:Mean age of the patients was 45 years with 180 (90%) females.

Duration of hospital stay

The minimum hospital stay was two days and maximum stay was five days in Group A patients with a mean hospital stay of 3.52 days. The minimum hospital stay in Group B patient was three days and maximum stay was five days with a mean hospital stay of 4.05 days. Statistical analysis showed the difference to be significant (p-value <0.001).



Difficulty in extraction

Total 80 (80%) patients had multiple stones in Group A and 20 (20%) patients were having single stones. In Group B 60 (60%) patients were having multiple stones and 40 (40%) patients were having single stones. six patients had empyema in Group A patients and one was having mucocoele. Four 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 >0.05).



In endobag group, no patients needed extension of incision for extraction of GB. Also, there were multiple stones present in group A. whereas, in Group B 4(4%) patients needed extension of incision. The statistical analysis showed that difference was insignificant (p-value 0.153) here.



Duration of procedure

The mean operative time taken in Group A was 49.30 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 significant between the two groups (p-value <0.001).



Placement of drain

In Group A in 70 (70%) of patients no drain was placed. Among the rest 30 cases (30%) in whom drain was placed, 4 (4 %) of patients drains was removed on day 1 and 26 (26%) on day 2. In 42 (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).

Port site complications

In Group A there was no spillage of stones and bile but in Group B patients 6 (6%) patients had spillage of stones and bile. The statistical analysis showed the difference to be significant (p-value <0.05).

No patient presented with the port site malignancy in Group A. whereas, 1 patient in Group B presented with port site malignancy. This was found statistically insignificant (p->0.05).

In Group A 1 (1%) of the patient had port site infection and 8 (8%) patients had port site infection in Group B. It was related to the port site spillage as 6 (6%) patient in Group B had port site spillage . The statistical analysis showed that difference between two groups was insignificant (p-value 0.169).

Port site pain in Group A was present in 4 (4%) patients, while 12 (12%) of the patients in Group B. The pain was related to port site infection and spillage and present in 1 (1%) and 0 (0%) respectively in Group A and 8 (8%) and 6 (6%) 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, 2 (2%) patient presented with port site hernia which was related to the port site infection seen in 8 (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 our study, mean duration of postoperative hospital stay in Group A was 3.52 days and 4.05 days in Group B. The difference was statistically highly significant with p value less than 0.001. The duration of hospital stay is also affected by the drain placement in patients ^[6]. Patients' in whom drain was placed generally stayed for longer period in the hospital as compared to the patients without drain (p-value 0.233).

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 ^[7]. Similarly, Riskin DJ et al., reported prolonged hospital stay and delayed discharged in drained group ^[8]. Stevens KA et al. reported a mean total stay as low as 2.6 days ^[9]. The statistical data in these studies is comparable with the present study.

Postoperative complications

There were no complications like postoperative bleeding, peritonitis or ileus in our study.

Operative time

The mean operating time in Group A was 49.30 minutes and in Group B was 57.90 minutes. The maximum time taken in both Group A and B was 90 minutes. Observations in other studies:

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Name of the study	Mean duration of
	procedure (mins)
Kirshtein B et al., ^[10]	In drain group 42.5 mins
	In undrain group 37
	mins
Makama JG and Ameh	37 mins
EA ^[11]	
Shakya JP et al., ^[12]	In endobag group -60
	mins
	In non endobag group
	B-90 mins
Present Study	In endobag group -49.30
	mins
	In non endobag group
	B-57.90 mins

Removal of drain

The drain 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 2^{nd} 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 [6]. 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 ^[13].

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 ^[14]

Intra-abdominal spillage

Intra-abdominal spillage can be reduced 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.

Name of the study	Bile leak	Spillage of stones
Kimura T et al., ^[15]	29 (26.3%)	3 (2.7%)
Memon MA et al.,	106 (12.3%)	l
[16]		
Diez J et al., ^[17]	627 (17%)	254 (6.9%)
Present Study	6(6%)	

Port site spillage

In our study no port site spillage was present in Group A patients .whereas 6% patients in Group B had port site spillage. The difference is significant statistically (p-value 0.041).

In study done by Memon AI et al., port site spillage was 0.88% ^[18]. In a study by Jones DB et al., with a sample size of 1059 patients, 29% had spillage of bile alone or spillage of bile and gallstone ^[19].

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 port site malignancy in group A and there was one case (1%) reported to have port site malignancy.

Study Name	Port site Malignancy
Katz SC et al. ^{[20].}	2(0.2%)
Singh K et al ^{.[21]}	0
Present Study	1(1%)

In study done by Z'graggen K et al., port site recurrence of carcinoma was seen in 14% patients. The recurrence rate was similar in patients with primary tumour confined to the gallbladder (T1/T2) or locally advanced (T3/T4)^[22].

In a study done by Wu JS et al., increased wound implantation was seen in cases of intra operative tumour spillage at carbon dioxide pneumoperitoneum pressure at 10 mmHg^[23].

Port site infection

In our study, port site infection in Group A was 1%.whereas in Group B it was 8%. This could be explained as 6% patients in Group B had spillage. Results of our study are comparable with other studies.

Study name	Port site infection
Singh DP et al., ^[6]	4%
Den Hoed PT et al., ^[24]	5.3%
Singh K et al., ^[21]	Open group - 2%
	Endobag group - 8%
Present Study	Group A-1%
	Group B-8%

Port site hernia

In Group A, no patient presented with port site hernia. In Group B, 2 (2%) patient presented with port site hernia which was related to the port site infection seen in 8 (8%) of patients in Group B. Not performing the fascial closure at the port site and large sized stone may be cause for increased incidence of hernia. Our results were comparable with other studies.

Study name	Port site hernia
Memon AI et al., [18]	3.66%
Coda A et al., [25]	0.38%
Singh K et al.,[21]	Endobag Group : 0%
	Open Group : 2%
Present Study	Group A-2%
	Group B-8%

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^[26].

A study conducted by Bisgaard T et al., found reduced incisional pain at smaller port sites six hours postoperatively ^[27].Study by Singh K et al, 4% patients in endobag group had port site pain whereas, in open group 8% patients had port site pain.

In our study, in Group A Port site pain was present in 4 (4%) patients, while 12 (12%) of the patients in Group B.

Conclusion

Endobag is superior for the extraction of gallbladder when compared to direct extraction of the gallbladder as it prevents spillage of stones and bile. It also reduces the incidence of port site infection, port site hernia, port site malignancy and lesser post-operative pain. It also significantly reduces duration of surgery and mean duration of hospital stay. Moreover, a simple drain bag can be used as an endobag as a simple and cost effective alternative.

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