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Is endobag effective preventing port site infections in laparoscopic cholecystectomy: Our experience

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Abstract

Background: Since the introduction of laparoscopic cholecystectomy different methods of retrieval have been used to extract the gallbladder from the peritoneal cavity. Various studies have shown the advantages of retrieval with endobag, this study aimed at evaluating efficacy of endobags in prevention of port site infections in histologically proven cholecystitis.

Methods: This retrospective study was conducted at the KIMS hospital Bangalore, for a period of four years from April 2015 to March 2019. Data were collected on patient demographics, the use of a bag, port site infections and final Histopathology of Gallbladder specimen.

Results: There were 270 Histologically proven cholecystitis during the study period. A bag was not used to retrieve the gallbladder [Group A] in 39.6% (n = 104) patients. A retrieval bag was used in the majority of patients [Group B] (62.6%). Overall wound infection rate was 7.2%, with 80% (n = 16) of those being in patients where no retrieval bag was used.

Conclusion: In this study it is observed that epigastric port retrieval without endobag resulted in more port site wound infection and use of endobag was associated with less port site infections but has its own disadvantages like increase need for extension of facial incision and longer operating time.

Keywords: Laparoscopic cholecystectomy, endobag, port-site infection, retrieval of gall-bladder

Introduction

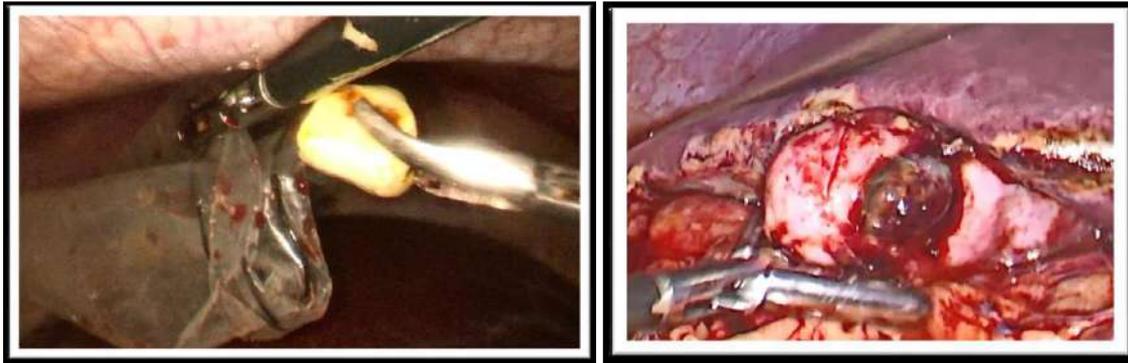
Laparoscopic cholecystectomy is the gold standard treatment for symptomatic cholelithiasis since last 15-20 years (Zehetner *et al.* 2007) [19]. It may be performed by single, two, three or four ports (3, 5 and 10mm size) technique depending on the surgeon's choice, his expertise and experience. At the end of the procedure, proper positioning of instruments (rail-roading) and orientation is required for retrieval of gall-bladder specimen (Kang & Lim 2003; Leggett *et al.* 2000) [6, 8]. Laparoscopic cholecystectomy is associated with greater chances of intra-abdominal stone spillage and implantation as well as port-site contamination during retrieval of gall-bladder specimen (Ali & Siddiqui 2013) [1]. In order to prevent above complications, gall-bladder specimen is retrieved in an endobag. Acutely inflamed or distended gall-bladder packed with stones always creates a problem during its retrieval. Gall-bladder removal in these cases requires a needle decompression, stone fragmentation and stone removal from the gall-bladder near the port site or extension of one of the fascial incisions to facilitate gall-bladder retrieval, which causes more post-operative port site pain (Zehetner 2007) [19]. In this study, we evaluate the safety and cost-effectiveness of technique of using sterile plastic endobag to retrieve gallbladder through epigastric port in group-B patients, while retrieval of gall-bladder through epigastric port without endobag in Group-A patients. The merits and demerits as well as complications of both the techniques were compared and analyzed.

Methodology

This comparative Retrospective study was conducted in the KIMS hospital Bangalore, for a period of four years from April 2015 to March 2019. This study included 270 patients with histopathologically proven cholecystitis who had underwent laparoscopic cholecystectomy. These patients were divided in two groups. Group A included 104 patients, who underwent conventional laparoscopic cholecystectomy with four port technique. 10mm epigastric working port, 10mm umbilical port for telescope and two lateral 5mm port for the surgeon's assistant. In these patients, the gall-bladder was retrieved through epigastric port without endobag.

The 10mm umbilical port (fascial defect) was closed by vicryl "0", while 10mm epigastric port and two 5mm ports just closed using nylon 2-0. Similar procedure was done in Group- B which includes 164 patients. The gall-bladder was retrieved through epigastric port by a sterile plastic endobag. The patients with obstructive jaundice and carcinoma gall-

bladder were excluded from the study. Informed written consent was taken from all patients. The demographic data, clinical examination, routine laboratory investigations and fitness for general anaesthesia were recorded. The results of both these techniques were collected and analyzed on SPSS version 14.



Laparoscopic view of placement of cholesterol stone to endobag and pigment stone spilling out of gallbladder

Results

A bag was not used to retrieve the gallbladder [Group A] in 39.6% (n = 104) patients compared to [Group B] 61.4% (n = 144) in whom a retrieval bag was used. Table 1 outlines the demographics data of the patients. The mean age of patients was 44.3 years. The male to female ratio was 1:3.8. Overall wound infection rate was high (7.4%), with 80% (n = 16) of those being in patients where no retrieval bag was used. Retrieval bag rupture was recorded in two patients (2.3%). In acutely inflamed cases 6% (n = 16) the gall-bladder was opened at the epigastric port site inside the endobag and decompressed before retrieval. There were twenty (7.4%) recorded wound infections during the study, with the vast majority being superficial wound infections (85%, n = 17). Of the patients presenting with superficial wound infections, 17.6% (n=3) were in whom retrieval bag was used

and the remaining 82.4% (n=14) in patients where a retrieval bag not was used. All superficial wound infections were treated with oral antibiotics and required no further intervention.

There were three recorded deep wound infections, two in group A and one in group B. Both patients required drainage of wound collection.

An increase incision in the fascia was required in 5.9% (n = 16) of patients. The majority of these were in patients in whom a retrieval bag was used 81.3% (n = 13). Histological examination showed no evidence of malignancy in any of the removed specimens.

Table 2 outlines the comparative results of Duration of Extraction of specimen (DOE), wound infection and need for increasing fascial incision between the two groups.

Table 1: Demographics

	All patients	No retrieval bag used	Retrieval bag used
Number of patients	270	104	164
Age (years)	Mean = 44.3	Mean = 42.6	Mean = 49.5
Male	28% (n = 76)	42% (n = 32)	58% (n = 44)
Female	72% (n = 194)	38% (n = 74)	62% (n = 120)

Table 2: The comparative results

variables	No Bag Used	Bag used	Relative risk	P-Value
Sup Wound inf	5.2%	1.11%	4.72	<0.0001
Deep wound inf	0.76%	0.36%	2.11	0.0002
Facial cutting	1.1%	4.7%	0.23	<0.0001
DOE	6min	17min	Average 11min more time required	

Discussion

After laparoscopic cholecystectomy, extraction of the gall-bladder is a time consuming and difficult job. Although several techniques and methods are suggested to facilitate the retrieval of gall-bladder 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, hematoma and infection as well as leaving a risky area for incisional hernia Sanz-Lopez *et al.* (1999) [14]. There is a lot of controversy regarding the retrieval of gall-bladder through umbilical or epigastric port and in an endobag or without endobag. In laparoscopic cholecystectomy, the ratio of gall-

bladder perforation and gallstone spillage reaches up to 36% (Mohiuddin 2006) [13]. In some of these cases, ruptures occur during the traction of the gall-bladder and as a result bile and gall-stones are spilled into the abdomen. In addition, when the port site is contaminated with bile or when gall-stones are left, infection develops. Gall-bladder perforation (10-40%) and stone spillage (6-30%) are the two most common complications encountered during dissection (75%) and removal (25%) of gall-bladder in laparoscopic cholecystectomy (Brockmann 2002; Wood field 2004; Sathesh-Kumar 2004) [2, 15]. Infected bile and gall-stone implantation in the subcutaneous tissues of the abdominal wall causing discharging sinus or abscess at the port

site of retrieval is a rare entity (Hand 2006; Shahzad 2007; Kumar 2004) [4, 16, 7]. In our study, we retrieved gall-bladder specimen safely through 10mm epigastric port using sterile plastic endobag in group-B patients, while in group-A through 10mm epigastric port without endobag. The gall-bladder perforation was found in 4.07% in group A and 1.48% in group-B while spillage of stones/ port impaction in 1.11% in group-A and 0.36% in group-B patients. However, a reported incidence of gall-bladder spillage varies from 6% to 30% (Kang 2003; Kumar 2004) [6]. Ali & Siddiqui (2013) [1] and Helme *et al.* (2009) [5] stated that best way to avoid complication of spilled gall-stones and port site contamination is to use endobag. Golash in his series of 772 patients of Laparoscopic cholecystectomies retrieved the gall-bladder specimen through the umbilical port without using endobag, hence reported a high incidence of port site contamination and gall-stone spillage (Golash & Rahman, 2006) [3]. In the present study, 1.47% of our patients of group-B developed epigastric port infection despite of using endobag, possibly due to contamination of the outer surface of endobag; and 5.96% of our Group-A patients developed epigastric port site infections. Since all of our patients had cholecystitis infection rates in our study is high compared to other studies. Memon *et al.* (2013) [11] also reported 5% umbilical port sepsis in patients with acutely inflamed gall-bladder specimen despite of using endobag for its retrieval. Another study reported port site wound infection 1.02% and port site hernia 1.38% (Sharma *et al.* 2013) [17]. Ali & Siddiqui 2013 [1] reported a rare complication of port-site infection due to implanted stones resulting in discharging sinus following laparoscopic cholecystectomy. All reasonable efforts should be made to remove spilled gall-stones; nevertheless, conversion to open surgery is not mandatory as the reported complication rate of lost stones is less than 1% (Brockmann 2002, Sathesh-Kumar 2004, Lrkorucu 2008) [2, 15].

Conclusion

Both the techniques of retrieval of gall-bladder through epigastric port with endobag and without endobag, have their own merits and demerits. In this study it is observed that Gall bladder retrieval without endobag resulted in more wound infections in comparison to the use of endobags. All the cases in our study is histologically proven cholecystitis cases and most of the infections were superficial infections which were treated conservatively. Using the endobag for retrieval was associated with difficulty in extracting the specimen and need for extension of the fascial incision hence resulting in longer operating time and increased post-operative pain. Use of endobag or no endobag is a surgeon's choice. We feel that in case of acute cases and those with risk factors for wound infections require an endobag retrieval.

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