ORIGINAL ARTICLE

FREQUENCY AND PREVENTION OF LAPAROSCOPIC PORT SITE INFECTION

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Background: The present study was conducted to evaluate the usefulness and safety of the non-powder surgical glove for extraction of the gallbladder in laparoscopic cholecystectomy. **Methods:** The study was carried out in Capital Hospital Islamabad and in a private hospital. The duration of study was from March 2009 to March 2012. This was an observational study carried out in 492 patients who underwent laparoscopic cholecystectomy using the surgical glove for extraction of the gallbladder and compared with the conventional method of gall bladder removal in two hospitals were analyzed. The operative findings, port site infection and co morbid conditions were evaluated. **Results:** Postoperative wound infection was found in 27 (5.48%) of 492 cases. Umbilical port infection was found in 26 (5.28%) of cases in which gall bladder was removed without endogloves and only one case (0.2%) had infection when gall bladder was removed with the endogloves. Wound infection was more in acute cholecystitis (25.9%) and empyema of Gall Bladder (44.4%). Among the co morbid conditions, diabetes mellitus has got higher frequency of wound infection (44%). **Conclusion:** The use of the surgical glove for extraction of the gallbladder is safe, cheap, simple and potentially reduces significant morbidity. Its routine use at laparoscopic cholecystectomy is mandatory in all cases.

Keyword: laparoscopic cholecystectomy; non-powder surgical gloves; retrieval bag; wound infection

INTRODUCTION

Cholecystectomy is the treatment of choice for symptomatic gallstones because it removes the organ that contributes to both the formation of gallstones and the complications ensuing from them.[1]

Laparoscopic cholecystectomy (LC) is now the gold standard treatment of symptomatic gallstones and is the commonest operation performed laparoscopically worldwide. Gall bladder perforation and spillage are the common complications encountered during dissection and removal of gall bladder (25%).[2,3] However there has been increasing report of infectious complications due to un-retrieved stones and spillage of bile. Such complications mask not only the advantages of minimal access surgery but also increase the economic burden on the patient. Work load on the staff is also increased and the reputation of hospital and attending surgeon bears the brunt.

There are number of factors contributing to the development of postoperative wound infections. Attempts have been made to control these by variety of methods. However there is misplaced belief that antibiotics are solution to all of these, thus leading to their inappropriate use and resultant emergence of the resistant microorganisms.[4] This innovative study will focus on the cost effective technology and technique of specimen extraction. The purpose of this study was to compare the postoperative wound infection rate between removal of gall bladder by endogloves and without endogloves.

MATERIAL AND METHODS

This observational study was conducted at Capital Hospital Islamabad (governmental), and Taj Surgery Rawalpindi (private) during March 2009 to March 2012. A total of 492 patients (346 female and 146 male) who underwent laparoscopic cholecystectomy were evaluated. The diagnosis was acute cholecystitis in 114 patients, empyema of gall bladder in 86 and symptomatic cholelithiasis in 192. All patients were given injection ceftriaxone 1 gm at the time of induction and two doses after that with an interval of 12 hours. In patients with acute cholecystitis, empyema of gall bladder especially when the bile culture was positive, broad-spectrum antibiotics were administered for a longer period depending on the clinical situation.

After laparoscopic cholecystectomy, the laparoscope was then placed through the epigastric port site and endogloves through the umbilical port site. The gallbladder was removed with endogloves and brought out through the umbilical incision. In case of removal of gall bladder without endogloves the laparoscope was moved to the epigastric port, and a large-tooth grasping forceps was inserted through the umbilical port to grasp the gallbladder at the area of the cystic duct. Under direct vision, the gallbladder was then retrieved and pulled out as far as possible through the umbilical port. When the gallbladder was small enough, it could be drawn right into the trocar sleeve, and the trocar with it could then be removed.

Postoperatively the first dressing was changed on the 4th day. Stitches were removed after 8 days of surgery. Follow-up of the patients for wound care was done for 4 weeks. Evaluation was done for postoperative fever, erythema, discharge from the wound. Local cultures were taken from the wound margin, discharge or

aspirate of haematoma. Postoperative infection was considered to be present if cultures were positive.

The dependant variable included suture material (monofilament non tissue reactive) and operating time (upper limit two hours). The independent variables were theatre environment and number of persons in operation theatre, operative pathology and co morbid conditions. The case records of these patients were maintained on the pre-designed proforma having demographic details, type of complications, underlying risk factor(s), treatment modalities, outcome and follow-up. Data were analysed using SPSS-10. Variables were calculated for frequencies and percentages.

RESULTS

Total 492 patients were included in the study, 346 females and 146 male. The mean age of the patients was 46.5±21.20 years (Range: 4.5 to 107 years).

Mean operating time was 40±20 minutes. Maximum operating time was 2 hours and minimum was 10 minutes. Wound infection was seen in 27 patients (5.48%). Postoperative wound discharge was seen in 15 (55%) cases of public hospital and 12 (45%) cases of private sector.

The operative findings in case of laparoscopic post-op infections shows that the frequency of infection is more in case of infective cases (empyema of gall bladder 44.45% and in acute cholecysttitis 25.9%) accounting for 60% of the post-op infection rates (Table-1).

The most common presentation of the wound infection postoperatively was discharge from port site (74%) and fever (55%). (Causes of fever like chest infection, urinary tract infection and drug-induced were excluded.) Method of removal of gall bladder was more significant rather than public or private hospital (Table-2).

The most common co-morbid condition associate with the gall stones were diabetes mellitus, hypothyroidism and obesity. Among them, diabetic patients were more prone to develop infection postoperatively (Table-3).

Postoperative wound infection was present in 26 (5.28%) patients in which gall bladder was removed without endogloves; whereas 1 (0.20%) patient had post operative wound infection with endogloves. This shows that gall bladder removed without endogloves has got higher chances of infection due to spillage of bile and stones (Table-4).

Table-1: Operative findings in wound infection cases after laparoscopic cholecystectomy

Operative findings	Frequency	Percentage
Empyema	12	44.45
Acute cholecystitis	7	25.9
Mucocele of gall bladder	2	7.40
Calculous cholecystitis	5	18.51
Acalculous cholecysttis	1	3.70

Table-2: Postoperative wound infection [n (%)]

Complications	With endogloves	Without endogloves	Public hospital	Private hospital
Post-op fever (excluding fever caused by factors unrelated to wound)	1 (3.7)	15 (55)	9 (33)	6 (22)
Discharge from port site	2 (7.4)	20 (74)	11 (40)	9 (33)
Positive culture	1 (3.7)	26 (96)	15 (55)	12 (44)
Abscess	0	6 (23)	4 (14)	2 (7.4)

Table-3: Co-morbid conditions in patients with port site infections patients

Co morbid Conditions	Frequency	Percentage
Diabetes mellitus	12	44
Hypothyroidism	4	14
Obesity	4	14
Cirrhosis of liver	3	11.1
Hypertension	1	3.7
Bronchial asthma	2	7.4

Table-4: Postoperative port site infection rate in laparoscopic cholecystectomy

Wound infection	Frequency	Percentage
Overall infection	27	5.48
Without endogloves	26	5.28
With endogloves	1	0.20

DISCUSSION

Any surgical procedure conducted has some risks and complications. A recent advance has been the introduction of laparoscopic or minimal access surgery. Large series document a reduced incidence of port site infection and other wound-related complications following laparoscopic surgeries. As minimally invasive surgery becomes conventional, dropped gallstones are becoming an increasingly common problem, because spillage of bile is more common with laparoscopy than with open procedures.[5]

According to previous studies, certain situations lead to higher risk of gallbladder perforation during laparoscopic cholecystectomy. Patients with acutely inflamed gallbladders have friable tissue which is susceptible to tear. Dense adhesions around the gallbladder make dissection potentially more difficult, and tense, distended gallbladder that has not been decompressed is at risk of perforation.[6,7] This usually occurs when the gallbladder is manipulated by laparoscopic instruments or when it is dissected from the liver bed. Spilled stones are also caused by the slipping of the cystic duct clip or the tearing of the gallbladder while it is retrieved from the port site.[8]

Patients with wound infection present with varying degrees of abdominal pain, with or without signs of peritoneal irritation, nausea, vomiting, or anorexia and can present with empyema[9] or non-healing fistulae. Because of the non-specific nature of symptoms, these symptoms often mimic symptoms of other more common pathologies that are indistinguishable by history and physical examination alone. The complication of abscess formation has been

reported to happen as early as 4 days after laparoscopic cholecystectomy and as late as 10 years after surgery.[10]

Although lost gallstones were initially considered innocuous, it is now recognised that they can be a small but significant source of postoperative morbidity (0.08–0.3%).[2] The presentation of complications will vary from patient to patient, and depend largely on the site and type of complication suffered. Recognised symptoms include abdominal pain, fever, abdominal masses, bowel obstruction and the presence of a sinus infection or fistula.[10] In our study the use of an endobag was safer for preventing wound infection.

The conventional method for the removal of the gall bladder is associated with higher incidence of infection as reflected in the studies which is present in 26 (5.48%) patients of the cases and more common in the infected patients and also in the patients associated with the co morbid conditions, whereas only 0.20% of cases in which gall bladder was placed in the surgical gloves. There is a variety of standard endobags available in the market for extraction of gall bladder which are quite safe but expensive.

It is very safe to remove the gall bladder through commercially available endobags in order to prevent the contamination. The only disadvantage is the cost of endobag which is very expensive. As it is for single use and disposable so the economic burden is more on the patient and on the hospital. In our country one should adopt a cost-effective approach which is more convenient and safe.

The infected gall bladder should be removed in endobag in order to prevent wound infection and to prevent spillage of stones and for the occult malignancy in gall bladder. Therefore in this study gall bladders were successfully retrieved from the abdominal cavity using an improvised 'endobag' made from a simple surgical glove and the cost for that procedure was 15 rupees compared to five to ten thousand rupees of commercially available bags. Such an endogloves presents several advantages; they are easy to make, sterile, economical, readily available, disposable, there is ample space to manipulate the specimen within, and there is minimal risk of contamination throughout the procedure. The authors recommend this approach as a routine use in case of retrieval of gall bladder from the abdomen after dissecting it from the liver bed. During the last 3 years, the authors have removed various specimens in 246 cases. The specimens were successfully retrieved in all cases without rupture of the bag or slippage.

The practice of using the cuffed surgeon's glove with the fingers cut-off and transfixation suture placed through the line of metacarpal heads as receptacle for the gallbladder at laparoscopic surgery has much to commend it. Dr. Raj *et al*[11] and ourselves as well not only have found it economical, but readily available and perfectly adequate for the task at hand. We agree entirely that the resilient circular rim of the cuff tends to lie open once introduced into the sub-hepatic space, making insertion of the gallbladder all the easier.

CONCLUSIONS

It is mandatory to use a simple and cheap powder-free glove bag to extract the gallbladder during LC. No complications in the form of bile or stone spillage during extraction were observed in endogloves technique. Use of glove bag due to low cost and complications is a wise option for extraction of gall bladder during LC. The use of the glove bag reduces the risk of contamination with bacteria, bile, and gallstones, and may reduce contamination by malignant cells in case of unexpected gallbladder carcinoma.

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