Port Site Infection and Associated Factors In Laparoscopic Cholecystectomy

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ABSTRACT

Objective — *To find out the frequency of port site infection and associated factors in laparoscopic cholecystectomy.*

Study design — *Cross sectional study.*

Place & Duration of study — *Department of Surgery, Jinnah Postgraduate Medical Centre (JPMC) Karachi, from October 2020 to April 2021.*

Methodology — *All patients between 30 - 60 years of age with the diagnosis of cholelithiasis, booked for elective laparoscopic cholecystectomy were included. Port site infection was labeled as presence of any two or more of the features like redness on naked eye examination, purulent discharge, fever with core temperature equal to or greater than (38° or 100.4° F), tenderness on palpation, serosanguinous discharge, and/or pain at port site with Visual Analogue Scale (VAS) for pain intensity more than 7.*

Results — *Mean age of the patients was 50.54±9.98 year. There were 115 (67.3%) female and 56 (32.7%) male patients. Port site infection was found in 9 (5.3%) patients. A significant difference of port site infection was found with gender (p=0.026) and number of antibiotic doses administered (p=0.018).*

Conclusion — *A high port site infection rate was observed. There was significant association with gender and antibiotic doses used in the study group.*

Key words — *Port site infection, Laparoscopic cholecystectomy, Cholecystitis.*

INTRODUCTION:

With the advent of laparoscopic surgery, open cholecystectomy has been largely abandoned.[1] The indications for laparoscopic cholecystectomy include cholelithiasis, gallstone pancreatitis and gallbladder masses/polyps.[2] Laparoscopic cholecystectomy is a minimally invasive and gold standard surgical treatment used for removal of gallbladder. All surgical procedures have certain complications but its frequency is negligible with laparoscopic approach. Perforation of gall bladder and spillage of bile are among the common complications encountered during gall bladder dissection and removal.[3] Moreover, there have been enough reports of infectious complications due to un-retrieved stones and bile spillage.[4] Complications like these not only mask the advantages of minimal access surgery but is burdensome for the patients as well.

Surgical site infections which include port site are major challenge even in contemporary time. The classification of surgical site infections includes skin and subcutaneous tissue infection which is termed as superficial infection whereas deep infection that involves fascia and muscle layer. A third category is organ space infection.[5] Infections are either intrinsic or extrinsic depending on the micro-organisms and the mode of transmission.[3] Although laparoscopic procedure is superior to open cholecystectomy in

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terms of complication rate but has a potential to add to the morbidity.[6] Prophylactic antibiotics have shown to reduce the rate of surgical site infections but it has its own grave consequences as well with addition of cost and emergence of bacterial resistance.[7] This study was conducted to find out the frequency of port site infections and measures which can reduce its rate.

METHODOLOGY:

This was a cross sectional study conducted in the Department of Surgery, Jinnah Postgraduate Medical Center Karachi from October 2020 to April 2021. The sample size obtained with 5% margin of error, and 95% confidence interval was 171. A non-probability, consecutive sampling technique was used. Patients of either gender between 30 - 60 years of age with the diagnosis of cholelithiasis confirmed with ultrasound, booked for elective surgery, were included. Patients in whom procedure was converted to open surgery, gallbaldder with empyema, emphysematous change, gangrenous, and that found perforated, presence of choledocholithiasis, cholangitis and acute pancreatitis and patients with comorbid (ischemic heart disease and hypertension), were excluded. Hepatitis B & C positive patients were not enrolled.

Patients were explained the purpose of surgery, benefits and risk of the study. Informed consent and approval from ethical review committee of the institute was taken. A structured form was used to enter data that included demographic details, clinical features and port site infection. The port site infection was assessed at 5th postoperative day.

Data was analyzed using SPSS version 25. Age, duration of hospital stay, number of antibiotic doses administered, duration of operation, the quantitative variables, presented as mean with standard deviation. Qualitative data such as gender, co-morbid conditions, port site infection (PSI) were reported as frequencies and percentages. Effect modifiers like age, gender, duration of surgery were controlled through stratification. Post stratification, Chi square test was applied and p value <0.05 was taken as significant.

RESULTS:

A total of 171 patients with gallstones underwent laparoscopic cholecystectomy. This included 115 females and 56 males. Fifty-five patients were =45 years of age. The mean age of the study group was 50.54 ±9.98 year. Port site infection was noted in 9 (5.3%) patients. A significant difference of port site

Table I: Comparison of Port Site Infection With Different Variables (n=171)

Port site infection	Yes (n %)	No (n %)	p value
Age(year)			
<45	2 (4)	53 (96)	0.512
>45	7 (6)	109 (94)	
Gender			
Male	6 (11)	50 (89)	0.026*
Female	3 (3)	112 (97)	
Duration of surgery, minutes			
<90	4 (4)	110 (96)	0.146
>90	5 (9)	52 (91)	
Duration of hospital stay (hours)			
<25	2 (3)	79 (98)	0.121
>25	7 (8)	83 (92)	
Number of antibiotic doses administered			
<3	6 (4)	153 (96)	0.018*
>3	3 (25)	9 (75)	
Diabetes Mellitus			
Yes	6 (7)	79 (93)	0.296
No	3 (4)	83 (97)	

infection was found in relation to gender (p=0.026) and number of antibiotic doses administered (p=0.018). Table I shows the comparison of port site infection in relation to age, gender, duration of surgery, duration of hospital stay, number of antibiotic doses given and diabetes mellitus.

DISCUSSION:

Laparoscopic cholecystectomy results in fewer complications like bile duct injury, bleeding, hematoma formation and port site infections.[8] The port site infection must not be considered as minor condition as it leaves a significant impact on the patients.[9] Sometimes these infections become protracted and pose a dilemma to the surgeon and distressing for the patients as well. In this study, a significant difference in port site infection rate was found in relation to gender and number of antibiotic doses administered. In this study 9 (5.3%) patients developed PSI whereas a lower rate of 3.9% is reported in another study.[2] A good hygiene and daily bath with cleaning of navel is important. This must be advised to the patients at discharge from hospital.

Port site infection was common among patients with history of acute cholecystitis which was found in 7 (41.1%) cases while in the other study the common cause was bile spillage noted in 4% of the patients. In a reported series of 294 cases a total of 17 (5.78%) patients developed port site infections. The reason may be bacterial spillage. However, in our study gallbladder was retrieved in an endobag.[10]

Most of the surgical site infections were observed in patients who had preoperative stay of greater than two days for surgical procedures. However, a study showed that those patients who underwent early operation after acute episode had gangrenous gallbladder with mucosal necrosis that may result in infection.[11] A study concluded that surgeries of less than 30-minutes duration had no infection however, a significant rise in surgical site infections occurred if duration of procedure exceeds 80-minutes or more.[12] Prophylactic antibiotics had not shown any major impact on the rate of surgical site infections in post laparoscopic cholecystectomy. Infection was commonly reported in emergency cases or with acutely inflamed organs even when antibiotics were used.[13]

The risk of surgical site infection is greater in patients who used nicotine and on steroids. It is also more common in patients with diabetes mellitus, malnutrition, long preoperative hospital stay. Diabetes mellitus is one of the co-morbid conditions with a higher frequency of wound infection around 44%.[14] These patients are immunocompromised with poor glycemic control that interferes with wound healing.

Port site infections most commonly affect the umbilical port.[15] The rate of infection might depend on the port through which the specimen is withdrawn. A study showed significant infection in the epigastric port which was 58% followed by umbilical port 42%. Whereas in this study we had 81% of the infection at umbilical port. Extensive research is still on to find out which port is considered ideal for the removal of gallbladder.[16]

The endogenous source of infections is unavoidable. Therefore, the use of sterile endobags can minimize the impending infections and the exogenous source of infection is preventable by sterile techniques. The infection with atypical mycobacteria is usually confined to the laparoscopic procedures because of the heat sensitive property of laparoscopic instruments rendering them non-autoclavable. Furthermore, as the instruments used for laparoscopy possess numerous joints and crevices, it tends to collect blood and tissue. Repeated use of these instruments without optimal cleaning cultivates organisms such as atypical mycobacteria. Despite the benefits and the better outcome of laparoscopic cholecystectomy, port site infection is still a challenge.[17] Following the principles of sterilization and surgery can go a long way in reducing this problem.

CONCLUSION:

Port site infection rate of 5.3% was observed in this study which had significant relation with the female gender and number antibiotic doses used.

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