Frequency And Risk Factor Assessment Of Port-Site Infection After Elective Laparoscopic Cholecystectomy In Low-Risk Patients At A Tertiary Care Hospital Of Kashmir.

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Citation

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Abstract

Background and objectives: The study was conducted with the aim to determine frequency and to assess the risk factors of port-site infection after elective laparoscopic cholecystectomy in low-risk patients at a tertiary care hospital of Kashmir.Design and Setting: Prospective.Patients and Methods
: The study included 675 consecutive patients of port-site infection after elective laparoscopic cholecystectomy for symptomatic cholelithiasis over a period of 12 months. Culture swabs were taken from port sites of all patients with signs of port site infection and transported to the microbiology laboratory. The positive swab cultures were noted. The risk factors like iatrogenic gallbladder perforation, two port method, experience of surgeon and age of the patients were assessed. The data obtained was analyzed by using appropriate statistical analytical tests. Results: The incidence of port-site infection after elective laparoscopic cholecystectomy is 6.7%. The port site infection is more often superficial and at the epigastric port site, associated with iatrogenic gallbladder perforation and more likely when laparoscopic cholecystectomy is performed by a junior surgeon and by two port method. Conclusion: The primary risk factor for port-site infection after elective laparoscopic cholecystectomy in otherwise normal patients is iatrogenic gallbladder perforation leading to spillage of bile.

INTRODUCTION

Surgical procedures often lead to both intrinsic and extrinsic infections. The human body enables survival of a wide variety of microorganisms with potential for causing infection. In circumstances where systemic host resistance is lowered, such as immuno-suppression from medication and disruption of intact cutaneous or mucous membranes as a result of surgical procedures or trauma, patients' bacterial flora may become opportunistic and cause infection. Laparoscopic cholecystectomy has become the preferred method of performing gallbladder surgery in present era. Laparoscopic cholecystectomies are associated with shorter hospital stay and convalescence, less pain and scarring, and lower rates of postoperative surgical site infection (SSI) than open cholecystectomies.[1-4] The fact that laparoscopic cholecystectomies are associated with fewer surgical site infections (SSIs) intuitively makes sense as laparoscopy access ports are short in length and only a fraction of the length of the incision used in open laparotomy. Elective laparoscopic cholecystectomy has a low risk for infection[1-5], but many surgeons still use prophylactic antibiotics.

The Centers for Disease Control and Prevention classification (CDC) categorized surgical site infection into incision-site infection and organ-space infection. The incision-site infection is further subdivided into "superficial" in which only skin and subcutaneous tissue is infected and "deep" where fascia and muscles are infected.[5, 6]

This study was designed to determine the port (incision) site infection rate and assessment of the risk factors for port-site infection in low-risk patients undergoing elective laparoscopic cholecystectomy.

PATIENTS AND METHODS

The study included 675 consecutive patients of postoperative port-site infection after elective laparoscopic cholecystectomy for symptomatic cholelithiasis in surgical units of our hospital over a period of 12 months from 1 st April 2010 to 3^{1st} March 2011 in the Department of Surgery Government Medical College Srinagar. In order to minimize the bias in our observations, the following patients were excluded: 1) patients with chronic debilitating illnesses and with known malignancies as their chances of port-site

infection are higher because of their immunocompromised state, 2) patients in extremes of age because the chance of infection in them is higher, 3) patients with acute cholecystitis as it increases the chance of infection, 4) patients with antibiotic prophylaxis because antibiotics decrease the chance of infection, and 5) patients with port-site infections after 30 days of elective laparoscopic cholecystectomy because these do not belong to the surgical-site infections. Culture swabs were taken from port sites of all patients with signs of port-site infection under all aseptic precautions and transported to the microbiology laboratory and then systemic antibiotics were given. The positive blood cultures were noted. The risk factors like iatrogenic gallbladder perforation, two port method, experience of surgeon, and age of the patients were assessed. The data obtained was analyzed by using appropriate statistical analytical tests.

Figure 1

Table 1: Risk factors

Port-site infection	IGBP	Male	Female	4 ports	2 ports	SS	JS	Total
No	0	110	520	521	109	524	106	630 (93.3%)
Yes	26 (57.8%)	14 (31.1%)	31 (68.9%)	10 (22.2%)	35 (77.8%)	10 (22.2%)	35 (77.8%)	45 (6.7%)

IGBP=Iatrogenic gallbladder perforation, SS=senior surgeon, JS=junior surgeon,

The p-value of port-site infection versus no port-site infection was highly significant (<0.005) on comparing IGBP, 4 ports, 2 ports, SS, JS, only in the case of sex differences it was insignificant (>0.01).

Figure 2

Table 2: Depth of port-site infection

Number of cases with port-site infection (culture positive)	Superficial port-site infection (SPI)	Deep port-site infection (DPI)
45	39 (86.7%)	6 (13.3%)

Figure 3

Table 3: Port-site involvement

Number of cases with port site infection (culture positive)	Epigastric port site infection	Umbilical port site infection
45	43 (95.6%)	2 (4.4%)

Figure 4

Figure 1. Epigastric port site uninfected

Figure 5

Figure 2. Umbilical port site uninfected

Figure 6

Figure 3. Epigastric port site infected

Figure 7

Figure 4. Umbilical port site infected

RESULTS

The incidence of port-site infection after elective laparoscopic cholecystectomy is 6.7% (table 1). The port-site infection occurred in 45 (6.7%) of patients (table 1), more often superficial (39/86.7%) than deep (6/13.3%) (table 2) and more common at the epigastric port site (43/95.6%) than umbilical (2/4.4%) (table 3). The uninfected port sites are shown in figures 1 and 2 and the port-site infections with soakage are shown in figures 3 and 4. Port-site infection is more often associated with iatrogenic gallbladder perforation (26/57.8%) and more likely when laparoscopic cholecystectomy is performed by a junior surgeon (35/77.8%) and by 2-port method (35/77.8%) (table 1). The p-values of port-site infection versus uninfected port site were highly significant (<0.005) on comparing iatrogenic gallbladder perforation, four-port laparoscopic cholecystectomy, two-port laparoscopic cholecystectomy, laparoscopic cholecystectomy by senior surgeon and laparoscopic cholecystectomy by junior surgeon, only in terms of sex differences the p-value was insignificant (>0.01).

DISCUSSION

The rate of port-site infections after elective laparoscopic cholecystectomy is lower than that of the incision-site infections after open elective cholecystectomy because laparoscopy port sites are shorter in length than the incisions made for open cholecystectomy.[1-4]

Risk factor assessment for the development of port-site infections after laparoscopic cholecystectomy in low-risk patients has not been studied thoroughly as it has been studied in cases of open cholecystectomy.

The incidence of port-site infections after elective laparoscopic cholecystectomy observed in our study was 6.7%. Shindholimath et al.[7] has also reported an almost similar incidence (6.3%) while Jan et al.[8], Den Hoed et al.[9], Zitser et al.[10] and Colizza et al.[11] reported a incidences of 5.07%, 5.3%, 2.3% and <2%, respectively. The higher incidence of PSI in our study could be due to use of reusable trocars.

In our study, the port-site infections (PSI) observed were more often superficial (39/86.7%) than deep (6/13.3%) (table 2). A higher rate of superficial than deep PSIs was also seen by Jan et al.[8] and Richard et al.[12] in their study.

Port-site infection (PSI) was also more common at epigastric port sites (43/95.6%) (table 3). An epigastric PSI preponderance was also observed by Jan et al.[8] and Hamzagaolu et al.[13], but Colizza et al.[11] and Tocchi et al.[14] have reported that PSI is more common at the umbilical port site. Epigastric-over-umbilical port-site infection predominance in our study was due to frequent retrieval of gall bladder through the epigastric port.

In our study, port-site infection was more often associated with iatrogenic gallbladder perforation (26/57.8%). Port (incision) site infection may be due to intrinsic commensalism or extrinsic pathogens. PSI may occur due to

contamination following spillage of gut or biliary contents.[15]

PSI was more likely when laparoscopic cholecystectomy is performed by a junior surgeon (35/77.8%) and when performed by 2-port method (35/77.8%) (table 1). In our study, we observed that junior laparoscopic surgeons often take more than an hour to complete the laparoscopic cholecystectomy and thus increased the PSI. Increased PSI with more than one hour of duration of laparoscopic cholecystectomy has been reported by Jan et al.[8] and Anielski et al.[16]. Therefore, the junior laparoscopic surgeon is a risk factor for port-site infection because of two reasons: 1) increased chance of perforation of gallbladder with subsequent spillage[15] and 2) increased duration of the procedure "laparoscopic cholecystectomy".[16] The increased incidence of PSI in two-port over three-port elective laparoscopic cholecystectomy can be explained on the basis of spillage of bile.[15]

The p-value of "port-site infected" versus "port-site uninfected" in terms of sex differences was insignificant (>0.01). Hence, sex is not a risk factor for development of PSI after laparoscopic elective cholecystectomy in low-risk patients.

These studied risk factors are all modifiable and therefore, port site infection (PSI) can be reduced by modifying these modifiable risk factors.

CONCLUSION

Hence, we concluded that the primary risk factor for port-site infection after elective laparoscopic cholecystectomy in otherwise normal patients is iatrogenic gallbladder perforation leading to spillage of bile. Utmost care to prevent the spillage will have great preventive impact on morbidity and mortality of patients due to port-site infection after elective laparoscopic cholecystectomy.

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