IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 19, Issue 10 Ser.7 (October. 2020), PP 50-54
www.iosrjournals.org

Analysis of Laparoscopic Port Site Infections: A Descriptive Study

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Abstract
Introduction: *Laparoscopic port site infections have emerged to become an important post laparoscopic morbidity. The aim of the study wasto analyze the contemporary data of laparoscopic surgery associated with ports in the site infectionsand to find out the treatment for it.*
Methods:*This prospective study was conducted in the Department of surgery in EnamMedical College Hospital, Bangladesh during the period from 8 May 2010 to 10 June 2011. 156 study people were selected for the study. Data were analyzed using SPSS-10 and MS-Excel 2016.*
Result: *In total 156 patients were selected for the study,maximum patients found in 40-60 that was 86(55.13%) and most of them were female patients is 96(61.54%). Maximum infections found in laparoscopic cholecystectomy surgery, which was 107(68.59%) patients. Most cases found in mycobacterium chelonae which was 56(35.90%)and in treatment chart most of the patients cured by taking clarithromycin which was 44(28.21%) and the duration is equal or more than 6 months.*
Conclusion:*Port site infections are a rare complication in laparoscopy. Non-tuberculous mycobacterium is the most common organism causing port site infections. Strictly abiding by the commandments of cleaning and sterilization of the laparoscopic instruments with the appropriate sterilizing agent, the complication can be best avoided.*

Key words: *post laparoscopic complications, port site infections, laparoscopic surgery.*

Date of Submission: 05-10-2020 Date of Acceptance: 19-10-2020

I. Introduction

Laparoscopic techniques have been revolutionized in the field of medical surgery day after day. The first laparoscopic surgery was laparoscopic cholecystectomy was Philips Mouret reported in 1987, the approach has been adopted for many other surgical procedures including appendectomy, herniorrhaphy, colonic surgery, gastric surgery, urological and gynaecological surgery[1-5]. The benefits decreased postoperative pain, quicker return to normal activity, and less postoperative complications. It has brought about a paradigm shift in the approach to various surgical diseases. Laparoscopic surgery, however, has its package of unique complications. These unique complications are associated with gaining access to the abdomen for laparoscopic surgery. Inadvertent bowel injury or major vascular injury are uncommon but potentially life-threatening complications, usually occurring during initial access[26,27]. From many complications, which is preventable although, is the Port Site Infection (PSI). Rate of port site infections (PSI) varied from 3.3% to 8% depending on area of reporting and type of surgery[6,7]. Port site infections is a type of surgical-site infection (SSI) confined to skin and soft tissue or rarely muscles around the ports throughwhich surgeons gain access into the abdomen and present within a month of the operative procedure[8]. Port site infection soon erodes the advantages of laparoscopic surgery, with the patient becoming worried with the indolent and nagging infection and losing confidence on the operating surgeon[7]. Thereoccurs a significant increase in the morbidity due to laparoscopic port site infection, hospital stay and financial loss to the patient happened[25].

The aim of this study was to determine the morbidity associated with the port site infections in laparoscopic surgery, to suggest appropriate drug regimen for it.

II. Objectives

General objective:

- To observe the contemporary data on laparoscopic port site infections**.**
- To find out the treatment of port site infections.

III. Methodology & Materials

This prospective study was conducted in the Department of surgery in Enam Medical College Hospital, Bangladesh during the period from 8 May 2010 to 10 June 2011.Study patients those were suspected to have developed port site infections following different laparoscopic surgery with the evidence of delayed wound healing, breakdown of wounds after initial healing, redness or discharge from any wound, nodules in or around the vicinity of the wounds, and nonresponsive to empiric antibiotic therapy were included in the study. So then, 156 cases were selected by random sampling. 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 analyzed using SPSS-10 and MS-Excel 2016. Variables were calculated for frequencies and percentages.

IV. Result

From 156 study patients in the age group maximum patients found in 40-60 and that was 86(55.13%) then 20-40,42(26.92%) and 60-80,28(17.95%) [Figure-I]. Again in the study there found male patients 60(38.46%) and number of female patients is 96(61.54%). So, the maximum patients are female [Figure-II]. In the study we found port wise distribution of cases of laparoscopic port site infections. Maximum infections found in laparoscopic cholecystectomy surgery, which was 107(68.59%) patients, then laparoscopic appendicectomy surgery of 35(22.44%) patients and minimum infected patients was not specified the field of laparoscopic surgery, which was 14(8.93%) patients. Moreover, umbilical infection rate in laparoscopic cholecystectomy was 67(42.95%) patients, umbilical infection rate in laparoscopic appendicectomy surgery was 31(19.87%) patients, umbilical infection rate in not specified laparoscopic surgery was 14(8.97%), epigastric infection rate in laparoscopic cholecystectomy surgery was 26(16.67%) patients, lateral infection rate in laparoscopic cholecystectomy surgery was 4(2.56%) patients, suprapubic infection rate in laparoscopic cholecystectomy surgery was 3.85% (6 patients), left iliac infection rate in laparoscopic cholecystectomy surgery was 1(0.64%) patient, not specified infection rate in laparoscopic cholecystectomy surgery was 3(1.92%) patients, not specified infection rate in laparoscopic appendicectomy surgery was 4(2.56%) patients[Table-I]. From the findings of the mycobacterial isolates there found most cases in mycobacterium chelonae which was 56(35.90%), after then 38(24.36%) cases found in mycobacterium massiliense, 18(11.54%) cases found in mycobacterium tuberculosis, 13(8.33%) cases found in mycobacterium abscessus, 7(4.49%) cases found in not specified group, 3(1.92%) cases found in mycobacterium fortuitum and minimum cases found in mycobacterium wolinskyi and mycobacterium neoaurum which was 1(0.64%). Moreover, 14(8.97%) cases found in staphylococcus aureus of gram positive group and 5(3.21%) cases found in pseudomonas of gram negative group[Table-II]. From the treatment chart of the patients, maximum patients cured by taking clarithromycin which was 44(28.21%) and the duration is equal or more than 6 months, after then 28(17.95%) in PB: polymyxin B and the duration was 4 months, respectively 27(17.31%) in anti-tubercular therapy and the duration was less than 6 months, 22(14.10%) in clarithromycin+ ciprofloxacin and the duration was equal or more than 6 months, 18(11.54%) in amikacin+ cefoxitin/imipenem and the duration was 3 weeks,, 7(4.49%) in clarithromycin+ cotrimoxazole and the duration was 2 weeks, and the minimum patients of 5(3.21%) found in clarithromycin+ doxycycline where the duration is more than 4 months and amikacin (IV), then oral ofloxacin/ciprofloxacin where the duration was 2 weeks[Table-III].

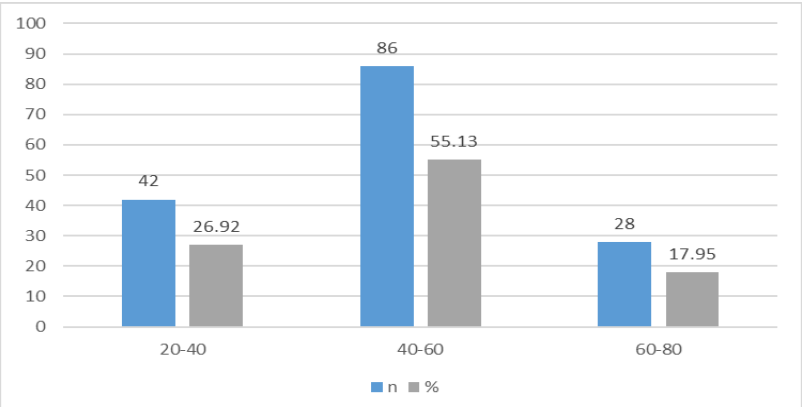

Figure-I: Distribute the study patients according to age (N=156)

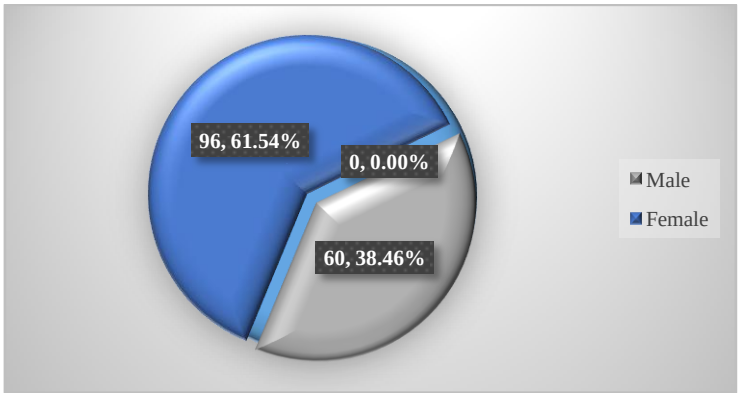

Figure-II: Distribute the study patients according to gender (N=156)

Table-I: Port wise distribution of cases of laparoscopic port site infections (N=156)

Site of port infections	Laparoscopic cholecystectomy		Laparoscopic appendicectomy		Not specified	
	n	%	n	%	n	%
Umbilical	67	42.95	31	19.87	14	8.97
Epigastric	26	16.67				
Lateral	4	2.56				
Suprapubic	6	3.85				
Left iliac	1	0.64				
Not specified	3	1.92	4	2.56		
Number of cases	107	68.59	35	22.44	14	8.97

Table-II: Distribute the study patients according to the mycobacterial isolates (N=156)

Micro-organisms		n	%
Mycobacterium	tuberculosis	18	11.54
	chelonae	56	35.90
	fortuitum	3	1.92
	abscessus	13	8.33
	wolinskyi	1	0.64
	massiliense	38	24.36
	neoaurum	1	0.64
Gram positive	Staphylococcus aureus	14	8.97
Gram negative	Pseudomonas	5	3.21
Not specified		7	4.49

Table-III: Distribute the study patients according to the duration of anti-microbial drugs

Antibiotics	Duration	N	%
Anti-tubercular therapy	<6 months	27	17.31
Clarithromycin	≥6 months	44	28.21
Clarithromycin + Ciprofloxacin	≥6 months	22	14.10
Clarithromycin + Cotrimoxazole	≤4 months	7	4.49
Clarithromycin + Doxicycline	>4months	5	3.21
Amikacin (IV), then oral Ofloxacin/Ciprofloxacin	2 weeks	5	3.21
Amikacin + Cefoxitin/Imipenem	3 weeks	18	11.54
PB: Polymyxin B	4 months	28	17.95

V. Discussion

From 156 study patients in the age group maximum patients found in 40-60 and that was 86(55.13%) then 20-40,42(26.92%) and 60-80,28(17.95%).Again in the study there found male patients 60(38.46%) and number of female patients is 96(61.54%). In another study in 492 patients were included in the study, 346 females and 146 males. The mean age of the patients was 46.5±21.20 years (Range: 4.5 to 107 years)[10].In the study we found port wise distribution of cases of laparoscopic port site infections. Maximum infections found in laparoscopic cholecystectomy surgery, which was 107(68.59%) patients, then laparoscopic appendicectomy surgery of 35(22.44%) patients and minimum infected patients was not specified the field of laparoscopic surgery, which was 14(8.93%) patients. Moreover, umbilical infection rate in laparoscopic cholecystectomy was 67(42.95%) patients, umbilical infection rate in laparoscopic appendicectomy surgery was 31(19.87%) patients, umbilical infection rate in not specified laparoscopic surgery was 14(8.97%), epigastric infection rate in laparoscopic cholecystectomy surgery was 26(16.67%) patients, lateral infection rate in laparoscopic

cholecystectomy surgery was 4(2.56%) patients, suprapubic infection rate in laparoscopic cholecystectomy surgery was 3.85% (6 patients), left iliac infection rate in laparoscopic cholecystectomy surgery was 1(0.64%) patient, not specified infection rate in laparoscopic cholecystectomy surgery was 3(1.92%) patients, not specified infection rate in laparoscopic appendicectomy surgery was 4(2.56%) patients[10]. Dense adhesions around the gallbladder make dissection potentially more difficult, and tense, distended gallbladder that has not been decompressed is at risk of perforation[11,12]. 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[13]. 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 or non-healing fistulae[14]. 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 beenreported to happen as early as 4 days after laparoscopic cholecystectomy and as late as 10 years after surgery[15].

From the findings of the mycobacterial isolates there found most cases in mycobacterium chelonae which was 56(35.90%), after then 38(24.36%) cases found in mycobacterium massiliense, 18(11.54%) cases found in mycobacterium tuberculosis, 13(8.33%) cases found in mycobacterium abscessus, 7(4.49%) cases found in not specified group, 3(1.92%) cases found in mycobacterium fortuitum and minimum cases found in mycobacterium wolinskyi and mycobacterium neoaurum which was 1(0.64%). Moreover, 14(8.97%) cases found in staphylococcus aureus of gram positive group and 5(3.21%) cases found in pseudomonas of gram negative group. Another study in India included port site infection of 624 cases, microorganisms were specified in 50%, of Mycobacterium chelonae (47%) and Mycobacterium massilinese (23.5%). Overall infections by Mycobacterium were 287 in number among which rapid growers were majority (91%). Among all isolates of Mycobacterium, in 13 cases (5%) Mycobacterium tuberculosis was found. Gram positive and Gram negative organisms were also found as a cause of port site infection and were included in study as a part of surgical site infections[9].

From the treatment chart of the patients, there maximum patients cured by taking clarithromycin which was 44(28.21%) and the duration is equal or more than 6 months, after then 28(17.95%) in PB: polymyxin B and the duration was 4 months, respectively 27(17.31%) in anti-tubercular therapy and the duration was less than 6 months, 22(14.10%) in clarithromycin+ ciprofloxacin and the duration was equal or more than 6 months, 18(11.54%) in amikacin+ cefoxitin/imipenem and the duration was 3 weeks, 7(4.49%) in clarithromycin+ cotrimoxazole and the duration was 2 weeks, and the minimum patients of 5(3.21%) found in clarithromycin+ doxycycline where the duration is more than 4 months and amikacin (IV), then oral ofloxacin/ciprofloxacin where the duration was 2 weeks.Another study showed that using combination of clarithromycin with doxycycline, cotrimoxazole or fluoroquinolones did not yield much different result than using clarithromycin alone, the duration of both being 6 months. Possibly clarithromycin for 6 months would be sufficient to treat port site infections if the organism is non-tubercular mycobacteriam[9]. A few studies reported infection by Mycobacterium tuberculosis[16-19]. Again in a study there found the management of PSIs with atypical mycobacteria lacks consensus. They respond poorly to first line anti-tubercular drug treatment. Second line antitubercular drugs including macrolides (clarithromycin), quinolones (ciprofloxacin), tetracyclines (doxycycline) and aminiglycosides (amikacin and tobramycin) in various combinations have been used with promising results[20-22]. Macrolides including clarithromycin are the only group of antimicrobials active against M. chelonae and M. abscessus[21,23]. Mycobacterium fortiumchelonae complex has shown resistance to antibiotics because of mutation in the porin channels present in the bacterial wall, which is the site for entry of antibiotic molecules for antimicrobial activity[21]. Linezolid was found to be active against M. chelonae and has been successfully used for treatment, alone or as combination therapy[24].

Limitations of the study

Our study wasn't a blinded study so patient bias was present along with observer bias in subjective recording and the findings may not reflect the exact scenario.

VI. Conclusion And Recommendations

Port site infections are a rare complication in laparoscopy. Non-tuberculous mycobacterium is the most common organism causing port site infections. These organisms are susceptible to clarithromycin, amikacin, but resistant to fluoroquinolones and first line anti-tubercular drugs. Leaving aside the bacterial causes, the emerging rapid growing multidrug resistant non-tuberculous mycobacteria are a new threat to the surgical fraternity. Strictly abiding by the commandments of cleaning and sterilization of the laparoscopic instruments with the appropriate sterilizing agent, the complication can be best avoided.

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Deb Prosad Paul, et. al. "Analysis of Laparoscopic Port Site Infections: A Descriptive Study." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(10), 2020, pp. 50-54.