Original Research Article

https://doi.org/10.53339/aimdr.2025.11.4.16
E-ISSN: 2395-2822 | P-ISSN: 2395-2814

A frustrating port sites infection due to tuberculosis following laparoscopic surgery

Md. Rabiul Karim[1], Afroja Siddiqua[2], Md Abu Sayem[3], Rubina Akter[4], Monirul Islam Sajib[5], Rana Jahangir Alam[6], SK. Mozammel Haque[7], Md. Rezaul Alam[8]

[1]Department of Surgery, Ship International Hospital, Dhaka, Bangladesh, [2]Department of Obestetrics and Gynaecology, Ship International Hospital, Dhaka, Bangladesh, [3]Department of Surgery, National Institute of Cancer Research and Hospital, Dhaka, Bangladesh, [4]Department of Obstetrics and Gynaecology, Dhaka Medical College and Hospital, Dhaka, Bangladesh, [5]Department of Surgery, Sir Salimullah Medical College Mitford Hospital, Dhaka, Bangladesh, [6]Department of Surgery, Bangladesh medical University, Dhaka, Bangladesh, [7]Department of Surgery, Bangladesh Medical University, Dhaka, Bangladesh, [8]Department of Surgery, Medical College for Women and Hospital, Dhaka, Bangladesh

Address for correspondence: Md. Rabiul Karim, Department of Surgery, Ship International Hospital, Dhaka, Bangladesh. E-mail: dr.rabisurgery@gmail.com

Abstract

Introduction: Minimal access surgery has brought a paradigm shift in the approach to modern surgery. Less pain, rapid post-operative recovery, cosmesis, and early return to work have led to this popularity. Laparoscopic procedures have progressed from cholecystectomies to appendicectomies to various other fields, including gastrointestinal surgery, onco surgery, urology, and gynecology.

Methods: This study included 100 laparoscopic surgeries at Ship International Hospital, Dhaka, from September 2021 to September 2022. Standard preoperative care and general anesthesia were given. Specimens were retrieved in endobags, and instruments were sterilized with 2% glutaraldehyde (30 min contact).

Results: Among 100 laparoscopic surgeries (80 cholecystectomies and 20 appendicectomies), port-site infection was observed in 7 patients. The umbilical port, particularly used for specimen extraction, was the most commonly affected site (42%), followed by combined umbilical and epigastric ports (28%). Operative findings associated with these infections included chronic cholecystitis with thick gallbladder wall (42%), acute cholecystitis (28%), empyema gallbladder (14%), and acute appendicitis (14%).

Conclusion: Port-site infection, though uncommon, remains a significant complication of laparoscopic surgery, leading to patient morbidity and undermining surgical outcomes. Atypical mycobacteria are emerging as important causative agents, often resistant to multiple drugs. Strict adherence to sterilization protocols, along with timely diagnosis and appropriate antimicrobial therapy, is essential to prevent and effectively manage these infections.

Keywords: Atypical mycobacteria, laparoscopic surgery, laparoscopic surgery, port-site infection, sterilization, surgical site infection

Introduction

Laparoscopic surgery was first introduced in the 18th century, and since then, it has become a preferred surgical procedure for multiple surgeries.[1] It is considered as gold standard for symptomatic gallstones.[2] Reduced hospital stays after surgery, early return to work, reduced post-operative pain, less surgical evaluation, and better outcome for cosmetic and minor post-operative

complications. These are the benefits.[3] It is true that laparoscopic cholecystectomy associated with a few SSIs is more than open cholecystectomy.[4] In MAS, the chance of wound infection has no doubt been reduced, but not altogether eliminated.[3-6] Port-site infections (PSI) soon erode the advantages of laparoscopic surgery, with the patient becoming worried with an indolent and nagging infection and losing confidence in the operating surgeon. There occurs a significant increase in the morbidity, hospital stay, and financial loss to the patient. The whole purpose of MAS to achieve utmost cosmesis is turned into an unsightly wound, and the quality of life of the patient is seriously affected.[7] Classifications of the PSI are superficial and deep. Moreover, wound was classified into clean, clean-contaminated, and contaminated using the standard National Nosocomial Infections Surveillance System, given by the United States Center for Disease Control and Prevention (CDC),[3] which defines PSIs as those occurring within 30 days of an operation.[5] Wounds were assessed clinically at regular intervals after surgery. In case of infection had occurred, pus was sent for C/S. Dressing and cleaning was done, and empirical antibiotics were started till C/S reports are available. The wounds were re-examined and if no response was seen, pus was again sent for AFB and AFB-positive cases, pus was sent for culture in Lowenstein–Jensen media. In some cases, sinuses and nodules are excised and sent for histopathology.

Methods

One hundred patients of laparoscopic surgery for various indications in the general surgery department of Ship International Hospital in Uttara, Dhaka are included. This study was conducted for 1 year from September 2021 to September 2024. All those patients who underwent laparoscopic surgery during the above period were included in the study. In all the patients, the pre-operative preparation was done by a complete bath before surgery using antiseptic soap, and the concerned area of skin was prepared by shaving. The patients were admitted a day before surgery and one preoperative dose of ceftriaxone 1gm at the time of induction and two subsequent post-operative doses of the same were given 12 h apart. All the surgeries were done under G/A. Pneumoperitoneum was created using a Veress needle in supra-umbilical incision. Through the same incision primary trocar (10 mm) was introduced into the abdominal cavity. Time duration was calculated from skin incision to the end of surgery. GB specimen extracted through epigastric port and appendix through supra-umbilical port. Both cases endobag was used. 10 mm ports closure was done by non-absorbable suture. 2% glutaraldehyde solution with a contact time 30 min was used to sterilize all laparoscopic instruments. The glutaraldehyde solution was replaced after every 2 weeks, and all instruments were washed with warm saline before surgery. All patients were monitored for PSI. The patient with superficial infection presented with intermittent watery, thin, purulent, and reddish discharge, erythema, mild induration and mild tenderness. The patients with deep infection had developed marked induration, nodules around the incisional scar and were having discharging sinuses. They were all clean wounds. The PSI did not respond to 2nd and 3rd generation cephalosporins. The most common presentation was pus and watery discharge, erythema, induration, and mild tenderness at the site of the infected port. No fever was reported by the patients. Hemogram reports were normal.

Results

Out of 100 laparoscopic surgeries, 80 patients underwent laparoscopic cholecystectomy and 20 underwent laparoscopic appendicectomy [Table 1].

The umbilical port from which GB was extracted showed infection in 3 (42%) cases. This is the most frequent. This was followed by double port involvement, epigastric and umbilical in 2 (28%) patients, both lateral ports showed infection in 1 (14%) patient, and the epigastric port only was infected in 1 (14%) case. In laparoscopic appendicectomy, the umbilical port used for the extraction of the appendix was involved infection [Table 2].

Table 1: Types of laparoscopic surgeries done

Laparoscopic surgeries	Number of surgeries
Cholecystectomies	80
Appendicectomies	20

Table 2: Port-site affected in the case of infection

Port site	Frequency (x=7)	Percentage
Umbilical port	3	42
Umbilical and epigastric port	2	28
Single epigastric port	1	14
Both lateral ports	1	14

The operative findings in case of PSI in laparoscopic cholecystectomies and appendicectomies included acute cholecystitis in 2 (28%), empyema of the gall bladder 1 (14%) case, chronic cholecystitis with thick-walled GB in 3 (42%) case, and acute appendicitis in 1 (14%) case only [Table 3].

Umbilical port

Epigastric port

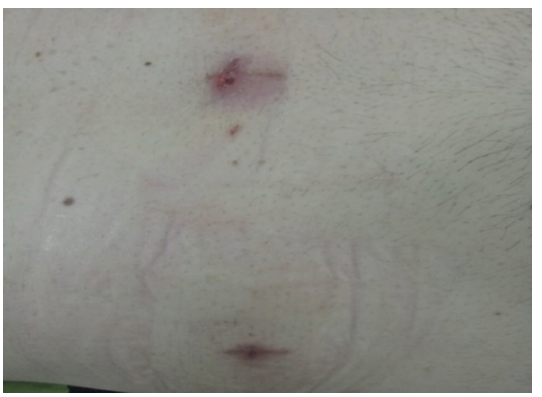
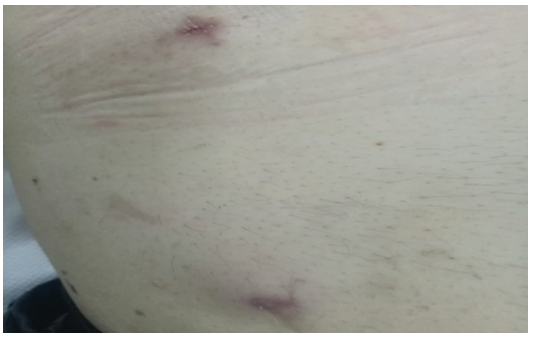


Table 3: Pre-operative findings in case of PSI's

Operative findings	Frequency (*n*=7)	Percentage
Acute cholecystitis	2	28
Empyema GB	1	14
Chronic cholecystitis with thick GB wall	3	42
Acute appendicitis	1	14

Lateral ports



Discussion

From available literature, it has been noted that PSI has been reported with respect to laparoscopic surgeries from different ports of the world namely Egypt,[8] Pakistan,[6] China,[9] Turkey,[10] and India.[7] It is pertinent to mention here that PSIs in laparoscopic surgeries have been reported more from developing countries as compared to developed countries.[9] On a review literature, it is noted that the frequency of PSI is variable. It has been reported as low as 2.2% from Israel[11] as high as 9.3% in Cario, Egypt.[8] In the present study, it was recorded as 7%; which is nearer to reported by Shindholimath VV (6.3%).[12] The CDC classification od SSI categorizes these wounds into two subtypes, superficial and deep. The superficial ones include those involving skin and subcutaneous tissue, whereas the deep ones refer to fascia, muscle, and organ or space infection.[5] In the present study, the wounds predominantly belonged to the superficial category (85.7%). The percentage of deep infections extending into the fascial plane was (14.3%) which was lower than reported in recent studies. Hence, it has

been noted that PSI is mostly superficial. It may be because of early diagnosis and management. The causative agent of these PSIs is mostly mycobacteria, of which over a hundred species are known.[8] Most of these are WTM, which are regarded to be causative agents for serious PSIs.[11] Of these, *Mycobacterium* fortuitum is known to cause pyogenic infection in soft tissues, whereas *Mycobacterium* chelone, abscessus complain is known to cause many wound infections. The PSI by mycobacterial organisms is of common occurrence, having been mostly reported in developing countries.[8] It is interesting to note that in the present study *Mycobacterium tuberculosis* has been reported to PSI's. Earlier also *M. tuberculosis* has been reported to cause PSI.[7] Another study reports that NTM in 4 cases out of 75.[13] Among the PSI, the cause may be exogenous or endogenous. Some authors believed that mycobacterial contamination may occur at the time of washing of reusable laparoscopic instruments. It is reported that some strains of mycobacteria grow in PVC pipes, even in sterilized water.[8] The practice of rinsing instruments with boiled tap water to remove glutaraldehyde may be the source of reinfection, with which the present author agrees.[12] However, in the present study, normal saline was used instead of boiled tap water, which in the opinion of the present author, seems to have no difference. Some authors even describe glutaraldehyde-resistant strains.[8] The authors believe that in the present cases, PSI is due to an exogenous source as most of the infections occurred in 1 month only during which the patients were operated. It seems that some glutaraldehyde solution was being used for all the patients during the said period. This is in conformity with the conclusions of Sharma *et al*., in 2013. In the present study, umbilical port showed infection in maximum cases (42%).[7,13] It is suggested by some authors that the port used for the extraction of specimens is the most commonly involved port in infection because of the spillage.[14] However, in the present surgeries, endobags were used for extraction, so there was no spillage, which is considered one of the risk factors of infection. Therefore, the cause of infection seems to be exogenous and most probably the contaminated instruments. A similar conclusion has also been drawn.[15,16]

Conclusion

Following MAS, PSI is infrequent, but it is a frustrating complication both for the patient as well for the operating surgeon. Leaving aside the bacterial causes, the emerging rapidly growing non-tuberculous mycobacteria are a new threat to the surgical fraternity. Strictly abiding by the commandment of cleaning and sterilization of the laparoscopic instruments, with the appropriate sterilizing agent, the complication can be best avoided. All the cases of PSI, especially of the atypical *Mycobacterium* should be notified to know the exact incidence, etiology and sensitivity pattern to various antibiotics. Macrolides, quinolones, and aminoglycosides do show promising activity against the atypical mycobacterium.

References

1. Dubois F, Icard P, Berthelot G, Levard H. Coelioscopic cholecystectomy. Preliminary report of 36 cases. Ann Surg 1990;211:60-2.
2. Mehraj A, Naqvu MA, Feroz SH, Ur Rasheed H. Laparoscopic cholecystectomy: An audit of 500 patients. J Ayub Med Coll Abbottabad 2011;23:80-90.
3. Williums LF Jr., Chapman WC, Bonua RA, McGee EC Jr., Boyd RW, Jacobs JK. Comparison of laparoscopic cholecystectomy with open cholecystectomy in a single center. Am J Surg 1993;165:459-65.
4. Jan WA, Ali IS, Shah NA, Ghani A, Khan M, Khan AS. The frequency of port-site infection in laparoscopic cholecystectomies. J Postgrad Med Inst 2008;22:1.
5. Centers for Disease Control Prevention. The National Healthcare Safety Networh (NHSN) Mannual: Patient Safety Component Atlanta, GA: Division of Healthcare Quality Promotion. National Centre of Emerging and Zoonotic Infections Diseases. Available form: https://www.cdc.gov/nhsn/acute care hospital/index html/2015 [Last accessed on 2025 Jul 15].
6. Horan TC, Gaynaes RP, Mortone WJ, Jarvis WR, Emori TG. CDC definitions of nosocomial surgical site infections, 1992: A modification of CDC definitions of surgical wound infections. Infect Control Hosp Epidemiol 1992;13:606-8.
7. Sasmal PK, Mishra TS, Rath S, Meher S, Mohapatra D.

Port site infection in laparoscopic surgery: A review of its management. World J Clin Cases 2015;3:864-71.

8. Abd-Elhamid N, Kashim K, Kelimeler A. Port site non-tuberculous Mycobacterial infection after laparoscopic cholecystectomy: A case series. TAF Prev Med Bull 2013;12:481-4.
9. Chuang SC, Lec KT, Chang WT, Wang SN, Kuo KK, Chen JS, *et al*. Risk factors for wound infection after cholecystectomy. J Formos Med Assoc 2004;103:607-12.
10. Leblebicioglu H, Erben N, Rosenlthal VD, Sener A, Uzun C, Senol G, *et al*. Surgical site infection ratesin 16 cities in turkey: Findings of the international nosocomial infection control consortium (INICC). Am J Infect Control 2015;43:48-52.
11. Jan WA, Ali IS, Shah NA, Ghani A, Khan M, Khan AS. The frequency of port-site infection in laparoscopic cholecystectomies. J Postgrad Med Ins 2008;22.
12. Sharma AK, Sharma R, Sharma S. Port site infection in laparoscopic surgeries-clinical study. Indian Med Gazette 2013;147:224-9.
13. Richarls C, Edwards J, Culver D, Emori TG, Tolson J, Gaynes R, *et al*. Does using a laparoscopic approach to cholecystectomy decrease the risk of surgical site infection? Ann Surg 2003;237:358-62.
14. Memon W, Khanzasa TW, Sanad A, Laghari MH. Complications of laparoscopic cholecystectomy at Isra University Hospital, Hyderabad. Pak J Med Sci 2009;25:69-73.
15. Tauro LF, Satish RB, Martis JJ, Shenoy DH. Port site tuberculosis: A rare complication following Laparoscopic cholecystectomy. Indian J Surg 2005;67:104-5.
16. Jagadish N, Sameer R, Omprakash R. Port-site tuberculosis: A rare complication following laparoscopic cholecystectomy. Scand J Infect Dis 2002;34:928-9.