

# Port Site Infections Following Laparoscopic Surgeries

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**Abstract:** *This study investigates the incidence, risk factors, and prevention strategies for port site infections (PSI) following laparoscopic surgeries, using a hospital-based prospective observational approach at the Department of General Surgery, Fakhruddin Ali Ahmed Medical College and Hospital, Barpeta, Assam, over one year. A total of 195 patients who underwent various laparoscopic procedures were analyzed, with laparoscopic cholecystectomy being the most common. The overall complication rate of PSI was found to be 7.68, with a notable association with patient age, gender, body mass index (BMI), the presence of comorbidities, and the specific type of port used. The study also highlights the significant role of intraoperative spillage of contents in the development of PSIs. The treatment of PSI involved empirical antibiotics, guided by wound culture sensitivity, with *Staphylococcus aureus* being the most common causative organism. The findings underscore the importance of strict sterilization protocols and the careful handling of specimens to minimize the risk of PSIs, which are preventable yet significant complications of laparoscopic surgery.*

**Keywords:** Laparoscopic surgery, port site infections, sterilization techniques, risk factors, prevention strategies

## 1. Introduction

Laparoscopic surgery (LS), also termed minimal access surgery (MAS) has become the surgical treatment for many surgical diseases nowadays. Shorter hospital stay, early postoperative recovery, less pain and scarring, improved aesthetics and early return to work have led to its popularity both amongst surgeons and patients. Laparoscopy has its own set of unique complications. Besides, major complications like bowel and major vascular injury; Port site infections (PSI), Port site hernia, Pyoderma, bleeding and metastasis at port sites for cancer patients are growing entity nowadays.<sup>1</sup> The total complication rate of laparoscopic surgeries was 3.6/1000 procedures and the rate of major complication was 1.4/1000 procedures.<sup>2</sup> Port site infection (PSI) although infrequent, is one of the bothersome complications which undermine the benefits of minimal invasive surgery. The incidence of Port site infection (PSI) after laparoscopic surgeries is approximately 21/1,00,000 cases.<sup>3</sup> And the rate of PSI depending upon various type of surgeries ranges from 3.3% to 8%.<sup>4</sup> Despite the advances in the field of antimicrobial agents, sterilization techniques, surgical techniques, operating room ventilation, PSIs still prevail. The emergence of rapid growing atypical mycobacteria with multidrug resistance has further compounded the problem. PSIs are preventable if appropriate measures are taken preoperatively, intraoperatively and postoperatively.

## Aim of our study

To assess the port site infections following Laparoscopic Surgeries and its associated risk factors and prevention.

## 2. Material and Methods

Study Location: Department of General Surgery, Fakhruddin Ali Ahmed Medical College and Hospital, Barpeta, Assam. Study Design: Hospital based prospective observational study. Study Duration: One year from 1st April 2022 to 31st March 2023. Sample size: Patients who underwent laparoscopic surgeries were included in the study. After considering the inclusion and exclusion criteria 195 patients (both male and females) were taken for this study.

### Inclusion criteria:

- 1) All the patients male and female from 18 years and beyond.
- 2) All patients who underwent laparoscopic surgeries for various diseases

### Exclusion criteria:

- 1) Laparoscopic surgery converted to open surgery.
- 2) Patient with immuno-compromised status. (HIV, hepatitis).

## 3. Results

In our study, a total of 195 patients underwent laparoscopic surgeries.

a) Types of Laparoscopic Procedures Done:

Laparoscopic procedures	Patients		Port site infections (PSI)	
	Number	Percentage	Number	Percentage
Laparoscopic Cholecystectomy	176	90.25	11	5.62
Laparoscopic Appendicectomy	12	6.15	2	1.02
Laparoscopic Hernia Repair	3	1.54	1	0.52
Laparoscopic Gastrojejunostomy	1	0.52	0	0.00
Laparoscopic pelvic abscess drainage	2	1.02	1	0.52
Diagnostic Laparoscopy	1	0.52	0	0.00
Total	195	100.00	15	7.68

Out of the surgical procedures, laparoscopic cholecystectomy was the most commonly performed procedure (90.25%) with highest port site complications of 5.62% out of the total complications of 7.68%

b) Age Distribution of the Patients:

Age groups (in years)	Patients		Port site infections (PSI)	
	Number	Percentage	Number	Percentage
18- 30	56	28.72	2	1.02
31- 40	64	32.82	5	2.56
41- 50	39	20.00	4	2.05
51- 60	23	11.80	3	1.54
61- 70	13	6.66	1	0.51
Total	195	100.00	15	7.68
Mean + SD	38.58 ± 12.66			

In our study, commonest age for PSI was 31 – 40 years and the mean was 38.58 ± 12.66. The rate of total PSI was found to be 7.68%.

c) Gender Distribution

Gender	Patients		Port site infections (PSI)	
	Number	Percentage	Number	Percentage
Male	69	35.85	5	2.56
Female	126	64.16	10	5.12
Total	195	100.00	15	7.68

In our study, 5 out of the 69 male patients i. e.2.56% and 10 out of 126 female patients i. e.5.12% developed PSI.

d) Basal Metabolic Index (BMI)

BMI	(Kg/m <sup>2</sup> )	Patients		Port site infections (PSI)	
		Number	Percentage	Number	Percentage
Underweight	<18.50	30	15.38	0	0.00
Normal	18.50- 24.99	102	52.30	4	2.05
Overweight	25.00- 29.99	42	21.56	8	4.10
Obese	≥30	21	10.76	3	1.53
Total		195	100.00	15	7.68

In our study, PSI seen 2.05% in normal BMI patients, 4.10% in overweight patients and 1.53% in obese patients.

e) Comorbidities

Comorbidities	Patients		Port site infections (PSI)	
	Number	Percentage	Number	Percentage
Present • Type 2DM (48 cases) • Hypothyroidism • Hyperthyroidism • Cardiac Problems • Cancers	61	31.28	10	5.13
Absent	134	68.72	5	2.55
Total	195	100.00	15	7.68

Maximum number of PSI i. e.5.13% was seen in patients with co - morbidities than without comorbidities i. e.2.55%. Rate of PSI among diabetic patients was higher than among non - diabetic patients.

f) Types of Port Involved

Port Involved	Port site infections (PSI)	
	Number	Percentage
Umbilical	8	4.10
Epigastric	6	3.07
Lateral	1	0.51
Suprapubic	0	0.00
Total	15	7.68

In our study, the most frequently encountered PSI after laparoscopic surgeries was Umbilical port i. e.8 cases (4.10%), followed by epigastric port i. e.6 cases (3.07%).

#### g) PSI in relation to spillage of contents during specimen retrieval in peritoneal cavity

Spillage of contents	Patients		Port site infections (PSI)	
	Number	Percentage	Number	Percentage
Yes	46	23.59	11	5.644
No	149	76.41	4	2.0
Total	195	100.00	15	7.68

In our study, 11 patients (5.64% out of total 7.68%) developed PSI in patients who had spillage of contents in peritoneal cavity.

#### h) Treatment of PSI

All PSI were treated with empirical antibiotics and daily dressing. Once wound culture sensitivity results is obtained, patient was changed to concerned antibiotics. Most common causative organism was staphylococcus aureus (80%). Atypical mycobacteria infections were present in 2 cases, which were treated with clarithromycin 500mg BDPC for a period of 1month. None of the PSI required surgical excision in our study.

## 4. Discussion

Infections at the port sites of laparoscopic surgery can be of two types. The first type occurs immediately within a week of surgery. It is caused by gram negative or positive bacteria derived from infection acquired during surgery or from the skin and can be treated by common antibiotics and local wound dressing. The second type is caused by atypical mycobacteria which includes the group of mycobacterial species like *M. chelonae* and *M. fortuitum* that is not part of the *M. tuberculosis* complex, and has an incubation period of 3 to 4 weeks and do not respond to common antibiotics. 5 PSI was 5.7% in a study by Sujith Kumar et al<sup>6</sup>, 6.3% by Shindholimath et al<sup>7</sup> and 5.5% by Atul K et al<sup>8</sup> in their studies.

## 5. Conclusion

PSI is one of the complications of laparoscopic surgery and is preventable by proper sterilisation of laparoscopic instruments. After the surgery all the instruments should be dismantled completely and cleaning and washing the instruments should be done under running water. Glutaraldehyde solution should be regularly changed and the minimum immersion time should be above 20 minutes. There is a significant association of PSI with spillage of bile, stones, or pus, with the port of specimen extraction. Complication can occur even in the best of hands and therefore, it is vital that these are recognized properly and immediately treated.

## References

[1] Karthik S, Augustine AJ, Shibumon MM, Pai MV. Analysis of laparoscopic port site complications: a descriptive study. J Minimal Access Surg 2013; 9: 59 - 64

[2] Hakki – siren, Kurki T – A nationwide analysis of laparoscopic complication. Obstet Gynecol 89: 108 - 112, 1997

[3] Aziz R. Practical manual of operative laparoscopy. New York: Springer - Verlag; 1992. p.1 - 8

[4] 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 October 16; 3 (10): 864 - 871

[5] Falkinham OJ., III Epidemiology of infections by nontuberculous mycobacteria. Clin Microbiol Rev.1996; 9 (2): 177–215. [PMC free article] [PubMed]

[6] Kumar SS, Babu DK, Grace DR, et al. A study of port site infections in laparoscopic surgeries. Journal Dent Med Sci 2015; 14 (4): 20–2

[7] Shindholimeth VV, Seenu N, Parshed R, et al. Factors influencing wound infection following laparoscopic cholecystectomy. Trop Gastroentero 2003; 24 (2): 90–2.

[8] Sharma AK, Sharma R, Sharma S. Post site infection in laparoscopic surgeries - clinical study. Indian Med Gazette 2013: 224–9.