

Research Article

Analysis of Port Site Complications & Measures to Prevent them

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A B S T R A C T

Background: Port site complications following elective laparoscopic surgeries are rare. Port site infection is the most common complication.

Objectives: The study was conducted to analyze port site complications occurring in the patients undergoing laparoscopic surgeries and measures to prevent them.

Patients and Methods: Total 408 patients who underwent various laparoscopic surgeries were included in the study. Follow up was done for 3 months postoperatively. Port site was examined for any complication.

Result: Out of 408 patients 24 patients (5.88%) developed port site complications. 14 patients developed post site infection, 4 patients had port site discharge with sinus formation, 4 patients developed port site bleeding and 2 patients had port site hernia. No case of port site metastasis or visceral injury while port insertion were found. No patient had port site omental entrapment.

Conclusion: Minimally invasive surgery is a safe and effective with minimal complication.

Keywords: Laparoscopy, Port Site, Infections, Cholecystectomy

Introduction

Laparoscopy surgery is a worldwide accepted gold standard treatment of many surgical diseases like gall stones disease, acute appendicitis, undiagnosed acute and chronic abdominal pain, stable patients of blunt trauma abdomen and many gynecological problems, liver abscess etc. the introduction of minimally invasive surgery has revolutionized in the field of abdominal and pelvic surgeries.¹ Though it is a routine procedure it is not free from complications. The complication arising due to the laparoscopic surgery is less frequent and

less severe compared to the traditional open surgery.² Port site complication is one of the recognized complication of laparoscopic surgery. Complications occurring at the port site could be access related complication like visceral injuries and vascular injuries etc. and post-operative complications (infection, hernia, bleeding, and metastasis.³ This study analyzed the frequency of port site complications post operatively in laparoscopic surgeries and measures to prevent them. Port site complications though rare sometimes leads to morbidity, increased cost of treatment and secondary surgical intervention.

Aims and Objectives

- To analyze port site complications occurring in the patients undergoing laparoscopic surgeries
- To study measures to prevent them

Material and Method

Design and Duration: Prospective study for a period of one year from January 2019 to December 2019.

Setting: Department of General Surgery, Saraswathi Institute of Medical Sciences, Hapur, UP.

Inclusion Criterion: All patients who were admitted to our hospital and underwent laparoscopic surgeries.

Exclusion Criteria

- Patient with past history of open abdominal surgery.
- Patient who converted from laparoscopic to open procedure.
- Patient who were unfit for surgery.
- Patient who lost follow up.

Methodology

Proper preoperative workup of all patients undergoing laparoscopic surgeries of any age and any sex was done. Diagnosis of patients undergoing laparoscopic surgery were included like cholelithiasis, choledocholithiasis, acute appendicitis, inguinal hernia, acute right iliac fossa pain, undiagnosed chronic abdominal pain, umbilical hernia, incisional hernia, liver abscess, hydatid cyst of liver, varicocele, rectal prolapse, stable patients of blunt trauma abdomen and various gynecological procedures (cystocele repair, total laparoscopic hysterectomy, ovarian cystectomy and oophorectomy, ectopic pregnancy).

All patient underwent the planned laparoscopic surgeries. Per operative and Post-operative complications were analyzed.

Analysis of port site complications including their management and measures to prevent them were done. Post-operative follow up was done for 3 months and port sites were examined for any complications.

Result

408 patients underwent laparoscopic surgeries for various diseases in the study period. 248 patients were females and 160 patients were males.

Table 1. Age Wise Distribution of Cases

| S. No. | Age in years | No. of cases | Percentage |
|--------|--------------|--------------|------------|
| 1 | 0-20 | 84 | 20.58% |
| 2 | 21-4 | 180 | 44.11% |
| 3 | >40 | 144 | 35.29% |
| Total | | 408 | |

Table 2. Frequency of Port Site Complications (Procedure Wise)

| S. No. | Procedure | No. of Cases | No. Port Site Compli-cations | % |
|--------|---------------------------------------|--------------|------------------------------|-------|
| 1. | Laparoscopic Cholecys-tectomy | 220 | 08 | 1.96% |
| 2 | Laparoscopic Appendectomy | 32 | 04 | 0.98% |
| 3. | Laparoscopic Inguinal Hernia Repair | 35 | 2 | 0.49% |
| 4. | Laparoscopic Umbilical Hernia Repair | 20 | 1 | 0.25% |
| 5. | Laparoscopic Incisional Hernia Repair | 16 | 1 | 0.25% |
| 6. | Laparoscopic Liver Abscess Drainage | 14 | 2 | 0.49% |
| 7. | Laparoscopic Hydrated Cyst Excision | 4 | 1 | 0.25% |
| 8. | Diagnostic Laparoscopy | 20 | 0 | 0% |
| 9. | Laparoscopic CBD Exploration | 8 | 1 | 0.25% |
| 10. | Laparoscopic Mesh Rectopexy | 2 | 0 | 0% |
| 11. | Laparoscopic Cystocele Repair | 2 | 0 | 0% |
| 12. | Laparoscopic Hysterectomy | 15 | 2 | 0.49% |
| 13. | Laparoscopic Ovarian Cystectomy | 8 | 0 | 0% |
| 14. | Laparoscopic Ectopic Pregnancy | 12 | 2 | 0.49% |

Statistical Analysis

Statistical Analysis was done using Chi Square test. P value found to be significant < 0.05.

Table 3.Types of Complications

| S. No. | Port Site Complications | Frequency | % |
|--------|--|-----------|-------|
| 1. | Port Site Bleeding | 4 | 0.98% |
| 2. | Visceral Injury | 0 | 0% |
| 3. | Port Site Omentum Entrapment | 0 | 0% |
| 4. | Port Site Hernia | 2 | 0.49% |
| 5. | Port Site Infection | 14 | 3.43% |
| 6. | Port Site Sinus Formation With Discharge | 4 | 0.98% |
| 7. | Port Site Metastasis | 0 | 0% |

Table 4.Procedure Wise Types of Port Site Complications

| S. No. | Types of complications | Lap cholecystectomy | Lap appendectomy | Lap inguinal hernia repair | Lap umbilical hernia repair | Lap incisional hernia repair | Lap liver abscess drainage | Lap cbd exploration | Lap hydatid cyst drainage | Ldiagnostic lap | Lap mesh rectopexy | Lap cystocele repair | Lap hystrectomy | Lap ovarian cystectomy | Lap ectopic pregnancy excision | Total |
|--------|--|---------------------|------------------|----------------------------|-----------------------------|------------------------------|----------------------------|---------------------|---------------------------|-----------------|--------------------|----------------------|-----------------|------------------------|--------------------------------|-------|
| 1. | Port Site Bleeding | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 2. | Visceral Injury | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3. | Port Site Omental Entrapment | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4. | Port Site Hernia | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 5. | Port Site Infection | 4 | 3 | 1 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 14 |
| 6. | Port Site Sinus Formation With Discharge | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 7. | Port Site Metastasis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 8 | 4 | 2 | 0 | 1 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 24 |

Discussion

Port site complications can be grouped into access related complications and post-operative complications and have been reported in all age groups and in both the sexes.

Complications at port sites included in our study were port site infection, port site bleeding, port site discharge and sinus formation, port site hernia and port site metastasis and port site omental entrapment.

The incidence of these complications noted in the study is comparable with worldwide statistical available data.

Port Site Infection

It is amongst the most common port site related complications. The incidence of port site infection in our study was 3.43% (14 cases). All the infections were involving

only the skin and subcutaneous tissue of the port site. It involved 4 cases of laparoscopic cholecystectomy, 3 case of laparoscopic appendectomy, 1 case of laparoscopic inguinal hernia repair, 2 cases of laparoscopic liver abscess drainage, 1 case in laparoscopic hydatid cyst drainage, 2 cases in laparoscopic ectopic pregnancy management and 1 case of laparoscopic CBD exploration. Comparable result in the study conducted by Ahemad et al (5) and Thomon et al (6) have repaired the infection rate of 0.3 % and 0.81% respectively. However a study conducted by Votk (7) and Hamzaoglu (8) showed a bit higher infection rate of port sites (9% and 8% respectively). Infections can be prevented by appropriate administration of antibiotics prophylaxis, taking appropriate aseptic precautions and use of sterile endobags for specimen retrieval.



Figure 1. Port site infection following laparoscopic cholecystectomy



Figure 2. Right breast abscess and right axillary abscess following epigastric port infection after laparoscopic cholecystectomy

Right breast abscess and right axillary abscess followed by port site infection. It occurred in 1 patients (0.40%) patient. It was very unusual complications. There was epigastric port site infection followed by small abscess in right axilla. Patient was a known case of diabetes mellitus type 2, hypertension and on long term steroid therapy for rheumatoid arthritis. Gram staining and culture and sensitivity was done in all three samples separately showed staphylococcus aureus in all three samples.

Port Site Bleeding

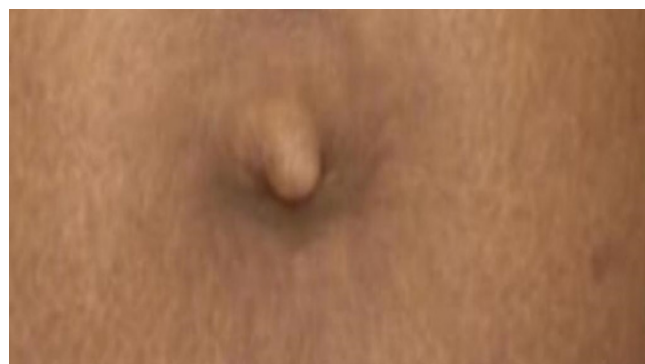
A single case of port site bleeding was found during the study in laparoscopic cholecystectomy which involved the epigastric port, one case was found in laparoscopic inguinal hernia repair, one case was found in laparoscopic CBD exploration and one case was seen in the laparoscopic incisional hernia repair where hernia was encountered in umbilical port site. When the trocar was removed under vision with camera a spurter was seen. The port site was sutured under vision which included the spurter with ethilon 3-0 cutting mattress suture. Number of cases of port site bleeding found in the studies shown by Khan,⁹ Ahmed et al.⁵ and Shamiyeh.¹⁰ But the study conducted by Muqim et al.¹¹ showed higher rates

of port site bleeding. The reason may be that patients with bleeding disorders were not taken into the present study. Prevention of port site bleeding can be done by:

- Visually inspecting the access site upon its creation
- Site should be also inspected during the removal of port after the procedure

Port Site Hernia

Incidence of port site hernia in our study was 0.49% only two cases namely laparoscopic cholecystectomy and laparoscopic liver abscess drainage, found in six months of follow up. Site was umbilical port following the laparoscopic cholecystectomy and liver abscess drainage. Study of Memon et al.,⁶ Swank et al.,¹¹ Ahmed et al.⁵ and Muqim et al.¹¹ had also shown that <1% of patients developed port site hernia.



Prevention of Port Site Hernia

After the procedure, all the ports should be removed under careful vision followed by the release of pneumoperitoneum. After the release of the pneumoperitoneum gas the primary port and telescope are to be removed together with a clear view at all times that the port is free of any entrapped fat omentum or bowel. To limit the port incision secure and adequate closure of the port sites 8 mm and above should be ensured. It is advisable to close the underlying sheath and skin separately.

Port Site Discharge and Sinus Formation

Total of four cases (0.98%) were found with the port site sinus formation and sero-purulent discharge during our study with regular three months follow-up. Out of the four cases 2 cases were found in the laparoscopic cholecystectomy, one case was found in laparoscopic appendectomy and one case was found in laparoscopic drainage of liver abscess. The port site involved in all the cases was the epigastric port which is used for removal of the specimen. One case was found in the laparoscopic appendectomy and the site involved was the supraumbilical port, which was used to remove the appendix specimen post-surgery.

Discharge was sent for culture & sensitivity, revealed it sterile. USG was done which showed hypo echoic sinus tract

in the abdominal wall without intraabdominal collection. CT sinogram done revealed a long irregular tract which was of branching nature in the abdominal wall with no intra-abdominal connections or visceral connection. Wide excision of the port site was done under general anesthesia and sent for Histopathological examination. HPE revealed port site sinus tract with granuloma with Langhan's giant cells. The patient was put on antitubercular treatment to which patient responded. Port site tuberculosis is a rare complication of laparoscopic surgery. It is usually nosocomial infection caused by incompletely sterilized laparoscopic instruments, dressings and suture material.¹³ The organism in the most of the cases was mycobacterium fortuitum, an atypical mycobacterium that colonizes in soil and tap water. Its incubation period is 3-4 weeks and it presents as port site infections after one month of surgery.¹⁴ Rinsing the instruments with boiled tap water is a source of tubercular infection.¹⁵

Following are the recommendations to prevent port site tuberculosis:

- Thorough mechanical cleaning of instruments by ultrasonic technology
- ETO gas sterilization or gas plasma sterilization of instruments is better than glutaraldehyde¹⁶
- If glutaraldehyde is used 3.4% solution should be used for 8-12 hours for sporicidal action
- Metallic cannulas should be autoclaved or use disposable port cannulas
- Use autoclaved water for rinsing the instruments

Other Complications

No case of omental entrapment in the port site, port site metastasis and visceral injury were found in our study.

Conclusion

Port site complications are rare in elective laparoscopic surgeries. Incidence can be reduced by following aseptic precautions, proper selection of patients, strictly follow basic principles of laparoscopic surgery.

All complications were manageable with minimal morbidity. Consideration of meticulous surgical technique during entry and exit of all port sites can minimize these complications further.

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