PORT SITE COMPLICATIONS IN LAPAROSCOPIC SURGERY

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ABSTRACT

BACKGROUND

Laparoscopic surgery is a new technique that has revolutionised the approach to surgery over the last two decades. However, it also has some demerits. Though the incidence is very low, port site complications are an important drawback of laparoscopic surgery.

AIMS AND OBJECTIVES

The study was conducted to evaluate the various port site complications in all types of patients undergoing laparoscopic procedure and to assess the magnitude of such complications.

MATERIALS AND METHODS

It was a prospective observational study on 117 patients admitted for elective laparoscopic procedure irrespective of age, sex, and weight during the study period. The study excluded patients that were lost during followup and those who had severe co-morbid factors. The patients were observed for any port site complication during operation and in the immediate and remote postoperative period. For this, the patients were asked to come for weekly followup for the first month postoperatively and subsequently once every month for the next three months. Any complication found was noted down and the data gathered was analysed.

RESULTS

Out of the 117 patients, the study showed that 4 (3.42%) patients had bleeding from the epigastric port intra-operatively. In 2 patients, the bleeding stopped spontaneously, but in another 2 patients, the epigastric port needed extension to control the bleeding. 2 (1.71%) patients developed skin and soft tissue infection in the postoperative period while on follow up 1 (0.85%) patient developed hernia at umbilical port site and 1 (0.85%) patient was detected to have malignancy at epigastric port site through which the gall bladder was extracted.

CONCLUSIONS

There had been a tremendous growth in the use of minimally invasive techniques over the past two decades due to the developments in technology and the ever increasing demand by patients for quicker postoperative recovery. Port site complications found in our study were bleeding during intraoperative period, infection during postoperative period, and port site hernia and port site malignancy during followup. The complications except malignancy were easily managed and the magnitudes were low.

KEYWORDS

Laparoscopy, Complication, Port Site Infection, Port Site Bleeding, Port Site Hernia, Port Site Malignancy.

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INTRODUCTION

Laparoscopic surgery is a new technique that has revolutionised the approach to surgery over the last two decades. Laparoscopic cholecystectomy is now considered the gold standard.^[1,2] Other laparoscopic procedures are also well appreciated. Laparoscopic procedure is also known as minimally invasive surgery (MIS). It is performed through small incisions (usually 0.5-1.5 cm) as compared to the large incisions needed for laparotomy.

Though done through small incisions, the entire procedure is under control due to availability of monitor screen that transmit enlarged image of the field seen by the telescope. Thus, wound healing is faster and return to work is quicker. Hence, patients also prefer it over the conventional surgery.

However, it also has some demerits. Though the incidence is very low, port site complications are an important drawback of laparoscopic surgery. The rate of port site complications following laparoscopic surgery is proportional to the size of the port. The common complications are infection, bleeding, hernia, and rarely malignancy.

One of the greatest advantages of laparoscopic procedures is reduction of wound site infection. Review of literature showed that port site infection following laparoscopic cholecystectomy was about 1.1% compared to 4% in open surgery, about 5% in laparoscopic colorectal surgery compared to 9.5% in open surgery, and about 2% in laparoscopic appendectomy compared to 8% in open surgery.^[3]

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Risk factors for port site infection are same as for any incision including poor nutrition, obesity, and diabetes mellitus. In addition to that, improper sterilisation of instruments can give rise to port site infection including that due to *Mycobacterium chelonae*.^[4]

The reported incidence of haemorrhage caused by injury of the epigastric vessels during trocar insertion range between 0.25% and 6.0%.^[5] Bleeding is more common with pyramidal tipped trocars compared to radial expanding trocars.^[6] Control of bleeding can be achieved by either enlargement of the incision or placement of deep sutures leading to an ugly scar. Studies show that plugging the port site with Surgicel can effectively control port site bleeding with excellent wound healing.^[7]

Incidence of port site hernia is 0.65%-2.80% of laparoscopic GI operations.^[8] The most important factors that are responsible for port-site hernia are old age, higher body mass index, pre-existing hernia, trocar design, trocar diameter, increased duration of surgery, and extension of the port site for gall bladder extraction.^[9] Laparoscopic port site herniation is a completely preventable cause of morbidity that requires a second surgical procedure to repair. All fascial defects larger than or equal to 10 mm should be closed while smaller defects may require closure at times to prevent herniation.^[10] Most port site hernias present within 10 days of the primary procedure though delayed hernias has also been reported. CT scan is effective in differentiating port site haematoma from incarcerated small bowel (Richter's hernia) thus helping in early diagnosis to avoid complications.^[11] Studies showed that drain sites can possibly be one of the sources of herniation. Hence, all intraperitoneal drain if necessary should be placed through a 5 mm port instead of 10 mm port.^[12]

Port-site malignancy following laparoscopic surgery is very rare. If there is port site metastasis after laparoscopic surgery during chemotherapy or when adequate chemotherapy has been given, it is usually associated with poor prognosis.^[13] Port-site metastasis is also reported to occur after laparoscopic cholecystectomy in an unsuspected case of gall bladder carcinoma. Hence, when there is clinical doubt like severely contracted gall bladder or abnormal wall thickness, the gall bladder should be extracted using a protective bag.^[14]

This study tries to assess the incidence of such complications in the study group and their magnitude in laparoscopic surgery.

AIMS AND OBJECTIVE

The aim of the study was to look for the various port site complications in laparoscopic surgery in all patients irrespective of age, sex, weight, and type of surgery.

The specific objective of the study was to know the type of complications that occurred at the port site following any laparoscopic procedure and the magnitude of such complications.

MATERIALS AND METHODS

It was a prospective observational study on 117 patients admitted for elective laparoscopic procedure during the study period, irrespective of age, sex, and weight. Each patient in the study group was examined separately.

The study excluded patients that were lost during follow up. It also excluded patients who had severe co-morbid factors.

All the patients had preoperative workup including a complete blood count, blood urea, serum creatinine, blood sugar assessment, ultrasonography of abdomen, x-ray of chest, and ECG. All patients were properly assessed by the anaesthetist preoperatively. Usual antibiotic regime comprised of two shots of intravenous 3rd generation cephalosporin (ceftriaxone) on the day of surgery followed by either oral or intravenous antibiotics as indicated.

All patients had general anaesthesia with endotracheal intubation. The 10 mm ports were closed in two layers. The rectus sheath was closed with polyglactin (No. 1) suture while the skin was closed with monofilament polyamide (2-0) suture. The 5-mm ports were closed in single layer. Only the skin was closed with monofilament polyamide (2-0). Most of the patients were discharged on third or fourth postoperative day.

The patients were observed for any port-site complication during operation and in the immediate and remote postoperative period. For this, the patients were asked to come for weekly followup at OPD for the first month postoperatively and subsequently once every month for at least the next three months. Any complication found was noted down and the data gathered was analysed.

RESULTS AND ANALYSIS

The most common operation performed was laparoscopic cholecystectomy while the least performed operation was diagnostic laparotomy. Table 1 shows the distribution of patients according to the type of operation performed.

Name of Operation	No. of Patients (n=117)	(%)
Laparoscopic Cholecystectomy	97	82.91
Laparoscopic Hernia Repair (TAPP)	10	8.54
Laparoscopic Appendicectomy	7	5.99
Diagnostic Laparotomy	3	2.56

Table 1

Fig. 1: Depicts the Distribution of Cases According to the Type of Operation Performed

Out of the 117 patients, the study showed that 4 (3.42%) patients had bleeding from the epigastric port intra-operatively. In 2 patients, the bleeding stopped spontaneously, but in another 2 patients, the epigastric port needed extension to control the bleeding. 2 (1.71%) patients developed skin and soft tissue infection at the port site in the

postoperative period while on followup, 1 (0.85%) patient developed hernia at umbilical port site and 1 (0.85%) patient was detected to have malignancy at epigastric port site through which the gall bladder was extracted. The outcome at port site is recorded in Table 2.

Outcome at Port Site	No. of Patients	Percentage
No complication	109	93.16%
Port-site bleeding	4	3.42%
Port-site infection	2	1.71%
Port-site hernia	1	0.85%
Port-site malignancy	1	0.85%

Table 2

The study showed that out of the 117 patients, 109 patients did not have any port-site complication. Only 8 patients had some kind of port-site complication. (Fig. 2).

Fig. 2

Of the 8 patients who developed complications, 4 patients had bleeding from port-site intra-operatively. 2 patients had port-site infection in the postoperative period while 1 each patient presented with port-site hernia and port-site malignancy during followup. Figure 3 depicts the same.

Fig. 3

The following are Illustrations of various Complications

Picture 1: Port-Site Infection

Picture 2: Port-Site Hernia

Picture 3: Port-Site Malignancy

DISCUSSION

Laparoscopic surgery is a new technique that has revolutionised the approach to surgery over the last two decades. Almost all general surgical procedures can be performed using minimally invasive techniques. The greatest benefit is achieved in operations where the trauma of access exceeds that of the procedure. Procedures in the chest, upper abdomen, and pelvis especially those not requiring tissue removals are ideally suited for minimally invasive techniques.

Out of the 117 patients included in our study, 97 patients (82.91%) underwent laparoscopic cholecystectomy (Table 1). This further supports the worldwide trend that laparoscopic cholecystectomy has become the 'Gold Standard' for treatment of gall stones.^[1]

109 out of the 117 patients undergoing laparoscopic procedure in our study had an uneventful recovery. Only 8 patients (6.84%) had some port site complications (Figure 2). Review of literature showed that a study on 570 patients by Karthik S et al in 2013 had an overall port site complication of 3% during a followup of three months.^[15] In our study, the incidence was double, but our followup was also of a minimum of four months.

The reported incidence of port-site bleeding due to injury of epigastric vessels during trocar insertion ranges from 0.25% to 6.0%.^[5] In our study, 4 patients (3.42%) had bleeding from epigastric port intra-operatively. In 2 patients, the bleeding stopped spontaneously on application of pressure by mop. However, in another 2 patients, the epigastric port needed extension to control the bleeding. In

both the cases, the bleeding was due to accidental injury to the superior epigastric vessels during extension of the port-site incision for smooth extraction of the gall bladder packed with large or multiple stones. A more cautious approach during extension of the port site will reduce this complication drastically. If we bring the telescope tip near the epigastric port, the vessels can be seen against the illumination of the telescope. This helps us to plan the extension.

Only 2 (1.71%) patients developed skin and soft tissue infection at the port site in the postoperative period. Further study revealed the growth of *Staphylococcus aureus* from the swab taken from the wound. This was effectively managed by removing skin stitches and regular dressing with normal saline and povidone iodine along with systemic antibiotics. Review of literature showed that port-site infection is about 1.1% following laparoscopic cholecystectomy and about 2% following laparoscopic appendectomy.^[3] In our study, laparoscopic cholecystectomy and appendectomy consisted of bulk of the patients. Together they formed 88.9% (104 patients) of the study group. Thus, our incidence of infection matches with the incidence recorded in literature. We did not have any port site infection due to *Mycobacterium chelonae* though there are studies giving account of this nagging complication. Sterilisation of laparoscopic equipment by ethylene oxide gas kills the acid-fast bacilli.^[4]

During followup, 1 (0.85%) patient developed hernia at umbilical port site that was extended to take out the gallbladder with multiple large stones and sludge. The patient presented with complaints of intermittent pain and swelling at umbilical port site. The patient required a second operation for correction of the hernia. Reported incidence of port site hernia ranges from 0.65% to 2.80% of all laparoscopic GI surgeries.^[8] Study of literature shows that one of the important causes of herniation after laparoscopic procedure is extension of the port site for gall bladder extraction.^[9] In our study, the only patient that developed hernia had her port site extended. Studies show that among trocar site hernias, Richter's hernias are the most frequent accounting for two-thirds of all small intestinal hernias. The trocar diameter, the trocar design, pre-existing fascial defects, and some operation-related and some patient-related factors were responsible for hernia development.^[16]

Finally, only 1 (0.85%) patient was detected to have malignancy at epigastric port site through, which the gall bladder was extracted. The unsuspected gall bladder came out to be a specimen of adenocarcinoma of gallbladder on postoperative histopathological examination. The patient was referred to oncology for further management. Review of literature gives evidence of port-site metastasis in a few cases having unsuspected malignancy of gall bladder. Thus, when the gall bladder looks suspicious, it should be taken out in a protective bag to reduce the chance of port-site metastasis.

CONCLUSION

There had been a tremendous growth in the use of minimally-invasive techniques over the past two decades due to the developments in technology and the ever increasing demand by patients for quicker postoperative recovery. Port site complications found in our study were bleeding during intraoperative period, infection during postoperative period, and port-site hernia and port-site malignancy during followup.

Port-site bleeding was the most common complication noted in our study. The use of radial expanding trocars is recommended as it reduces the chance of intraoperative bleeding. Before extension of the epigastric port for removal of specimen, if the telescope head is placed against the port, the blood vessels can be seen against the illumination of the telescope. This helps to plan the extension.

Infection during the postoperative period was the next commonest complication and can be managed by simple stitch removal and regular dressing of the wound along with sensitive antibiotics. Proper sterilisation of laparoscopic equipment preferably by ethylene oxide gas reduces the rate of infection including that due to *Mycobacterium chelonae*.

During followup, one patient presented with port-site hernia, which needed another operation. Proper closure of the ports especially 10 mm ports reduces the chance of herniation. Extension of epigastric port is better than extension of umbilical port for removal of specimen because the falciform present below the epigastric port further prevents herniation.

In our study, one patient presented with port-site metastasis due to extraction of unsuspected malignant gallbladder through the port. All patients undergoing laparoscopic procedure for malignancy and patients in whom the operative finding hints towards possible malignancy should have their specimen removed in a protective bag to prevent port-site metastasis.

Thus to conclude, though the incidence is very low, port-site complications are an important drawback of laparoscopic surgery. In our study, the complications except malignancy were easily managed and the magnitudes were low.

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