A COMPARATIVE STUDY OF THE VARIOUS PORT SITE COMPLICATIONS OF LAPAROSCOPIC SURGERY

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ABSTRACT *Laparoscopic surgery has metamorphosed the field of surgery in the recent years with advantages like less post operative pain, quicker return to normal, decrease in wound size, improved vision and so on. The rate of port site complications of laparoscopic surgery is 21 per 1 lakh cases and has shown a proportional rise of port site incision and trocar. Although uncommon, the various port site complications include port site bleeding, port site infection ,port site hernia and port site discharge.* ***AIMS AND OBJECTIVES OF THE STUDY:*** *To study the various port-site complications Port site infection, Port site bleeding Port site hernia, Port site discharge. In all patients undergoing laparoscopic surgeries in Justice K. S. Hegde Hospital.* ***METHODS AND MATERIALS:*** ***Study Design****- Prospective Study,* ***Study Setting****- This prospective study is carried on all patients undergoinglaparoscopic surgeries in the department of surgery and associated super-specialty branches at the Justice K.S. Hegde Hospital.* ***Sample size****- 100 patients or 2 years, whichever comes earlier.* ***Selection Method****- In this study, all patients undergoing laparoscopic surgeriesin the department of surgery and associated super-specialty branches at the Justice K. S. Hegde Hospital.* ***Inclusion Criteria:*** *All patients undergoing laparoscopic surgeries in the department of surgery and associated super-specialty branches at the Justice K. S. Hegde Hospital.* ***Exclusion Criteria:*** *Patients not willing to participate in this study. Obese patients (BMI>30) Immuno-compromised patients Patients on long term steroid therapy, anti-coagulation therapy and blood thinning agents.* ***Methodology:*** *100 patients who are undergoing laparoscopic surgeries between 2014 and 2016 at the department of surgery and associated super-specialty branches at the Justice K. S. Hegde Hospital.* ***Assessment:*** *Port-sites will be assessed Intra-operative, Day of discharge, 1 month later (Day 30), months later (Day 60)* ***Results:*** *Out of 112 patients evaluated, 17 patients had port-site complications (n-17, 15.1%). Port-site bleeding was the most common port-site complication (n-9, 8%), followed by port-site infection which accounted for 6 patients (n-6, 5.3%). Port-site discharge accounted for 2 patients (n-2, 1.7%). No cases of port-site hernia were reported in this study.* ***Conclusion:*** *At the end of the study, Percentage wise, the incidence of port-site complications in my study is 15.1%, which is higher than the statistics reported worldwide (0.2-6%). The commonest port-site complication is port-site bleeding, commonly seen in the epigastric port-site. We conclude by stating all port-site complications can be managed with minimal morbidity.*

Introduction

Laparoscopic Surgery is a marriage of modern technology and surgical innovation that aims to accomplish surgical therapeutic goals with minimal somatic and psychological trauma[5]. Laparoscopic techniques have revolutionized the field of surgery in the recent years with advantages such as less post-operative pain, early recovery after surgery, decrease in wound size, decreased wound trauma, improved vision, decreased heat loss and reduction in wound infecton[1]. However various complications at the port site are coming to light such as port site bleeding, port-site infection, port-site herniation and so on.The principle of laparoscopy is introduction of a rigid endoscopy (Laparoscope) into the peritoneal cavity through a port and visualization of its contents which help in diagnosis[1].

Port site Complications

1) Port site Bleeding:

Bleeding from the port-site occurs due to the injury to the epigastric vessels. Epigastric vessel injuries is the most common vascular injury which occurs most commonly due to blind insertion of the trocar cannula. To prevent this it is advisable for the camera assistant to bring the tip of the laparoscope near the area, the surgeon is expected to make an incision, the light from the tip
delineates the vessels in the abdominal wall and they can be avoided[12,13]. In case the vessel is damaged, the tamponade can be done by compressing the site with the trocar this usually is enough, but if the bleeding still continues then a direct suture ligation may be tried. Stopping the bleeding from the port sites is cumbersome because of the small size of the incision and of course the fact that it is situated deep in the incision especially in obese patients and patients on anti-platelet drugs undergoing emergency in such circumstances, control of bleeding needs placement of deep sutures or enlargement of the scar leading to an

ugly scar. However recently an innovative technique has been developed.which involves plugging the port-site with Surgicel (local hemostatic agent) which has shown excellent wound healing, with no complications such as site infection or hematoma.However, good surgical technique, awareness and early management of this complication is the key[1,17].

2) Port site Infection:

Infection at port site is becoming a common entity in developing countries. They are classically classified as acute and chronic port-site infections. Acute port-site infection; patient presents with pain, fever and seropurulent discharge, most common organism cultured is Staphylococcus aureus. The management of acute port-site infections includes drainage of the underlying collection and leaving the wound open accompanied by antibiotics. Chronic port-site infections in third world countries especially where tuberculosis is more prevalent, the patients can develop a chronic discharging sinus. Bhandarkar et al reported port-site infection with Mycobacterium chelonei, group 4 mycobacterium[6,7,8,9].

Port-site infection although infrequent is a cumbersome complication which destroy the benefits of laparoscopic surgery. It not only causes morbidity to the patient, but also spoils the reputation of the surgeon.

Despite the recent advances in the field of anti-microbial agents, sterilization techniques, surgical techniques, operating room ventilation, there is an increasing incidence of port-site infection. The emergence of rapid growing atypical mycobacteria with multi-drug resistance has further compounded the problem. Port-site infections are preventable if adequate steps are taken pre-operatively, intra-operatively and post-operatively. Port-site infections can often be treated non-surgically with early identification and appropriate management.

3)Port site Hernia:

Port-site hernia are found with increasing incidence with trocar size greater than 10mm, it is rarely found in 5mm trocar size. This is one of the most dangerous complications as they can present with intestinal obstruction though it is quite rare. Incidence is approximately 1%. Usually majority of the cases are of Richter's type involving the small intestine. To prevent this complication it is essential to close defects of 10mm and more.

The management of port-site hernia is by closing the defect or by placing a non-absorbable mesh over the defect. The incidence of port-site hernia in a range of laparoscopic procedures is 03%-5.4%[1].

Time of diagnosis as per recent literature ranged anywhere from 5 days to 3 years with an average of 9.2 months.

AIMS AND OBJECTIVES

To study the various port-site complications
Port-site infection
Port-site bleeding
Port-site hernia
Port-site discharge
In all patients undergoing laparoscopic surgeries in Justice K. S. Hegde Hospital.

Need for Study

Laparoscopy has metamorphosed the field of surgery in the last decade, however various complications are coming into light especially port-site complications. My study aims at studying the various port-site complications of laparoscopic surgery and also to identify the risk factors causing this complications.

METHODOLOGY

Study Design- Prospective Study

Study Setting- This prospective study will be carried on all patients undergoing laparoscopic surgeries in the department of surgery and associated super-specialty branches at the Justice K. S. Hegde Hospital.

Sample size- 100 patients or 2 years, whichever comes earlier.

Selection Method- In this study, all patients undergoing laparoscopic surgeries in the department of surgery and associated super-specialty branches at the Justice K. S. Hegde Hospital.

Inclusion Criteria:

All patients undergoing laparoscopic surgeries in the department of surgery and associated super-specialty branches at the Justice K. S. Hegde Hospital.

Exclusion Criteria:

Patients not willing to participate in this study.

Obese patients (BMI>30)
Immuno-compromised patients
Patients on long term steroid therapy, anti-coagulation therapy and blood thinning agents.

Methodology:
100 patients who are undergoing laparoscopic surgeries between 2014 and 2016 at the department of surgery and associated super-specialty branches at the Justice K. S. Hegde Hospital.
All patients must have HIV/ HbsAg/ HCV negative status.
Both reusable and disposable ports can be used.
Reusable ports must be sterilized as per protocol prior to surgery.

Assessment:
Port-sites will be assessed
Intra-operative
Day of discharge
1 month later (Day 30)
2 months later (Day 60)

RESULTS
In this study, a total of 121 patients were evaluated who underwent laparoscopic surgery at Justice K. S. Hegde Hospital. However 9 patients were excluded from the study and 112 were included.
Total cases = 121 patients
Included cases = 112 patients
Excluded cases = 9 patients

Sex Distribution:

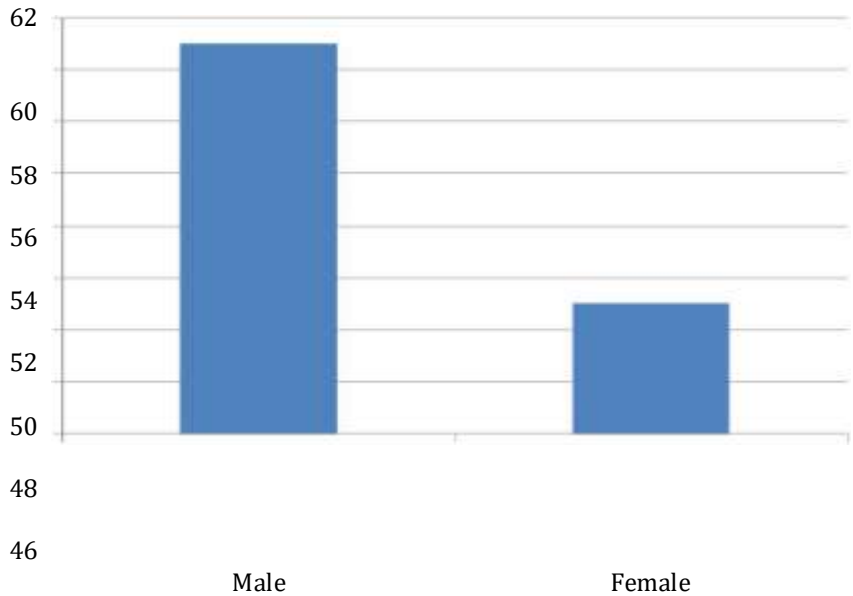
The sex distribution were as follows:

61 male patients (54.4%) and 51 female patients (45.6%) were included in this study.

SEX DISTRIBUTION

Male-61

Female-51



Laparoscopic Procedure Distribution:

The most common laparoscopic procedure was Lap. appendicectomy (n- 60, 53.5%), followed by Lap. cholecystectomy (n- 47, 41.9%). 2 patients underwent TEP (n-2, 1.7%), 2 patients underwent Lap. varicocelectomy (n-2, 1.7%). 1 patient underwent diagnostic Lap (n-1, 0.8%).

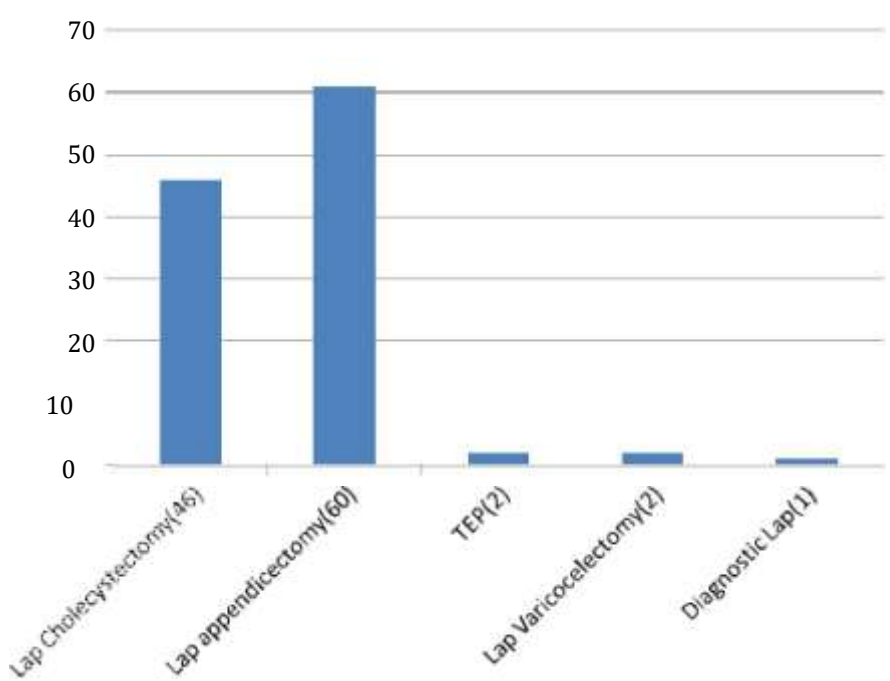
Lap appendicectomy - 60

Lap cholecystectomy - 47

Lap hernia- 2

Lap varicocelectomy- 2

Diagnostic Lap- 1



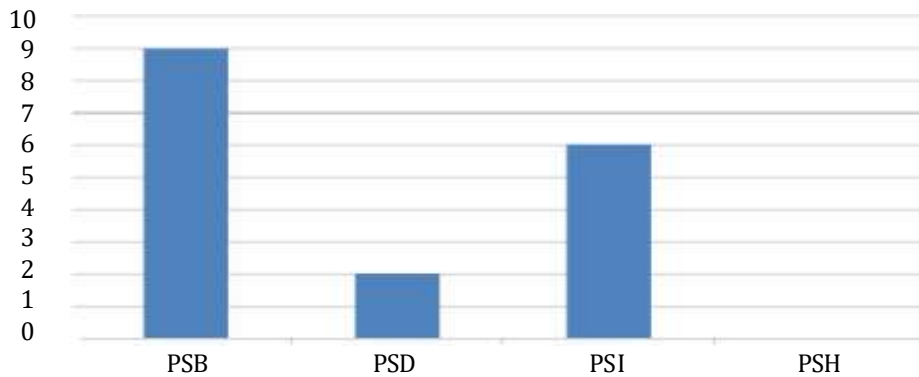
Port-site Complications:

Out of 112 patients evaluated, 17 patients had port-site complications (n-17, 15.1%). Port-site bleeding was the most common port-site complication (n-9, 8%), followed by port-site infection which accounted for 6 patients (n-6, 5.3%). Port-site discharge accounted for 2 patients (n-2, 1.7%). No cases of port-site hernia were reported in this study.

Port-site Bleeding- 9
Port-site Infection- 6
Port-site Discharge- 2
Port-site Hernia- 0

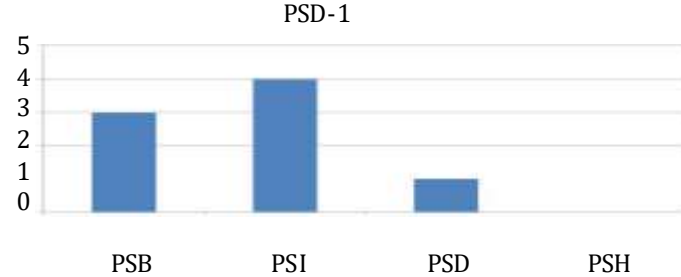
PORT SITE COMPLICATIONS

PSB-9
PSD-2
PSI-6
PSH-0



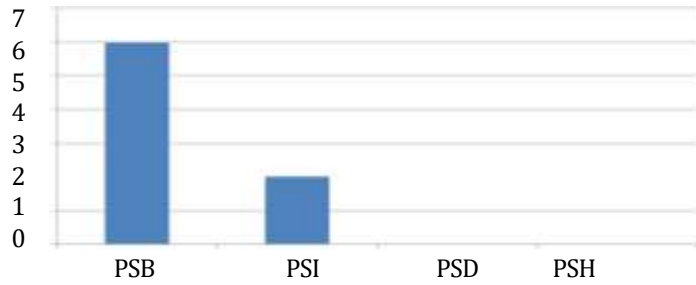
Umbilical port (n-8)
PSB- 3
PSI- 4
PSD- 1

Umbilical port complications
PSB-3
PSI-4
PSD-1



Epigastric Port (n-8)
PSB- 6
PSI- 2
PSD- 0
PSH- 0

Epigastric port complications
PSB-6
PSI-2
PSD-0
PSH-0



Port Site	Complication	Procedure
Umbilical (n - 8)	Bleeding: 3 Infection:4 Discharge:1	Lap Cholecystectomy Lap Appendicectomy Lap Appendicectomy
Epigastric (n - 8)	Bleeding: 6 Infection: 2	Lap Cholecystectomy Lap Cholecystectomy
Left iliac (n - 1)	Discharge:1	Lap Appendicectomy

DISCUSSION

Laparoscopic surgeries have metamorphosed the field of surgery in the recent years with benefits of less post-operative pain, early recovery to normal, decrease in wound size and so on, however various complications of laparoscopic surgery are coming to light.

In this study, we aim to study the various port-site complications.They are classified as access related and post-operative complications, and have been seen in all age groups and both genders. The present study shows that laparoscopic appendicectomy was the most common procedure. The umbilical and epigastric ports were the most common ports to have complications. In our study we excluded obese patients (BMI>30) as literature shows that obesity is associated with increased morbidity and port-site complications, various factors are also taken into account like the need of longer trocars, thicker abdominal wall, larger incisions to expose the fascia, limitation of mobility of the instrument due to thicker subcutaneous tissue.

Augustine, S. Kartik et al has shown that the incidence of port-site complications is 0.2-6% which were comparable to statistics worldwide, the most common port-site complication was port-site infection, which was seen more in the secondary ports. In our study, the incidence of port-site complications is 15.1% which is higher than the worldwide statistics (0.2-6%), the commonest procedure was laparoscopic appendicectomy. The commonest port-site complication is port-site bleeding which was more at the epigastric port.

Port site Bleeding:

Augustine et al showed the incidence of port-site bleeding is 0.7% and were comparable to the results worldwide and the other studies. All the PSBs were seen in the placement of secondary ports. In our study, the incidence of port-site bleeding is 8% which is relatively higher than the worldwide statistics. The PSB was most commonly seen at the epigastric port and was the procedure of laparoscopic cholecystectomy in which all the port-site bleeding occurred. The PSB stopped on its own and needed no active surgical intervention. Deepak et al showed that in their study in which they studied the various port-site complication and observed that PSB accounted for 0.7%, they concluded that laparoscopic surgeries is not without complications and common complications are PSIs, PSHs, PSB and PSD.

We observed that port-site bleeding is related to injury to epigastric vessels and is related to carelessness during the placement of secondary trocars, which must be placed under direct vision and with prior illumination of the abdominal wall. Sometimes bleeding from the abdominal wall may not be apparent until after the port is removed as it serves as a tamponade. In our study all patients having PSBs stopped by itself without any active intervention.

Port site Infection:

S. Kartik et al showed that the incidence of port-site infection is 1.8% in his study and which were comparable to the statistics worldwide. All PSIs were superficial involving only the skin, and subcutaneous tissue. The umbilical port-site was the most common site followed by epigastric port-site. In our study we observed thatthe incidence of PSIs is 5.3% which is higher than the statistics worldwide. The PSI in our study was superficial involving the skin and subcutaneous tissue. The umbilical port was the most common site, followed by the epigastric port.

All the PSI cultured staphylococcus aureus and were treated with a course of antibiotics, analgesics and a drainage of pus under strict aseptic precautions.

Port site Discharge:

S. Kartik et al showed that the incidence of port-site discharge is 0% and reported no cases. In our study, we observed 1 case having PSD from the left iliac port which was observed at the day of discharge and resolved by Day 30, no active surgical intervention was needed. The laparoscopic procedure was a laparoscopic appendicectomy.

Port site hernia:

S. Kartik et al showed that the incidence of port-site hernias is 0.35% which was most commonly seen at the umbilical port site. In our study, we did not observe any case of PSH. Port-site hernia are mostly observed in umbilical port-site and all ports larger than 10mm should be closed. D C Moran et al concluded that development of port-site hernia in post-operative period can be associated with significant morbidity. With meticulous closure of port-site, 10mm or larger, the incidence of PSH may be reduced.

CONCLUSION

We conclude by stating all port-site complications can be managed with minimal morbidity. Consideration of meticulous surgical technique during entry and exit at all port-sites can minimize these complications, also skill and experience of the operating surgeon should also be taken into account.

Limitations of the study

The main drawback was the skill, experience and training couldnt be assessed in my study hence it is difficult to predict whether meticulous surgical technique can minimize port site complications.

REFERENCES

1. Augustine A,PaiM,shibumonM,Kartik S. Analysis of laparoscopic port site complications; A descriptive study. Journal of Minimal access surgery. 2013;9(2):59.
2. SpanerSwarnock G.A brief history of endoscopy,laparoscopy and laparoscopic surgery.Journal of Laproendoscopic and Advanced Surgical Techniques. 1997;7(6):369-373.
3. BoyceH.Highlights in the history of laparoscopy. Gastroenterology. 1998; 114(4):854-855.
4. Jeffreys, Peters. Physiology of laparoscopic surgery.6thed Springer.2001.
5. Williams N,Bulstrode ,O' Connell P,Bailey H, Love R.Bailey and Love short practice of Surgery.P1122-1226.London:hodder Arnold ;2008.6-8
6. Cushieri;Minimal access or minimal invasive surgery;surg endosc;6:214-217
7. S.M iqbal, K.M sayed.Laparoscopy ; JKMP; 2003;10(3);226-228
8. S.A. Kartik AJ,M.M.P Shibumon analysis of laparoscopic port site complications; A descriptive study; J Minim Access surg 2013 Apr;9 (2);59-64.
9. S.Deepak, P. kavach, M.M. Anchalia;a study of cases of complications at portsite; ISSN 2(12) 12-14
10. D.Pankaj, S. pankaj, S.harnam, M.sushil, K.Ashwiniand M.anand ;A prospective study of portsite complications in laparoscopic cholecystectomy; Journal of Minimal invasive surgical sciences; 3(2); 1763-4
11. K.Nauman, C.maurice, H.terrence, M.kelly ;5 millimeter trocar site bowel herniation following laparoscopic surgery;a case report; Journal of the society of laparoscopic surgeons 2012 apr 16[2] 306-310
12. G.Girolamo, S.carmelo, P.franco, V.francessco, F.tiziana, M.giuseppe; portsite related abdominal wall bleeding in 200 patients after laparoscopic cholecystectomy; World Journal of gastroenterology; 2006 november 28; 12(44); 7165-7167
13. M. Owens, M. Barry, A Z Janjua, D C Winter;a systematic review of laparoscopic port site hernia in gastrointestinal surgery ;the Surgeon ;9(4)218-224
14. D C moran,D O Kavanagh, S. Sahebally, P.C . Neary-incidence of early symptomatic portsitehernia;IJMS.december 2012;181(4) 463- 466
15. Ahmad G, Duffy JM,PhilipsK,WatsonA.Laparoscopic entry techniques. Cochrane Database Syst Rev.2008;2CD006583.
16. Jansen FW,Kolkmann et al.Complications of laparoscopy: An injury about closed versus open-entry technique.Am J Obstet Gynecol.2004:190;634-8.
17. Mettler I, Schmitt EH et al. Laparoscopy entry and its complications. Gynaecol Endose.1999;8:283-9.