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Prospective Study on Port Site Complications in Laparoscopicsurgeries

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ABSTRACT

BACKGROUND AND OBJECTIVE: Laparoscopic techniques have revolutionized the field of surgery and offerseveral advantages over laparotomy including lower patient morbidity rates,reduced hospital length of stay and earlier return to normal activities. Althoughrare,several port site complications have been reported in the literature.Laparoscopic port site complicationscan be access-related or post-operative.Complications are related to port-site incisionsize, number of port sites,obesity, and umbilical ports.The objective of this study is to determine themorbidity associated with ports at the site of their insertion in laparoscopicsurgery,to identify riskfactors for complications and their management.

METHODS : All patients who underwent laparoscopic surgeries, between December 2020 andNovember 2022, at pims,karimnagar, in the Department of GeneralSurgery,were included in the study after taking a written consent and port sites were monitored for complications . A total of 100 cases were operated upon.Out of 100 cases 45 undergo cholecystectomy,20 had appendectomy, 10 had diagnostic laparoscopy,6 hadadhesiolysis,6 had lap APRand the remaining 3 cases did gastropexy,splenectomy andligation of testicular vein for varicocele respectively.Wounds were assessed clinicallyafter surgery and in case of infection, were treated with regular cleaning and dressing,with empirical oral antibiotics.PSI was studied in relation to frequency, type of surgery,and port-position.

Similarly, port site bleeding, was studied in relation to frequency, site, type of ports, and size of ports.Omentum related complications were studied in relation tofrequency, type of surgery, number of ports, and the port site involved. Further port sitecomplications were studied in relation to age, sex, body mass index (BMI), total numberof ports used, technique of port closure, and procedure performed.Data collected and analyzed by various statistical methods.

RESULTS: Of the 100 patients undergoing laparoscopic surgery, 40%had developedcomplications specifically related to the port site during a minimum follow-up of two year period.

Port site discharge (PSD) was the most frequent (n = 14,14%), followed by port site infection (n = 11,11%),bleeding(n=5,5%),PIH(n=6,6%),PSM (n=4,4%)&omentum-related complications were nil.

CONCLUSION: Laparoscopic surgeries are associated with minimal port site complications.Complications are related to the increased number of ports. Umbilical port involvement is the commonest. Most complications aremanageable with minimal morbidity, and can be minimized with meticulous surgical technique during entry and exit.

AIMS & OBJECTIVES

1)The aim of this study is to determine the complications associated with the
Port-site in laparoscopic surgeries.

2)To identify the risk factors there by anticipating complications .

3)The objective of the study is to determine the morbidity associated with ports at
the site of their insertion in laparoscopic surgeries.

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MATERIALS AND METHODS

MATERIALS

Studydesign&Setting:PROSPECTIVECLINICAL STUDY
Participants:100
Method:SIMPLERANDOMSAMPLING.

Inclusioncriteria:
•patients>13yrs.
•Patients who have undergone basic and advanced laparoscopicsurgeries , consented for inclusion in the study in Prathima medicalcollege,Karimnagar.

Exclusioncriteria :
i)Patients<13years.
ii)Patientconvertedto,opensurgeries

Samplesize:100
Duration of study : DECEMBER 1, 2020 TO NOVEMBER 30, 2022
Investigations:
A)USG
B)OTHERS– HB%,BLOODGROUP,BLOODUREA SERUMCREATININE,HbSAg,HIV, RBS,ECG, ROUTINEURINE, CHESTXRAY, XRAYERECTABDOMEN ,SERUMELECTROLYTES

OBSERVATION AND RESULTS

In the present study 100 cases were selected in the surgery who underwent laparoscopic surgeries at Prathima Institute of Medical Sciences. From period of December 2020 to November 2022.

Tab:1Case distribution

Diagnosis	No ofCases
Abdomen pain for evaluation	16
AcuteAppendicitis	5
AcuteCholecystitis	29
Carectum	6
Cholelithiasis	16
Chronicappendicitis	10
Epigastrichernia	2
Gastricvolvulus	1
LTinguinalhernia	2
MassiveSplenomegaly	1
RTinguinalhernia	2
Subacuteappendicitis	5
UmbilicalHernia	4

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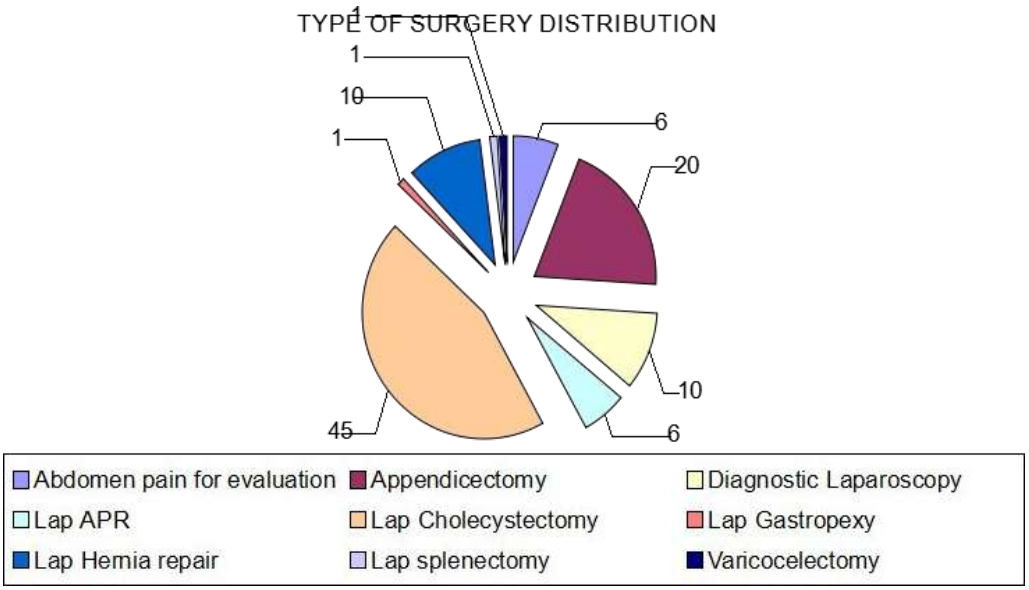
Varicocole	1
Total	100



Tab:2Sexdistribution

SEX	NoofCases
Male	49
Female	51
Total	100

Tab:3Age distribution

AgeDistribution	No.ofcases
13-30	23
31-40	37
>40	40
Total	100

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Tab:4 Procedure and portsite complications

Type of Surgery	Portsite Complications
Appendicectomy	9
DiagnosticLaparoscopy	5
LapAPR	2
LapCholecystectomy	26
LapGastropexy	nil
LapHerniarepair	nil
Lapsplenectomy	nil
Varicocelectomy	nil
Total	42

Tab:5 PORTSITE COMPLICATIONS DISTRIBUTION

TYPESOF Cx	NOOFCx
PSI	11
PSD	14

Bleeding	5
PIH	6
PSM	4
Omentalentrapment	0
Subcutaneousemphysema	0

Tab:6 Port site complications in different surgeries

PSIvs TypesofSurgery	No.ofcomplications	Percentage
Adhesiolysis(6)	2	18.2
Appendicectomy(20)	1	9.1
DiagnosticLaparoscopy(6)	1	9.1
LapAPR(6)	1	9.1
LapCholecystectomy(45)	6	54.5
Total	11	100.0

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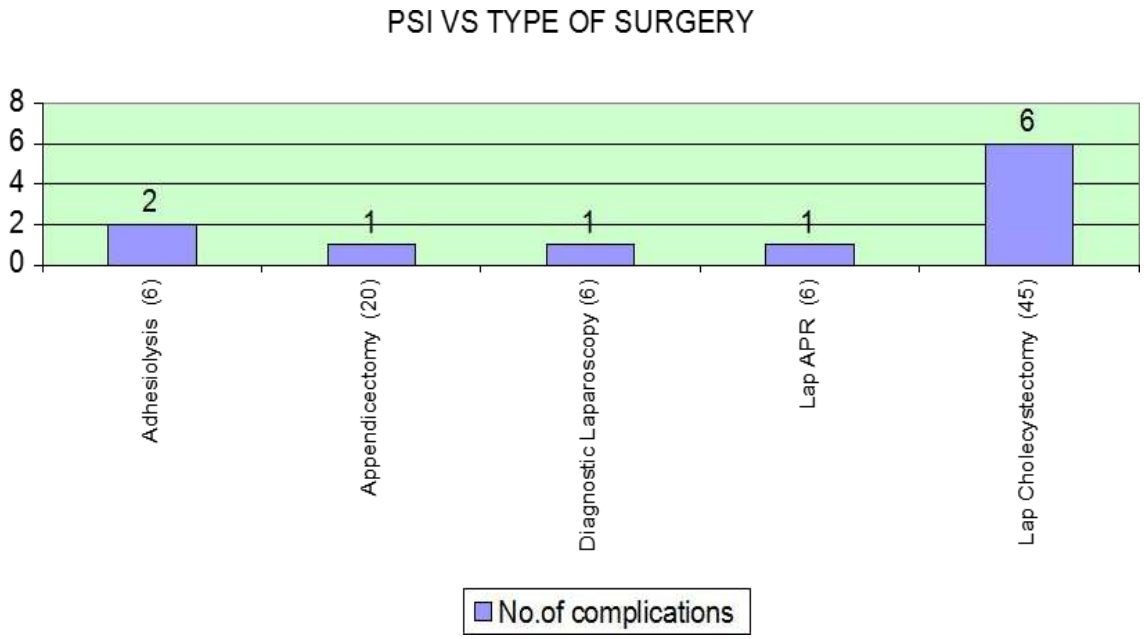

Fig:Portsite complication in different surgery

Tab:7 Port site infection in relation to use or not used of retrievalbag

PSIvsNoRetrievalBag	No.ofcomplications	Percentage
Yes	1	9.1
No	10	90.9
Total	11	100.0

PVALUE 0.001significant

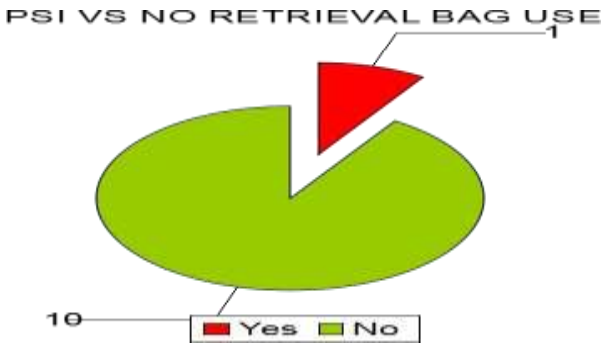

Fig:Portsite infection in relation to use or not used of retrieval bag

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Tab:8 Portsite infection in relation to Porttypes

PSIvsPortType	No.ofcomplications	Percentage
Epigastricport	2	18.2
Umbilicalport	9	81.8
Total	11	100.0

PVALUE 0.011significant

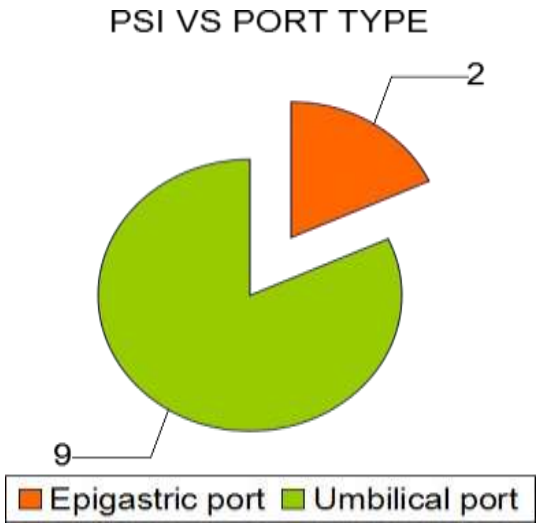

Fig:Portsite infection in relation to Port types

Tab:9Port site infection in relation to method of access;

PSI vs Technique	No of complications	percentage
open	9	81.8
close	2	18.2
total	11	100.0

P VALUE 0.011 significant

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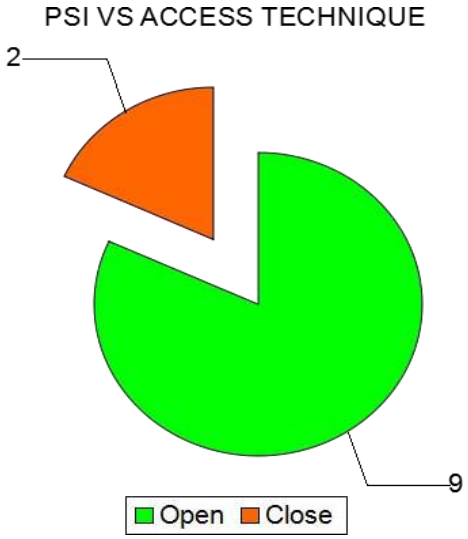
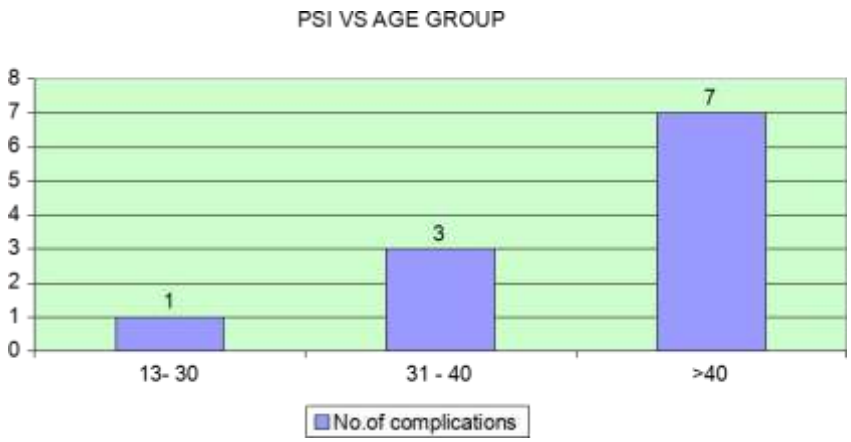


Fig:Portsite infection in relation to method of access

Tab:9 Portsite infection in different age group

PSIvsElder GroupofAge	No.ofcomplications	Percentage
13-30	1	9.1
31-40	3	27.3
>40	7	63.6
Total	11	100.0

PVALUE 0.022significant



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Tab:10 Port site discharge in relation to access technique

PSDvsaccesstechnique	No.ofcomplications	Percentage
Open	11	78.6
Close	3	21.4
Total	14	100.0

PVALUE 0.008significant

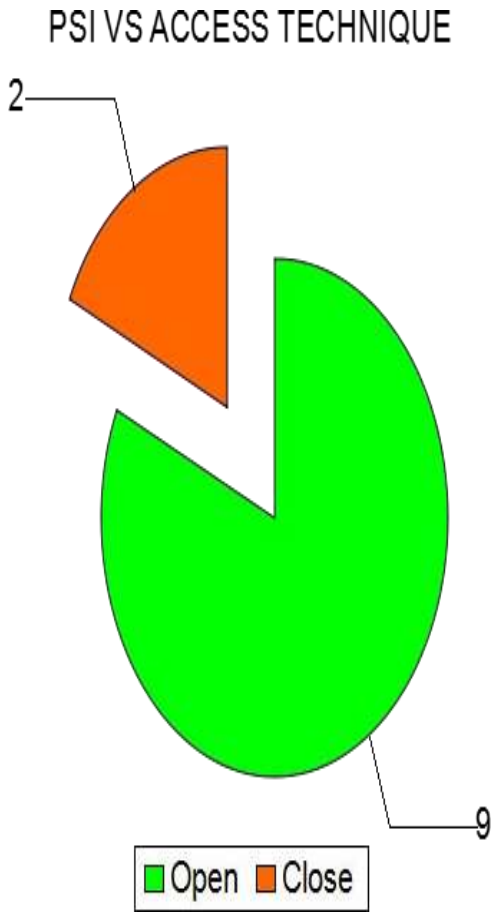

Fig:Portsite discharge in relation to access technique

Tab:11Portsite discharge in relation to portsize

PSDvsPortsize	No.ofcomplications	Percentage
Large	11	78.6

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Small	3	21.4
Total	14	100.0

PVALUE 0.008significant

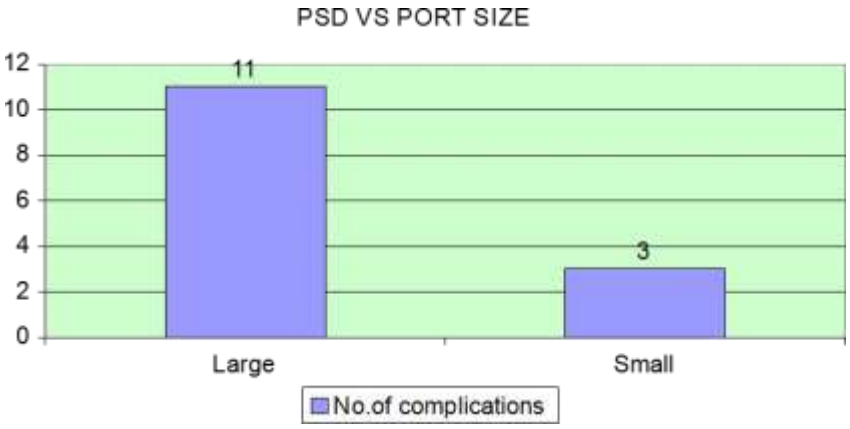

Fig:Portsite discharge in relation to portsize

Tab:12Portsite discharge in relation to BMI

PSDvsBMI	No.ofcomplications	Percentage
>25	11	78.6
<25	3	21.4
Total	14	100.0

PVALUE 0.008significant

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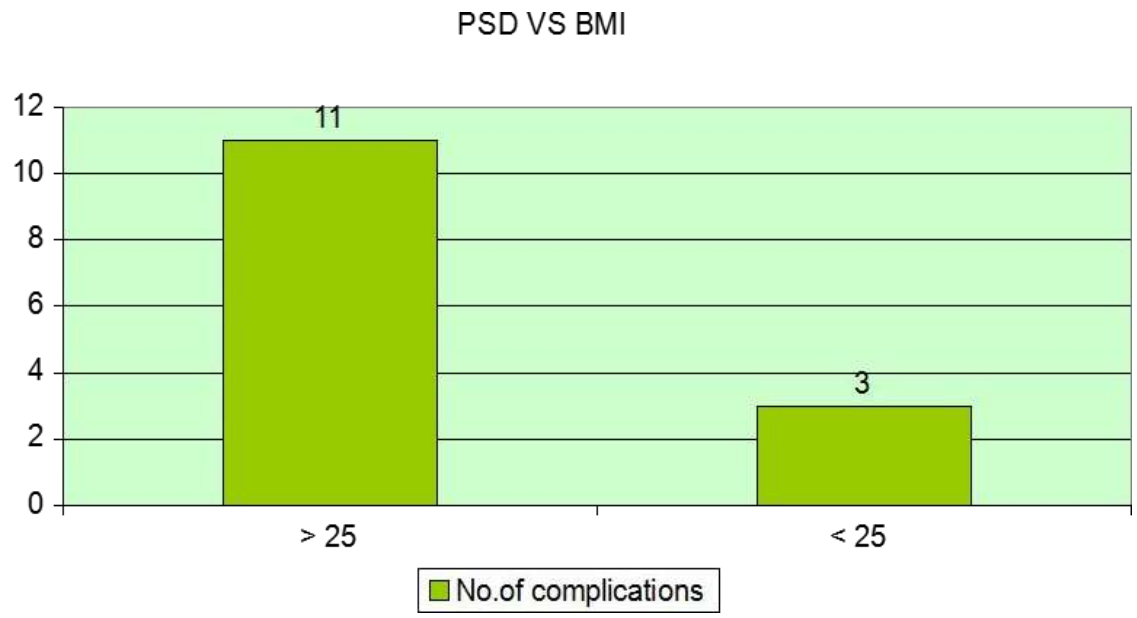

Fig:Portsite discharge in relation to BMI

Tab:13Portsite hernia in relation to portsize

PIHerniaVSPortsize	No.ofcomplications	Percentage
Small(<10mm)	1	16.7
Large(>10mm)	5	83.3
Total	6	100.0

PVALUE 0.206Notsig

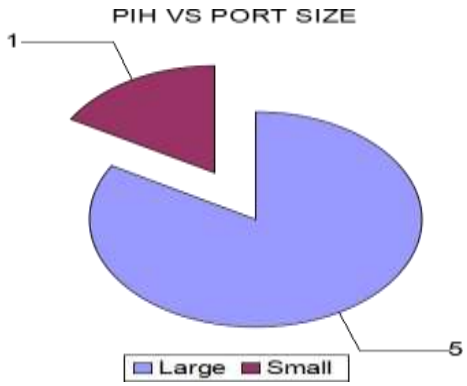

Fig:Portsite hernia in relation to portsize

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Tab:14 Portsite hernia in different age group

PIHerniaVSAgegroup	No.ofcomplications	Percentage
13-30	1	16.7
31-40	1	16.7
>40	4	66.7
Total	6	100.0

PVALUE 0.105Notsig

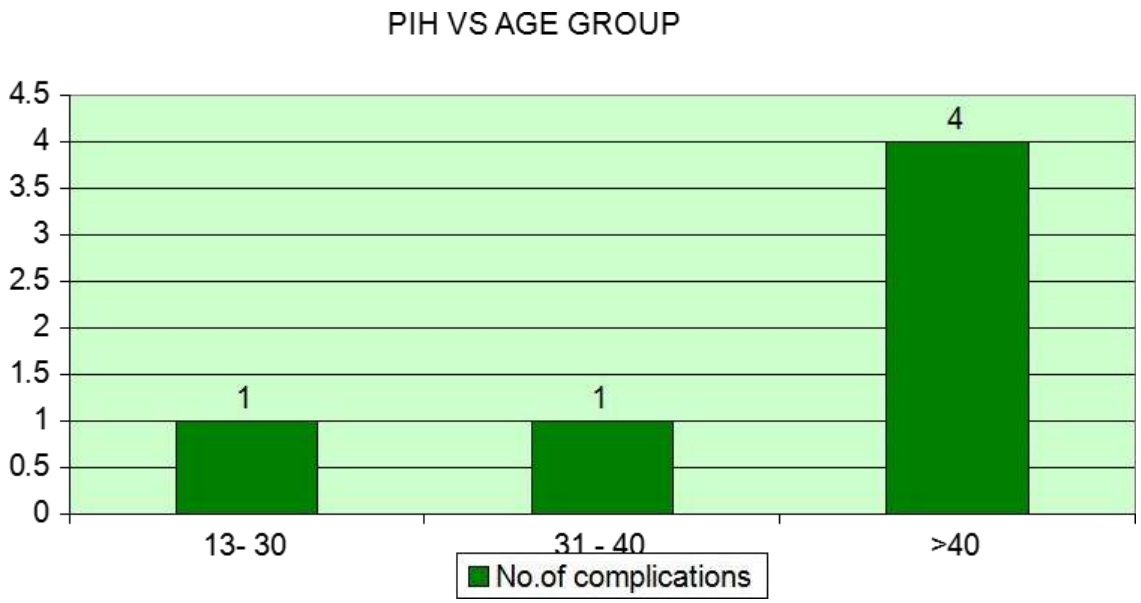

Fig:Portsite hernia in differentage group

Tab:15Portsite metastasis in relation to Specimen bagusage

PortsitemetastasisvsNotuseretrievalbag	No.ofcomplications	Percentage
Yes	4	100.0
No	0	0.0
Total	4	100.0

Pvalue 0.029Significant

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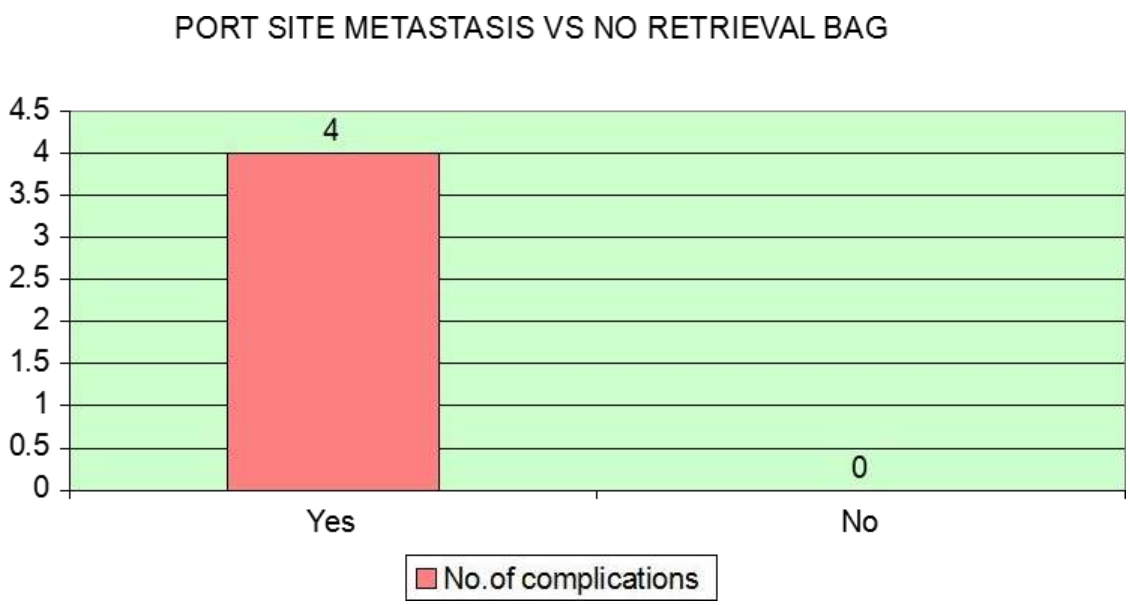

Fig:Portsite metastasis in relation to Specimen bagusage

Tab:16 Portsite metastasis in relation to different types of port

PortsitemetastasisvsPorttype	No.ofcomplications	Percentage
Epigastricport	4	100.0
Umbilicalport	0	0.0
Total	4	100.0

Pvalue 0.029Significant

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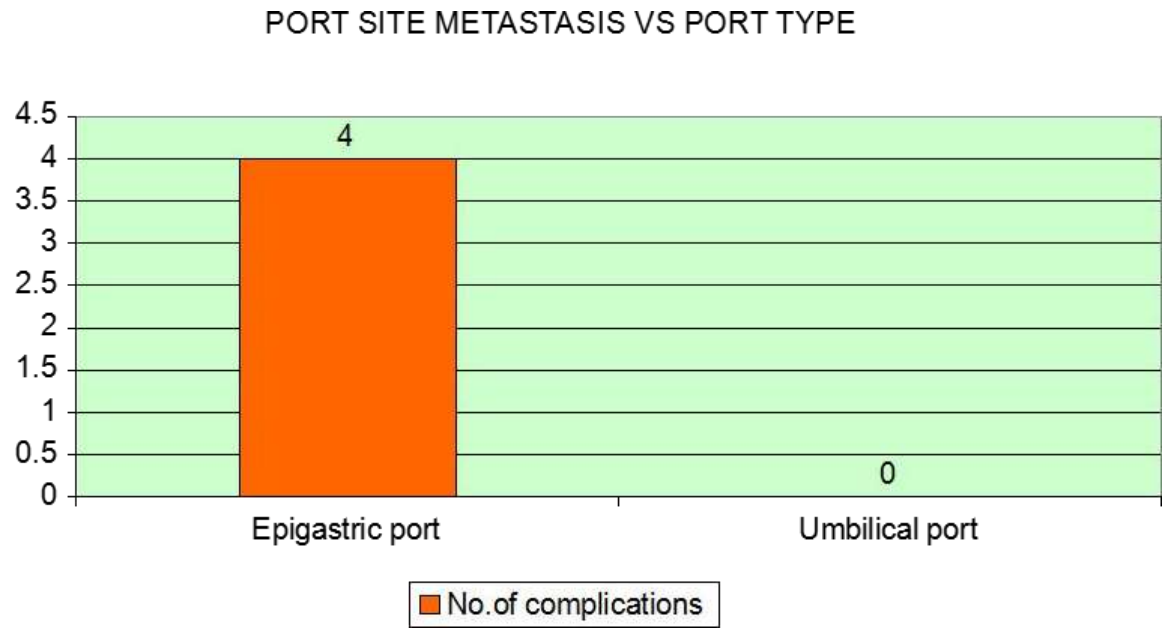

Fig Portsite metastasis in relation to different types of port

DISCUSSION:

Port site complications can be grouped into access-related complications and postoperative complications, and have been reported in all age groups and in both genders. The literature showsthat obesity is associated with increased morbidity related to port site due to various factors like theneed for longer trocars, thick abdominal wall,need for larger skin incision to expose fascia adequately,and limitation in mobility ofthe instrument due to increased subcutaneous tissue. Care must be taken duringplacement of trocars to align their axes as needed for the procedure.

In my study,therewasincreased in the frequency of morbidity related to port site and obesity.Patientswith more BMI hasmore portsitecomplications in relation to those with normal BMI.In this study that Lap cholecystectomy was the commonest procedure performed and more frequentlyassociated with port site complications. This is comparable to observations made by Fuller et al[30].Neudecker et al.[31] had shown that port sitecomplications were increased with more number of ports. Fascial closure isrecommended for ports ≥10 mm; the fascia are closed with sutures to reduce the risk of developing a port site hernia. Re-approximation of the fascia can be accomplished in avariety of ways. Ideally, the fascia is directly visualized with the aid of retractors. The fascial edges are grasped and the sutured closed with interrupted or continuous suture.A number of specialized instruments have been devised for fascial closure at theport site (e.g., Grice sutureneedle,Carter-Thomsonneedle-point suture passer, Endo-Closeinstrument,Reverdinsutureneedle).Thebenefit of these devices is yet to be proven. Thetechnique of closure of the rectus sheath had no influence on my study.

PORT SITE DISCHARGE/INFECTION:

Laparoscopic procedures have a reduced incidence of PSIs and other wound-related complications.Nonetheless, they can produce significant morbidity. The presence of significant peri-incisional erythema, wound drainage, and fever may indicate thepresence of a necrotizing fascial infection. The incidence of PSI was 11%.These resultsare comparable with many other studies. All PSIs were superficial,involving only the skin and subcutaneous tissue. Superficial skin infection is more common and has been reported by another study.Umbilical port site was the most common site of PSI followed by epigastric port site. In the literature, there is great emphasis on the increased frequency of umbilical site PSIs and the role of umbilical flora in the development of PSIs. Emphasis is also there on the increased frequency of PSI and the trocar site of extraction. All gall bladder specimens in cholecystectomy were removed through the epigastric port without the use of specimen bag so there is higher incidence of

infection compare to usage of specimenbag.Woundinfections are prevented by appropriate administration of antibiotic prophylaxis, sterile techniques, and the use of specimen bags during specimen extraction.Once present, infections are treated with proper cleaning and dressing, and antibiotics according to culture and sensitivity test.

PORTSITEBLEEDING:

Incidence of port site bleeding was found to be 5%. Our results are comparable withother studies.All were associated with the placement of secondary trocars. There was no associated bleeding with port site dilatation for specimen removal. Injury to epigastricvessels can be related to carelessness during the operative procedure usually during theplacement of secondary trocars(<10mm size port) which should be placed under directvision and with prior illumination of the abdominal wall. Bleeding from the abdominalwall may not become apparent until after the port is removed because the port maytamponade muscular or subcutaneous bleeding. In addition to visually inspecting theaccess site upon its creation, the site should also be inspected during and followingremoval of the port. Bleeding points can usually be identified and managed withelectrocautery. On occasion, the skin incision may need to be enlarged to control the bleeding. If persistent bleeding continues, a Foley catheter canalsobe inserted, inflated, and gentletraction applied to tamponade the site.Also,U-stitches can be placed into the abdominal wall underdirect laparoscopic visualization using a suture passer with absorbable braided sutures. A number of specialized instruments have been devised for fascial closure at the port site and these mayalso be useful for managing abdominal wall bleeding.

OMENTUMRELATEDCOMPLICATIONS (ENTRAPMENT/PENETRATINGINJURY):

In this study there was no incidence of omental related complications.Various factors are attributed tothe occurrence of these complications including Removal of the ports prior to complete deflation of the peritoneal cavity,inadequate/faultyclosure of the portsite incisions,and large incision at theportsite.

They can be avoided or managed asfollows:

- After the procedure,all theports should be removed undercareful vision,
- All the accessory ports to be removed under vision followed by the releasingpneumoperitoneum by opening the valve of10mm cannulas.
- After releaseof gas is completed, the primaryport and telescope are to be removedtogether,with a clear view at all times that the port is free of any entrapped bowel,
- To limit thesize of theport incisions
- A secure and adequate closure of the port sites of size 10 mm and above should beensured.

PORTSITE INCISION HERNIA:

The incidence of port site incisional hernia in this study was 6%.Thiscomplication was found more in old age group,large port and in whomHasson'stechnique was used.There is also higher incidence of PIH among patients who had infections in postoperative period.The risk of developing incisionalhernia is low with the use of trocars ≤12 mm, radially dilating trocars, or bladelesstrocars. Most authors close fascial defects if a port >12 mm is used regardless of site or type of trocar. Some advocate closure if >10 mm in size.The fascia should be closed with suture to reduce the risk of developing a port-site hernia.Although rare, hernia hasbeen reported even for 5 mm trocar sites. When port site hernia is identified following laparoscopy,the site should be repaired to prevent the development of intestinal complications(i.e.,obstruction,strangulation).

PORTSITE METASTASIS:

The incidence of port site metastasis in this study was 4% and was found more in those cases where specimen retrievalbag was not used at the time of time of retrieval.In recent years some studies have reported the incidence of metastasis at port siteafter laparoscopic oncological procedures,The exact mechanism of development of metastasis of theabdominal wall is unknown. However, various explanations are given in the literature.Studies show that recurrence of tumour at the port site probably can be avoided by the use of plastic bags or wound protectors to avoid direct contact between the tumour and the wound. It is also essential that extraction of the specimen is done through abdominal incision wide enough to allow easypassage of the specimen.

CONCLUSION:

This is an prospective study to analyse the morbidity associated with port site in laparoscopic surgeries(Basic and advanced) both elective and emergencies,to determinethe risk factors of thecomplications and their management.The study population consist of 100 and was carried out

overtwo years of period. Complications encountered at portsite were discharge,infection,bleeding,port sitehernia and metastasis with discharge and infection being most common.

These complications were more in patient where following factors were present:

1.Open or Hasson's method of access
Larger port size
Old age group
Increased BMI
Not used of specimen retrieval bag

The commonest intraoperative complications were seen in secondary ports, though overallcomplications weremore at the umbilical port. Percentage wise, the incidence of these complications noted in the study is comparable with statisticsworldwide.All complications were manageable with minimum morbidity. Considerationof meticulous surgical technique during entry and exit at all the port sites can minimize these complications further.

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KEYS TO MASTER CHART

TOS-Types of surgery	O-Open technique
UOB-Use of retrieval bag	C-Close technique
PS-Port size	SSE-Subcutaneous emphysema
PT-Port type	Y-Yes N-No
BMI-Basal metabolic rate	D-Epigastric port
PSI-Port site infection	U-Umbilical port
PSD-Port site discharge	S-Smaller size port(<10mm)
PIH-Port incisionsl hernia	L-Large size port(>10mm)
PSM-Port site metastasis	Cx-Complication
O/Cx-Omental related complications	