"ANALYSIS OF LAPAROSCOPIC PORT-SITE COMPLICATIONS-A ONE YEAR DESCRIPTIVE STUDY IN KLE'S DR.PRABHAKAR KORE HOSPITAL, BELAGAVI, A SINGLE CENTRIC STUDY."

By

REGNO:B H 0 1 1 8 0 0 7

Dissertation

Submitted to the
KLE Academy of Higher Education and Research,
Belagavi, Karnataka.
In partial fulfillment
of the requirements for the degree of

MASTER OF SURGERY(M.S)
IN
GENERAL SURGERY

DEPARTMENT OF GENERAL SURGERY,

J. N. MEDICAL COLLEGE

BELAGAVI-590010. KARNATAKA

APRIL–2021

KLE ACADEMY OF HIGHER EDUCATION AND

RESEARCH, BELAGAVI, KARNATAKA

Endorsement by the HOD/Principal/ Head of the Institution

This is to certify that the dissertation entitled **"ANALYSIS OF LAPAROSCOPIC PORT-SITE COMPLICATIONS-A ONE YEAR DESCRIPTIVE STUDY IN KLE'S DR.PRABHAKAR KORE HOSPITAL, BELAGAVI, A SINGLE CENTRIC STUDY"**is a bonafide research work done by **REG NO:BH0118007.**

Dr. A.S.GOGATE$_{M.S.}$
Professor and Head,
Department of General Surgery,
J. N. Medical College,
Nehru Nagar, Belagavi – 10

Date:
Place: Belagavi

Dr. N.S. MAHANTASHETTI. $_{MD}$
Principal,
J. N. Medical College,
Nehru Nagar, Belagavi – 10

Date:
Place: Belagavi

KLE
JAWAHARLAL NEHRU MEDICAL COLLEGE
(Recognized by Medical Council of India, New Delhi)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
Nehru Nagar, Belagavi- 590 010, Karnataka, INDIA
0831 - 2471350 0831 - 2470759 www.jnmc.edu principal@jnmc.edu

Ref No: MDC/PG/ Date: 11-09-2020

ACCEPTANCE LETTER

The softcopy of thesis entitled: **"ANALYSIS OF LAPAROSCOPIC PORT SITE COMPLICATIONS - A ONE YEAR DESCRIPTIVE STUDY IN KLE'S DR PRABHAKAR KORE HOSPITAL BELAGAVI, A SINGLE CENTRIC STUDY."** has been submitted for Anti-Plagiarism check through Turnitin software. The scan has been carried out and the scanned output reveals a match percentage of **03%** which is within the acceptable limits of **10%** as per the guidelines given by UGC.

KAHER BELAGAVI J. N. MEDICAL COLLEGE

Dr. (Mrs.) N.S. Mahantashetti.
Chairperson-Antiplagiarism Committee &
Principal,
J. N. Medical College, Belagavi.

To,
Reg. No. BH0118007.
Postgraduate Student,
2018-19 Batch,
Department of General Surgery,
J. N. Medical College, Belagavi.

ABSTRACT

BACKGROUND: The incidence rate of complications of laparoscopic surgeries is about 1.4% and the incidence rate of port site complications is 21 per 100000 cases. Complications are increasing in incidence in relation to abdominal access difficulties, ineffective fascia closure, improper sterilization of instruments, and in obese patients. Port site infections, port site bleeding, port site hernia, port site metastasisare some of common complications has to be prevented by using meticulous surgical procedures.

AIM: To determine the incidence of morbidity from port site complications in laparoscopic surgeries and to identify the risk factors for port site complications thereby suggesting timely preventive measures.

MATERIALS AND METHODS: All patients undergoing laparoscopic surgeries in KLE'S Dr. PrabhakarKore Hospital & MRC, Belagavi were observed prospectively for the period of one year in the age group of 8-80years. And statistical software, namely, SPSS 20 will be used for analysis

RESULTS: 120 patients with mean age-group of 37.84 years, including 77 females and 43male had undergone various laparoscopic procedures, most common being laparoscopic appendicectomy, over-all 10 patients (8.33%) developed different port site complications like port site infection (PSI)(4.17%), port site seromaformation(0.8), Port site bleeding (PSB)(0.8%),and port site hernia (PSH) (Most common complication being PSI(n=5) in this study. Obesity and co-morbidities are found to have statistical significance with port site complications.

CONCLUSION: PSCs include port site infection, wound dehiscence, herniation, entrapment of omentum, port site bleeding and hematoma formation and port site

metastasis. Overall complications seen were infections in umbilical port sites and most of them were obese patients. Most of the LPSCs are treatable with little morbidity by taking careful operative precautions and strictly following sterilization methods, while insertion and removal of all ports,so that all these complications and morbidities are avoided.

Key words: Port site complications,laparoscopic surgeries

LIST OF ABBREVIATIONS

LPSCs	-	Laparoscopic port site complications
PSCs	-	Port Site Complications
LI	-	Laparoscopic Instruments
LA	-	Laparoscopic Appendicectomy
LC	-	Laparoscopic Cholecystectomy
LVHR	-	Laparoscopic Ventral Hernia Repair
LUHR	-	Laparoscopic Umbilical hernia Repair
LIHR	-	Laparoscopic Inguinal Hernia repair
DLap	-	Diagnostic Laparoscopy
PSI	-	Port Site Infection
PSB	-	Port Site Bleeding
PSM	-	Port Site Metastasis
BMI	-	Body Mass Index
VAS	-	Visual Analogue Scale.
NNIS	-	National Nosocomial Infections Surveillance
CDC	-	Centre of Disease Control and Prevention

CONTENTS

LIST OF TABLES

TABLE OF FIGURES

TABLE OF PICTURES

INTRODUCTION

Laparoscopic surgeries are the most commonly performed procedures among the minimally access procedures worldwide. Laparoscopic procedures have made it possible to perform wide range of surgical procedures with comparatively smaller incisions and are less painful with speedy recovery, less operative stress, decreased morbidity, lesser hospital stay as an advantage as compared to conventional open surgeries.[1] Though laparoscopic surgeries are associated with least number of complications, problems associated with them should be considered in the present era of minimal access surgeries.

Laparoscopic port site complications are the common complications among laparoscopic surgeries which include, port site infection, seroma formation, discharge, pain, port site or trocar site hernias, bleeding, metastasis which are major complications and other miscellaneous complications.[2]

Incidence rate of complications of laparoscopic surgery is about 1.4 percent. [3] Twenty-one/one lakh procedures[4] is found to be the incidence of laparoscopic port site complication and were increasing in incidence in relation to abdominal access difficulties, ineffective fascia closure, improper sterilization of instruments, and in obese patients. Complications can present early or late. Early complications like infection, bleeding, discharge, seroma formation and delayed complications like hernia and metastasis have been mentioned in the study.

Most common laparoscopic procedure associated with port site complications is laparoscopic cholecystectomy.[14]

Obesity[21,23] is the most important risk factor for PSCs, because to operate on obese patient we need lengthier trocars, need to take bigger skin incision, [23] and there will be restrictions in movement of the Laparoscopic instruments because of their thicker tissue content of the abdominal wall, and there is poor wound healing in obese patients. PSC will be more with the higher number of ports.

Port site hernias (PSH) are developed following large port incision sites [5,6], faulty port closure techniques and removal of the trocars before complete deflation of the abdomen. Studies have recommended that the ports of 10mm or more should be closed in adults and even ports of size 5mm or more should be closed in children.

Implantation of tumour cells at port sites has been stated in all types of oncological procedures [10,11] operated with laparoscopy with an incidence rate of 1% and 2.3% for colorectal and gynaecologic malignancies respectively.

Faulty surgical technique and incorrect handling of specimens were established as a possible cause and specimen should be extracted through an incision which is of the size sufficient for easier retrieval**.**

Port site pain, Loss of port position, Leaking of ports, failed entry, and nerve injuries are the complications which have also been shown in the studies.

OBJECTIVE OF THE STUDY

"To determine the incidence of morbidity from port site complications in laparoscopic surgeries and to identify the risk factors for port site complications thereby suggesting timely preventive measures."

REVIEW OF LITRETURE

History and Evolution of Laparoscopic Surgeries:

Laparoscopic surgery has generated a revolution in the operative surgery during past few decades. But the history began 100years back for its component parts. First laparoscopy was conducted in "Berlin" by the "German surgeon Georg Kelling," to inspect the abdominal cavity of the canine by inflating abdomen with gas, using illuminoscope in beginning of 20th century [46]. "H C Jacobaeus,[46] a Swedish surgeon" began animal experiments with the illuminoscope and later in 1910 described his experimental study with seventeen laparoscopic procedures by creating pneumoperitoneum and 2 thoracoscopic procedures and coined the term "Laparothorakoskopie" [46,47]in 1911.

First laparoscopic sterilization of fallopian tubes by electrocoagulation was performed by a "Swiss gynaecologist, Boesh"[47]. During the mid1950 to1970, apprehensions were aimed at significant upsurge in the rate of complications like visceral injuries and injuries from the cautery, decelerated the progress of laparoscopic surgery. With the advent of the video laparoscopy technological advancements in complex laparoscopic procedures occurred, then progressed rapidly over the past few decades.

In 1971-Harrit Hasson[48,50,] Gynaecologist paid to the safety of laparoscopic surgeries, by inventing "the Hasson's trocar" for the open access technique. "German Gynaecologist Kurt Semm", conducted the 1st lap appendicectomy in 1983.

The term "minimal invasive surgery"[47] was first used by "John Wicker," in 1983. In 1985 Erich Muhe performed laparoscopic cholecystectomy and was the 1st to

document it in Germany. A French surgeon, Philippe Mouret, performed laparoscopic cholecystectomy by using video technique acknowledged laparoscopic cholecystectomy by 4 Trocar.

The evolution of minimal access surgery has progressed to the robotic system. The US food and drug administration (FDA) approved the Da Vinci surgical system in 2000.Robotic Prostectomy became the 1st most commonly conducted Robotic surgery.

The goal of MAS is to minimize the traumatic insult for the patients undergoing surgical procedures without comprising their safety and efficacy. If this is achieved, patients recover more quickly, which reduces the length of hospital stay and allows more rapid return to full activity and work within minimum time.

LAPAROSCOPIC PORT SITE COMPLICATIONS: (LPSCs):

Augustine and S Karthik [5] assessed 570 patients, of which 307 were males and 263 were females and were in between the age of 13-80years. In this study 3% i.e.17 patients had PSCs,indicating that female gender had a higher risk in developing port site complications i.e eleven females and six males($p > 0.05$). Port site complications were most seen in the age group of 20-40 ($p > 0.05$) with Mean BMI 23.2 and had no statistical significance in the occurrence of PSCs. Lap cholecystectomy was the most commonly done procedure with maximum port site complications (52.9%).

Majority of the complications were seen in the umbilical port sites (47%, n=8).PSCs significantly increased with the increase in no. of port-sites ($p = 0.23$); but, a "causal relationship" could not be elucidated and no influence of port closure technique on incidence of PSCs was found to be associated .

"Out of seventeen LPSCs, (58%) i.e. ten were port-site infections, almost all were superficial skin infections. 4 of them developed port-site bleeding; in all cases minor vessel injury has occurred while placing secondary(working) ports.

Neu decker *et al*. [15] had observed that PSCs were more in number with increase in the number of ports. In the Ports of size ≥10 mm [16] fascia has to be repaired appropriately to decrease the occurrence of a port site hernia. Ideally, fascial edges are identified under direct vision and edges are sutured either with figure of 8 configuration or interrupted sutures. A variety of newer devices have been designed for closure of fascia at the port site whose advantages have to be proven till date ("Grice suture needle," "Carter-Thomson needle", "Endo-Close instrument", "Reverdin" suture needle).[17,18]The fascial closure method showed no significant

difference in their observations and they concluded that Laparoscopic procedures have least number of "port site complications." LPSCs occurring are port site infection (PSI), wound gaping, hernia, omental entrapment, bleeding, metastases tumour.

Jansen F , Kolkman W , Bakkum E A , de Kroon CD,Trimbos-Kempel TC,Trimbos JB et al,[3,4] Conducted study on 25,764 surgeries, a total of 145 LPSCs were found (incidence of 5.7 per 1000 [/1000]); with 2 mortality, in that 84 females required laparotomy(rate 3.3/1000). Port site complications among 83 patients were-57%;(95% CI for approach = 49-65%).In sixty two cases (43%) due to faulty technique. Bleeding from epigastric(inferior>superior) vessels and intestinal injury, needed laparotomy (90% of cases). The incidence rate of overall LPSCs is 2.7/1000 for Diagnostic Lap, 4.5/1000 for sterilisation procedures. The maximum incidence of complications reported in the laparoscopic hysterectomy.

"Azurin et al[24] 'retrospectively reviewed 1300 cases of laparoscopic cholecystectomies, in that 10 patients had port site hernias ,9 of these patients had incidental midline ventral hernias. Fascia closure in these was done by figure of 8 configuration by using polyglycolic acid sutures during the same procedure, none developed port site hernia.

Roumi et al,Soumen et al, Asmita et al found to have 59.4% of PSI associated with LC, where as 18.7% in patients of laparoscopic hernioplasty. Most common PSI is found in the umbilical port site followed by epigastric port. Emphasis on increased umbilical port site infection is mentioned in literature along with the part played by umbilical flora in the occurrence of Port site infection.

Despite all these studies there is no fixed value of incidence of port site complications and there is lack of proper knowledge in studies. The aim of my study is to assess the incidence of morbidity associated with the complications and try to identify the risk factors.

LAPAROSCOPIC PORT SITE COMPLICATIONS (LPSCs):

Are associated with

1. Larger incision size
2. Number of trocars used
3. Inadequate sterilization of Laparoscopic instruments
4. Umbilical ports and
5. In individuals with high BMI

CLASSIFIED AS

I) "ACCESS RELATED"[1]

II) "POST- OPERATIVE"

   a. Early or immediate

   b. Delayed

      Early complications-bleeding, air embolism, sub cutaneous emphysema, omental related complications, visceral injuries (bowel and bladder)

      Delayed port site complications- hematomas, infection /abscess, hernia, and metastases

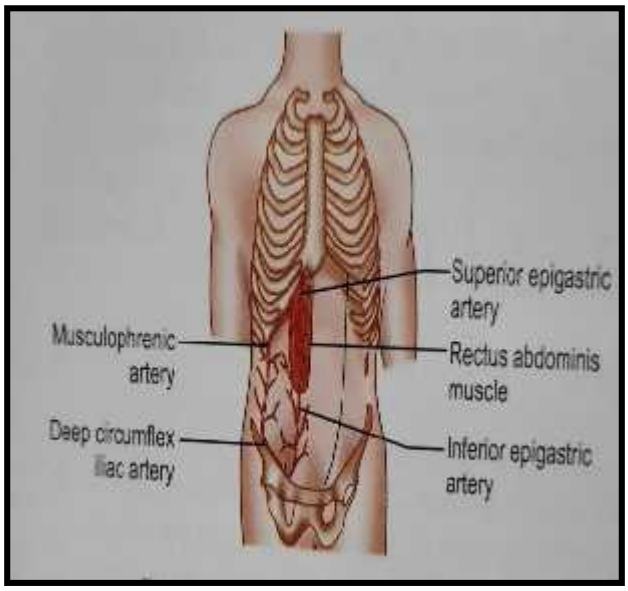
BLEEDING/VASCULAR INJURY

Inferior epigastric artery, which is the branch of external iliac artery, on the anterior abdominal wall, courses superio-medially from the inguinal canal towards the midline, and gives off many branches which supply skin and muscles of anterior abdominal wall. At the level of umbilicus anastomoses with superior epigastric artery

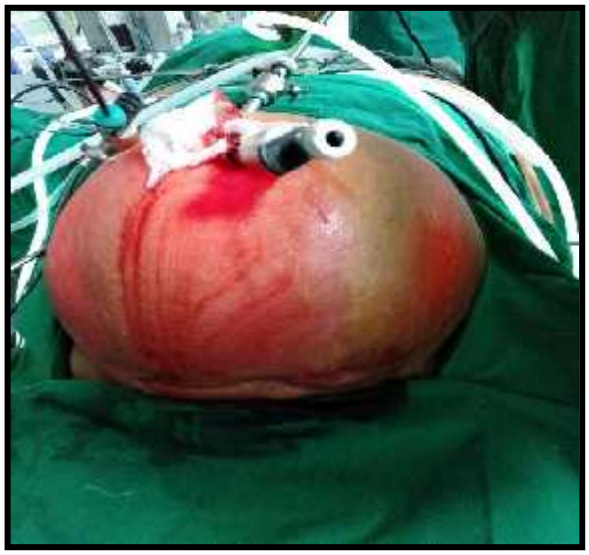
which is a branch of internal thoracic artery. Bleeding from inferior epigastric artery is a big problem because of its larger diameter than superior epigastric artery.

Umbilicus is the safe site for insertion as it is relatively avascular and thin.

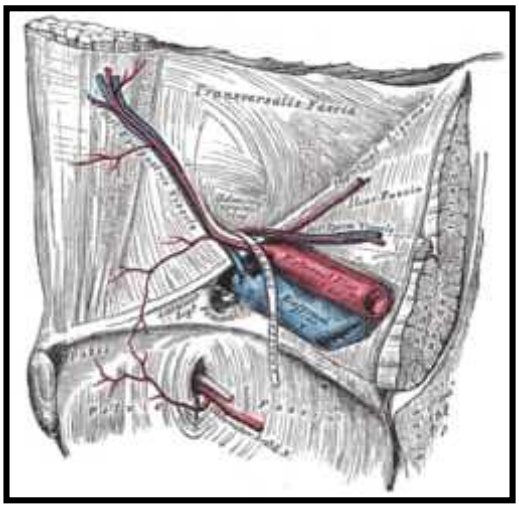
To avoid injury to superior and inferior epigastric vessels puncture site should be chosen lateral to the rectus abdominus.



PICTURE 1-ANATOMY OF INFERIOR EPIGASTRIC VESSELS



PICTURE 2-INTRAOPERATIVE PORTSITE BLEEDING



PICTURE 3-COURSE OF INFERIOR EPIGASTRIC VESSELS

Bleeding from the abdominal wall is usually found during secondary port insertion.[23] Before placement of secondary trocars abdominal wall should be well illuminated, thereby avoiding port-site bleeding. Bleeding points are controlled by electrocautery or occasionally skin incision is enlarged to control the bleeding by ligating the bleeding vessel and by applying U -stitches.

PORT SITE HERNIA(PSH)

PSH is the type of hernia, though less common can lead to morbidity requiring hernia repair. Occurs commonly at the umbilical port site when the ports of size 10mm or more are used.

Incidence varies from 1-6% and number of risk factors have been identified in the occurrence of PSH, like bigger trocar size ,midline trocars ,infection , extension of incision ,or forceful stretching on port while extracting the specimen, in the umbilicus with previous fascial defects, higher intra- abdominal pressures, in patients with persistent cough, high BMI ,co-morbidities likeT2DM,collagen vascular diseases. But the key predisposing factor identified is faulty technique in re-approximation of the fascia.

Picture 4-Port site hernia at right lumbar region following the extension of port incision for extraction of specimen

Picture 5-Portsite hernia at umbilical region

HERNIA AT TROCAR SITE ARE CLASSIFIED[32] INTO

1. The early-onset type
2. The late-onset type
3. the special type

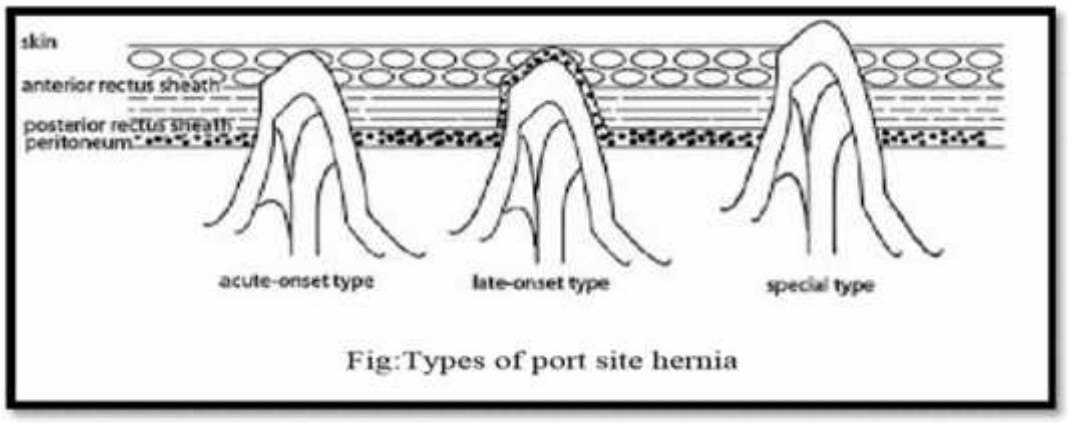


Fig:Types of port site hernia

CLINICAL PRESENTATION:

Most of the times PSH does not present with obstruction or strangulation in initial days. If presents ,it is typical of "Richter's type.[29] " Usually patient presents with crampy abdominal pain, nausea and vomiting.

DIAGNOSIS TIME: Diagnosis time of PSH varies, patients often presents late. Diagnosis time varies from 5 days to 3 years, mean is 9.2[36] months as observed in different studies.

PREDISPOSING FACTORS:

a.)The trocar diameter

b.)The trocar design

c.)Pre-existing fascial defects

d.)Some operation and patient-related factors.

"PATIENT-RELATED FACTORS"-

Patients who developed PSH followed by laparoscopic surgeries were found to have pre-existing umbilical/paraumbilical hernia.[4,30,31]

In the retrospective study of **'Azurin et al'**[24]of 1300 laparoscopic procedures port site hernia occurred in 10 cases ,9 of these were diagnosed to have pre-existing ventral midline hernias incidentally, umbilical closure in them was done by Fig- of 8 configuration by Vicryl sutures. When pre-operatively hernia was diagnosed, the defect was repaired at the time of surgery with non -absorbable, interrupted sutures. None developed hernias post operatively.

"Nassar et al"[30] observed among laparoscopic cholecystectomy procedures twelve percent of them had "pre -existing umbilical" / "paraumbilical defects."83% of them did not had any symptoms and defects were repaired with Vicryl in 90% of them ,rest had anatomical hernia repair with polypropylene .Port site hernia developed in 1.8% ,twenty five percent had a "pre-existing hernia" with fascial closure at the time of surgery .

Males have more incidence of a PSH in one report, with no statistical significance[30] but in another study women were more affected.

Obesity is identified to be the risk factors in many studies,[4,31-33] majority of them could not asses the association of obesity on incidence. Diagnosis of incisional hernia is more difficult in obese patients, because of their delayed presentation.

" **Coda et al"**[36] ,found that larger gall stones were considered as the prompting factor for PSH .In 5 / 13 patients port site hernia were being linked with GB calculi whose size varied from 2cm to 5 cm , all these were extracted via the umbilical port with the need of extending the port incision ,which has also been recognised as a predisposing factor in several other results .

Nassar et al, Ashkar et al, Rashad et al and Azurin DJ et al, Arroyo et al found that number of co morbidities are linked to hernias they are diabetes mellitus, [30,32] COPD[29,] and immunocompromised conditions such as AIDS. [32]

OPERATIVE FACTORS

Diameter of trocar has been widely testified as a factor in the development of PSH.[36,37]In the review article of **Bunting et al** [25], out of the 99 patients identified, only 2 hernias were through ports of 5mm in diameter, rest

occurred in port sites of size 10mm in diameter. Primary port insertion is either by "closed or open" technique. In the closed technique abdomen is insufflated with Veress needle and then trocar is inserted. In open Hasson technique, the abdomen is accessed, and the trocar is placed under vision.

A study of 373 patients, Port site hernia occurred only in the closed technique group[34]. However, fascia was closed only in those in whom incision was extended while in the "open" group fascia was repaired in everyone. It was found that the incidence of PSH was highest in the closed technique because the fascia closure is not easy particularly in obese. But in the study of 1300 procedures, the incidence of a PSH was equal in both closed group (0.8%) and the open group (0.7%)[32] No other study had better methodology to compare both . PSH was fewer in secondary ports, but hernias do occur at secondary ports.

Trocar type is thought be a determining factor [31, 37] and are of 2 types:

1) Cutting and

2) Dilating trocars (Radially Expanding trocars).

Generally, two types of trocars. Reusable pyramidal metal trocars and disposable metal blade trocars with or without a sprung protective sleeve. These need minimal force for insertion and seem to have greater risk of developing LPSCs, like PSI, PSB, and PSHs. Radially expanding or dilating trocars need greater force to insert into the abdominal wall bluntly separating abdominal wall tissues. They are associated with less bleeding and pain**.**

Shafer et al [37] measured the defect size caused by variety of trocars in a swine model. The defect was smallest for "hybrid and radially dilating trocars"

comparison to cutting or plastic bladed trocars indicating that the cutting trocs have less of developing PSH. In a study on 747 procedures, a dilating trocar (Versa Step) were used in 373 procedures and in whom no hernia developed. Observers identified 9 PSH, where Hasson's ports were used for the abdominal access. In one more study, on 849 gastric bypass surgeries, "a bladeless," 12-mm visual entry trocar was used, in them the rate of port site hernia was 0.2% after 10months of observation. It must be remembered that no specimen is retrieved from the port sites in these procedures.,

In a review study of **Antoniou et al**[41]on single-incision laparoscopic cholecystectomy, analyzed twenty nine large studies and reported only one port site hernia out of 1166 cases .Further 2 more studies found to have no incidence of an PSH in 80, and 29 cases[42,43] There are many unreliable studies regarding association of longer handling time, movements and reinsertion of ports with the higher chance of occurrence of PSH.[29]

Study by **Uslu et al**,[33] analyzed that prolonged duration of surgery was related to more rate of port site hernia.

Increasing the port incision to make organ extraction easier is also identified as a predisposing factor for occurrence PSH [4, 29]. Although, in another study, none of the 10 patients developed PSH in whom incision was extented.[32] Some authors suggest that there are higher chance of hernia development in the "midline ports rather than off-midline ports"[44,45]

Non-closure of the fascia is identified as a risk factor in PSH formation,[4] but PSH is also found to have occurred despite fascial closure in all cases.[46]

In a study of Mayol et al [34] slightly greater incidence of a PSH was seen in those who had fascia closure. However, fascia closure as only done in those who needed extension of port site to retrieve the gallbladder. In another study of 776 procedures where fascia closure was not done, comparatively very high incidence of 5.4% port-site hernia was found. Conclusion from this to be drawn with caution, which means that not closing the fascia is at least by some percent a risk factor in their results.

By putting external and internal fascia at different levels forming a Z-Tract using 10 mm lateral trocar in an oblique fashion will decrease the chance of hernia formation following surgery. So it is suggested that all 10 and 12mm ports must be sutured.

"**Kulacogu, Reardon , and Nezhat et al"** suggested that it is not essential to routinely close all 5mm port sites but, when 5mm access point("port") were included for continuous handling for a longer duration, fascia should closed to prevent hernia formation. Pneumoperitoneum has to be maintained while closing the fascia preventing injury to bowel which also provides easy way to assess adequate closure of fascia by the attainment of a "air-tight' seal and permits the latent for intra peritoneal visualization via rest lateral ports, so that the bowel is not injured during the repair, and hemostasis is attained, before finishing the proper closure. Appropriate fascia closure also prevents ascitic fluid leak. Different types of trocar tips are designed. Trocar and cannulas are of different sizes, most common sizes are 5, 10 mm.

"Metal trocar" has variety of tips (types)

a. conical

b. pyramidal

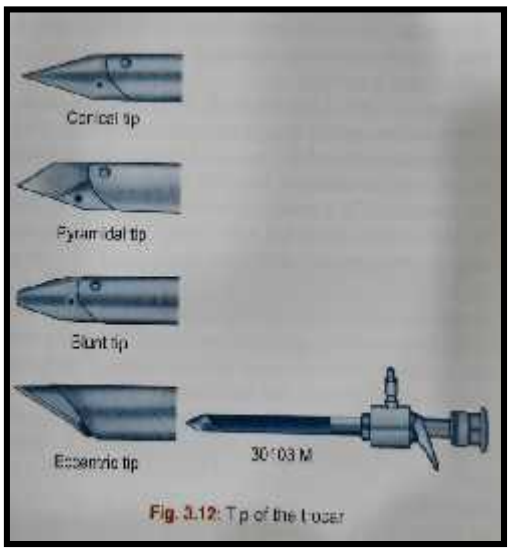
c. blunt and

d. eccentric.

FIGURE 4-2 Various trocars for the introduction of laparoscopic ports through the abdominal wall. There are bladed and nonbladed types. Of the bladed trocars, there are shielded and nonshielded types. The Veress needle with a radially dilating sheath used in the Step system is an example of a nonbladed trocar. (Reprinted with permission from Chandler JG, Corson SL, Way LW. Three spectra of laparoscopic entry access injuries. *J Am Coll Surg.* 2001;192:478–490; discussion 490–471.)

Picture 6-various trocar types

Picture 7-optical trocars



Picture 8-types of trocar tips

TECHNIQUES OF ABDOMEN ACCESS

"OPEN HASSON'S TECHNIQUE:"(1974) : Supraumbilical/infraumbilical incision is taken ,fascia is identified and incision is taken with knife and then peritoneum is opened. The side ports of the trocars are connected with tubes for insufflation. This is preferred technique for patients who have undergone previous abdominal surgeries to avoid injury to underlying structures.

"CLOSED TECHNIQUES"-there are two procedures firstly, can select infraumbilical midline position trocar can be placed directly after lifting the abdominal wall sufficiently and then insufflating .

In another method, left hypochondriac region a palmer's point is marked about 2 finger breadth in midclavicular line. Before port insertion, check for proper placement by 1) Aspiration test 2) Hanging drop test-a drop of saline is kept on the top of needle, the saline will be sucked into the abdominal cavity if placed properly as abdomen is having a negative pressure. 3) Free movement of the needle. Aspiration of bile, blood, air signifies faulty positioning .

After confirming the placement pneumoperitoneum was created. Direct trocar insertion without first establishing pneumoperitoneum is not used frequently for the fear of injury to bowel and blood vessels.

"Optical trocar" is the newer type of trocar which permits to see for the trocar tip as it goes through the wall of the abdomen.[53-56]

"Balloon dissection" is effective" in retroperitoneal region. This access method is suitable for the extraperitoneal repair of hernias of inguinal type and other advanced surgeries using laparoscopy.

A 0 degree scope with straight viewer is kept inside a clear trocar which is either with or without bladed tip.

Hence it is beneficial for the surgeons to know numerous access technique since no single technique that is best for every situations.

DIFFICULT ACCESS-

Abdominal approach is difficult in some cases no matter whichever technique is used like in

1) In obese patients-umbilicus is pushed upwards with increased distance to reach the abdominal cavity, to combat this difficulty combination of open and Veress technique must be used to access the abdomen.

2) previous surgery with midline incision-not safe to use open Hasson's method through the midline as there is higher chance of adhesion of bowel to the posterior surface of the abdominal wall .In such cases safest collection has to be chosen like Palmers point in the left hypochondrium.[57-62]

VARIOUS PORT CLOSURE TECHNIQUES

Even though MIS results in minimisation of patient's pain post-operatively, which is better cosmetically acceptable, but as time progresses,new difficulties are faced .Port closure techniques is one of them in order to avoid complications. From a practical point of view techniques[45-50] can be

1. "visualization through a laparoscope (seen through telescope)
2. "Without seen by (surgeon, no telescope)"

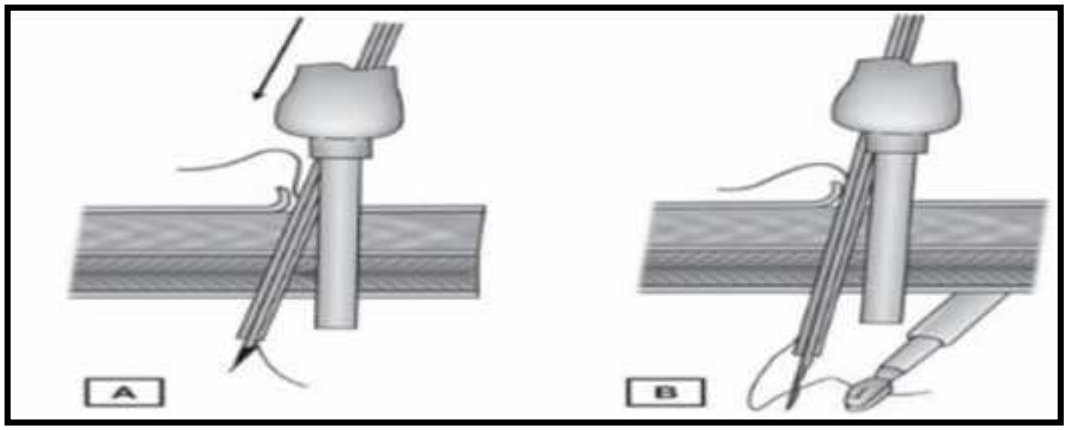
A) GROUP-1 (With laparoscopic visualization)

In this there is maximum safety in avoiding injury organs. Manipulation is done from within abdomen under direct visualization.

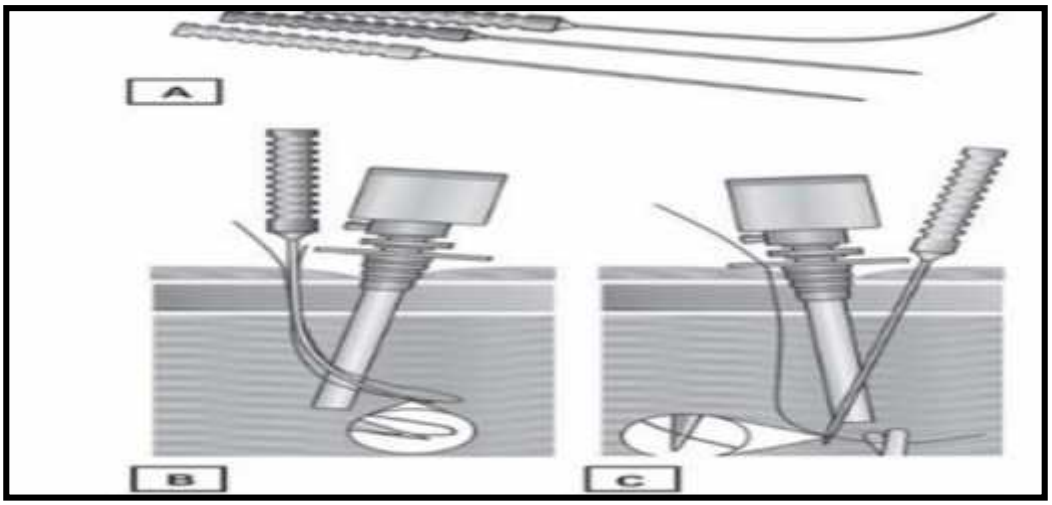
The methods are:

1. "The Grice needle"
2. "The Maciol"
3. "Catheter / spinal"
4. "Endoclose device"
5. " Gor-Tex "
6. "Reverdin"
7. "Deschamps needles"
8. "Semm's emergency"
9. "The modified Veress needle with a blunt tip"
10. "Dental awl with an eye"
11. "Prolene 2/0 on a straight needle aided by a Veress needle"
12. "Auto -stitch (United states surgical),"
13. "Modified Veress needle bearing a crochet hook at the tip,"
14. "Veress needle loop technique"

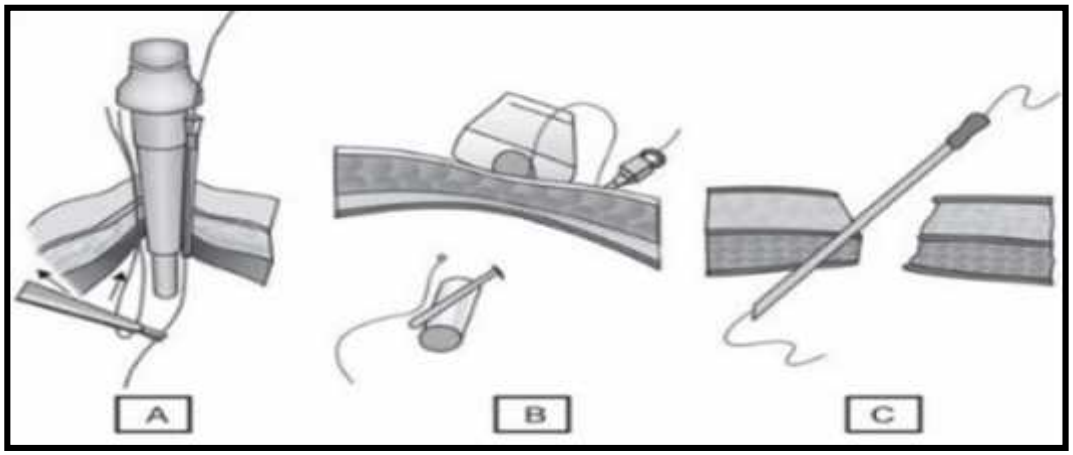
The Grice needle



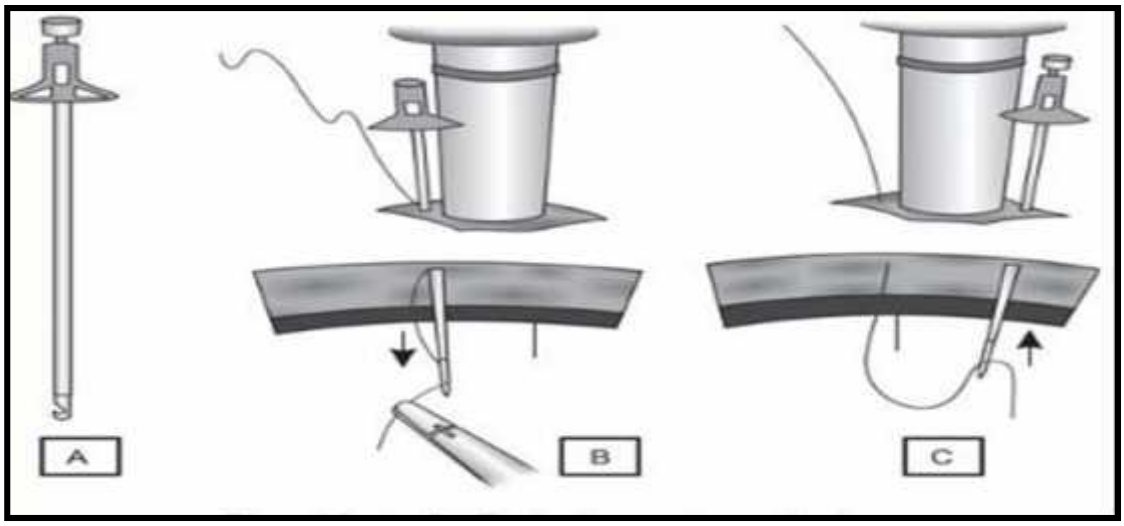
(A) Maciol suture needle set (B& C) Maciol needles



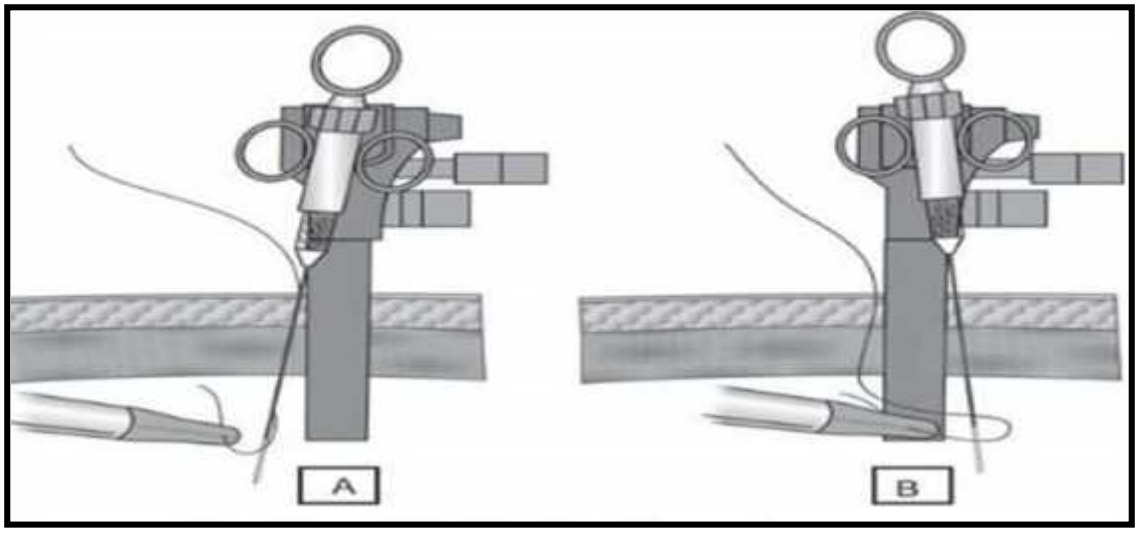
Vein catheter, Spinal cord needle and Angiocath needle



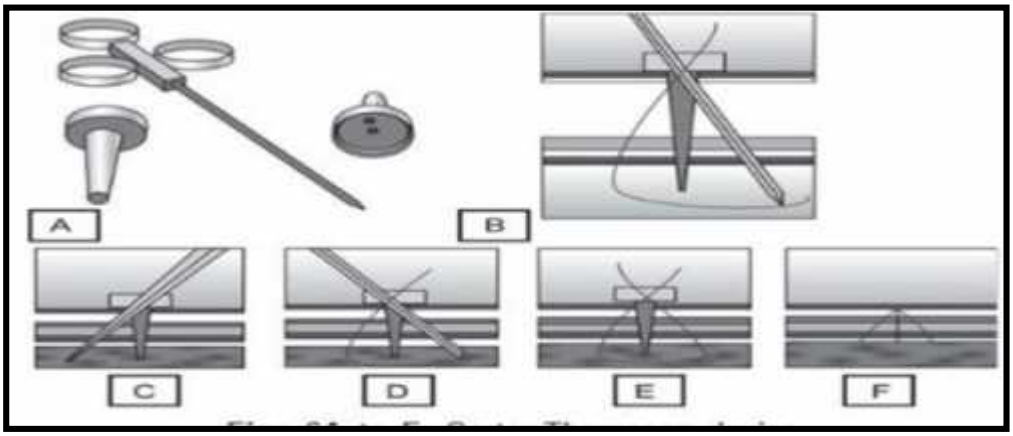
Endo close suture device



The Gore-Tex Suture Passer



'Carter-thomason device'[18]



It has two parts (Fig 6A and Fig 6B)

I) The Pilot guide and

II) the Carter-Thomason suture passer.

Port incision closure requires 4 simple sequence:

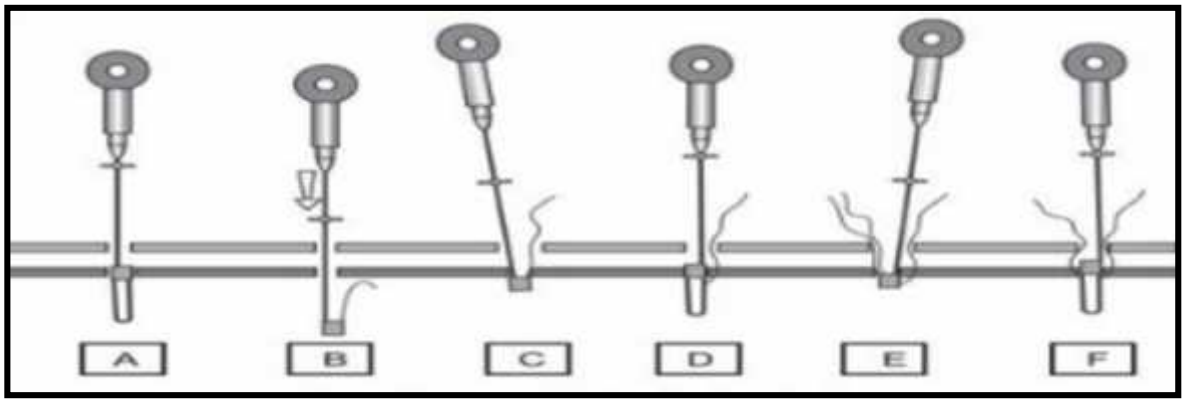
1) Using the suture passer. into the abdomen a suture material is pushed through the Pilot guide, fascia, then drop the suture and take out the suture passer

2) Push the suture passer through the opposite side of the pilot guide and pick up the suture (Fig.6D)

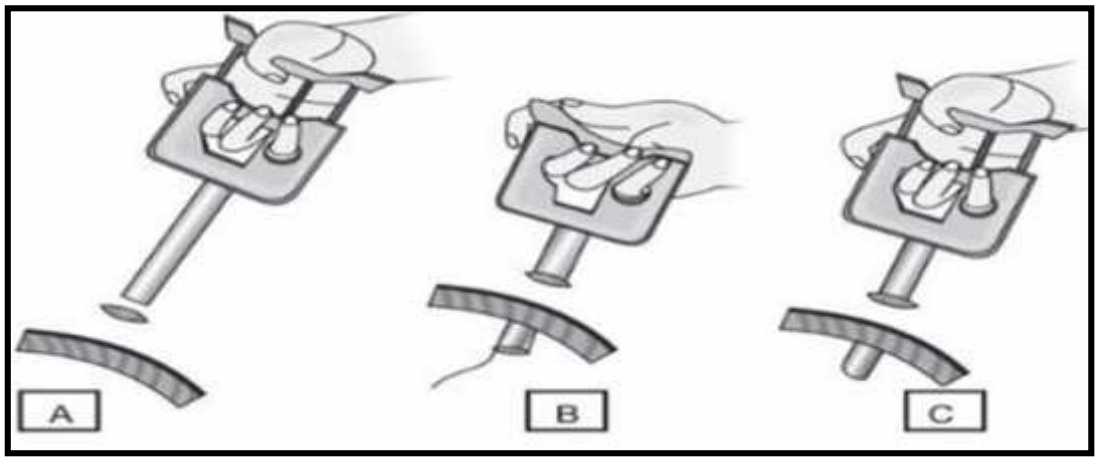
3) Pull the suture up through the peritoneum, muscle, fascia, and guide (Fig.6E),

4) remove the Pilot guide and tie (Fig.6F)

Endo-Judge device



Tahoe surgical instrument ligature device

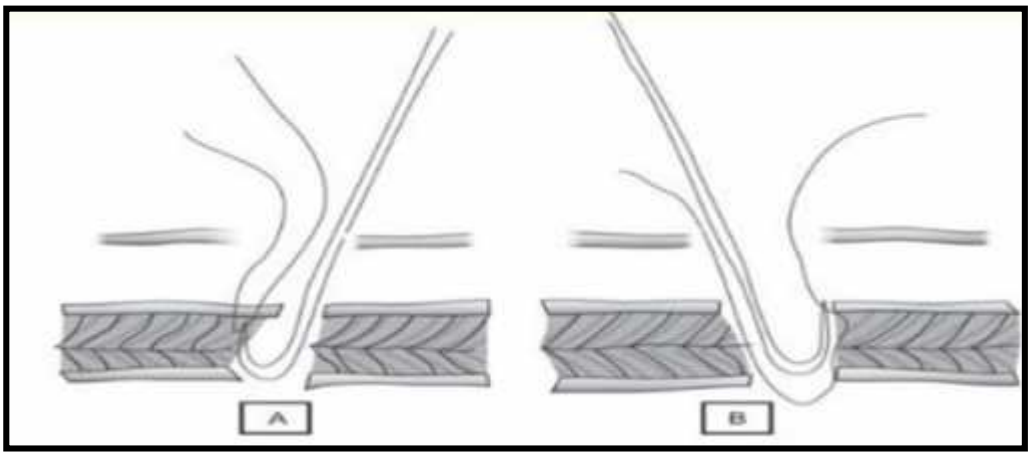


SECOND GROUP: **("Without laparoscopic visualization")**; Closure of the port can be performed under direct vision which needs better insufflation of the abdomen but when the gas is reduced, close the port, a finger is inserted to know by tactile sense to check proper closure.

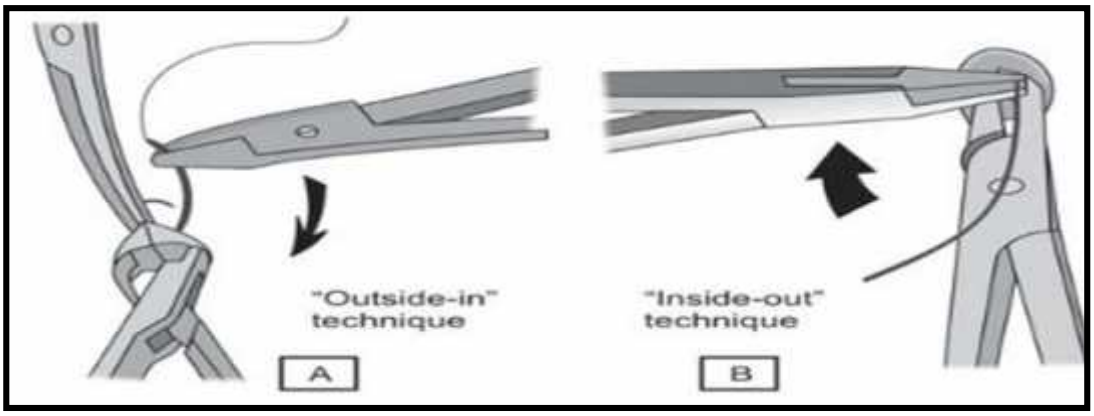
This technique is used during insufflation or after desufflation.

Developed by Jorge et al and Li and Chung - a hook suture carrier (Figs10AandB) for closure of trocar wounds and knot (Fig.10B)

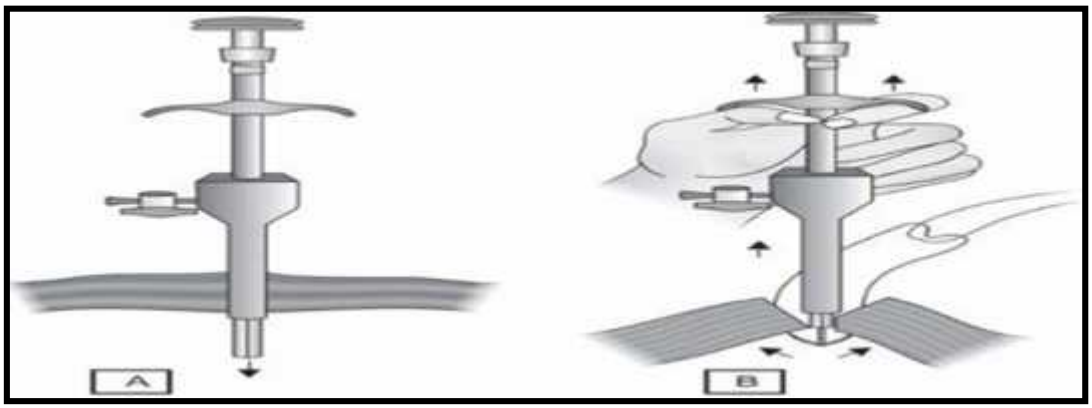
Suture Carrier



'Dual-hemostat technique'



Lowsley retractor with hand closure



"PORT SITE INFECTION (PSI):" is the infection confined to skin and soft tissue around the port through which surgeon gain abdominal access and presents within a month .

PSIs can be avoided by giving antibiotic prophylaxis pre and post op, by using sterile surgical methods, and the usage of organ retrieval bags for organ retrieval.

Once PSI identified, they should be managed by cleaning the ports, by regular dressing, packing after drainage if pus is present and administrating proper antibiotics.

Port -site infections (PSI): [26] Though rare, are bothersome complications in patients which undermine the advantages of MIS ,not only add to the morbidity but also spoils the surgeon's reputation.

Despite advancement in the sterilization technique field, antimicrobial agents used against microbiota, surgical methods, operation theatre air-flow, infections at port site still succeed. Necrotizing fascial infection is indicated by the presence of erythema, wound discharge and fever. PSIs are of 2 types "superficial" and "deep". Superficial PSI is commoner as mentioned in various studies.

Most common site of PSI is the umbilicus and next is epigastric port. The evidence reveals that there is much weightage on the increased incidence of "PSI" in the umbilicus and the part played by umbilical microbiota in the emergence of "PSI". Seroma from the port-site

Picture 9-port stie seroma at epigastric port site

Picture 10-port site infection

MEASURES TO PREVENT PSIs:

PSIs can be prevented by the

(1) Usage of disposable LIs and sterilized ports to include all the laparoscopic surgeries within one day should be available.

(2) Usage of autoclavable LIs;

(3) LIs with good ergonomics, with minimal joints and crevices should be used so that LIs can be cleaned easily, remove debris.

(4) Use of ultrasonic technology for sterilizing LIs after dismantling;

(5) Following proper protocols regarding the concentration, contact time, and how frequently LIs can be sterilized with liquid steriliser.

(6) Plasma steriliser or ETO for consecutive surgery

(7) Separate set of LIs should be used for different methods.

(8) Leaking of bile or intestinal components at the port site should be prevented.

(9) Using non-porous endo-bags for extraction of the specimen

(10) Until suturing, extensive irrigation and Port-site washing to be done.

Laparoscopic surgery needs advanced equipments which are precisely calibrated. Laparoscopic instruments differ from other surgical instruments in being more complex and also delicate in design .Hence, LIs are most susceptible to bioburden (microbes and debris) within their crevices so LIs should be sterilised and cleaned gently to avoid complications. Also, meticulous cleaning techniques are

needed so that the safety of patients, surgeons and operating theatre people is not compromised.

It is necessary to meticulously clean LIs and disinfect and sterilise as there are newer resistant strains of microorganisms.

Types of Disinfection :

A) High – level type: here all microbes are destroyed except the spores.
B) Intermediate type-level: some types of fungi, viruses and spores are spared, or
C) Low-level type-in which fungi, viruses, spores and mycobacteria are not destroyed.

For LIs preferably sterilization should be used, if not high level type of disinfection can be done. Premium LI processing involves multiple steps which reduce the risk of PSI.

STEPS OF STERILIZATION OF LIs

To process adequately, it is important to follow the sterilisation steps in correct order as mentioned below.

- "Dismantling"
- "Decontamination"
- "Precleaning"
- "cleaning and rinsing"
- "Drying"
- "Sterilization and Storage"

Picture 11-dismantling

Picture 12-decontamination

Picture 13-rinsing

Picture 14-cidex

After each surgery LI are cleaned in operation theatre and then dried, after that instruments are wrapped and sent to Central Sterile Supplies Department (CSSD) for sterilization.

Decontamination involves keeping laparoscopic instruments in a container containing disinfected solutions,0.5 % chlorine for 10mins.

Any instrument requires specialized cleaning before autoclaving.

The "centres for disease control" ("CDC") acclaims that rigid laparoscopic instruments should be sterilized, in case of non-feasibility they should be disinfected with high level disinfection steps.

Picture 15-ethylene oxide sterlizer

NEWER METHODS OF STERILISATION: STERRAD PRINCIPLE:

Uses H_2O_2 vapours and least temperature plasma to sterilize most devices, rapidly with no hazardous leftovers.

Picture 16-sterrad sterilizer

Storage : LI should be either used immediately after sterilization or should be stored properly, so that they are not contaminated.

" PORT SITE METASTASIS "Nowadays many oncological procedures are undertaken by laparoscopic approach.

The way which metastasis develops to the port site is not known. Several studies have been conducted to identify the associated risk factors. a) Hematogenous spread

b) Direct spread -direct contact of the tumor to the port site during retrieval and "Chimney effect" (carbon dioxide leakage along the trocar) has been identified as the predisposing factor responsible port-site metastasis post laparoscopic surgery.

The actual incidence rate of PSM is not known however estimate range is about 0-21%.

Following preventive majors have to be taken to prevent the development of port site metastasis –

a) minimize tissue trauma as much as possible and minimize the number of instrument transfers.

b) rinse trocars in 5% Povidine- iodine when interchanging instruments.

c) Resect tumours with adequate margins.

d)Use protective bags to retrieve tumours .

e) Deflation should be done with trocars in place.

f) Port -sites should be cleaned with betadine(Povidine iodine).

g) Close peritoneal trocar sites.

Picture 17-portsite metastasis

Picture 18-portsite metastasis

Picture 19-CT image of a laparoscopic port site metastatic deposit

Picture 20-sagittal ct image of a laparoscopic portsite metastatic deposit

" **Omental-related complications"**: Such complications are seen if trocars are removed before the complete deflation of abdominal cavity and also in inadequate/faulty closure of the fascia.

"Preventive measures include:"

a) After the surgery, all the trocars should be taken out with caution while inspecting the same.

b) Complete removal of carbon dioxide gas is done by opening the valve of 10mm cannulas.

c) The camera and primary port are to be removed together following complete removal of the gas. At the same time look for any bowel or omental entrapment.

d) appropriate sized incisions should be taken for ports and

e) Proper closure of fascia has to be achieved."

Miscellaneous complications like

"Sub cutaneous emphysema"

"Failed entry."

"Leaking port."

"Loss of port position"

"Port site pain": Pain can be diminished by using lesser number of trocars.

"Nerve injury": If pain is persistent post-operatively, suspect nerve injury, which can be avoided by selecting the proper position of port placement avoiding. Injury to nerve is not likely to be acknowledged intra operatively.

MATERIALS AND METHODS

All patients undergoing laparoscopic surgeries in KLE'S Dr. Prabhakar Kore Hospital & MRC, Belagavi were observed prospectively

Sample size: 120

Study design: A cross sectional –observational study

Study duration: 1 year

Study period: 1st January 2019-31st December 2019

Inclusion criteria: All patients undergoing laparoscopic surgeries in KLE hospital Belagavi were included

Exclusion criteria:

1) Laparoscopic surgeries converted to open
2) pregnant women
3) immune compromised patients
4) age <8years

All patients undergoing laparoscopic surgeries, between January 2019 to December 2019, at our institute were included and port sites were observed for complications prospectively. And statistical software, namely, SPSS 20 was used for analysis.

Procedure: With written informed consent taken from the patient, data is collected, patient enrolled for study, screening done and taken up for procedure. Procedures were taken under general anaesthesia. All patients undergoing laparoscopic surgeries

were given antibiotics preoperatively. Reusable ports were used after sterilisation with ethylene oxide.

Access into the abdomen was gained by open Hasson's technique and pneumoperitoneum created. 10mm trocar was used for umbilical port (camera port), another 10mm trocar for additional epigastric port and 5mm trocars 2-4 in number were used(multiple ports) .Reusable conical rotatory type of trocars were used. Fascia of ports of 10mm were closed with Vicryl sutures and skin closed with Ethilon suture.

Port site	Surgery done	No. of ports used	Complications
1.Umbilical port			
2.Epigastric port			
3.Left iliac			
4.Suprapubic			
5.additional port 5mm in right side of abdomen			
7.5mm			
8.3mm			
9.3mm			

Post-operatively port sites were observed for complications by myself and my co-pgs in the following way: Within 24hours, post op day 3, during next follow up(within 1 week), after 1month and subsequent follow ups ,and if further any complications through telephonic conversation.

Formula:

Incidence= No. of new cases of port site complications/total no. of cases observed ×100

Data was analysed by using a software named SPSS 20

Laparoscopic surgeries done in our institute includes

Laparoscopic Cholecystectomy

Laparoscopic appendicectomy

Laparoscopic inguinal hernia repair

Laparoscopic umbilical hernia repair

Diagnostic laparoscopy

Laparoscopic assisted cystectomy

Fundoplication

Laparoscopic assisted vaginal hysterectomy

And other laparoscopic assisted surgeries

Picture 21-operation theatre setup during laparoscopic surgeries

RESULTS

Table:1) Age wise distribution

Age groups	Number	Percent
<=20yrs	14	11.67
21-30yrs	31	25.83
31-40yrs	35	29.17
41-50yrs	13	10.83
51-60yrs	16	13.33
>=61yrs	11	9.17
Total	120	100.00
Mean age	**37.84**	
SD age	15.76	

Figure:1A) Pie chart showing Age wise distribution of patients

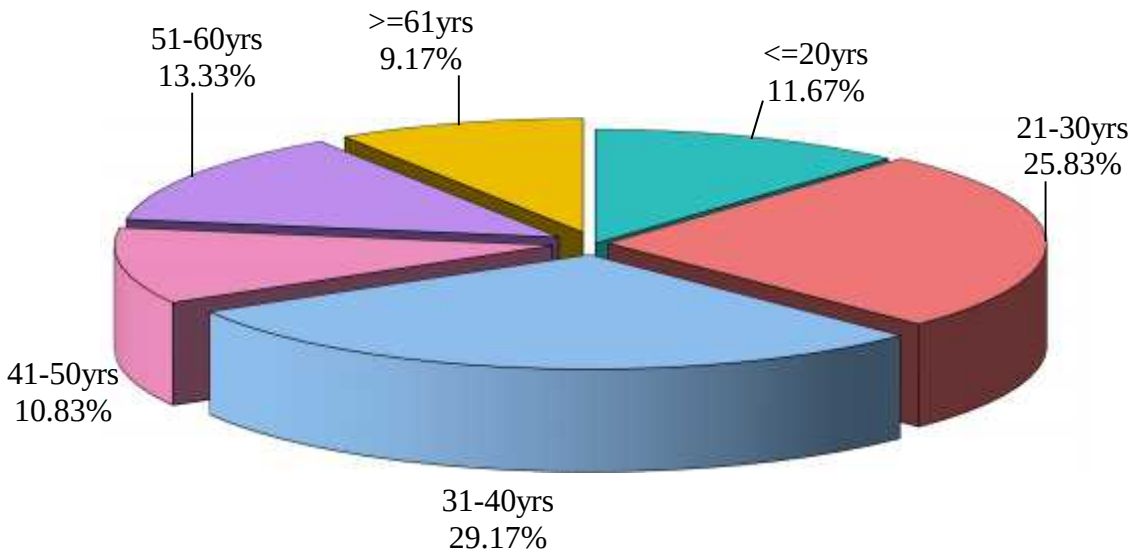


Table:2) Comparison of various procedures by age groups

Age groups	DLap	%	LA	%	LC	%	LUHR	%	Others	%	Total	%
<=20yrs	1	7.14	4	28.57	5	35.71	2	14.29	2	14.29	14	11.67
21-30yrs	3	9.68	13	41.94	11	35.48	3	9.68	1	3.23	31	25.83
31-40yrs	5	14.29	18	51.43	11	31.43	1	2.86	0	0.00	35	29.17
41-50yrs	2	15.38	5	38.46	3	23.08	2	15.38	1	7.69	13	10.83
51-60yrs	0	0.00	6	37.50	7	43.75	0	0.00	3	18.75	16	13.33
>=61yrs	2	18.18	7	63.64	2	18.18	0	0.00	0	0.00	11	9.17
Total	13	10.83	53	44.17	39	32.50	8	6.67	7	5.83	120	100.00
Chi-square=22.4651 p=0.3158												

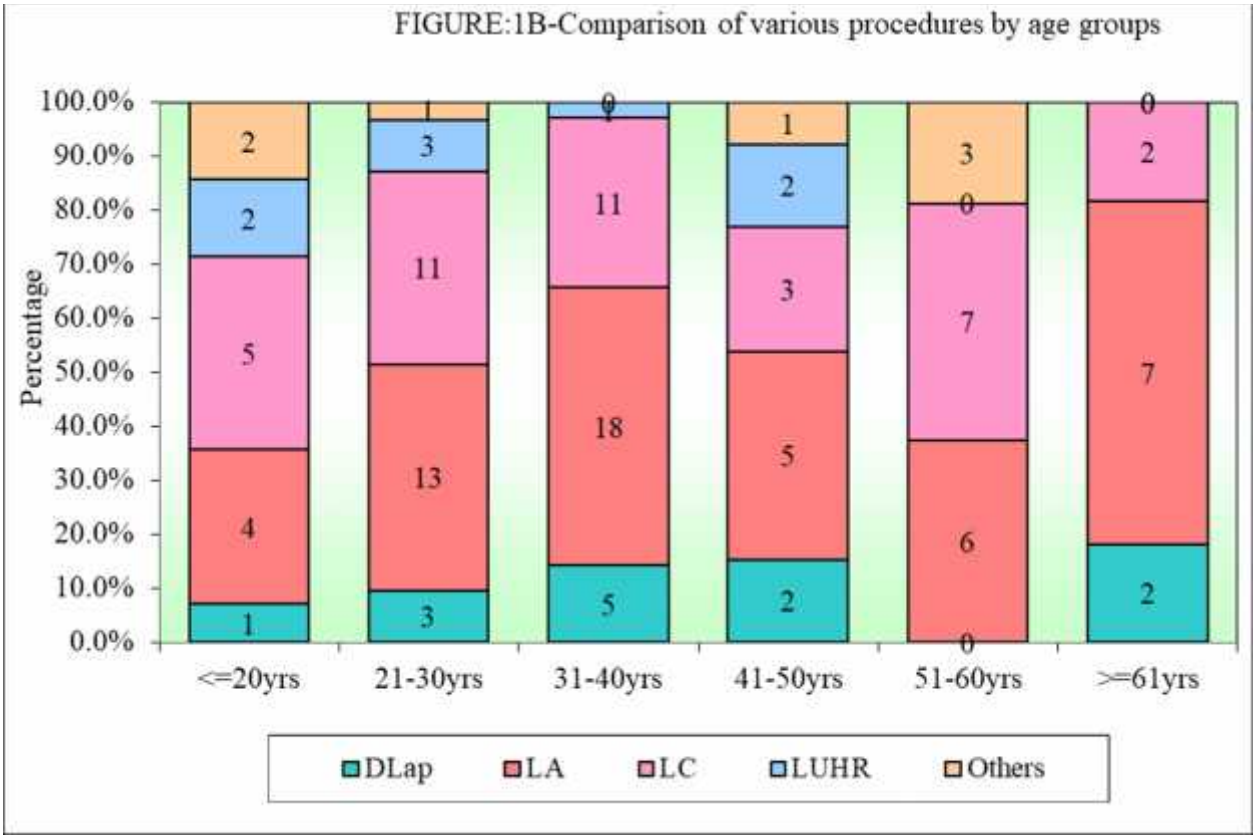


Table:3) Gender wise distribution

Gender	Number	Percent
Male	43	35.83
Female	77	64.17
Total	120	100.00

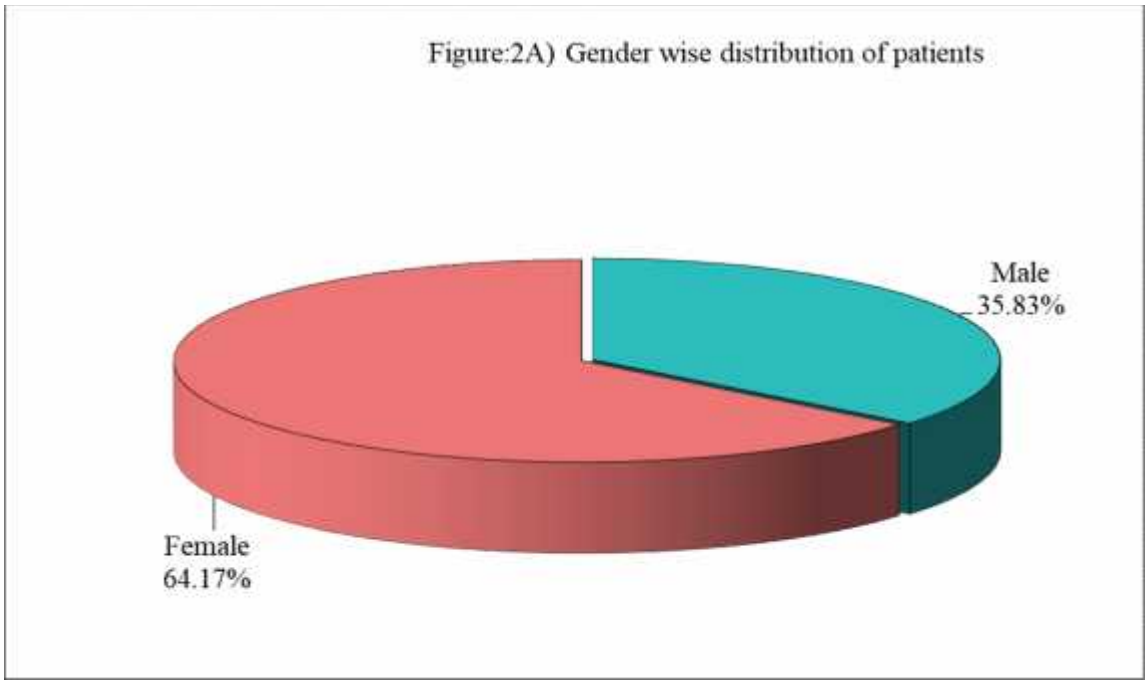


Table:4) Comparison of various procedures by gender

Gender	DLap	%	LA	%	LC	%	LUHR	%	Others	%	Total	%
Male	6	13.95	14	32.56	18	41.86	4	9.30	1	2.33	43	35.83
Female	7	9.09	39	50.65	21	27.27	4	5.19	6	7.79	77	64.17
Total	13	10.83	53	44.17	39	32.50	8	6.67	7	5.83	120	100.00
Chi-square= 1.2195 p=0.9430												

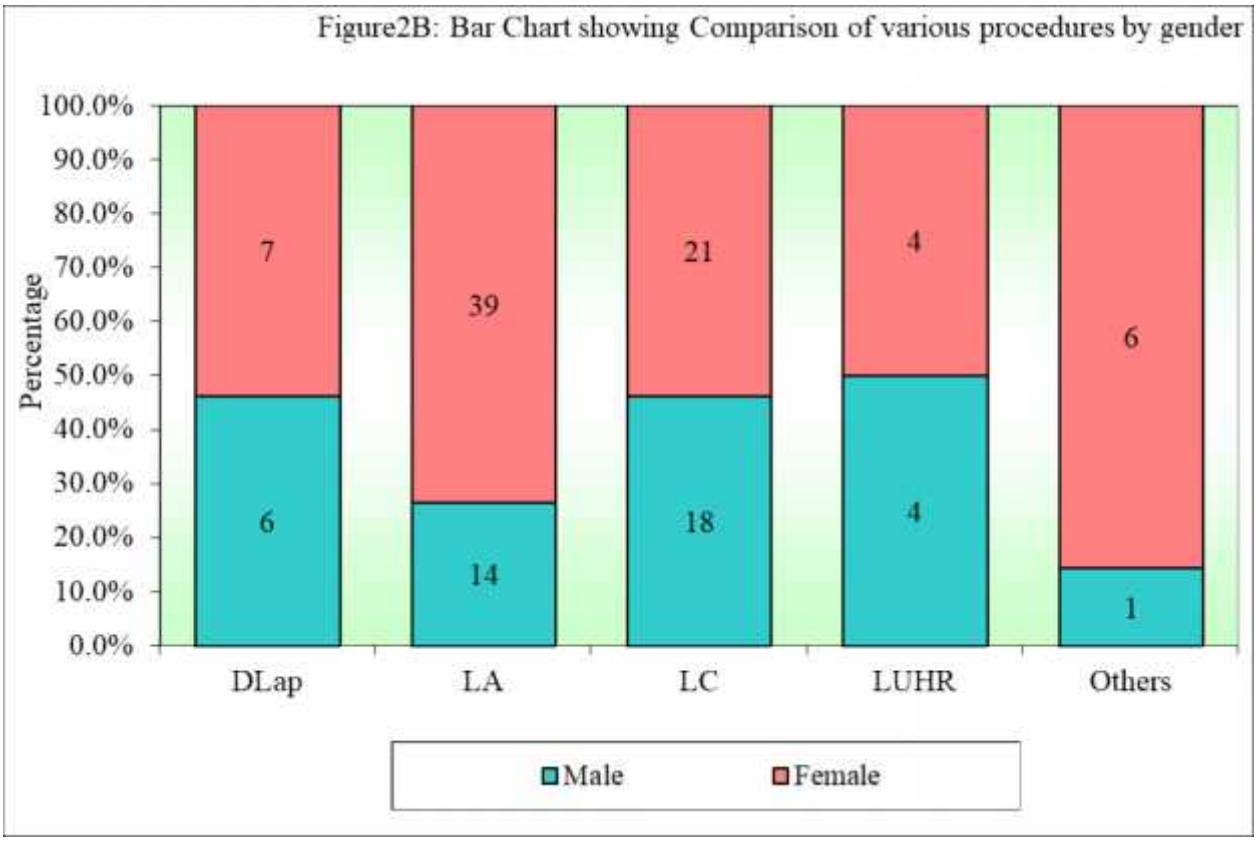


Table:5 Distribution of Number of port used

Number of ports	Number	Percent
3	70	58.33
4	48	40.00
5	2	1.67
Total	120	100.00

Figure 3: Pie chart showing Distribution of number ports used (3, 4, 5)

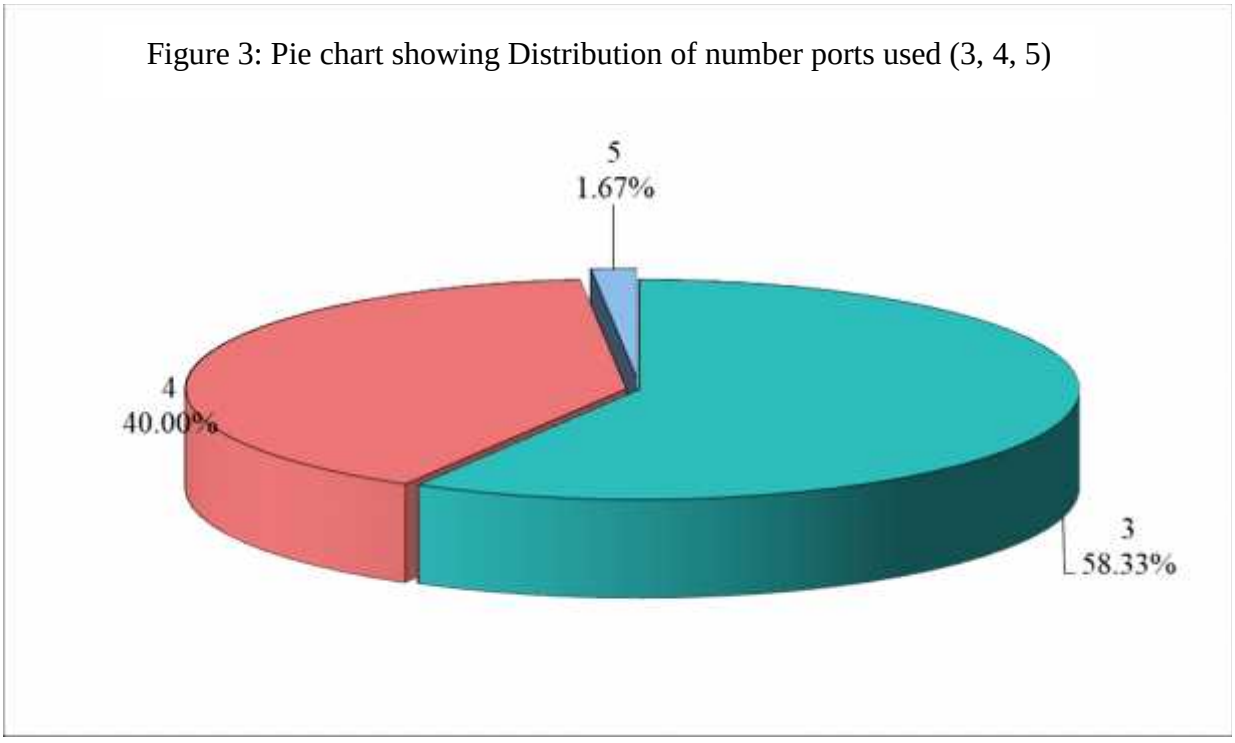


Table:6 Comparison of various procedures by number of ports

Procedure	3	%	4	%	5	%	Total	%
DLap	7	53.85	4	30.77	2	15.38	13	10.83
LA	33	62.26	20	37.74	0	0.00	53	44.17
LC	21	53.85	18	46.15	0	0.00	39	32.50
LUHR	6	75.00	2	25.00	0	0.00	8	6.67
Others	3	42.86	4	57.14	0	0.00	7	5.83
Total	70	58.33	48	40.00	2	1.67	120	100.00
Chi-square= 19.1288 p=0.0142*								

*p<0.05

Figure 4: Bar diagram for Comparison of various procedures by number of ports

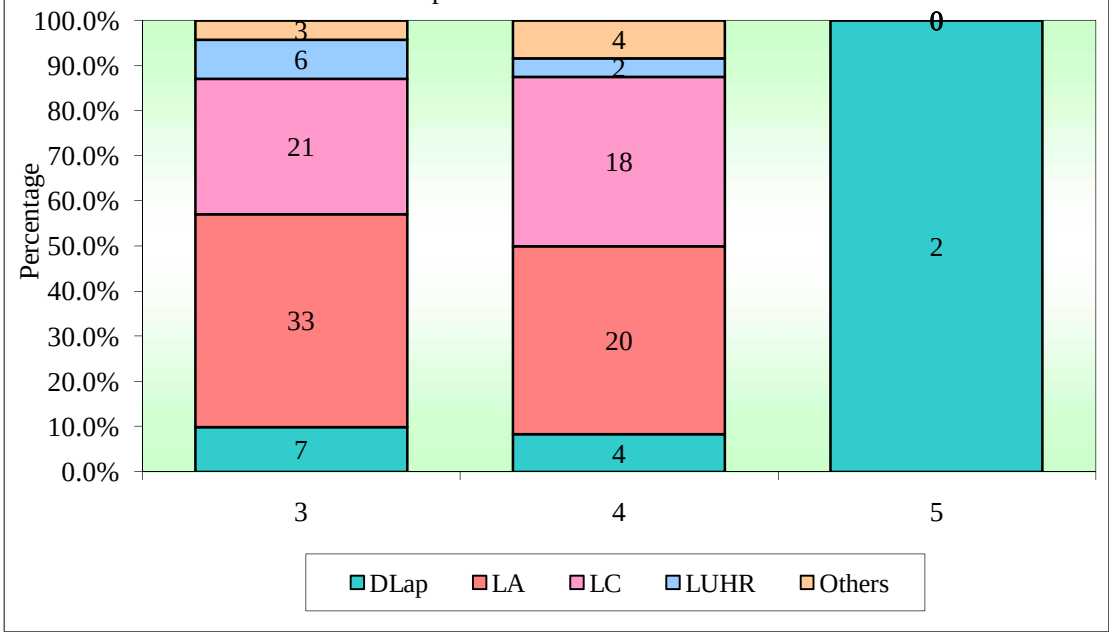


Table: 7 Distribution of presence or absence of Co-morbid conditions

Co-morbidities	Number	Percent
Present	8	6.67
Absent	112	93.33
Total	120	100.00

Figure:5)Pie chart showing distributuion of presence or absence of co-morbid condition

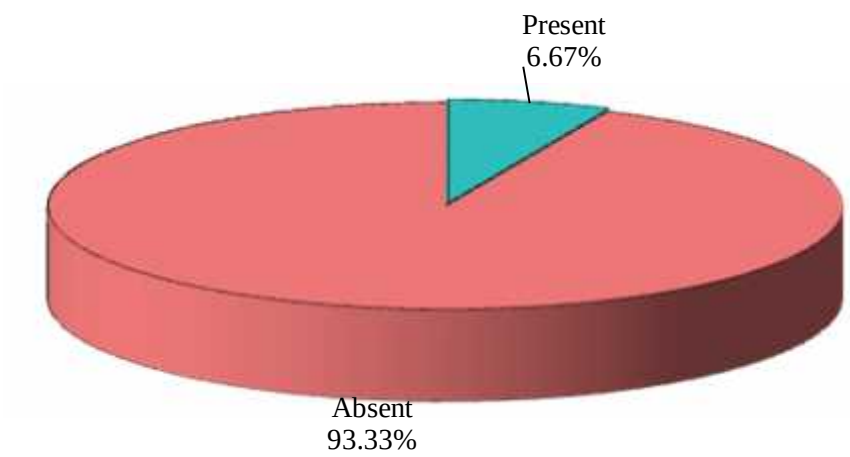


Table: 8 Comparison of various procedures with presence of co-morbidities

Procedure	Present	%	Absent	%	Total	%
DLap	0	0.00	13	100.00	13	10.83
LA	6	11.32	47	88.68	53	44.17
LC	2	5.13	37	94.87	39	32.50
LUHR	0	0.00	8	100.00	8	6.67
Others	0	0.00	7	100.00	7	5.83
Total	8	6.67	112	93.33	120	100.00
Chi-square= 3.9934 p=0.4069						

Figure6:Bar chart for Comparison of various procedures with presence of co morbidities

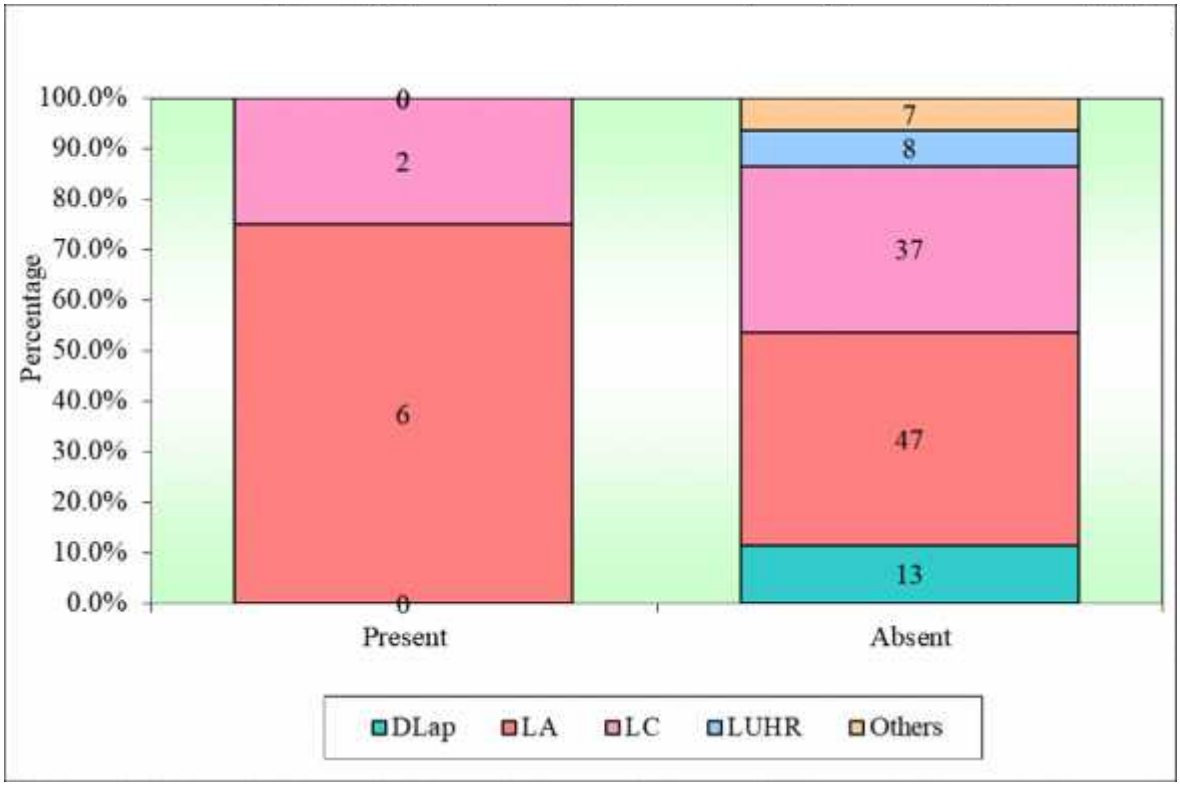


Table:9 Presence of PSI wise distribution

Presence of PSI	Number	Percent
Yes	5	4.17
No	115	95.83
Total	120	100.00

Figure 7: Pie chart showing distribution of Presence and absence of PSI

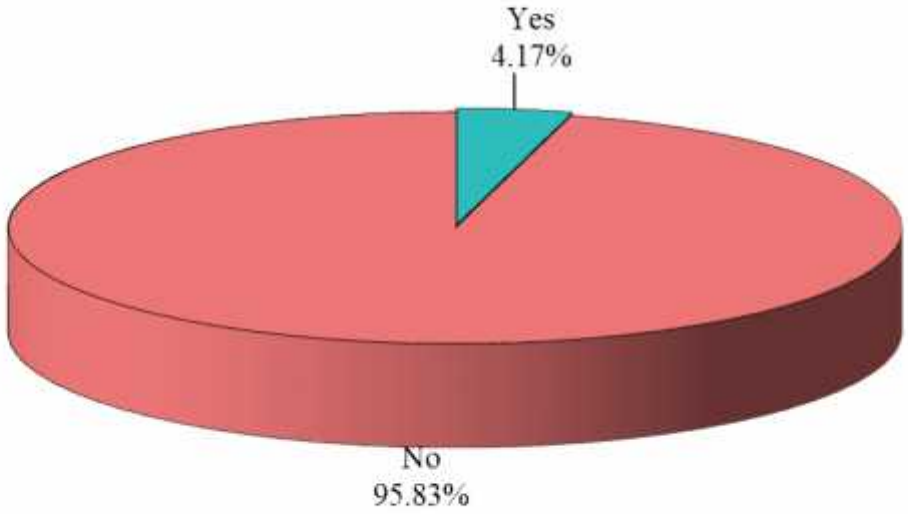


Table: 10 Comparison of various procedures with presence of PSI

Procedure	Yes	%	No	%	Total	%
DLap	0	0.00	13	100.00	13	10.83
LA	4	7.55	49	92.45	53	44.17
LC	1	2.56	38	97.44	39	32.50
LUHR	0	0.00	8	100.00	8	6.67
Others	0	0.00	7	100.00	7	5.83
Total	5	4.17	115	95.83	120	100.00
Chi-square= 2.9854 p=0.5603						

Table; 11 Distribution of patients with preence or absence of seroma formation

Presence of seroma formation	Number	Percent
Yes	1	0.83
No	119	99.17
Total	120	100.00

Figure 8:Pie chart showing -Distribution of seroma formation

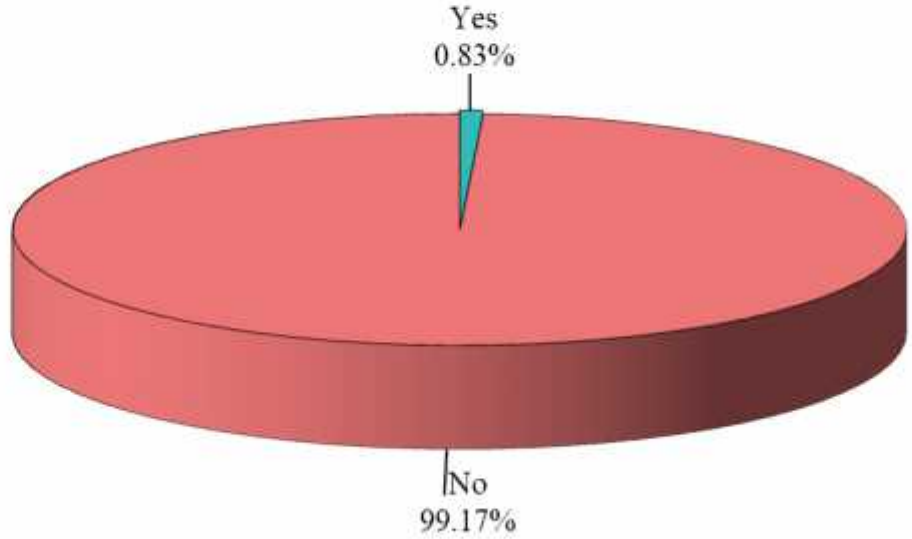


Table:12 Comparison of various procedures with presence of seroma formation

Procedure	Yes	%	No	%	Total	%
DLap	0	0.00	13	100.00	13	10.83
LA	0	0.00	53	100.00	53	44.17
LC	1	2.56	38	97.44	39	32.50
LUHR	0	0.00	8	100.00	8	6.67
Others	0	0.00	7	100.00	7	5.83
Total	1	0.83	119	99.17	120	100.00

Table: 13 distribution of presence or absence of port-site hernia

Presence of PSH	Number	Percent
Yes	2	1.67
No	118	98.33
Total	120	100.00

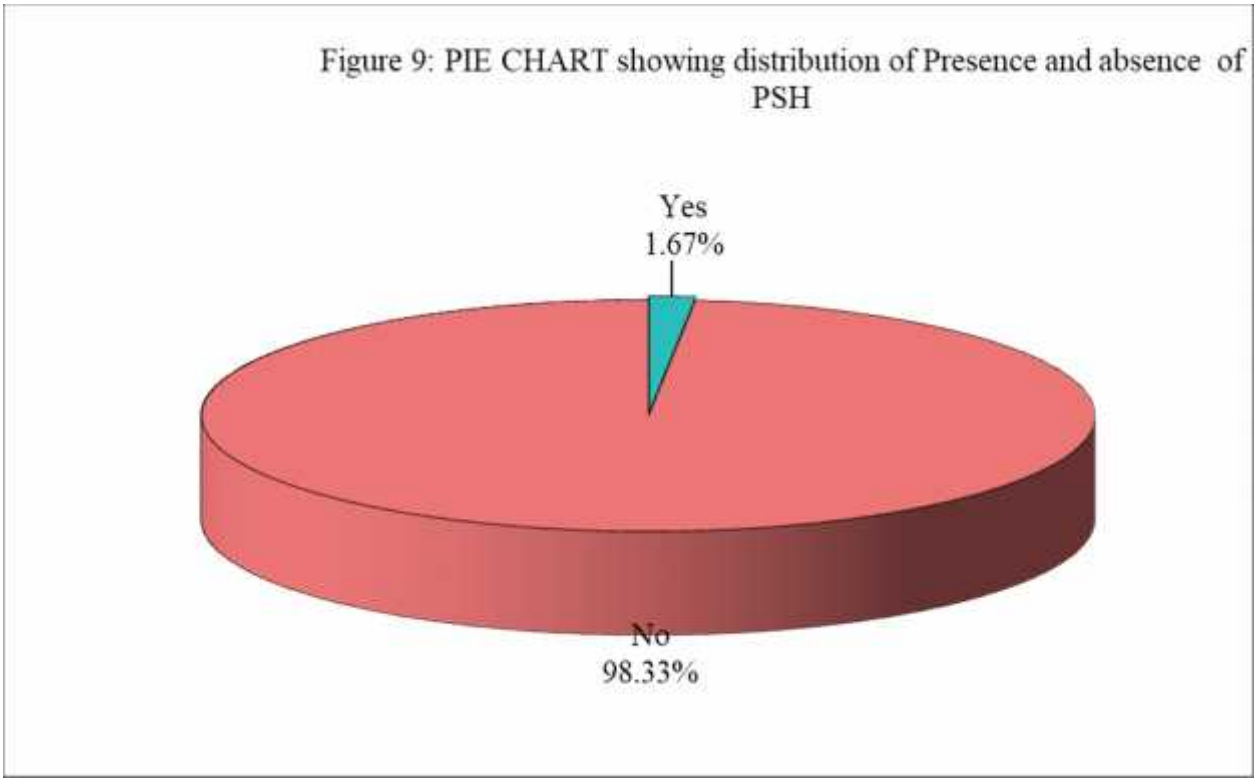


Table: 14 Comparison of various procedures with presence of PSH

Procedure	Yes	%	No	%	Total	%
DLap	0	0.00	13	100.00	13	10.83
LA	1	1.89	52	98.11	53	44.17
LC	0	0.00	39	100.00	39	32.50
LUHR	0	0.00	8	100.00	8	6.67
Others	1	14.29	6	85.71	7	5.83
Total	2	1.67	118	98.33	120	100.00

Table: 15 Presence of PSB wise distribution

Presence of PSB	Number	Percent
Yes	2	1.67
No	118	98.33
Total	120	100.00

Figure;10-Pie chart showing distribution of presence or absence of PSB

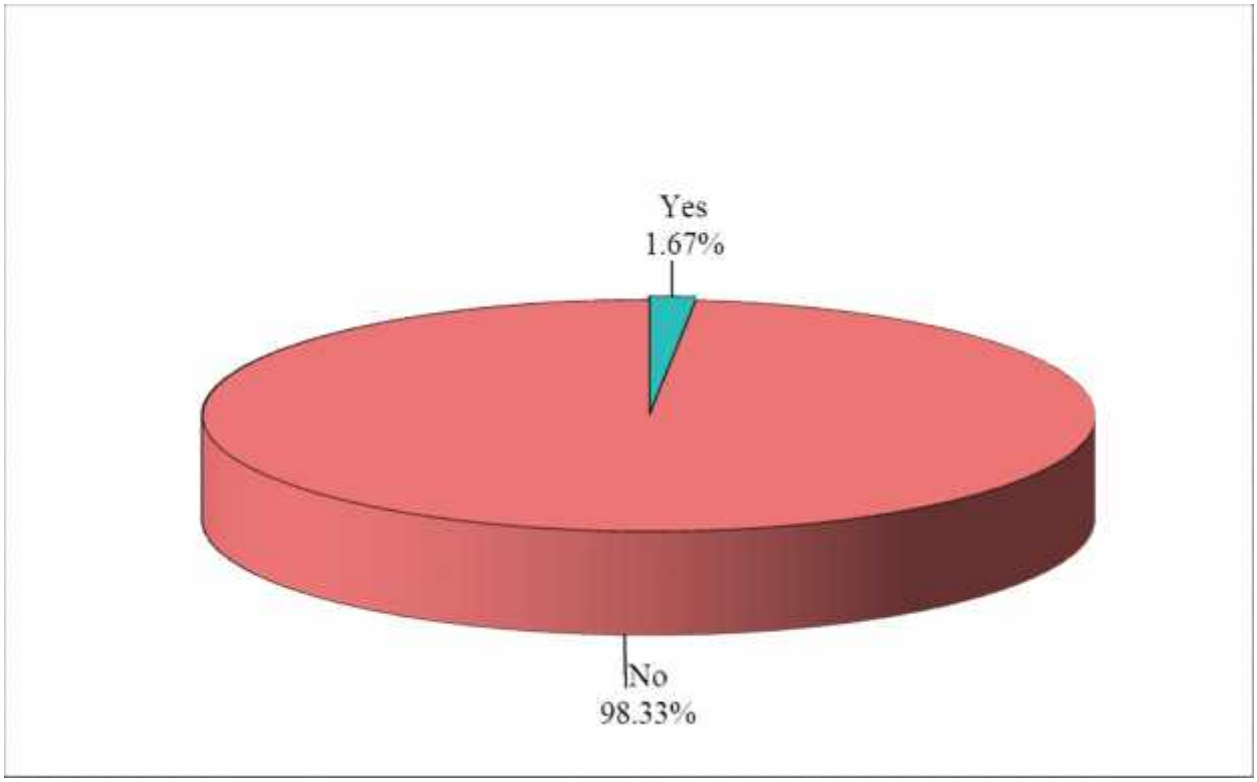


Table:16 Comparison of various procedures with presence of PSB

Procedure	Yes	%	No	%	Total	%
DLap	0	0.00	13	100.00	13	10.83
LA	2	3.77	51	96.23	53	44.17
LC	0	0.00	39	100.00	39	32.50
LUHR	0	0.00	8	100.00	8	6.67
Others	0	0.00	7	100.00	7	5.83
Total	2	1.67	118	98.33	120	100.00

Table: 17 Distribution of PSM

Presence of PSM	Number	Percent
Yes	0	0.00
No	120	100.00
Total	120	100.00

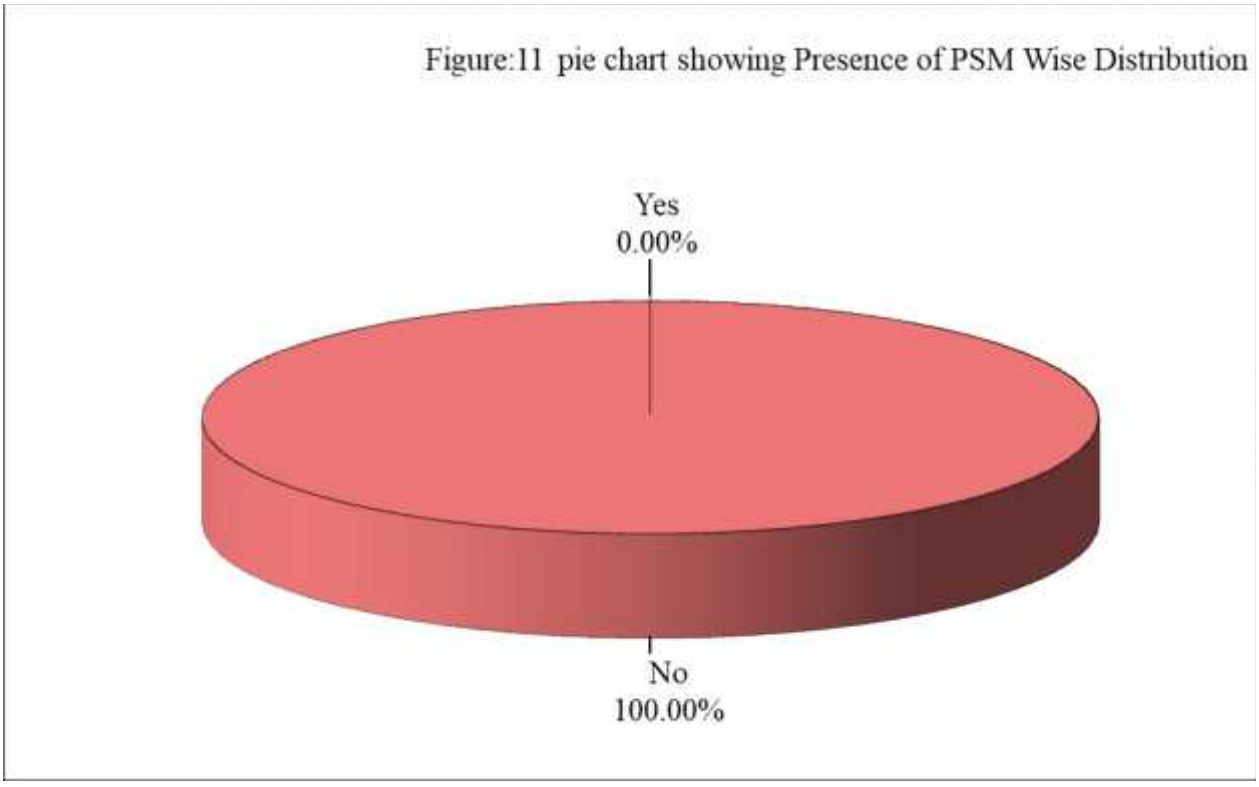


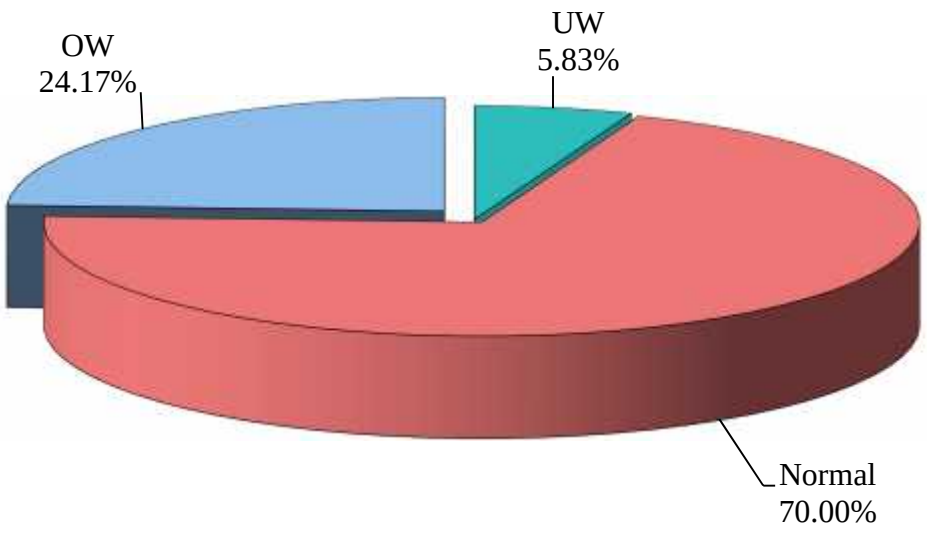
Table:18 Comparison of various procedures with presence of PSM

Procedure	Yes	%	No	%	Total	%
DLap	0	0.00	13	100.00	13	10.83
LA	0	0.00	53	100.00	53	44.17
LC	0	0.00	39	100.00	39	32.50
LUHR	0	0.00	8	100.00	8	6.67
Others	0	0.00	7	100.00	7	5.83
Total	0	0.00	120	100.00	120	100.00

Table:19 distribution of paients according to BMI

Obesity	Number	Percent
UW	7	5.83
Normal	84	70.00
OW	29	24.17
Total	120	100.00
Mean BMI	22.46	
SD BMI	3.28	

Figure 12:pie chart showing distribution of patients according to BMI



OW-Overweight or obese

UW-underweight

Normal BMI

Table:20 Comparison of various procedures with obesity

Procedure	UW	%	Normal	%	OW	%	Total	%
DLap	0	0.00	9	69.23	4	30.77	13	10.83
LA	2	3.77	41	77.36	10	18.87	53	44.17
LC	3	7.69	26	66.67	10	25.64	39	32.50
LUHR	1	12.50	5	62.50	2	25.00	8	6.67
Others	1	14.29	3	42.86	3	42.86	7	5.83
Total	7	5.83	84	70.00	29	24.17	120	100.00
Chi-square= 2.0944 p=0.7184								

Figure 13: Bar diagram for Comparison of various procedures with obesity

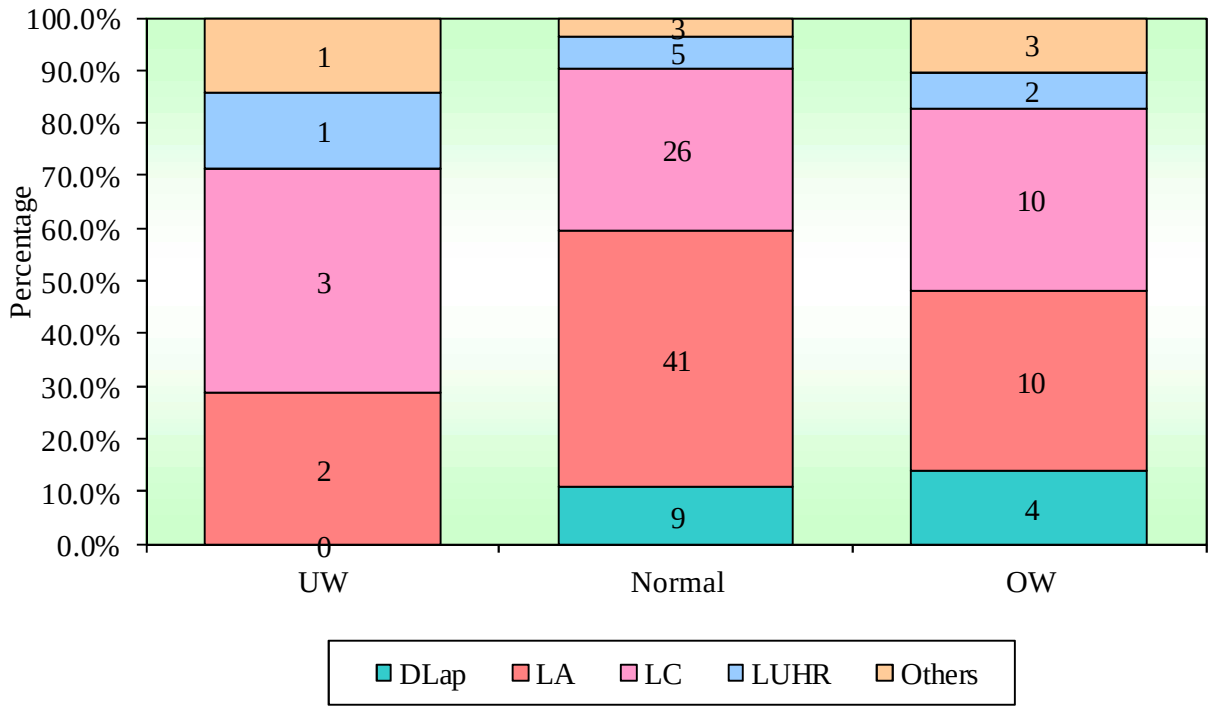


Table: 21 Association between obesity with No. of ports

No. of ports	Under weight	%	Normal	%	Over weight	%	Total	%	p-value
3	7	10.00	60	85.71	3	4.29	70	58.33	0.0001*
4	0	0.00	23	47.92	25	52.08	48	40.00	
5	0	0.00	1	50.00	1	50.00	2	1.67	
Total	7	5.83	84	70.00	29	24.17	120	100.00	

*p<0.05

"Association of obesity with number of ports used is found to be statistically significant with p value-0.0001.

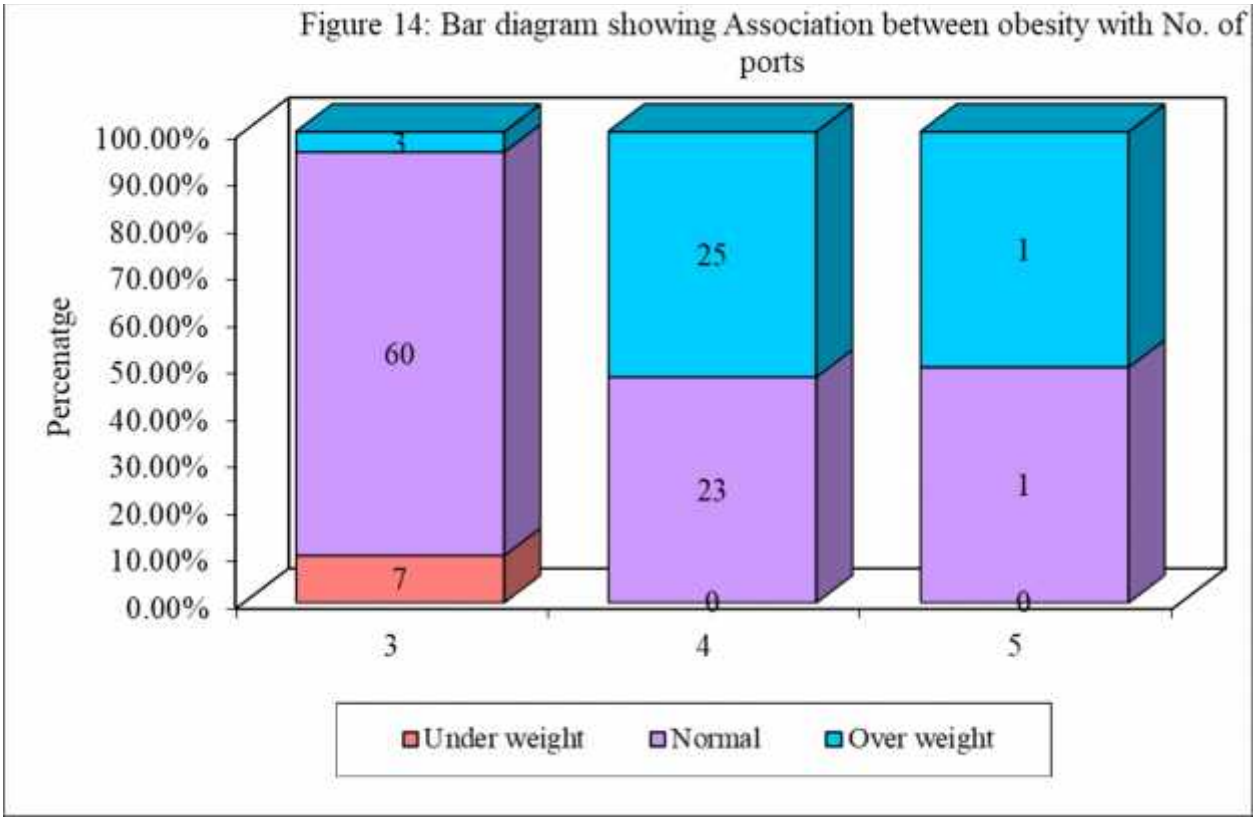


Table: 22 Association between obesity with Co-morbidities

Co-morbidities	Under weight	%	Normal	%	Over weight	%	Total	%	p-value
Present	0	0.00	6	75.00	2	25.00	8	6.67	0.7660
Absent	7	6.25	78	69.64	27	24.11	112	93.33	
Total	7	5.83	84	70.00	29	24.17	120	100.00	

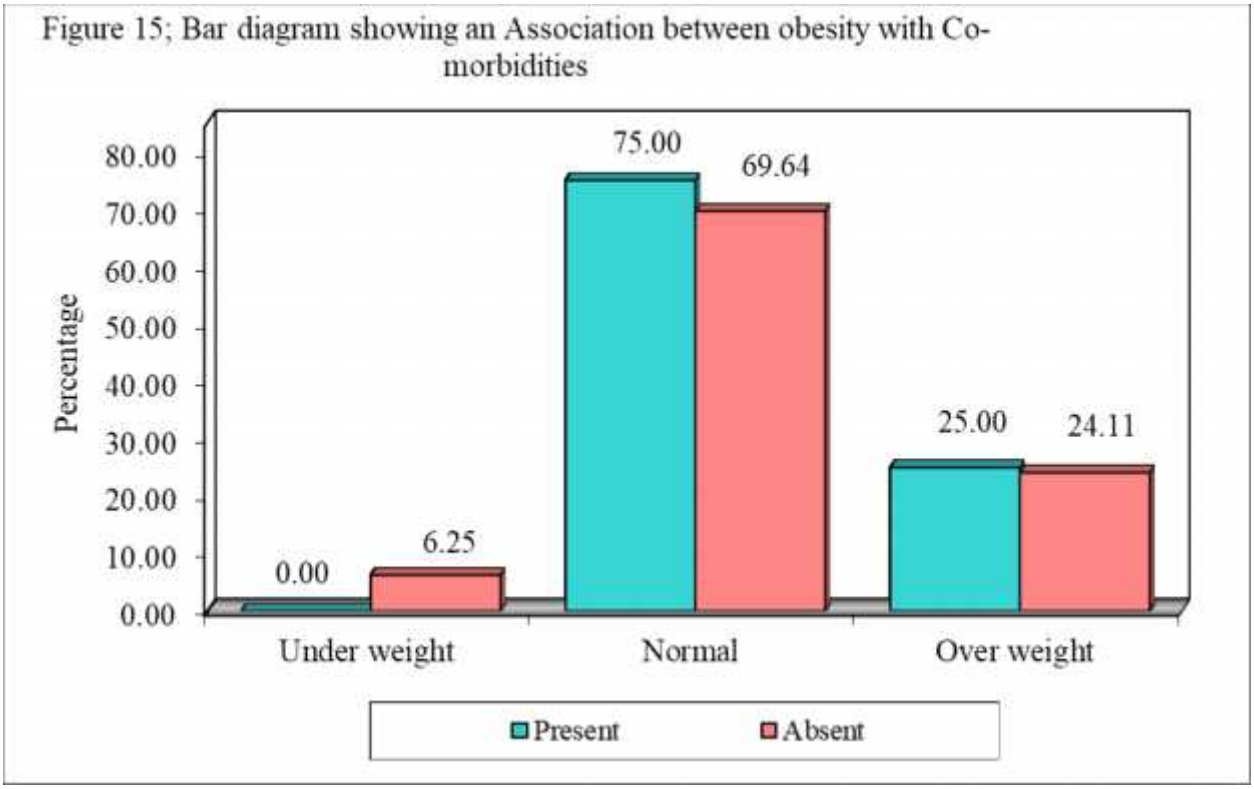
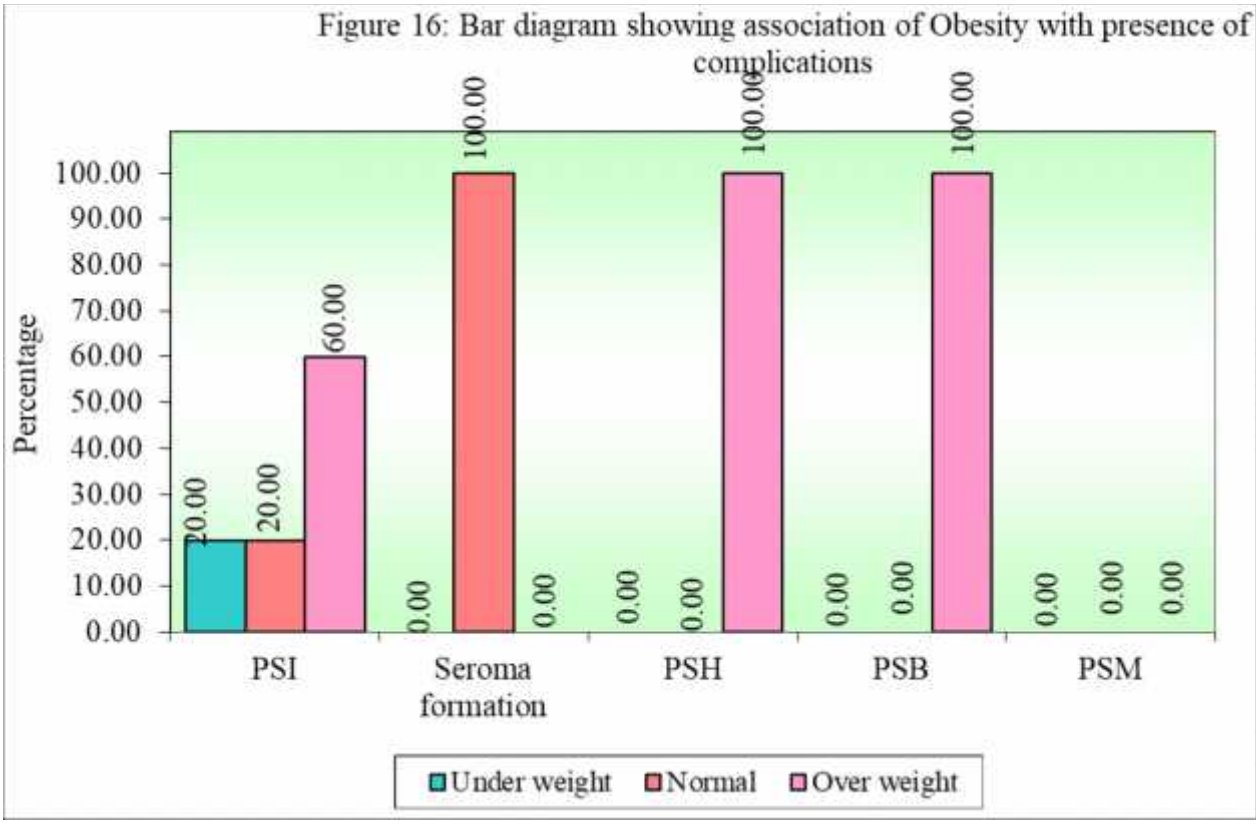


Table: 23 Association of obesity with complications

	Under weight	%	Normal	%	Over weight	%	Total	%	p-value
PSI									
Yes	1	20.00	1	20.00	3	60.00	5	4.17	0.0402*
No	6	5.22	83	72.17	26	22.61	115	95.83	
Seroma formation									
Yes	0	0.00	1	100.00	0	0.00	1	0.83	0.8057
No	7	5.88	83	69.75	29	24.37	119	99.17	
PSH									
Yes	0	0.00	0	0.00	2	100.00	2	1.67	0.0411*
No	7	5.93	84	71.19	27	22.88	118	98.33	
PSB									
Yes	0	0.00	0	0.00	2	100.00	2	1.67	0.0411*
No	7	5.93	84	71.19	27	22.88	118	98.33	
PSM									
Yes	0	0.00	0	0.00	0	0.00	0	0.00	1.0000
No	7	5.83	84	70.00	29	24.17	120	100.00	
Total	7	5.83	84	70.00	29	24.17	120	100.00	

*$p<0.05$, obesity is found to be statistically significant with occurrence of port site infections (p – value- 0.0402), PSH(p – value – 0.0411) and PSB (p – vaue – 0.0411)



"Obesity is found to be statistically significant in the development of port-site infection, port-site hernia and bleeding."

Table:24 Association between co morbidities with number of ports

No. of ports	Present	%	Absent	%	Total	%	p-value
3	4	5.71	66	94.29	70	58.33	0.7948
4	4	8.33	44	91.67	48	40.00	
5	0	0.00	2	100.00	2	1.67	
Total	8	6.67	112	93.33	120	100.00	

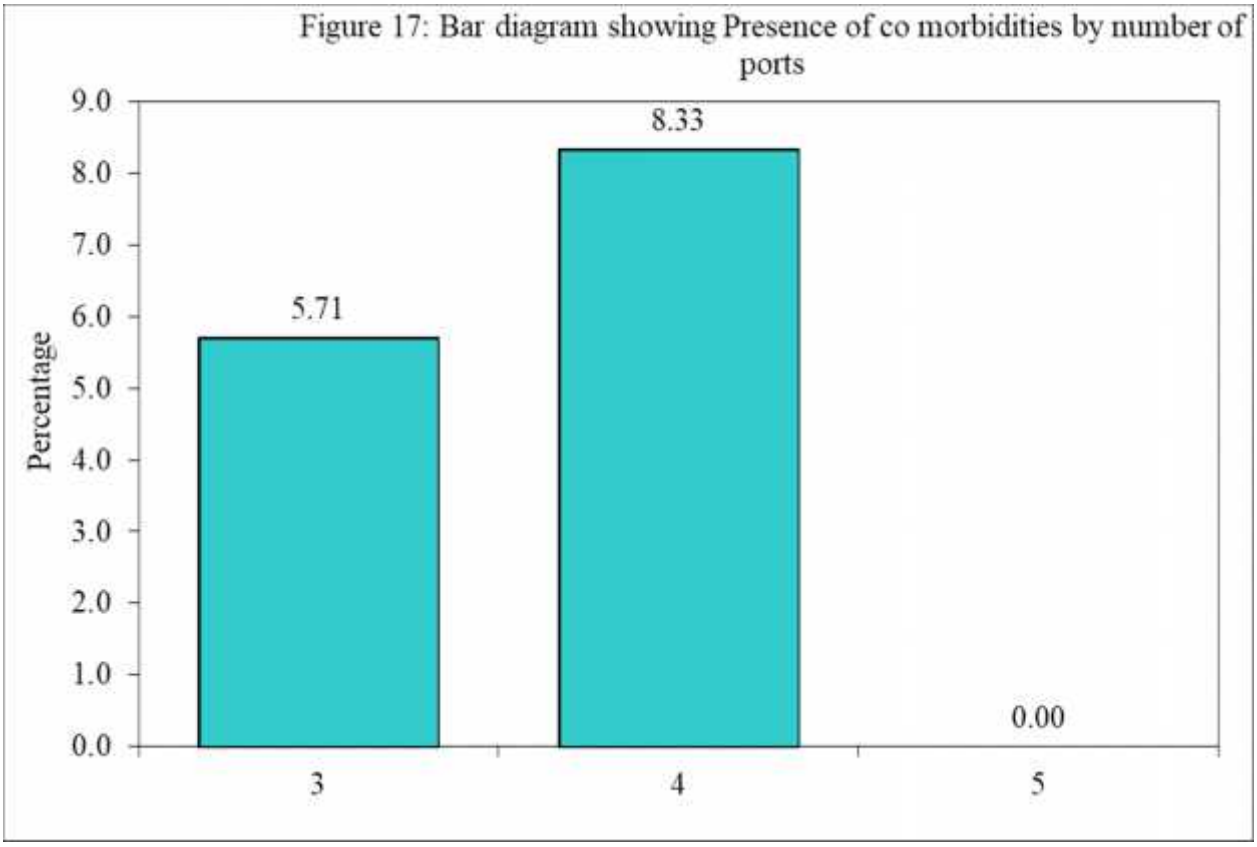


Table: 25 Association between co morbidities with complications

	Present	%	Absent	%	Total	%	p-value
PSI							
Yes	0	0.00	5	100.00	5	4.17	0.5415
No	8	6.96	107	93.04	115	95.83	
Seroma formation							
Yes	1	100.00	0	0.00	1	0.83	0.0001*
No	7	5.88	112	94.12	119	99.17	
PSH							
Yes	0	0.00	2	100.00	2	1.67	0.7030
No	8	6.78	110	93.22	118	98.33	
PSB							
Yes	1	50.00	1	50.00	2	1.67	0.0132*
No	7	5.93	111	94.07	118	98.33	
PSM							
Yes	0	0.00	0	0.00	0	0.00	1.0000
No	8	6.67	112	93.33	120	100.00	
Total	8	6.67	112	93.33	120	100.00	

*$p<0.05$

“Co-morbidities like diabetes mellitus, hypertension, have been found to be significantly associated with the development of port-site complications, specially in seroma formation (0.0001) and bleeding.”(p-value0.0132).

Figure 18: Bar diagram showing Presence of co-morbidities with various complications

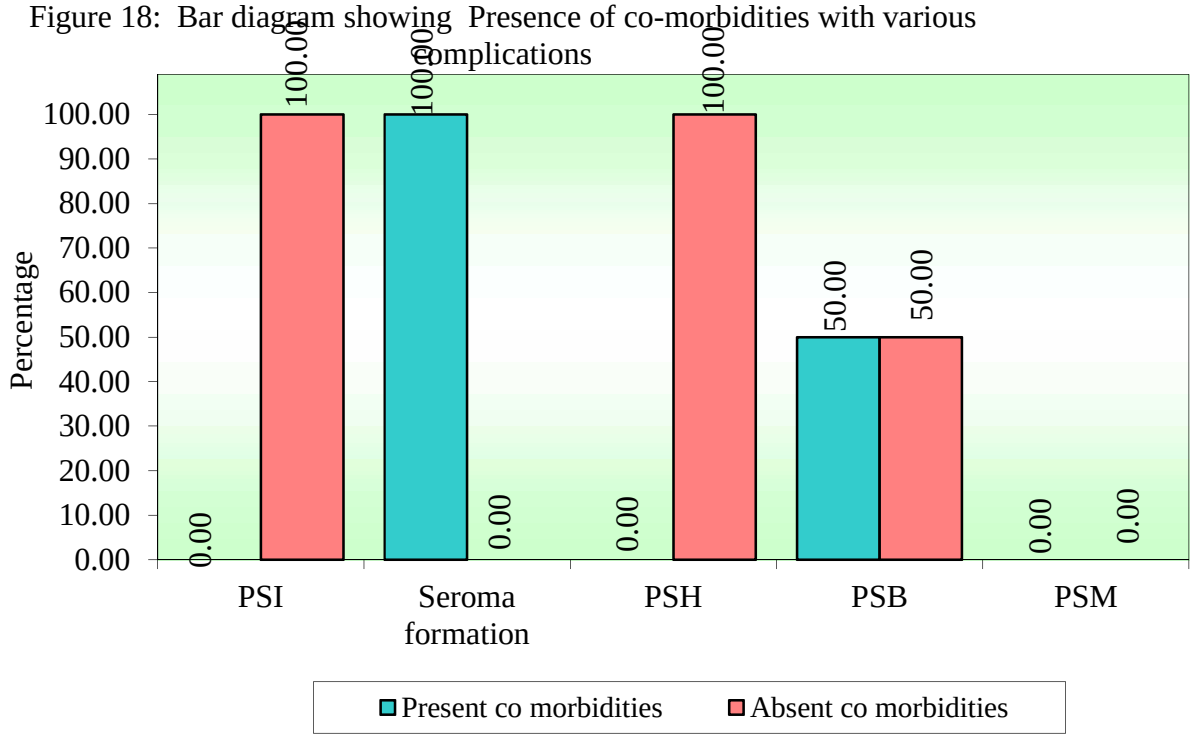


Table: 26 Comparison of male and females with use status of retrieval bag

Gender	Used	%	Not used	%	Total	%
Male	13	30.23	30	69.77	43	35.83
Female	24	31.17	53	68.83	77	64.17
Total	37	30.83	83	69.17	120	100.00
Chi-square=0.0110, p=0.9150						

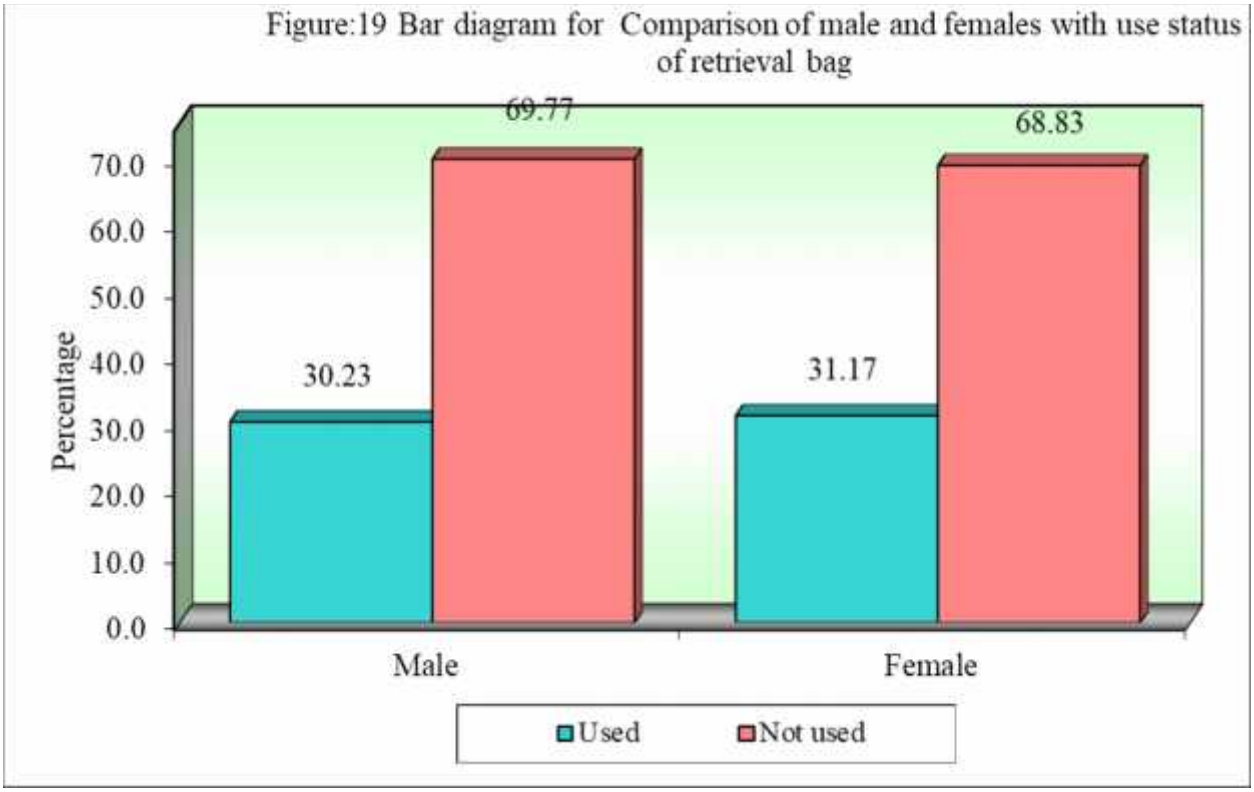


Table:27 Comparison of age groups with use status of retrieval bag

Age groups	Used	%	Not used	%	Total	%
<=20yrs	6	42.86	8	57.14	14	11.67
21-30yrs	9	29.03	22	70.97	31	25.83
31-40yrs	11	31.43	24	68.57	35	29.17
41-50yrs	0	0.00	13	100.00	13	10.83
51-60yrs	8	50.00	8	50.00	16	13.33
>=61yrs	3	27.27	8	72.73	11	9.17
Total	37	30.83	83	69.17	120	100.00
Chi-square=9.6190, p=0.0870						

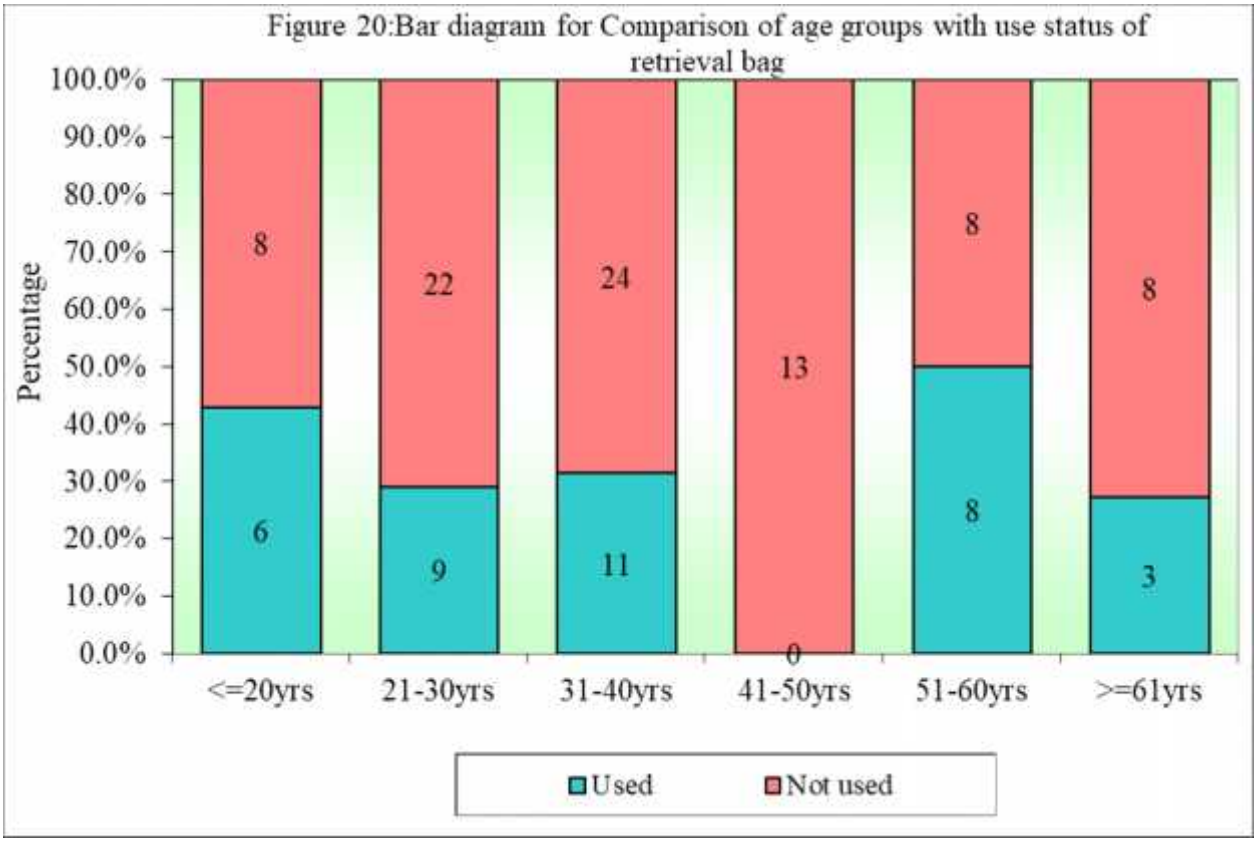


Table: 28 Association between use status of retrieval bag with number of ports

No. of ports	Used	%	Not used	%	Total	%
3	23	32.86	47	67.14	70	58.33
4	13	27.08	35	72.92	48	40.00
5	1	50.00	1	50.00	2	1.67
Total	37	30.83	83	69.17	120	100.00
Chi-square=0.7950, p=0.6720						

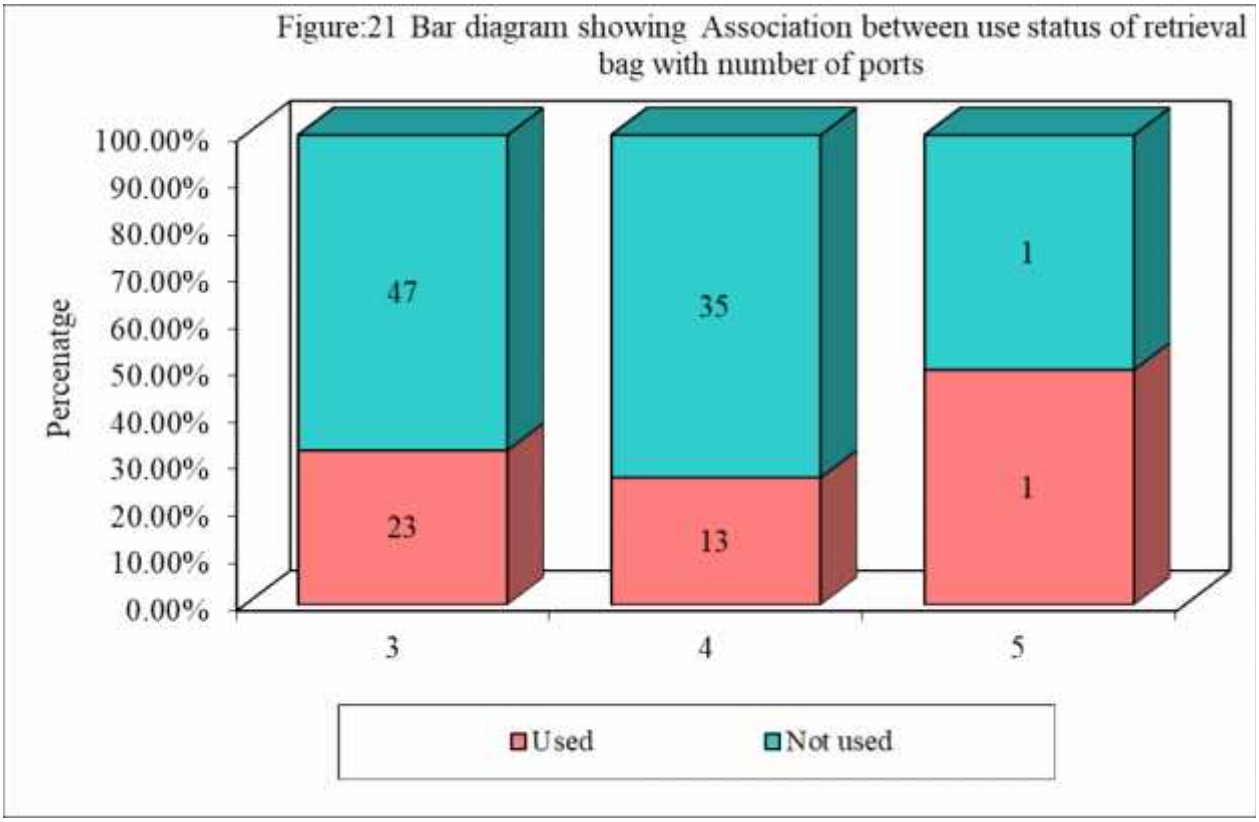


Table:29 Association between use status of retrieval bag with co-morbidities

Co-morbidities	Used	%	Not used	%	Total	%
Present	6	75.00	2	25.00	8	6.67
Absent	31	27.68	81	72.32	112	93.33
Total	37	30.83	83	69.17	120	100.00
P=0.0040*						

*p<0.05

Figure :22 Bar diagram showing Association between use status of retrieval bag with co-morbidities.

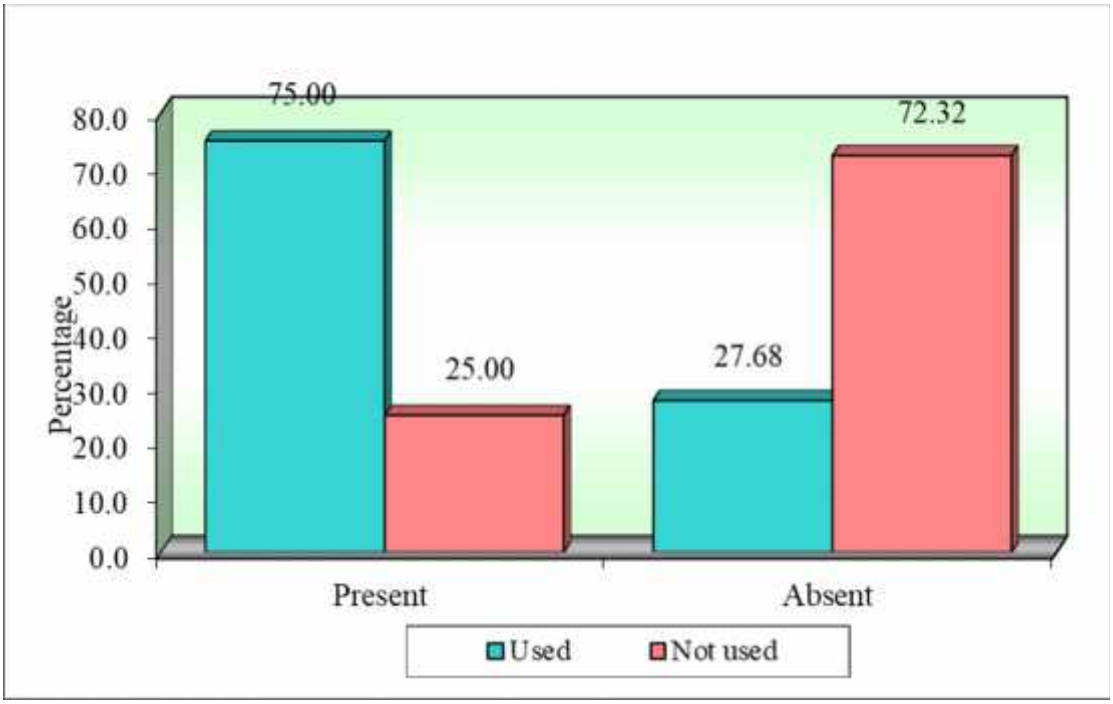
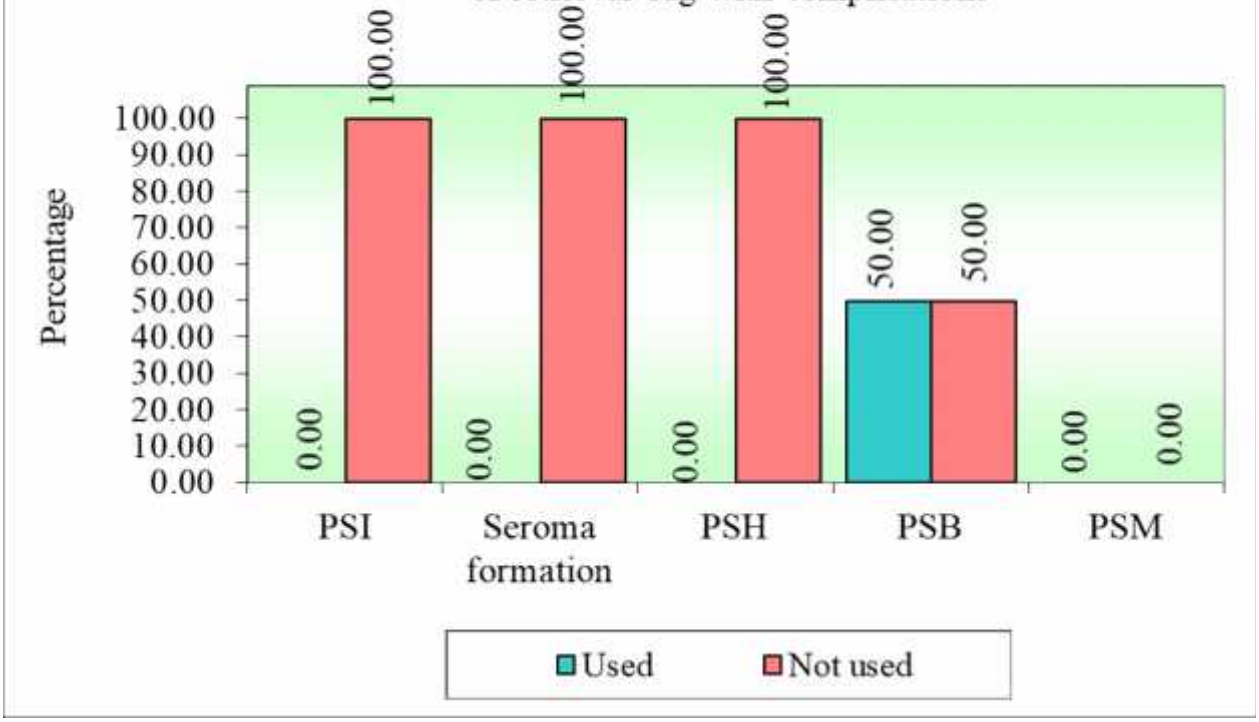


Table:30 Association between use status of retrieval bag with complications

	Used	%	Not used	%	Total	%	p-value
PSI							
Yes	0	0.00	5	100.00	5	4.17	0.1270
No	37	32.17	78	67.83	115	95.83	
Seroma formation							
Yes	0	0.00	1	100.00	1	0.83	0.5030
No	37	31.09	82	68.91	119	99.17	
PSH							
Yes	0	0.00	2	100.00	2	1.67	0.3410
No	37	31.36	81	68.64	118	98.33	
PSB							
Yes	1	50.00	1	50.00	2	1.67	0.5540
No	36	30.51	82	69.49	118	98.33	
PSM							
Yes	0	0.00	0	0.00	0	0.00	1.0000
No	37	30.83	83	69.17	120	100.00	
Total	37	30.83	83	69.17	120	100.00	

Figure: 23 -Bar diagram showing Association between use status of retrieval bag with complications



DISCUSSION

Laparoscopic port site complications are broadly categorized into

1) Post -operative complications and
2) Access related complications.[1]

Laparoscopic port site complications are found in both male and female gender and also found in all age groups. Literature shows that most important risk-factor is the obesity[21,22] in the development of port site complications. Since to operate on obese patients longer trocars are needed, larger skin incision[23]should be taken for adequate fascia exposure and they have thicker abdominal wall, causing limitations in the mobility of instruments. Hence proper alignment of ports to their axis is necessary to avoid Swording. For proper placement of ports Baseball Diamond concept of port placement should be followed which avoids Swording.

In the current study, 120 patients with mean age-group of 37.84 years, including 77 females and 43 males who had undergone various laparoscopic procedures, were observed. Most common procedure being done was laparoscopic appendicectomy. Over-all 10 patients (8.33%) developed different port site complications like port site infection (PSI), port site seroma formation, Port site bleeding (PSB), and port site hernia (PSH) .

Most common procedure being laparoscopic appendicectomy and most common port involved is umbilical port.

Obesity and co-morbidities are found to have statistical significance with port site complications which is comparable to the study conducted by Karthik, Augustine et al.[5]

Most common complication being PSI(n=5) in this study. Neu decker et al[15] observed to have more number of complications with increase in number of ports, like in the procedure where more number of ports were used (>4,5,6), more complications occurred.

Fascial closure is required for the ports with the size 10mm or more[27] and some also advise closure in 5mm ports in children to reduce the risk of LPSCs, particularly hernia .Fascia should be re approximated under direct visualization by adequately exposing fascia by retractors. Fascial edges should then be grasped and sutured either by figure of eight configuration or interrupted sutures. Different techniques for closure of fascia are now available, using specialized devices such as the Grice suture needle, Carter Thomson needle-point suture passer, Endo close , Reverdin suture needle but their benefits are yet to be proved.

In my study out of 120 patients 8.3% patients developed port site complications, most common is PSI which is 4.17%,followed by PSB and PSH which are 1.67% each ,followed by port site seroma formation which is 0.8% during a minimal follow up period of one year.

Other complications like PSM, omental entrapments and sub cutaneous emphysema were not found.

Picture -22 Depicting various port site complications

<u>"PORT SITE INFECTION"</u>

Though SSIs are less in number in laparoscopic surgeries nonetheless produce significant morbidity. A proper knowledge about PSI development is necessary which most of the times is neglected by us.

In this study, of 120 patients who underwent various laparoscopic procedures,5 patients developed PSIs which is 4.17%,most common site involved was umbilical port and most common procedure being involved was Laparoscopic appendicectomy i. e. 4 in number followed by laparoscopic cholecystectomy, which is analogous to the studies conducted by "Mir , Den Hoed et al"[21] who reported the incidence to be 5.3%. "Shindholimath et al" [12] found 6.3% incidence and "Colliza et al"<2%. [22]

Obesity [21,23]is the most identified risk factor in the development PSI with statistical significant value.(p -value of 0.0402.)

PSIs are attributed in this study because of the usage of reusable LIs, non-usage of endo bags for specimen retrieval, umbilical flora.

In this study, all port site infections involved were superficial infections (skin and subcutaneous tissue) only, which is most commonly seen as stated by Richards c et al, Edwards c et al, Emori et al , Culver ,Tolson J et al NNIS system.[13]

Among port site infection umbilical port site is the most common site because of umbilical flora and retrieval of specimen many times was done through umbilical port. Then epigastric port is next common. As per the literature, much weightage is towards the raised incidence of PSI at the umbilicus and the part played by umbilical flora in the occurrence of Port site infection. Much weightage has also given to the site of extraction of specimen, wherein most of the times gall bladder is extracted via epigastric port.

PSI are prevented by using proper sterilization techniques, administration of appropriate prophylactic antibiotics, use of endo bags for specimen extraction. Once PSIs have occurred they have to be managed by proper cleaning, drainage, packing and proper antibiotics.

"PORTSITE HEMORRHAGE/BLEEDING (PSB)"

In my study 1.67% i.e. 2 patients were found to have developed PSB out of 120 patients. Bleeding was recognized soon and was managed by application of local pressure and cauterization, this is comparable to studies conducted by Jansen F et al,

Kolkman ,W et al, Bakkum EA et al, de Kroon CD et al,Trimbos-Kempel TC et al, Trimbos JB et al, on 25,764 laparoscopic procedures. [3,4]

Most of the times Epigastric vessels are injured during the secondary port placement, hence ports should be inserted with utmost care by direct visualization and with better lighting of the abdominal wall .PSB goes unseen till the ports are in place because the port may tamponade muscular or subcutaneous bleeding. Bleeding points can be controlled by cauterization, rarely need the extension of incision to control the bleeding. If still bleeding persists Foleys catheter is placed and U-stitches can be applied.

"PORT SITE HERNIA"

In this study port site hernias (PSH) were 2 out of 120, i.e. 1.67%.One of which was in the umbilical region and other was in the Right lumbar region. Obesity is significantly associated with the occurrence of PSHs with the p value of 0.0411 both with BMI of >30. One PSH which had occurred at the umbilical port had a history of previous surgery i.e. exploratory laparotomy with midline infra-umbilical scar which resulted in the PSH this is comparable to Nassar et al[30] who found that 12% of patients who had laparoscopic cholecystectomies were having previous fascial defects and 83.7% were without any symptoms.

Obese patients have the higher risk for the development of PSH because of their thicker preperitoneal fat and increased intraabdominal pressure. Hence closure of fascia alone is not helpful.

Another patient who developed PSH at right lumbar region, underwent an extension of port site incision for the extraction of specimen, resulted in port site hernia.

Risk of occurrence of port site hernias are low with the use of trocars of less than 12mm, "radially dilating trocars or bladeless trocars."[16]. Most surgeons do fascia closure of port where in trocars of >12mm size are used, also 10mm port's fascia must be closed.

At 5mm port sites, though port site hernia is rare has been reported in the study. Keeping a "SURGICEL plug" into muscular layer has also been anticipated that dramatically expanding trocars could be useful to avoiding the need to close fascial defects.

Leibl et BJ , Schmedt Cg Schwarz j, and Kraft et al have also studied to have lesser rate of PSH with the use of para median incision and non -bladed trocars with conical tip.As compared with other methods like “Deschamps needle” and “non - bladed trocars”, the simple closure and the cost effectiveness of the classical approach is promising.

Following laparoscopic surgery if PSH develops, the port site must be repaired to avoid development of intestinal complications like obstruction and strangulation. Numerous causes have been identified in the development of hernia including a) removal of the trocars before full deflation of the abdominal cavity is done, b) wrong techniques of port closure, c) bigger incisions at port site.

PSH can be prevented and managed accordingly a)After the procedure , trocars should to be removed with utmost caution and vision ,b)other working trocars are also to be removed with care and then deflating the abdomen c) Cannula and camera should be removed together ,after the removal of gas fully with a clear vision port site incision every time that the port if free of any entrapped bowel d)the size of port incision should limited. A secure and appropriate closure of the ports of size>10mm should be ensured.”

“PORT SITE METASTASIS”

In our study no single case of port site metastasis was found.

In various oncological procedures performed laparoscopically, port sites have been found to have metastases at the port sites by the implantation of tumor cells. PSH has been testified for all types of malignancy treated with laparoscopy with an

incidence of 1% and 2.3% for colorectal[10] and gynecological malignancies respectively. [10,11]

Evidence of direct influence of carbon dioxide gas on neoplastic cells is an important factor for PSM after the surgery by laparoscopic approach. “Jacobi, et al” found that the carbon dioxide gas used to create pneumo-peritoneum in laparoscopic surgery promoted growth of tumor cells in an animal model of laparoscopy when compared to helium /controls. Using an animal model of laparoscopy” “Tseng et al,”[63]also described the proliferative growth of neoplastic cells in a carbon-dioxide insufflation group when compared to those with no pneumo-peritoneum. Many other studies showed that the micro environment of the port site could be imperative in tumor growth and that the local factors at the port site play a significant role in the mechanism of development of PSM.

Injury to the tissue and local abdominal factors may be as significant as cell aerosolization, Tseng et al[63] studied the effect of tissue injury and the local abdominal factors.

However various explanation are given in the literature saying Endo bags and extension of incision are the measures to be taken to avoid the recurrence of the tumor.

CONCLUSION

Surgeries with laparoscopic approach are found to have fewer port site complications.

PSCs include ‘port site infection’, ‘wound dehiscence’,’ herniation’,’ entrapment of omentum’, ‘port site bleeding’ and ‘hematoma formation’ and’ port site metastasis.’

Incidences in the present study of individual complications are comparable with statistics worldwide (0.2-6%). Overall complications seen were infections in umbilical port sites and most of them were in obese patients.

Most of the LPSCs are treatable with little morbidity by taking careful operative precautions and strictly following sterilization methods, while insertion and removal of all ports, so that all these complications and morbidities are avoided.

SUMMARY

In the era of minimal invasive surgeries laparoscopic surgeries have become the first choice for most of the abdominal and pelvic surgeries. Though laparoscopic port site complications are rare, have to be recognized soon and treated to avoid morbidity in the patients.

Aim of this study is to determine the incidence of morbidity associated with the port site complications following laparoscopic surgeries and to identify the risk factors associated with them thereby suggesting timely preventive measures.

In the current study 120 patients who have undergone laparoscopic surgeries were observed and incidence of port site complications was found to be 8.19%,i.e.10 patients had different port site complications like port site infection(5), port site seroma formation (1), port site bleeding(2), port site hernia(2), all were recognized and treated timely with minimal morbidities.

Obesity and co-morbidities are identified as the statistically significant risk factors for the development of port site complications, and the most common complications being infection.

By using meticulous surgical techniques and appropriate measures port site complications can be prevented, thereby reducing morbidity in patients.

BIBLIOGRAPHY

1. Ahmad G, Duffy JM, Phillips K, Watson A. Laparoscopic entry techniques. Cochrane Database Syst Rev 2008;2:CD006583.

2. Jansen FW, Kolkman W, Bakkum EA, de Kroon CD, Trimbos-Kemper TC, Trimbos JB. Complications of laparoscopy: An inquiry about closed- versus open-entry technique. Am J Obstet Gynecol 2004;190:634-8.

3. Jansen FW, Kapiteyn K, Trimbos-Kemper T, Hermans J, Trimbos JB. Complications of laparoscopy a prospective multicentre observational study. Br J Obstet Gynaecol 1997;104:595-600.

4. Aziz R. Advantages and disadvantages of operative endoscopy. In: Aziz R, Alvarez Murphy A, editors. Practical Manual of operative Laparoscopy. New York: Springer – Verlag; 1992. p. 1-8.

5. Karthik S ,Augustine AJ ,Shibumon MM, Pai MV.Analysis of laparoscopic port site complications:A descriptive study .J min Access Surg.2013:9:59-64.

6. Chiu CC, Lee WJ, Wang W, Wei PL, Huang MT. Prevention of trocar-wound hernia in laparoscopic bariatric operations. Obes Surg 2006;16:913-8.

7. Mc Gurgan P, P' Donovan P. Optical versus as an entry technique. Endose 1999;8:379-92.

8. Mettler I, Schmidt EH, Frank V, Semm K. Laparoscopic entry and its complications. Gynaecol Endose 1999;8:383-9.

9. Noblett SE, Woodcock S. Port-site pyoderma gangrenosum - a rare complication of surgical trauma. Ann R Coll Surg Engl 2009;91:665-6.

10. Wexner SD, Cohen SM. Port site metastases after laparoscopic colorectal surgery for cure of malignancy. Br J Surg 1995;82:295-8.

11. Cirocco WC, Schwartzman A, Golub RW. Abdominal wall recurrence after laparoscopic colectomy for colon cancer. Surgery1994;116:842-6.

12. Shindholimath VV, Seenu V, Parshad R, Chaudhry R, Kumar A. Factors influencing wound infection following laparoscopic cholecystectomy. Trop Gastroenterol 2003;24:90-2.

13. Richards C, Edwards J, Culver D, Emori TG, Tolson J, Gaynes R. The National nosocomial infections surveillance (NNIS) system, centers for disease control and prevention. Does using a laparoscopic approach to cholecystectomy decrease the risk of surgical site infection? Ann Surg 2003;237:358-62.

14. Fuller J, Ashar BS, Carey-Corrado J. Trocar-associated injuries and fatalities: An analysis of 1399 reports to the FDA. J Minim Invasive Gynecol 2005;12:302-7.

15. Neudecker J, Sauerland S, Neugebauer E, Bergamaschi R, Bonjer HJ, Cuschieri A, et al. The European association for endoscopic surgery clinical practice guideline on the pneumoperitoneum for laparoscopic surgery. Surg Endosc 2002;16:1121-43.

16. Johnson WH, Fecher AM, McMahon RL, Grant JP, Pryor AD. VersaStep trocar hernia rate in unclosed fascial defects in bariatric patients. Surg Endosc 2006;20:1584-6.

17. Berguer R. A technique for full thickness closure of laparoscopic trocar sites. J Am Coll Surg 1995;180:227-8.

18. Carter JE. A new technique of fascial closure for laparoscopic incisions. J Laparoendosc Surg 1994;4:143-8.

19. Targarona EM, Balagué C, Knook MM, Trías M. Laparoscopic surgery and surgical infection. Br J Surg 2000;87:536-44.

20. Losanoff JE, Richman BW, Jones JW. Trocar-site hernia complicated by necrotizing fasciitis-case report and review of the literature. Hernia 2003;7:220-3.

21. Den Hoed PT,Boelhouwer RU, n HF, Hop WC, Bruining HA. Infections and bacteriological data after laparoscopic and open gallbladder surgery. J Hosp Infect1998;39:27-37

22. Colizza S,Rossi S, Picardi B, Carnuccio P, Pollicita S, Rodio F, et al. Surgical infections after laparoscopic cholecystectomy: Ceftriaxone vs ceftazidime antibiotic prophylaxis. A prospective study. Chir Ital 2004;56: 397-402.

23. Quilici PJ,Greaney EM, Quilici J, Anderson S. Trans abdominal preperitoneal laparoscopic inguinal herniorrhaphy: Results of 509 repairs. Am Surg

24. Azurin DJ, Go LS, Arroyo LR, Kirkland ML. Trocar site herniation following laparoscopic cholecystectomy and the significance of an incidental preexisting umbilical hernia. Am Surg 1995;61:718-20.

25. Bunting DM. Port-site hernia following laparoscopic cholecystectomy. Jsls. 2010;14(4):490-7.

26. Montz FJ, Holschneider CH, Munro MG. Incisional hernia following laparoscopy: A survey of the American association of gynecologic laparoscopists. Obstet Gynecol 1994;84:881-4.

27. Kumar SS,Babu KB,Grace RD ,Anpian JC MBBS,Bhaskar M.A Study of Port Site Infecyions in laparoscopic Surgeries.IOSR-JDMS .2015:14(4) :20-

28. Bruyère F, Sun J, Cosson JP, Kouri G. Incarceration of bowel through opening of a 5-mm port. J Endourol 2004;18:675-6.

29. Boughey JC, Nottingham JM, Walls AC. Richter's hernia in the laparoscopic era: four case reports and review of the literature. Surg Laparosc Endosc Percutan Tech. 2003;13(1):55-8.

30. Nassar A, Ashkar K, Rashed A, Abdulmoneum M. Laparoscopic cholecystectomy and the umbilicus. Br J surg. 1997;84(5):630-3.Shea JA, Healey MJ, Berlin JA, Clarke JR, Malet PF, Staroscik RN, et al. Mortality and complications associated with laparoscopic cholecystectomy. A meta-analysis. Ann Surg 1996;224:609-20.

31. Rastogi V, Dy V. Simple technique for proper app.roximation and closure of peritoneal and rectus sheath defects at port site after laparoscopic surgery. J Laparoendosc Adv Surg Tech A. 2001;11(1):13-6.

32. Tonouchi H, Ohmori Y, Kobayashi M, Kusunoki M. Trocar site hernia. Arch Surg. 2004;139(11):1248-56.

33. Uslu HY, Erkek AB, Cakmak A, Kepenekci I, Sozener U, Kocaay FA, et al. Trocar site hernia after laparoscopic cholecystectomy. J Laparoendosc Adv Surg Tech A. 2007;17(5):600-3.

34. Mayol J, Garcia-Aguilar J, Ortiz-Oshiro E, Jose A, Fernandez-Represa JA. Risks of the minimal access approach for laparoscopic surgery: multivariate analysis of morbidity related to umbilical trocar insertion. World j surg. 1997;21(5):529-33.

35. Di Lorenzo N, Coscarella G, Lirosi F, Gaspari A. Port-site closure: a new problem, an old device. Jsls. 2002;6(2):181-3.

36. Coda A, Bossotti M, Ferri F, Mattio R, Ramellini G, Poma A, et al. Incisional hernia and fascial defect following laparoscopic surgery. Surg Laparosc Endosc Percutan Tech 2000;10(1):34-8.

37. Shafer D, Khajanchee Y, Wong J, Swanström L. Comparison of five different abdominal access trocar systems: analysis of insertion force, removal force, and defect size. Surg Innov 2006;13(3):183-9.

38. Chatzipapas IK, Hart RJ, Magos A. Simple technique for rectus sheath closure after laparoscopic surgery using straight needles, with review of the literature. J Laparoendosc Adv Surg Tech A. 1999;9(2):205-9.

39. Eltabbakh GH. Small bowel obstruction secondary to herniation through a 5-mm laparoscopic trocar site following laparoscopic lymphadenectomy. Eur J Gynaecol Oncol. 1999;20(4):275-6.

40. Holzinger F, Klaiber C. [Trocar site hernias. A rare but potentially dangerous complication of laparoscopic surgery]. Chirurg. 2002;73(9):899-904.

41. Kadar N, Reich H, Liu CY, Manko GF, Gimpelson R. Incisional hernias after major laparoscopic gynecologic procedures. Am J Obstet Gynecol. 1993;168(5):1493-5.

42. Krug F, Herold A, Wenk H, Bruch HP. [Incisional hernias after laparoscopic interventions]. Chirurg. 1995;66(4):419-23.

43. Montz FJ, Holschneider CH, Munro M. Incisional Hernia Following Laparoscopy: A Survey of the American Association of Gynecologic Laparoscopists. J Am Assoc Gynecol Laparosc. 1994;1(4, Part 2):S23-4.

44. Nezhat C, Nezhat F, Seidman DS, Nezhat C. Incisional hernias after operative laparoscopy. J Laparoendosc Adv Surg Tech A. 1997;7(2):111-5.

45. Stringer NH, Levy ES, Kezmoh MP, Walker J, Abramovitz S, Sadowski DL, et al. New closure technique for lateral operative laparoscopic trocar sites. A report of 80 closures. Surg Endosc. 1995;9(7):838-40.

46. Vecchio R, MacFayden BV, Palazzo F. History of laparoscopic surgery. Panminerva Med. 2000;42(1):87-90.

47. Litynski GS. Endoscopic surgery: the history, the pioneers. World J Surg. 1999;23(8):745-53.

48. Nezhat F. Triumphs and controversies in laparoscopy: the past, the present, and the future. Jsls. 2003;7(1):1-5.

49. Litynski GS, Paolucci V. Origin of laparoscopy: coincidence or surgical interdisciplinary thought? World J Surg. 1998;22(8):899-902.

50. Perissat J, Collet D, Monguillon N. Advances in laparoscopic surgery. Digestion. 1998;59(5):606-18.

51. Nezhat C. 2005 Presidential Address. Jsls. 2005;9(4):370-5.

52. Lajer H, Widecrantz S, Heisterberg L. Hernias in trocar ports following abdominal laparoscopy. A review. Acta Obstet Gynecol Scand. 1997;76(5):389-93.

53. Education L, Magazines T. Richter's herniation of the small bowel through the trocar site following laparoscopic surgery. J Laparoendosc Surg. 2009;3(5):520-2.

54. Majeski J, Anthony E. An improved, inexpensive, quick, and easily learned technique for closure of all large abdominal trocar wounds after laparoscopic procedures. J Am Coll Surg. 2002;194(3):391-3.

55. Voyles CR, Petro AB, Meena AL, Haick AJ, Koury AM. A practical approach to laparoscopic cholecystectomy. Am J Surg. 1991;161(3):365-70.

56. Larson GM, Vitale GC, Casey J, Evans JS, Gilliam G, Heuser L, et al. Multipractice analysis of laparoscopic cholecystectomy in 1,983 patients. Am J Surg. 1992;163(2):221-6.

57. Baird DR, Wilson JP, Mason EM, Duncan TD, Evans JS, Luke JP, et al. An early review of 800 laparoscopic cholecystectomies at a university-affiliated community teaching hospital. Am Surg. 1992;58(3):206-10.

58. Earle DB. A simple and inexpensive technique for closing trocar sites and grasping sutures. J Laparoendosc Adv Surg Tech A. 1999;9(1):81-5.

59. Hussain A, Mahmood H, Singhal T, Balakrishnan S, Nicholls J, El-Hasani S. Long-term study of port-site incisional hernia after laparoscopic procedures. JSLS. 2009;13(3):346

60. Raftopoulos I, Courcoulas A. Outcome of laparoscopic ventral hernia repair in morbidly obese patients with a body mass index exceeding 35 kg/m2. Surg Endosc. 2007;21(12):2293-7.

61. AHMAD SA, SCHURICHT AL, AZURIN DJ, ARROYO LR, PASKIN DL, BAR AH, et al. Complications of laparoscopic cholecystectomy: the experience of a university-affiliated teaching hospital. J Laparoendosc Adv Surg Tech A 1997;7(1):29-35.

62. Nakajima K, Wasa M, Kawahara H, Hasegawa T, Soh H, Taniguchi E, et al. Revision laparoscopy for incarcerated hernia at a 5-mm trocar site.

63. Tseng LN,Berends FJ,Wittich P,Bouvy ND,Marquet RL,Kazem-ier G,et al.Port –site metastases.Impact of local tissue trauma and gas leakage.Surg Endosc 1998;12:1377-80.

ANNEXURE – I

CONSENT FORM

Consent for participation in the study

Mr/miss/mrs _____ we are requesting you to enroll yourself in study titled" Analysis of laparoscopic Port site complications-A One year descriptive study in KLE'S-Dr Prabhakar Kore Hospital, Belagavi -A single centric study" conducted by Dr.

Post Graduate in M.S. General Surgery under the guidance of

Associate Professor, Department of General Surgery, J.N. Medical College, Belgaum under KLE university, Belagavi.

The purpose of research study is to know the incidence of port site complications in Laparoscopic surgeries and to know the risk factors for the complications. I will be the investigator for our study. This study is not being funded .I am going to give you information about this research project. Before you decide, you can talk to anyone you feel comfortable with about the research.

Purpose of study:

Laparoscopic techniques aims to accomplish minimal surgical trauma with better cosmetic outcome, quicker recovery and cost effectiveness ,but are still associated with complications in gaining access into the abdomen .The purpose of the study is to find the incidence of port site complications and to find out the risks factors associated with them ,so that the precautions would be taken during surgeries to reduce the complications.

Type of Study

This study is an observational study. It involves post operative prospective observation and interview of patients undergoing laparoscopic surgeries for various illnesses.

Participant selection

We are inviting all patients undergoing laparoscopic surgeries in kle hospital for various illnesses .

Voluntary Participation

Your participation in the research is voluntary. It is your choice whether to participate or not .Your decision whether to participate in the study or not will not change present or future health care services offered to you and will not affect your relationship with kle hospital and J.N. Medical College. If you choose not to participate in this study, you will still be offered laparoscopic surgeries and other operative and non-operative procedures at our hospital. You will continue to receive the treatment for your illness at our hospital even if you decline to participate in this study. If you decide to participate you are free to withdraw at any time.

Information regarding Laparoscopic surgeries

Procedure will be taken under general anaesthesia.

Reusable ports are used after sterilization with ethylene oxide.

Reusable conical rotatory type of trocars will be used.

Access into the abdomen is gained by open Hasson's technique and pneumoperitoneum created.

10mm trocar is used for umbilical port (camera port), another 10mm trocar for additional epigastric port and 5mm trocars 2-4 in number will be used and additional 3mm ports will be used depending upon the type of surgeries and BMI (multiple ports).

Excised specimen like appendix, gall bladder ,biopsy specimen ,depending upon the illness will be retrived with or without using endo bag depending on surgeon's choice.

Fascia of ports of 10 mm will be closed with vicryl sutures and skin is closed with ethilon sutures.

Procedure Involved:

If you agree to enroll yourself in my study, your detailed history, your height , weight ,BMI will be taken .Your contact details like phone number and address details will be taken and pictures of port sites will be taken with your permission to compare the scar, appearance , and look for any bleeding, infection , abscess , wound dehiscence and other complications at various

intervals of time :within 24 hours, post operative day 3, follow up for suture removal, after 1month and further you will be called for follow up if any other complications like hernia , metastasis (in case of onco surgeries) occurs.

Risks

Per operative risks include port site leak ,port site bleeding, inadvertent bowel injury, injury to major vessels, bladder ,uterus, fallopian tubes and possibility of conversion to open the abdomen (laparotomy) and anaesthetic complications like nausea, vomiting, arrhythmias, blood pressure changes, allergic reactions to drugs, temperature changes ,very rarely cardiac arrest.

Post operative risks include pain, bleeding ,port site complications like bleeding from port site, infection , wound dehiscence, hernia, omental trapping,, anaesthetic complications like sore throat, dizziness, blurred vision, damage to lips, tongue ,tooth, allergic reactions to drugs, confusion, prolonged anaesthetic effect, arrhythmias.

Benefits

The benefits of taking part in this research is that, your participation will help in reducing the complications in future surgeries ,by using meticulous surgical techniques, including sterlisation of laparoscopic instruments ,size of trocars, number of trocars used .

Your participation will be a valuable contribution to medical research to improvise treatment currently practiced in reducing the complications by taking precautionary measures.

Financial Incentives for participation: No financial incentives are being offered to enrolled patients. It is purely being done with the idea of research and all the cost of the study will be borne by the investigator.

Privacy and Confidentiality:

The only people who will know that you are the research subject will be the members of the research team. No information about you or information provided by you during the research will be disclosed to others without your written permission except:

1. In emergency to protect your rights and welfare.
2. If required by law.

Authorization to Publish Results:

When the results of the research are published or discussed, in a conference, no information will be displayed that would disclose your identity. Any information that is obtained in connection with this study and that can be identified with you will remain confidential. Results of the study will be used to improve post operative outcome.

Right to refuse or withdraw from study:

You do not have to participate in this research if you do not wish to .You can withdraw at any time from the study. There will be no penalty for withdrawal. Your treatment and care in this hospital will not change irrespective of whether you agree to participate or not. You can be removed from the study if necessary.

Institutional/sponsor's policy:

In the event of any injury related to the study, treatment will be made available through KLE's Hospital & MRC, Belgaum. There is no compensation or payment for such medical treatment by law.

Contact details:

In case you have any questions related to the study, in future or in case of study related issues, you can contact ,Post graduate student, Department of General surgery, KLE's Hospital and MRC, Belgaum.

Consent statement

I, _____ voluntarily agree for participating in this study. By signing this consent form I am not giving up any of my legal rights, I may withdraw from the study anytime. I am signing the consent form after having read or been read form in my own vernacular language, including the risks and the benefits and having all my questions answered.

Participant Name : _____

Signature or the Left Thumb Print of Participant : _____

Investigators Name: _____ Signature: _____

Witness Name : _____ **Signature:** _____

Date: _____

ANNEXURE – II

PROFORMA

Name-

Age-

Gender

Address-

Occupation-

Contact no-

General physical examination- at admission

Systemic examination- P/A

Investigations-

CBC-

MR-

LFT-

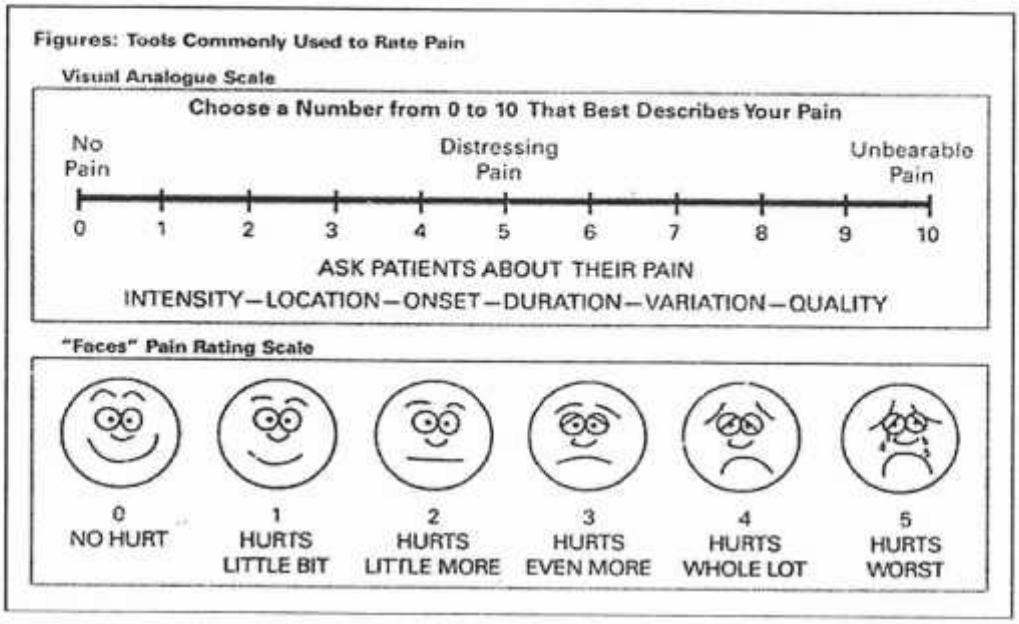
USG abd and pelvis-

Date of surgery:

Post-op day-

Number of hospital stay :Number of Days

Analysis of Postoperativepain : by using Visual Analogue Scale



Post-operative findings

Portsite	Surgerydone	No.ofportsused	Complications
1.Umbilicalport			
2.Epigastricport			
3.Leftilliac			
4.Suprapubic			
5.right lumbar			
6.others			

Results:

SCREENING FORM

Screening no-

Date of screening (dd-mm-yyyy): _____

Name: _____

Age (years)/Gender: _____

IP number: _____

Occupation: unemployed/unskilled/semiskilled/skilled/Professional

Education: illiterate/primary (1st-7th std)/high school/intermediate/graduate and above

Date of admission:. Date of discharge:

Date of interview:

Socio-economic status:low/middle/upper middle/high

Willing to participate:

Final result:Ineligible/eligible but refused/eligible and participating

Height:

Weight:

BMI:

ANNEXURE – III

ETHICAL CLEARANCE LETTER

K.L.E. ACADEMY OF HIGHER EDUCATION AND RESEARCH
(Deemed – to- be- University)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
JAWAHARLAL NEHRU MEDICAL COLLEGE,
NEHRU NAGAR, BELAGAVI-590010 (KARNATAKA-INDIA)
Website: http//www.jnmc.edu
E-Mail : dome@jnmc.edu
Phone: (+ 91-(0)831 Office : 2472550
Principal: 2471701
Fax No. +91 (0)831 – 2470759

Ref: MDC/DOME/ 75 **Date: 24/11/2018**

To,

PG student in Surgery,
J.N.Medical College,
BELAGAVI.

Sub: Institutional Ethical Clearance for the study.

With reference to the above, we wish to inform you that your proposed research project titled **"ANALYSIS OF LAPAROSCOPIC PORT SITE COMPLICATIONS – A ONE YEAR DESCRIPTIVE STUDY IN KLE'S DR PRABHAKAR KORE HOSPITAL BELAGAVI, A SINGLE CENTRIC STUDY",** is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee on Human Subjects Research.

(Dr. Arathi Darshan)
Member Secretary
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

(Dr. Roopa M Bellad)
Chairman,
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

ANNEXURE – IV

KEY TO MASTER CHART

LPSCs-Laparoscopic port site complications

PSCs-Port Site Complications

LI-Laparoscopic Instruments

LA-Laparoscopic Appendicectomy

UH-Umbilical Hernia

LC-Laparoscopic Cholecystectomy

LVHR-Laparoscopic Ventral Hernia Repair

LUHR-Laparoscopic Umbilical hernia Repair

LIHR-Laparoscopic Inguinal Hernia repair

MLN-Mesenteric Lymph node

DLap-Diagnostic Laparoscopy

PSI-Port Site Infection

PSB -Port Site Bleeding

PSM-Port Site Metastasis

BMI-Body Mass Index

VAS-Visual Analogue Scale.

NNIS-National Nosocomial Infections Surveillance

CDC-Centre of Disease Control and Prevention

S.NO	IP.NO	AGE IN YRS/SEX	DOA	DOS	DOD	DIAGNOSIS	PROCEDURE	No. OF PORTS	CO MORBIBITIES	PSI	SEROMA FORMATION	PSH	PSB	PSM	3m	6m	BMI	Retrival bag Used or No
1	970069	37/F	9/12/2019	9/12/2019	9/18/2019	cholelithiasis	LC	4	nil	No	No	No	No	NA	nil	nil	26	No
2	972977	76/F	9/23/2019	9/24/2019	9/26/2019	Acute appendicitis	LA	3	HTN,T2DM	No	yes	No	No	NA	Nil	Nil	24	No
3	935623	35/F	3/23/2019	3/23/2019	3/30/2019	Acute appendicitis	LA	3	nil	No	No	No	No	NA	nil	Nil	21	No
4	980911	20/F	11/3/2019	11/6/2019	3/15/2019	calculous cholecystitis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	22	No
5	987142	60/F	12/2/2019	12/2/2019	12/8/2019	calculous cholecystitis	LC	4	Nil	Yes	No	No	No	No	Nil	Nil	26	No
6	977461	17/F	10/16/2019	10/17/2019	10/20/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	18.5	No
7	982661	21/F	11/11/2019	11/12/2019	11/15/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	19	No
8	991474	72/M	12/24/2019	12/27/2019	12/31/2019	GB perforation periampullary Diverticuli	DLap	4	IHD/HTN	No	No	No	No	No	Nil	Nil	22	Used
9	919966	27/F	12/31/2018	1/1/2019	1/4/2019	CA +MLN+Rt ovarian cyst	DLap	3	Nil	No	No	No	No	NA	Nil	Nil	19.5	No
10	981112	36/F	11/4/2019	11/5/2019	11/14/2019	Abd TB +MLN+Appendicitis	DLap	3	Nil	Yes	No	No	No	NA	Nil	Nil	18	No
11	973536	62/M	9/26/2019	9/27/2019	10/3/2019	Perforated appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	22	Used
12	973388	57/F	9/25/2019	9/30/2019	10/7/2019	cholelithiasis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	23	Used
13	928888	40/F	2/13/2019	2/14/2019	2/23/2019	UH	LUHR	3	Nil	No	No	No	No	NA	nil	Nil	23.6	Used
14	957458	39/F	7/11/2019	7/12/2019	7/18/2019	cholelithiasis +PUH	LC+PUHR	4	Nil	No	No	No	No	NA	Nil	Nil	22.5	used
15	957975	44/F	7/15/2019	7/16/2019	7/19/2019	cholelithiasis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	23	No
16	978749	80/F	10/22/2019	10/22/2019	10/29/2019	cholelithiasis	LC	4	T2DM+HTN	No	No	No	No	NA	Nil	Nil	23	No
17	957227	24/F	7/10/2019	7/12/2019	7/18/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	19	Used
18	941504	17/F	4/22/2019	4/24/2019	4/27/2019	Acute appendicitis	LA+Cecopexy	3	Nil	No	No	No	No	NA	Nil	Nil	18	No
19	941676	26/F	4/27/2019	4/26/2019	5/3/2019	Acute appendicitis+pelvic adhesions	LA+Adhesiolysis	3	Nil	No	No	No	No	NA	Nil	Nil	21	No
20	942065	36/F	4/25/2019	4/26/2019	4/29/2019	UH+Ventral hernia	LUHR+VHR	3	Nil	No	No	No	No	NA	Nil	Nil	22	No
21	958388	21/M	7/11/2019	7/15/2019	7/20/2019	cholelithiasis	LC+MAL Repair	4	Nil	No	No	No	No	NA	Nil	Nil	23	No
22	942869	26/F	4/29/2019	5/3/2019	5/6/2019	Sub acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	20	No
23	917596	39/M	12/17/2018	1/4/2019	1/29/2019	pain abd	DLap	3	Nil	No	No	No	No	NA	Nil	Nil	21	Used
24	982752	31/M	11/11/2019	11/12/2019	11/15/2019	cholelithiasis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	22	No
25	944219	47/M	5/6/2019	5/11/2019	5/22/2019	pain abd,?abd TB	DLap+MLN excision	3	T2DM	No	No	No	No	NA	Nil	Nil	23	no
26	919929	27/M	12/31/2019	1/2/2019	1/9/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	21	No
27	933694	22/M	3/13/2019	3/14/2019	3/23/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	19.5	No
28	933609	42/M	3/13/2019	3/15/2019	3/18/2019	Acute on chronic Appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	21	No
29	965374	20/M	8/21/2019	8/23/2019	9/20/2019	Hydatid cyst +abscess	Lap deroofing+drainage	4	Nil	No	No	No	No	NA	Nil	Nil	18.5	No
30	974289	30/M	9/30/2019	9/30/2019	10/4/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	nil	21	Used
31	981323	28/M	11/4/2019	11/5/2019	11/11/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	21.5	No
32	981046	28/F	11/4/2019	11/8/2019	11/11/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	20	Used
33	923910	37/M	1/22/2019	1/24/2019	1/30/2019	pain abd	LA	3	Nil	No	No	No	No	NA	Nil	Nil	21	No
34	921517	40/F	1/8/2019	1/11/2019	1/16/2019	cholelithiasis	LA	4	Nil	No	No	No	No	NA	Nil	Nil	20	No
35	933510	14/F	3/12/2019	3/13/2019	3/19/2019	Reccurrent Appendicitis	LA	3	Nil	No	no	No	No	NA	Nil	Nil	18	No
36	986670	34/F	11/29/2019	12/9/2019	3/16/2019	cholelithiasis	LC	4	T2DM+HTN	No	No	No	No	NA	Nil	Nil	24	No
37	977748	38/F	10/17/2019	10/17/2019	10/23/2019	cholelithiasis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	23	No
38	980012	21/F	10/29/2019	10/29/2019	11/16/2019	Acute appendicitis +dengue	LA	3	Dengue	No	No	No	yes	NA	Nil	Nil	27	Used
39	977214	54/M	10/15/2019	10/17/2019	11/26/2019	calculous cholecystitis	LC	4	T2DM	No	No	No	No	NA	nil	Nil	21	No
40	986167	34/M	11/27/2019	11/28/2019	12/1/2019	Chronic calculus cholecystitis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	23	Used
41	949609	22/M	6/2/2019	6/2/2019	6/5/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	19	Used
42	957253	40/M	7/10/2019	7/12/2019	7/15/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	21	No
43	950347	42/F	6/6/2019	6/7/2019	6/10/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	20	No
44	979722	37/F	10/26/2019	10/26/2019	10/30/2019	calculous cholecystitis	LC	4	T2DM	No	No	No	No	NA	Nil	Nil	23	No
45	920211	40/F	2/23/2019	2/23/2019	29/02/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	nil	20	No
46	934569	29/F	3/18/2019	3/18/2019	3/21/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	19	No
47	932953	22/F	3/13/2019	3/13/2019	3/15/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	18.5	No
48	930017	75/F	3/6/2019	3/6/2019	3/20/2019	Rectal prolapse	Lap rectopexy	5	T2DM+HTN	No	No	No	No	NA	Nil	Nil	22	No
49	929293	22/F	2/21/2019	2/21/2019	2/24/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	21	No
50	922640	61/F	1/12/2019	1/13/2019	1/20/2019	cholelithiasis	LC	4	T2DM	yes	No	No	No	NA	Nil	Nil	25	No
51	921542	40/F	4/7/2019	4/8/2019	4/12/2019	cholelithiasis	LC	4	HTN	No	No	No	No	NA	Nil	Nil	22	No
52	945627	36/F	5/13/2019	5/15/2019	5/20/2019	UH	LUHR	3	Nil	No	No	No	No	NA	Nil	Nil	23	No
53	958007	14/M	7/15/2019	7/19/2019	7/23/2019	chronic appendicitis +MLN	LA+MLN excision	3	Nil	No	No	No	No	NA	Nil	Nil	17.5	Used
54	948419	35/F	5/27/2019	5/27/2019	6/3/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	18	No

S.NO	IP.NO	AGE IN YRS/SEX	DOA	DOS	DOD	DIAGNOSIS	PROCEDURE	No. OF PORTS	CO MORBIBITIES	PSI	SEROMA FORMATION	PSH	PSB	PSM	3m	6m	BMI	Retrival bag Used or No
55	933399	52/F	3/12/2019	3/14/2019	3/23/2019	UH	LUHR	3	Nil	No	No	No	No	NA	Nil	Nil	20	Used
56	935623	30/F	3/23/2019	3/25/2019	3/29/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	20	No
57	935551	13/F	3/23/2019	3/25/2019	3/29/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	19	Used
58	926614	59/F	2/11/2019	2/8/2019	2/11/2019	cholelithiasis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	22.5	Used
59	972387	48/M	9/20/2019	9/21/2019	9/30/2019	cholelithiasis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	23	No
60	938821	80/M	4/9/2019	4/10/2019	4/15/2019	UH+Inguinal Hernia	LUHR+LIHR	4	Nil	No	No	No	No	NA	Nil	Nil	21.5	No
61	950935	63/F	6/9/2019	6/10/2019	6/13/2019	calculous cholecystitis	LC	4	T2DM+HTN	No	No	No	Yes	NA	Nil	Nil	33.8	No
62	982778	44/F	11/11/2019	11/12/2019	11/15/2019	cholelithiasis	LC	4	T2DM	No	No	No	No	NA	Nil	Nil	27	No
63	984210	54/F	11/18/2019	11/20/2019	11/23/2019	pain abdomen	DLap	3	Nil	No	No	No	No	NA	Nil	Nil	22	No
64	984354	40/M	11/18/2019	11/25/2019	11/26/2019	Acute appendicitis	LA	3	nil	No	No	No	No	NA	Nil	Nil	21	No
65	981554	71/F	11/5/2019	11/6/2019	11/10/2019	Gastric perforaton+Abscess	LPR+abscess drainage	4	Nil	Yes	No	No	No	NA	Nil	Nil	23	No
66	982000	51/M	11/7/2019	11/11/2019	11/17/2019	Epigastric hernia	LVHR	4	No	No	No	No	No	NA	Nil	Nil	25.2	No
67	952227	24/F	7/10/2019	7/12/2019	7/18/2019	Acute appendicitis	LA	3	No	No	No	No	No	NA	Nil	Nil	18	No
68	976115	35/M	10/10/2019	10/11/2019	10/17/2019	cholelithiasis	LC	4	No	No	No	No	No	NA	Nil	Nil	23	Used
69	974971	22/M	10/3/2019	10/5/2019	10/8/2019	Acute appendicitis	LA	3	No	No	No	No	No	NA	Nil	Nil	22	No
70	937752	64/F	4/3/2019	4/5/2019	4/9/2019	RT ovaian cyst+appendicitis	Lap cystectomy+LA	3	Hypothyroidism	No	No	No	No	NA	Nil	Nil	21	Used
71	991547	40/F	12/24/2018	1/2/2019	1/28/2019	appendicitis +pelvic abscess	DLap	3	ca colon	No	No	No	No	No	Nil	Nil	19	Used
72	950360	39/F	6/6/2019	6/7/2019	6/10/2019	pain abdomen	DLap+adhesiolysis	3	Nil	No	No	No	No	NA	Nil	Nil	22	No
73	953771	54/F	6/23/2019	6/23/2019	6/26/2019	cholelithiasis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	26.7	No
74	970478	52/F	9/13/2019	9/13/2019	9/16/2019	calculous cholecystitis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	24.5	No
75	985734	35/F	11/12/2019	11/12/2019	11/15/2019	Acute appendicitis	LA	3	Nil	No	no	No	No	NA	Nil	Nil	19	No
76	943395	22/M	4/4/2019	4/4/2019	4/7/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	19.5	No
77	957637	31/F	4/4/2019	4/6/2019	4/10/2019	Cholelithiasis	LC	4	Nil	No	No	Yes	No	NA	PSH	PSH	33.8	No
78	985672	25/F	11/25/2019	11/25/2019	11/28/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	22	No
79	987279	50/F	11/29/2019	11/29/2019	12/5/2019	perforated appendix	LA	3	nil	No	no	No	No	NA	Nil	Nil	21	No
80	987066	40/F	11/17/2019	11/17/2019	11/20/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	20	Used
81	959643	25/M	7/23/2019	7/24/2019	7/26/2019	Recurrent appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	22	Used
82	958107	56/M	7/21/2019	7/24/2019	7/28/2019	cholelithiasis	LC	4	T2DM	No	No	No	No	NA	Nil	Nil	26	Used
83	961263	51/F	7/28/2019	7/30/2019	8/4/2019	mesenteric cyst	DLap+MC excision	3	Nil	No	No	No	No	NA	Nil	Nil	19	Used
84	961061	17/F	7/31/2019	7/31/2019	8/3/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	21	Used
85	956597	19/F	7/19/2019	7/19/2019	7/22/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	23	Used
86	961183	18//F	7/31/2019	8/1/2019	8/3/2019	Recurrent Appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	22	Used
87	961148	28/M	7/30/2019	7/31/2019	8/2/2019	Recurrent Appendicitis	LA	3	Nil	No	no	No	No	NA	Nil	Nil	18.5	No
88	963700	14/M	8/13/2019	8/13/2019	8/16/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	17.5	No
89	969024	55/F	9/17/2019	9/18/2019	9/22/2019	B/L ovarian cyst	lap cystectomy	3	Nil	No	No	No	No	NA	Nil	Nil	20	No
90	971080	37/F	9/19/2019	9/20/2019	9/29/2019	Pain abdomen	DLap+Adhesiolysis	3	Nil	No	No	No	No	NA	Nil	Nil	21	No
91	945617	45/M	4/19/2019	4/20/2019	4/26/2019	cholelithiasis	LC	4	T2DM	No	No	No	No	NA	Nil	Nil	26	No
92	967514	58/F	8/2/2019	8/2/2019	8/15/2019	RT Gross HUN+ureteric cal	Lap Nephrectomy	4	T2DM+HTN	No	No	Yes	No	NA	PSH	PSH	26	No
93	926663	19/F	2/5/2019	2/9/2019	2/25/2019	Duodenal stenosis	Lap TV+GJ	5	Nil	No	No	No	No	NA	Nil	Nil	24.5	Used
94	966944	27/F	8/29/2019	8/30/2019	9/3/2019	cholelithiasis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	26	Used
95	966296	47/M	8/21/2019	8/25/2019	8/30/2019	cholelithiasis	LC	4	T2DM+HTN	yes	No	No	No	NA	Nil	Nil	32	No
96	966514	66/M	8/26/2019	8/27/2019	9/5/2019	Empyema GB	LC	4	T2DM+HTN	No	No	No	No	NA	Nil	Nil	30	No
97	968946	44/F	9/8/2019	9/9/2019	9/13/2019	cholelithiasis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	28	No
98	968942	21/F	9/9/2019	9/9/2019	3/12/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	21	No
99	966784	37/M	8/26/2019	8/28/2019	8/31/2019	Umbilical Hernia	LUHR	3	Nil	No	No	No	No	NA	Nil	Nil	26	No
100	962470	46/M	8/5/2019	8/6/2019	8/10/2019	incisinal hernia	LIHR	4	Nil	No	No	No	No	NA	Nil	Nil	25.5	No
101	927358	15/F	1/5/2019	1/7/2019	1/10/2019	cholelithiasis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	26.5	No
102	991214	60/M	12/22/2019	12/24/2019	12/30/2019	cholelithiasis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	25	Used
103	961971	26/F	8/5/2019	8/5/2019	8/8/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	23	Used
104	961507	30/F	8/5/2019	8/6/2019	8/8/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	24	Used
105	955038	40/F	6/30/2019	7/1/2019	7/7/2019	calculus cholecystitis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	29	Used
106	976451	55/M	10/13/2019	10/14/2019	10/20/2019	cholelithiasis	LC	4	HTN	No	No	No	No	NA	Nil	Nil	28	Used
107	976650	40/F	10/20/2019	10/21/2019	10/27/2019	Empyema GB	LC	4	T2DM	No	No	No	No	NA	Nil	Nil	30	Used
108	980547	32/F	11/4/2019	11/4/2019	11/7/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	19.5	Used

S.NO	IP.NO	AGE IN YRS/SEX	DOA	DOS	DOD	DIAGNOSIS	PROCEDURE	No. OF PORTS	CO MORBIBITIES	PSI	SEROMA FORMATION	PSH	PSB	PSM	3m	6m	BMI	Retrival bag Used or No
109	982153	38/M	11/9/2019	11/9/2019	11/12/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	20.5	Used
110	982359	31/M	11/10/2019	11/11/2019	11/16/2019	cholelithiasis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	26	No
111	926091	24/F	2/4/2019	2/5/2019	2/10/2019	cholelithiasis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	25	No
112	919929	27/M	1/2/2019	1/2/2019	1/6/2019	Pain abdomen	DLap	3	Nil	No	No	No	No	NA	Nil	Nil	19.5	No
113	933609	42/F	3/15/2019	3/15/2019	3/18/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	NA	Nil	Nil	21	No
114	933615	39/M	3/16/2019	3/17/2019	3/22/2019	cholelithiasis	LC	4	Nil	No	No	No	No	NA	Nil	Nil	22	No
115	933805	28/M	3/29/2019	3/30/2019	4/3/2019	Pain abdomen	DLap	3	Nil	No	No	No	No	NA	Nil	Nil	25	No
116	991150	58/F	12/15/2019	12/16/2019	12/30/2019	Ca Gall bladder	LC	4	Cancer +T2DM	No	No	No	No	No	Nil	Nil	24	Used
117	969051	21/F	9/15/2019	9/15/2019	9/19/2019	Acute appendicitis	LA	3	Nil	No	No	No	No	No	Nil	Nil	21	No
118	985551	32/M	11/20/2019	11/21/2019	11/25/2019	Pain abdomen	DLap+MLN	3	Nil	No	No	No	No	No	Nil	Nil	23	No
119	991195	20/M	12/18/2019	12/18/2019	12/21/2019	Acute appendicitis	LA+Adhesiolysis	3	Nil	No	No	No	No	No	Nil	Nil	21	NO
120	991212	41/F	12/23/2019	12/24/2019	12/29/2019	cholelithiasis	LC	4	Nil	No	No	No	No	No	Nil	Nil	27	No