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A Clinical Study of Incisional Hernia (A Study of 50 cases)

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Abstract **Original Research Article**

Introduction: Incisional hernia is a type of ventral hernia which is herniation through a weak abdominal scar. Depending on size and condition of patient, the repair of incisional hernia varies from anatomical repair to major reconstruction of abdominal wall with creation of muscle flap and the use of mesh. Careful preoperative planning combined with meticulous surgical technique and experienced judgement is important in order to minimize the risk of complications and hernia recurrence. ***Methods:*** This is a retrospetive study of 50 cases of incisional hernia carried out in Shri Guru Gobind Singh Hospital during September 2015 to September 2017. The entire patient operated either via open approach or laparoscopic approach. ***Summary:*** Incisional hernia is most commson in elder age group (40-60 year) female patients. Common cause for incisional hernia is previous surgery complicated with wound infections, wound dehiscence, urinary retension, cough or associated with other comorbid condition like diabetes, obesity, hypertension, COPD, anemia. Obesity is also a significant predisposing factor. ***Conclusion:*** The study may not reflect all the aspect of incisional hernia as series is small, duration is short and follow up is for shorter duration in most of the cases. Incisional hernia is common iatrogenic condition of previous surgery. Precaution should be taken in lower mid line incision with proper aseptic technique, using non absorbable monofilament suture and preferring mass closure. Laparoscopic repair is better than open repair due to less tissue dissection and complications, but its use is limited because of learning curve and cost factors.

Keywords: Mesh repair, Proline mesh, Laparoscopic hernia repair.

INTRODUCTION

Hernia is one of the very common surgical problems which are encountered in day to day surgical practice. Hernia is defined as an abnormal protrusion of an organ or tissue through a defect in its surrounding wall. Ventral hernia is second most common type of abdominal Hernia after groin hernia and it accounts for about 10% of all hernia. Ventral hernia means Hernia through anterior wall of abdomen. Incisional hernia is a type of ventral hernia which is herniation through a weak abdominal scar (scar of previous surgery)[1]. Incisional hernia occurs in approximately 5 to 11% of patients subject to abdominal operations [72].

Incisional hernia occurs as a result of weakness in musculofascial layers of the anterior abdominal wall. Incisional hernia has an iatrogenic origin which can range from small to extremely large defects. At the extreme end of ventral hernia spectrum is the giant incisional hernia that leads to loss of abdominal domain which occurs when the intra-abdominal contents can no longer lie within the abdominal cavity. Modern rate of incisional hernia rates from 8-11%. The incidence seems to be lower in smaller incision so that laparoscopic port site hernias are much less common than hernia following large midline abdominal incision. Incisional hernia after laparotomy is mostly related to failure of the fascia to heal and involve technical and biological factors; approximately 70% of incisional hernia occurs in first 5 years following surgery and 30% occurs in next 5-10 years[73].

INTRODUCTION

Depending on size and condition of patient, the repair of incisional hernia varies from anatomical repair to major reconstruction of abdominal wall with creation of muscle flap and the use of mesh. This can be done with an open approach or laparoscopic approach.

Careful preoperative planning combined with meticulous surgical technique and experienced

judgement is important in order to minimize the risk of complications and hernia recurrence [74]. Almost every surgeon has got own techniques and may modify it to the situation [75].

AIMS

- Study of various predisposing factors.
- To study Clinical manifestations.
- To study management and early post-operative complications of incisional hernia.
- To compare the final outcome in incisional hernia repair between two techniques 'open' and 'laparoscopic'.

MATERIALS AND METHODS

This is a retrospetive study of 50 cases of incisional hernia carried out in Shri Guru Gobind Singh Hospital during September 2015 to September 2017.

INCLUSION CRITERIA

Patients who were admitted to surgical ward of Shree M. P. Shah Medical College, G. G. Hospital, diagnosed to have incisional hernia and managed by open and laparoscopic repair are included in this study.

EXCLUSION CRITERIA

- All patients other than incisional hernia.
- Less than 15 years of age and more than 70 years.
- Patients with co morbid conditions who is not fit for general anesthesia.
- Patient with large incisional hernia with redundant skin.
- Patient with strangulated hernia.
- Incisional hernia in pregnancy.
- Re- recurrent incisional hernia.
- Psychiatric patient.

MATERIALS AND METHODS

METHODS

Pre- operative preparation. All the patients are thoroughly investigated using physical, biochemical, radiological investigatios.

- NBM from night prior to surgery
- Written and informed consent for anesthesia and surgery
- Shaving and scrubbing
- Anesthetic reference: on the previous day of operation pre-anesthetic assessment of patient will be done. Vitals are recorded. Type of anesthesia is to be given is decided. Anesthetic grade will be given and patient is recruited for operation on next day.
- Painting and draping is done before carrying out the procedure.

Open Incisional hernia repair

The procedure was done under general anaesthesia, spinal or epidural anaesthesia in supine position.

In all cases, old operative scar was excised, generous skin incisions were used to permit adequate exposure of hernia sac and defect. The sac was opened and contents were reduced after lysis of the adhesions. The excess sac was excised. The fascia was cleared of superficial fat for a distance of 5-6 cm from the edge of the defect. The defect was then closed with prolene 1-0 interrupted sutures. A piece of prolene mesh was placed and fixed 4 cm away from the defect in all directions with prolene 2-0 sutures. Suction drains were laid over the prosthesis and brought out through separate stab wounds. Skin closed with monofilament 2-0 vertical mattress sutures. In the post-operative period suction drain was

Removed when the drainage become negligible usually on the 5th post-operative day. Antibiotics were continued for five days. Postoperativel, deep breathing exercises, active and passive movement of limbs in bed was advised as soon as patient recovered from anesthesia. Early limited ambulation was done once the patient was able to bear the pain. Stitches are removed mostly between 10th and 14th post-operative days according to the condition of the wound. At discharge, patients were advised to avoid carrying heavy weight for 6 months. Follow up every 3 months for a minimum of 1 - 2 years was done to see late wound complications like sinus, neuralgia and recurrence of hernia etc.

Fig-1: Mess placement

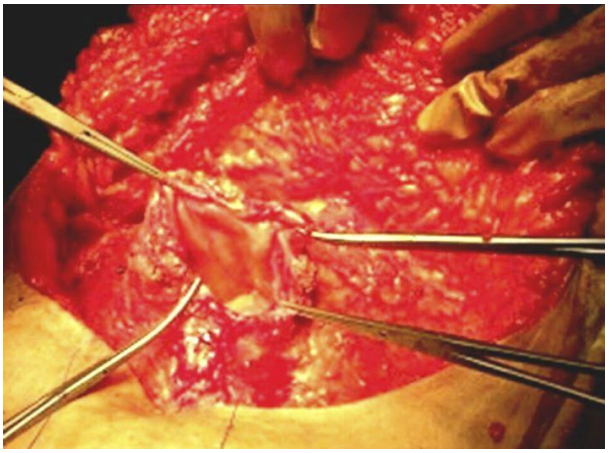


Fig-2: Sac identification

Laparoscopic incisional hernia repair

Anesthesia-General anesthesia with endo tracheal intubation, close monitoring, IV canula and proper fluid and electrolyte balance

Patient position-Supine position without any tilt, so that the bowel is distributed equally. Foley's catheter and nasogastric tube inserted and kept in place.

Position of surgical team - Surgeon stand to the left of the patient with the cameraman on his left or right depending upon the position of the incisional hernia. If the hernia is above the umbilicus then the camera should be to the left of the surgeon and if the defect is below the umbilicus then the camera should be to the right of the surgeon. The monitor should be placed opposite to the surgeon and the instrument trolley towards the leg of the patient.

Port placement technique and operative procedure – The routine cleaning then painting draping of the patient should be done; checking the light cable, insufflation tube cautery wires and the suction tube and machine. 10 mm trocar inserted at the palmers point on the left side in the subcostal region on the midclavicular line and the pneumoperitoneum is created. Once pneumoperitoneum is created then another 5 mm port and 10 mm port are put under vision according to the Baseball Diamond concept performed and the content of the hernia sac either omentum or bowel is reduced.

Then the extent of the defect is assessed thoroughly. Measurement of the defct is drawn on the surface of the anterior abdominal wall and mesh of adequate size which covers the entire defect is selected. The defect is closed with prolene size 1 suture. All precautions to be taken so that the mesh should not get contaminated with any kind of pathogen including those present on the skin. Then the flexible composite mesh is rolled and inserted in a port of adequate caliber to the abdominal cavity, the mesh is then unrolled and fixed by absorbable tacker to the abdominal wall without dissecting the peritoneum. Finally the omentum is placed over the underlying bowel loops to prevent direct contact with the mesh. After completing the procedure, the ports are withdrawn under vision and the telescope port is the last to be removed keeping some instrument or the telescope itself to prevent traction on any part of bowel or omentum. The insertion sites of the 10mm ports are better repaired because of greater chances of further incisional hernia. A sterile dressing is applied. Follow up examination is done at regular intervals at 1, 3 and 6 months.

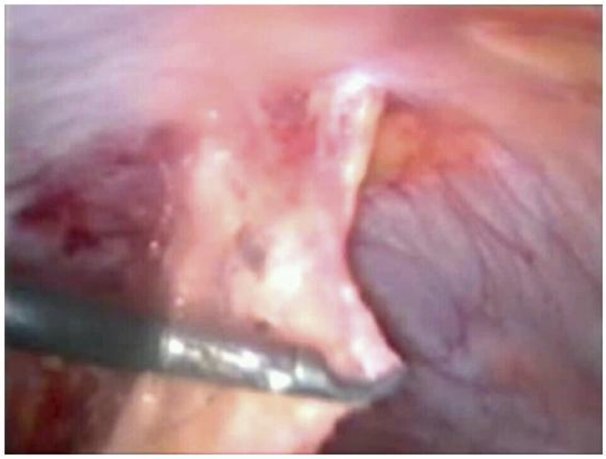


Fig- 3: Identification of Sac

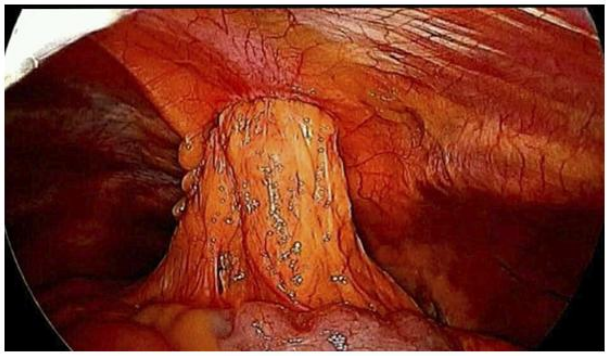


Fig-4: Reducing content of Sac

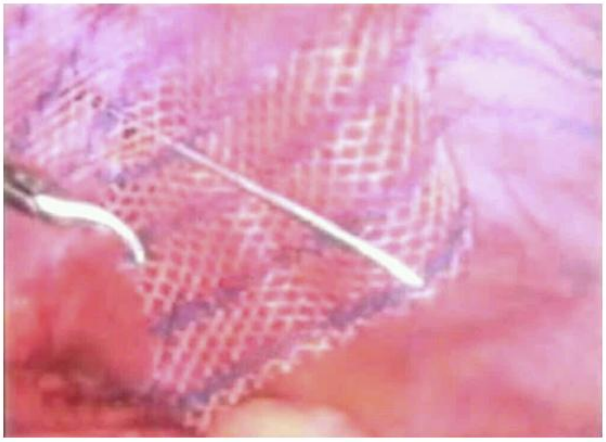


Fig-5 Placement of mess

Fig-6: Closing peritoneum over mess

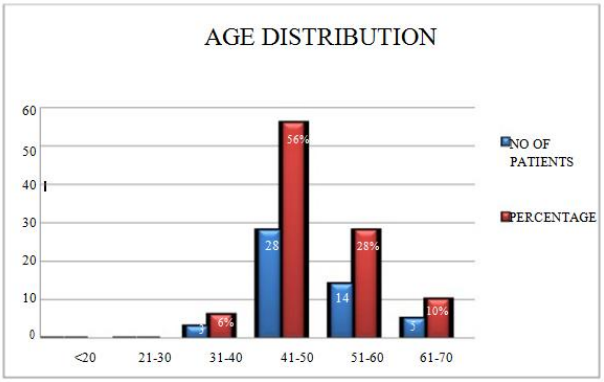
Fig-7: Fixation Device (Tacker)

OBSERVATION

In this study 50 patients had been selected and following observations are made

Table-1: Age distribution

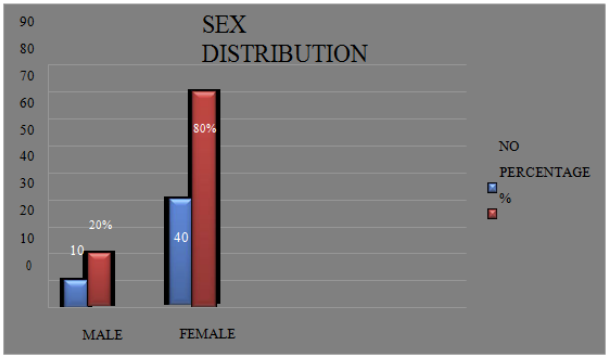
AGE(YEARS)	NO OF PATIENTS	PERCENTAGE
10-20	0	-
21-30	0	-
31-40	3	6%
41-50	28	56%
51-60	14	28%
61-70	5	10%



In this study incidence of incisional hernia is more common in age group of 41-50 years which is 56%. Mean age is-43.5 years. 73

Table-2: Sex distribution

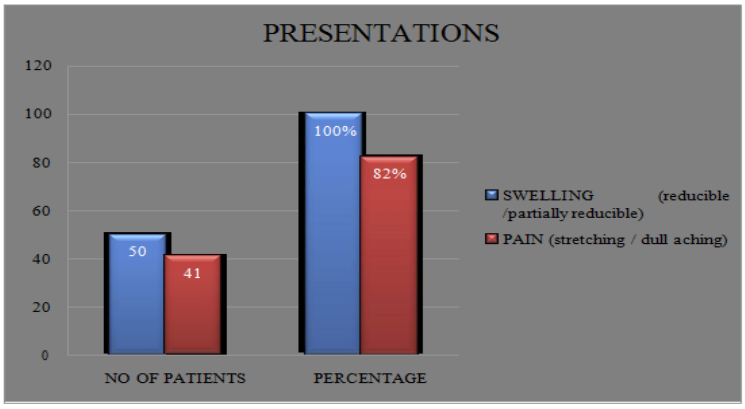
SEX	NO	PERCENTAGE
MALE	10	20%
FEMALE	40	80%



Incisional hernia is more common in females than in males. In this study out of 50 cases, 40 were females and 10 were males.

Table-3: Presentations

PRESENTATION	NO OF PATIENTS	PERCENTAGE
SWELLING (reducible /partially reducible)	50	100%
PAIN (stretching / dull aching)	41	82%

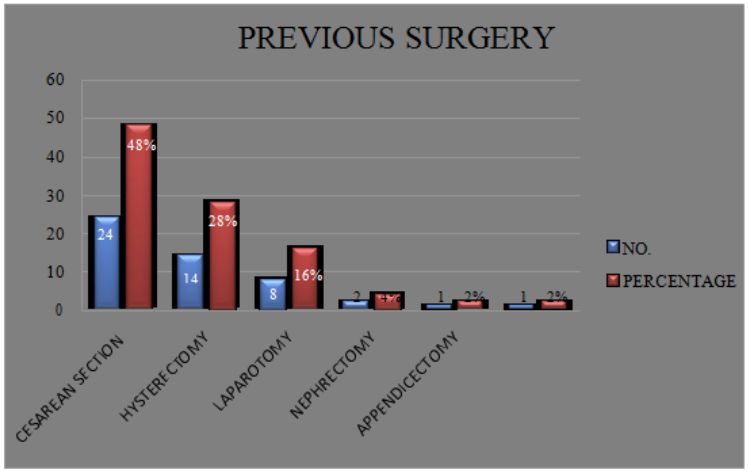


In this study all patients had swelling. Swelling is either reducible or partially reducible. We have excluded obstructive hernias for ease of study.

Around 82 % had pain. Pain is either streching or dull aching type. Hence swelling is the most common presentation of uncomplicated incisional hernia.

Table – 4: Previous surgery

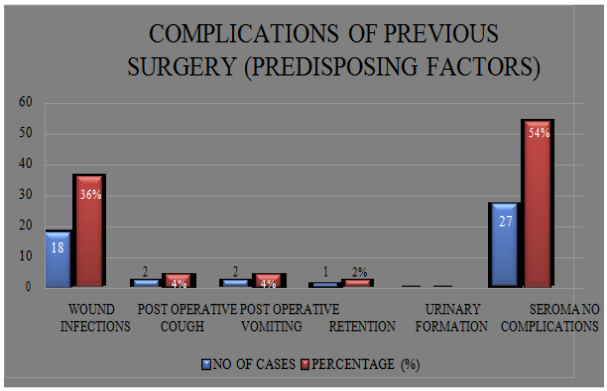
Type of surgery	No.	Percentage
Cesearean section	24	48%
Hysterectomy	14	28%
Laparotomy	8	16%
Nephrectomy	2	4%
Appendicectomy	1	2%
Hydatid cyst removal of liver	1	2%



In this study 48 % patients had history of cesaerian section ,28 % patients had histroy of hysterectomy and 16% had history of laparotomy and 8% had histroy of other sugeries. So incisional hernia is more common in gynecological surgeries.

Table-7: Complications of previous surgery (predisposing Factors)

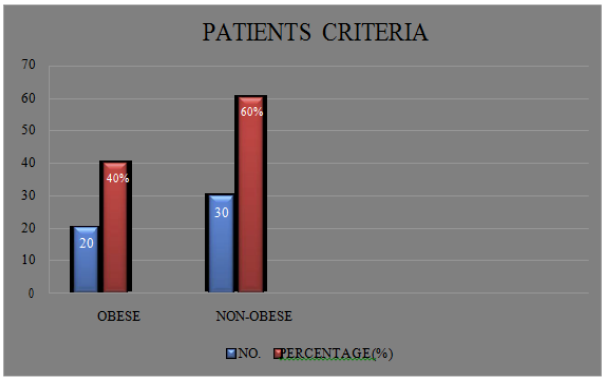
Complications	No of cases	Percentage (%)
Wound infections	18	36%
Post-operative cough	02	4%
Post-operative vomiting	02	4%
Urinary retention	01	2%
Seroma formation	00	0%
No complications	27	54%



In this study 46% patients had post-operative complications of previous surgery and 54% patients had no complications. So complications in previous surgery also play a role in causation of incisional hernia.

Table -8: Patient's criteria

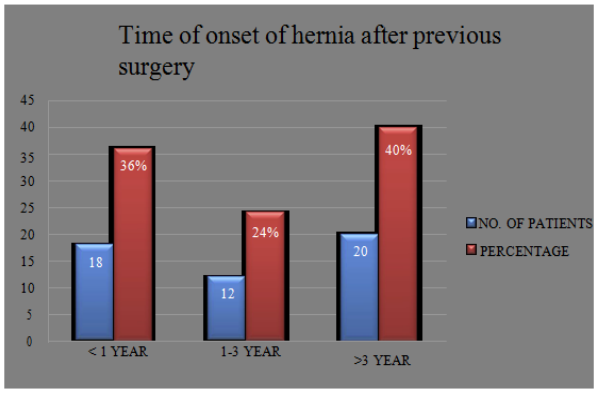
CRITERIA	NO.	PERCENTAGE
OBESE(BMI >30)	20	40%
NON-OBESE(BMI <30)	30	60%



In Our Study Out of 50 Patients 20 Patients Are Obese And 30 Patients Are Non-Obese, Having Incisional Hernia.

Table-9: Time of onset of hernia after previous surgery

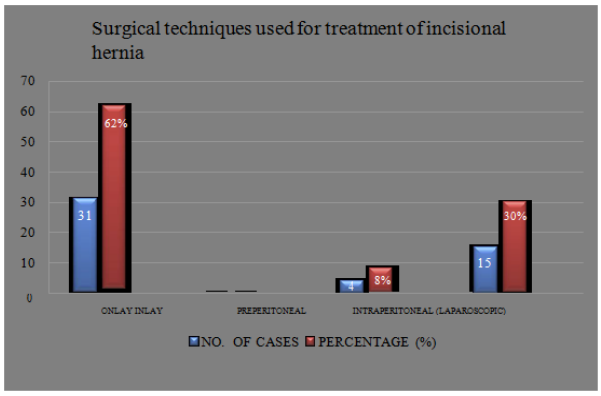
Duration since Surgery	No. of patients	Percentage
< 1 year	18	36%
1-3 year	12	24%
>3 year	20	40%



In this study 60% patients had developed incisional hernia within 3 yrs of previous surgeries.

Table-10: Surgical techniques used for treatment of Incisional hernia

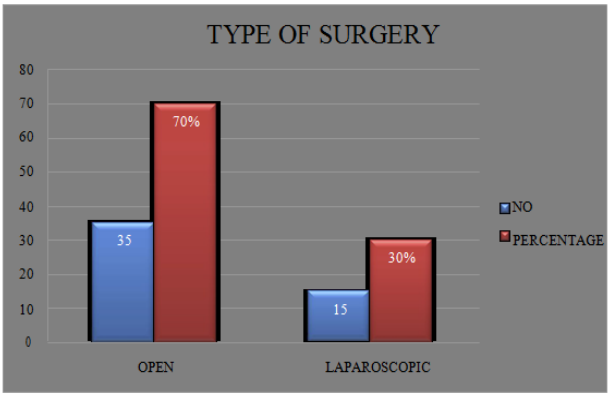
Type of repair	No. of cases	Percentage (%)
Onlay	31	62%
Inlay	0	0%
Preperitoneal	4	8%
Intraperitoneal (laparoscopic)	15	30%



In this study 70% patients had been operated by open methods and 30% had been operated by laparoscopic methods.maximum no of patients had been operated by onlay meshplasty (62%).

Table -11: Type of surgery

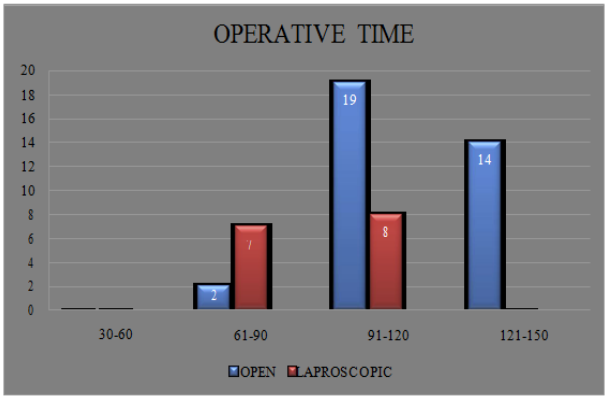
Type	No	Percentage
Open	35	70%
Laparoscopic	15	30%



In my study maximum patients 70% had been operated by open methods and 30% had been operated by laparoscopic methods.

Table – 12: Operative time

Time(mins)	Open	Laparoscopic
30-60	0	0
61-90	2	7
91-120	19	8
121-150	14	0



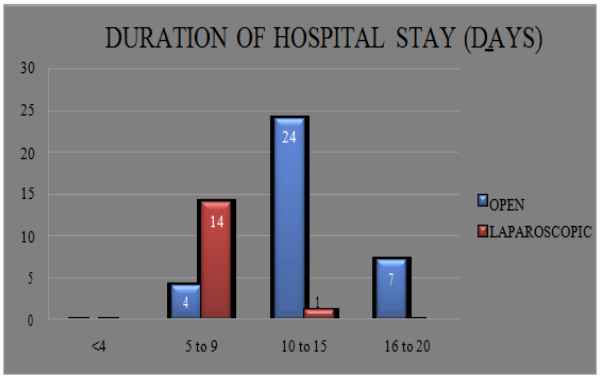
In this study in case of laparoscopic repair 7 patients were required 61-90 mins and 8 patients were required 91-120 min for operation.

In case of open repair 2 patients were required 61-90 mins, 19 patients were required 91-120 mins and 14 patients were required 121-150 mins.

So mean duration of operation for laparoscopic repair is 97 mins which is less compared to open repair which is 120 mins.

Table-13: Duration of hospital stay (days)

Duration(days)	Open	Laparoscopic
<4	0	0
5-9	4	14
10-15	24	1
16-20	7	0

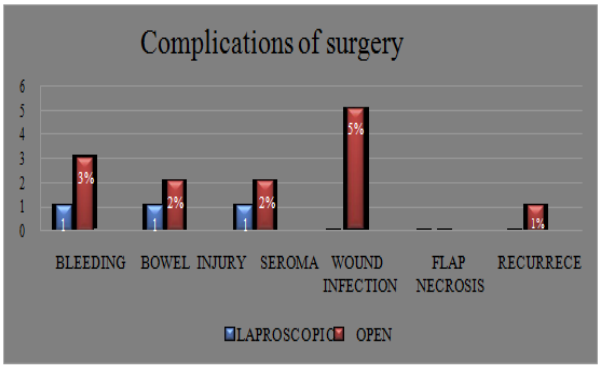


In this study in laparoscopic repair hospital stay for 14 patients were 5-9 days and for one patient 10-15 days. For open repair hospital stay for 4 patients were 5-9 days, for 24 patients 10-15 days and for 7 patients 16-20 days.

So mean duration of hospital stay for laparoscopic surgery is 7 days which is less compared to open repair for which duration of hospital stay is 13 days.

Table-14: Complications of surgery

Complications	Laparoscopic	Open
Bleeding	1	3
Bowel injury	1	2
Seroma	1	2
Wound infection	0	5
Flap necrosis	0	0
Recurrence	0	1



In this study in case of laparoscopic repair 1 patient develop bleeding and 1 patient had bowel injury and 1 patient had wound seroma in case of open repair 3 patients developed bleeding, 2 had bowel injury, 5 had wound infection, 2 had seroma formation and 1 had recurrence.

So complications are less in laparoscopic repair as compared to open repair. To estimating the recurrence in this study regular follow up was done at 1, 3 and 6 months. But to estimate the actual recurrence rate after surgery long term follow up is required.

DISCUSSION

Comparison of mean age group

In the present study the youngest patient was 34 year and oldest being 64 years so the mean age of the patient presenting with incisional hernia was 43.5 year. This may be because of the frequency with which certain operations are performed at this time of life.

Referance Study	Mean age (years)
tulaskar *et al*. [76]	41.85
Carlson *et al*.[77]	60.3
Ellis ,gajraj and george *et al*. [78]	49.4
Our study	43.5

Comparision of prevalence in female patients

Incisional hernia is more common in female patients probably because of early marriage, early and multiple pregnancies with more number of gynecological surgeries which leave the abdominal wall lax and weak.in my study prevalence in female patients is 80% which is comparable to other reference study.

Reference Study	Percentage Female Patients
tulaskar *et al.*	81%
Ellis, gajraj and george *et al.*	64.6%
Kumar SJG *et al*. [80]	80%
Sudhir Dnyandeo bhamre *et al*. [81]	70%
Amrendra Prasad *et al*.[82]	86%
Regnad *et al*.[83]	82%
In our study	80%

Comparision of presentations

Most common presentation of incisional hernia is swelling. In my study all the patients present with swelling, which is comparable to Bose *et al*. reference study, but in other studies like Amrendra Prasad *et al.* and sudhir Dnyandeo bhamre *et al.* study it is 68% and 56% respectively.

Reference Study	Presentation
Sudhir Dnyandeo bhamre *et al*.	Swelling and pain-56%
Bose *et al*. [84]	Swelling-100%
Amrendra Prasad *et al.*	Swelling-68%, pain-24%
In our study	Swelling-100%, pain-82%

Comparision of previous gynecological surgery

Incisional hernia is more common in gynecological surgeries because of general use of lower midline incision. In my study 76% patients had history of previous gynecological surgeries which is comparable to Tulaskar *et al.* (78%) and Amrendra Prasad *et al*. (84%) study but goel and Dubey, Sudhir Dnyandeo bhamre and Ponka 6 studies had 28.76%, 53%, and 36% respectively.

Reference Study	% of Gynecological Operation In Previous Surgery
tulaskar *et al.*	78%
Sudhir Dnyandeo bhamre *et al*.	53%
Amrendra Prasad *et al.*	84%
Goel and Dubey (85)	28.76%
Ponka 6 (86)	36%
Our study	76%

Comparision of previous surgery

Comparing with other studies data suggest that gynecological operations particularly cesaerian section which is performed by either lower mid line or pffenenstial incision is more prone for development of incisional hernia in future.

Type of operation	Goel TC, Dubey PC	Tulaskar *et al.*	Our study
Cesaerean section	39.65%	39.11%	48%
Tubal ligation	20.75%	10.9%	0
Hysterectomy	13.20%	21.9%	28%
Exploratory Laparotomy	16.98%	15.6%	16%
Appendicectomy	4.71%	0	2%
Cholecystectomy	4.71%	3.12%	0
Renal surgeries	0	3.12%	4%
Hydatid cyst removal	0	0	2%
Incisional hernia	0	6.25%	0

Comparision of complications in previous surgery

If post-operative complications are present in previous surgery then chances of incision hernia is more because of increased intraabdominal pressure, gapping and infection .In my study 46% patient had postoperative complication in previous surgeries which is comparable to Bose *et al*. Bucknell TE *et al.* study in which 53.63% and 48.80% respectively. In other studies like Kumar SJG *et al*. tulaskar *et al*. Ellis, gajraj and george *et al.* and Larson *et al.* it is 30%, 37.5%, 35.85%, 35.85% respectively.

Reference Study	Complication percentage
Kumar SJG *et al*.	30%
tulaskar *et al.*	37.5%
Bose *et al.*	53.63%
Ellis ,gajraj and george *et al.*	35.85%
Larson *et al.* [87]	35.85%
Bucknell TE *et al*. [88]	48.80%
Our study	46%

Comparision of mid line (vertical)/lower Midline incision in various study

Incisional hernia is most common in midline vertical incision particularly lower midline. It is because of *Higher intra-abdominal pressure in lower abdomen (20 cm of H2O) as compare to upper abdomen (8 cm of H2O) in erect position. *Absence of posterior rectus sheath below arcuate line. *This incision is mostly used in gynecological surgeries that have poor abdominal wall musculature.

In our study 62%/ 46% patients had midline vertical/ lower midline type of incision of previous surgeries which is comparable to tulaskar *et al.* Sudhir Dnyandeo bhamre *et al.* and Amrendra *Prasad et al.* which had 86%/71%, 70%/41%, 92%/80% respectively.

Reference Study	% of midline vertical/ lower midline incision
tulaskar *et al.*	86%/71%
Sudhir Dnyandeo bhamre *et al.*	70%/41%
Goel and Dubey	-/44.6%
A.B.thokor *et al.* [89]	-/67%
Amrendra Prasad *et al.*	92%/80%
Our study	62%/46%

Comparision of time of onset of hernia after the previous surgery

Maximum number of patients had developed incisional hernia within 2 to 3 years of previous surgeries. In my study 60% patients had develop within 3 years of previous surgeries which is comparable to Kumar SJG *et al*. Sudhir dnyandeo bhamre et al which had 66% and 68% respectively.

Reference Study	Duration		
	<1 YEAR	1-3 YEAR	>3 YEAR
Kumar SJG *et al.* study	36%	30%	34%
Sudhir Dnyandeo bhamre *et al.*	51.20%	16.25%	32.55%
Our study	36%	24%	40%

Comparision of post-operative complication after surgery

In my study Post-operative complication after surgeries is 16% which is comparable to other referral studies as shown in below table.

Reference Study	% of Complications
Kumar SJG *et al.*	20%
tulaskar *et al.*	23%
Sudhir Dnyandeo bhamre *et al.*	16%
Amrendra Prasad *et al.*	10%
Our study	16%

Comparision of obesity as a predisposing factor

Obesity is a significant predisposing factor for causation of incisional hernia because cutting through large masses of fat and increased retraction needed, may raise the infection rate and delay wound healing.In obese patient weight reduction and proper exercise is needed for avoidance of post-operative complicatons after surgery. In my study 40% patients are obese (BMI>30) which is comparable to other reference studies as shown in below mentioned table.

Reference Study	% of Obesity
Kumar SJG *et al.*	20%
Bose *et al.*	30%
Amrendra Prasad *et al.*	36%
Bucknell TE *et al.*	35%
Regnad *et al.*	29%
Our study	40%

Comparision of surgical technique used for treatment of incisional hernia

Maximum patients had been operated by onlay meshplasty because of ease of operation, assesibility, tension free repair, less complication, ease of treatment of post-operative infections. In my study 70% patients had been operated by open method and 30% had been operated by laparoscopic method, in which 62% had onlay meshplasty. In other studies like Kumar SJG et al. and Tulaskar *et al.* had 60% and 48.4% onlay meshplasty respectively.

Reference Study	Surgical technique cases/percentage						
	On lay	In lay	Preperitoneal	Anatomical repair	Intraperitoneal (laparoscopic)	Retro muscular	Rami rez technique
Tulas ar *et al.*	31/48.4%	-	31/48.4%	1/1.5%	-	1/1.5%	-
Kumar SJG *et al.*	18/60%	12/40%	-	-	-	-	-
Kings North AN *et al.* [93]	16/30.7%	1/1.92%	33/63.4%	-	-	-	2/3.84%
Our study	31/62%	-	4/8%	-	15/3%	-	-

Comperision of recurrence after surgery

For recurrence rate regular follow up large time period of study and large patient group is required. Time period of my study is short (2 year) patient group is small (50) and follow up period is also short (In this study regular follow up was done at 1,3 and 6 month) so estimation of actual recurrence rate is difficult. In our study recurrence rate is 2% which is comparable to other shown studies in table.

Reference Study	% of Recurrence
tulaskar *et al.*	1%
Fenn1968	7%
Maingot [91]	7%
J B Shah [92]	6%
Kings north AN 2004	8.7%
Our study	2%

Comparetive studies on laparoscopic repair

Reference study	Operative Time(mins)	Hospital Stay(days)	Seroma rate %	Infection Rate	Recurrence Rate
Franklin *et al.*	-	-	0	2	1.1
Toy *et al.*	120	2.3	16	3	4.4
Carbajo *et al.*	62	1.2	10	0	2
Henyford *et al.* Al	97	1.8	5	2	3
Palanivelu	95	3	7.71	-	0.89
Our study	97	7	6	-	0

Comparative studies of open repair

Reference Study	Infection rate %	Recurrence %	Mesh rejection %	Operative time (mins)	Hospital stay (days)
KENNY US '94	5	2.5	2.5	84.5	8.3
LIAKAKOS, GREECE'94	4	8	2	80	5.9
CHEVREL, FRANCE '97	10.9	5.5	0	92	6.8
OUR STUDY	14.2	2.8	0	120	13

SUMMARY

This study is done for 50 cases of incisional hernia in SHRI GURU GOVIND SINGH Hospital Jamnagar between Sept - 2015 to Sept - 2017.

- Incisional hernia is most commson in elder age group (40-60 year) female patients.
- Common cause for incisional hernia is previous surgery complicated with wound infections, wound dehiscence, urinary retension, cough or associated with other comorbid condition like diabetes, obesity, hypertension, COPD, anemia.
- Obesity is also a significant predisposing factor.
- Incisional hernia most commonly present with swelling and pain.
- Incisional hernia is most common in vertical midline incision as compared to other incision; specially lower midline incision.
- In incisional hernia mostly hernia sac contain omentum and pre peritoneal fat.
- The size of hernia defect >3cm is found in 45 patients (90%).
- Incisional hernia is more common in patient which had previous history of gynecological operations (76%).
- Mostly incisional hernia appears within 3 years of previous surgery
- Post-operative complications are minimized by use of close suction drain.
- Most hernia repair is done by open (on lay) method.
- Post-operative complications, hospital stay, operative time are less in laparoscopic repair as compared to open repair.
- Cost effectiveness between both procedures is not mentioned in this study due to free supply of various types of meshes and fixation devices to the hospital. But compare to open; laparoscopic mesh and fixation devices are more costly.
- Recurrence rate is 2% in my study, but to estimate the actual recurrence rate after surgery long term follow up is required.

Certain patient's population can expect different outcome after repair, notably those with recurrent hernia, morbid obesity.

CONCLUSION

The study may not reflect all the aspect of incisional hernia as series is small, duration is short and follow up is for shorter duration in most of the cases.

- Incisional hernia is common iatrogenic condition of previous surgery. Precaution should be taken in lower mid line incision with proper aseptic technique, using non absorbable monofilament suture and preferring mass closure.
- Proper preoperative preparation of the patients with proper selection of operative procedure and expert anaesthesia is needed for good result.
- Use of Naso gastric tube, broad spectrum antibiotic and suction drain decreases the post-operative complications and give better result.
- Incisional hernia is more common in patients having associated comorbid conditions like obesity, diabetes, anaemia, hypertension, COPD and various post-operative complications after previous surgery.
- Laparoscopic repair is better than open repair due to less tissue dissection and complications, but its use is limited because of learning curve and cost factors.

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