

A Prospective Study of complications, risks and causes while repairing the Incisional Hernia by Preperitoneal Meshplasty

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Abstract

Background: An abdominal wall hernia is defined as an intermittent or continuous protrusion of abdominal organs through a defect in the abdominal wall. In case of an incisional hernia an abdominal wall defect develops in the scar of a wound in the abdominal wall, which was inflicted during previous surgery. Incisional hernia is a frequent complication of abdominal surgery the exact incidence has not been well defined, although a number of reports in the literature suggest that the incidence is probably between 2% and 11%. Another study shows Incisional hernia occurs in 10- 20 % of patients subjected to abdominal operations. **Aim & Objective:** To study the causes, complications, operating time, while dealing to Incisional hernia cases. **Materials and Methods:** This is a prospective study, our sample size was of 30 patients, data collection from Jan 2018 to September 2020 of the admitted patients in the department of surgery, R.D.J.M. medical college & hospital. Patients fulfilling the selection criteria were offered Preperitoneal mesh repair. **Results:** A total of 30 patients were included in the present study. In which 11 (37%) were male and 19 (63%) were female. All patients were in ranged of 16years to 64 years of age. Maximum number of patients were between to the age group of 36-45 years followed by 46-55 years and 10-20 years. And 14 patients (46.7%) with abdominal swelling and 16 Patients (53.3%) presented with swelling and pain both in abdomen. Out of total of 30 patients, (12) of patients had history of Exploratory Laparotomy followed by Hysterectomy (7), LSCS (6), Herniorrhaphy and Laproscopy 2 each and Tubal Ligation and open Appendectomy one each, 7 patient (23.3%) presented with incisional hernia within 3 months of the previous surgeries. 9(30%) patients noticed swelling at the operation site within 3 months to one year of surgery, 5 patients (16.7%) within 1-3 years of surgery and Remaining 9(30%) patients developed hernia after 3years. **Conclusion:** The preperitoneal mesh repair an excellent method called as Rive's stoppa technique where mesh was placed between peritoneum and abdominal wall or rectus muscle and posterior rectus sheath. The main advantage of pre peritoneal mesh repair are - Less chance of mesh infection and erosion through skin because the graft lies in preperitoneal plane between posterior rectus sheath and peritoneum, avoids adhesions, bowel obstruction, enterocutaneous fistula and erosion of mesh, minimal morbidity and duration of hospital stay is less compared to other techniques.

Keywords: Laparoscopy, Preperitoneal mesh repair, Incisional hernia, Exploratory laparotomy, VAS SCORE.

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Introduction

Incisional hernia is defined as a diffuse extrusion of peritoneum and abdominal contents through a weak scar after an operation or accidental wound [1]. The exact incidence of incisional hernia has not been well defined, although a number of reports in the literature suggest that the incidence is probably between 10% to 20% [2, 3]. Recent studies however show that about 2/3rd appear within the first 5 years and that at least another third appear 5-10 years after the operation. It is seen more in females, obese and older age group [4]. Jack Abrahamson [4] a pioneer in hernia surgery in the modern era said, many factors singly or in various combinations may cause failure of the wound to heal satisfactorily and lead to development of Incisional hernia, main causes in its causation are Poor surgical technique and Sepsis. Hernias were considered large, when the width measured more than 10 cm at its greatest diameter. Medium hernias measured between 6 and 10 cms in diameter. Small hernias were those under 6 cm. Complications of hernia include irreducibility, frequent and partial obstruction, Strangulation, Spontaneous ulceration, rupture.

Considering the significant recurrence rate noted after various techniques for incisional hernia repair, the task of repairing this defect can challenge the scientific and artistic talents of the most experienced surgeon. Various types of repair have been described, both anatomical and prosthetic. But the results have been disappointing with a high incidence of recurrence-about upto 50% after an anatomical repair and upto 10% following prosthetic mesh repairs [5]. In general the postoperative complications of incisional hernia include pulmonary atelectasis, bronchitis, pulmonary embolism. postoperative ileus, thrombophlebitis and deep venous thrombosis, where as local complications like wound seroma, haematoma, infection, sinuses and complications of mesh. Mesh repair is an excellent method of repair preferred for patients with large defects of the anterior abdominal wall, especially preferred more than 4 cm, size defect [6, 7, 8]. An excellent method, which has been used, called Rive's Stoppa technique, where mesh was placed between peritoneum and abdominal wall or rectus muscle and posterior rectus sheath [9]. The main advantage of pre peritoneal mesh repair are - Less chance of mesh infection and erosion through skin because the graft lies in preperitoneal plane between posterior rectus sheath and peritoneum, avoids adhesions, bowel obstruction, enterocutaneous fistula and erosion of mesh, minimal morbidity and duration of hospital stay is less compared to other techniques. The main disadvantage is more time consuming, extensive preparation of preperitoneal plane and

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surgical experience. Management of incisional hernia by preperitoneal mesh repair in our surgical department.

Materials and Methods: This is a prospective study, our sample size was of 30 patients. And we have collected data from Jan 2018 to September 2020 of the admitted patients in the department of surgery, R.D.J.M. Medical college and hospital, Turki ,Bihar.

Inclusion Criteria:

1. All the patients of both sex with incisional hernia between 15 and 65 years.
2. Incisional hernias located in the upper and lower midline incisions of the abdomen, pfannensteil's incision, Paramedian incisions, Recurrent hernia, and port site hernia.

Exclusion Criteria:

1. All the patients with chronic obstructive pulmonary Disease (COPD) like asthma.
2. Patients with abdominal malignancy & cirrhosis with end stage liver disease.
3. Patients with previous loss of the abdominal wall & large scarred area of the abdominal skin.
4. Patients with age less than 15 years & more than 65 years.
5. Patients with size of hernia larger than 15 cm in its largest dimension.
6. Patients with complicated hernia operated in emergency.

Methodology

Patients fulfilling the selection criteria were offered Preperitoneal mesh repair. An informed consent was taken from all patients. All patients underwent routine preoperative investigations (haemetological and biochemistry) including

1. Chest X ray

2. Ultrasonography of the abdomen to evaluate other diseases like gall bladder stone, fibroid uterus and tumor mass.

Procedure

- After PAC fitness, patients underwent surgery.
- A day prior to surgery, shaving of the abdomen and genitalia was done.
- Informed consent was taken.
- A nasogastric tube and Foley's catheter was passed and broad-spectrum antibiotics were given to all patients before the procedure.
- Patient were explained about the effects and complications of the procedure.
- The procedure was done under general anaesthesia, spinal or epidural anaesthesia in supine position.
- In all cases, old operative scar was excised, generous skin incision was given to permit adequate exposure of hernial sac and defect.
- The sac was opened and contents were reduced after lysis of the adhesions.
- The excess sac excised, peritoneum closed with absorbable synthetic suture.
- Adequate preperitoneal plan prepared between the posterior rectus sheath and peritoneum, mesh placed and fixed with prolene no. 2-0 or 3-0 sutures.
- Suction drains were laid on the mesh and brought out through separate stab wounds. Muscular aponeurotic structures repaired with prolene no.1 suture. Skin closed after insertion of suction drain in subcutaneous plane.



Fig 1:showing large incisional hernia as a sequelae of Exploratory lapartomy for duodenal perforation with visible healed scars of laparotomy and drain sites.



Fig 2:Picture depicting preperitoneal plane dissection between posterior rectus sheath and peritoneum.

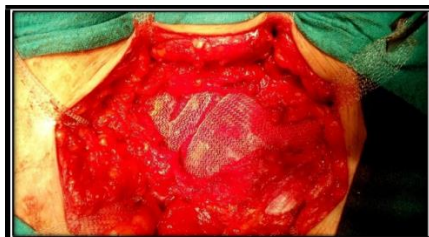


Fig 3: Showing intraoperative placement of large sized prolene mesh for hernia defect in preperitoneal plane.



Fig 4: showing suction drain kept in situ over preperitoneal mesh on preperitoneal plane and brought out through separate openings

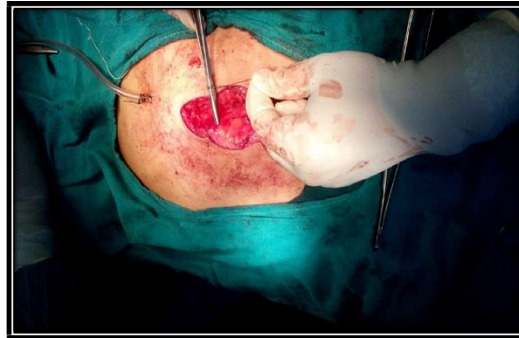


Fig 5: showing final closure of musculoaponeurotic plane using prolene no 1 suture and closure of subcutaneous plane using vicryl 3-0.

Intraoperative Factors to Be Assessed Like

- Operative time
- Creation of adequate preperitoneal plane
- Complications such as:
- Bleeding
- Other factors noted

Postoperative Factors

1. Duration of hospital stay(days)
2. Wound infection
3. Seroma formation
4. Postoperative ileus
5. Induration of stitch line
6. Recurrence
7. Assessment of pain using VAS Score



Follow Up

- 3 Days
- 7 Days
- 3 Weeks
- 3 Months
- 6 Months

Observation & Results

Table 1: Distribution of Patients According To Sex.

Sex	Frequency
Male	11
Female	19
Total	30

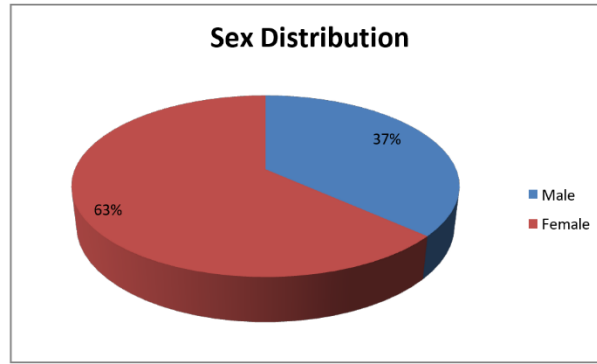


Fig 6: Distribution of Patients According To Sex.

A total of 30 patients were included in the present study. In which 11 (37%) were male and 19 (63%) were female.

Table 2: Distribution of Age among Patients

Age Group	Frequency
16-25	4
26-35	3
36-45	14
46-55	7
56-65	2

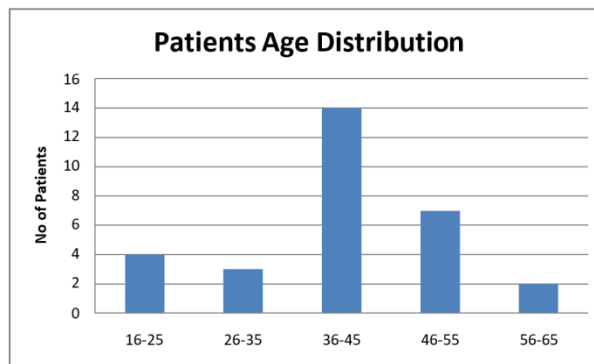


Fig 7: Distribution of Age among Patients

All patients were in ranged of 16years to 64 years of age. We found that maximum number of patients were between to the age group of 36-45 years followed by 46-55 years and 10-20 years.

Table 3: Mode of Presentation

Mode of presentation	Frequency
Abdominal Swelling	14
Abdominal Swelling & Pain	16
Total	30

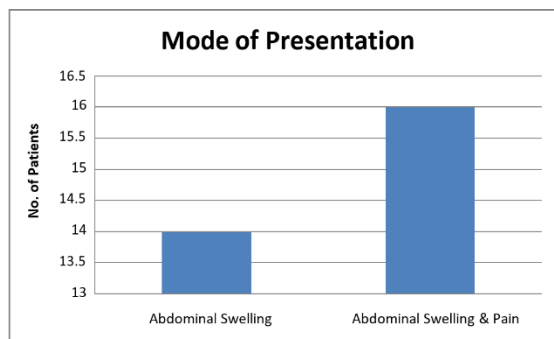


Fig 8: Mode of Presentation

In our study, 14 patients (46.7%) with abdominal swelling and 16 Patients (53.3%) presented with swelling and pain both in abdomen.

Table 4: Distribution Reducible/Irreducible Swelling

Reducible Swelling	27
Irreducible Swelling	3

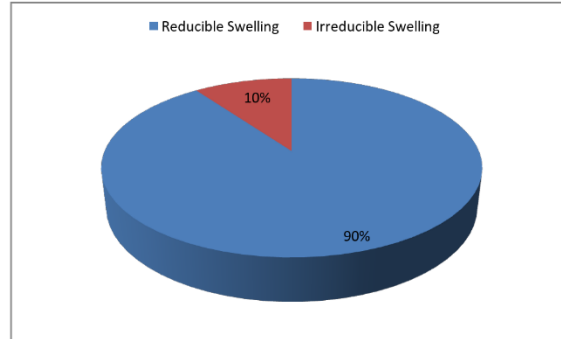


Fig 9: Distribution of Reducible/Irreducible Swelling

In our study most of the cases had reducible swelling 27(90%) and 3(10%) cases had irreducible swelling.

Table 5: Distribution of Patients According to Previous Surgeries

Surgeries	Frequency
TAH	7
LSCS	5
Exp Lap	12
Laproscopy	2
Open Appendectomy	1
Tubal Ligation	1
Herniorraphy	2

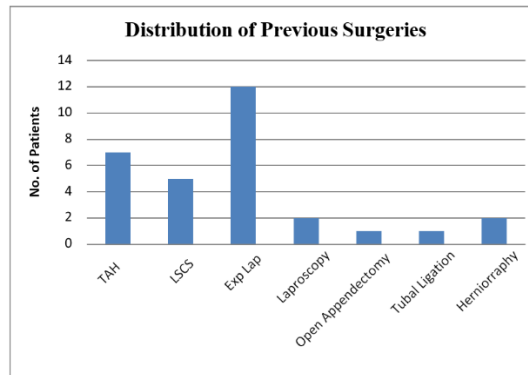


Fig 10: Distribution of Patients According to Previous Surgeries

In our study, out of total of 30 patients, (12) of patients had history of Exploratory Laparotomy followed by Hysterctomy (7), LSCS (6), Herniorraphy and Laproscopy 2 each and Tubal Ligation and open Appendectomy one each.

Table 6: Type of Incision Used in Previous Surgeries

Incision	No. of Cases
LowerMidline	17
Uper Midline	4
Para Median	1
Pfannensteil	6
Umbilical Port site	2

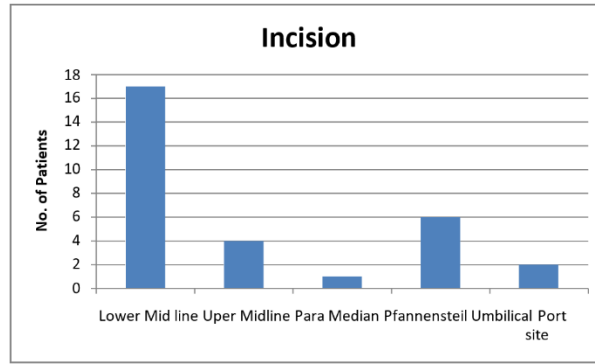


Fig 11: Type of Incision Used in Previous Surgeries

In majority of patients previous operations was done by lower midline abdominal incision 17(56.7%). Other incision used was upper midline in 4(13.3%) Para median 1(3.3%), Pfannensteil 6(20%) and umbilical port site 2(6.7%)

Table 7: Time of Onset of Incisional Hernia after the Previous Surgeries

Duration Since Surgery	No. of Patients
0-3 Months	7
3 months - 1 Year	9
1 year - 3 Years	5
> 3 Years	9

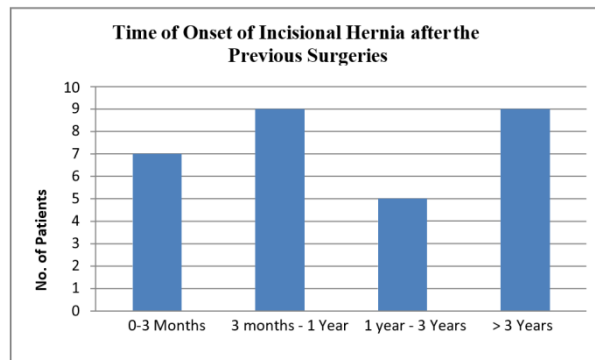


Fig 12: Time of Onset of Incisional Hernia after the Previous Surgeries

From the above data it is found that in our study 7 patient (23.3%) presented with incisional hernia within 3 months of the previous surgeries. 9(30%) patients noticed swelling at the operation site within 3 months to one year of surgery, 5 patients (16.7%) within 1-3 years of surgery and Remaining 9(30%) patients developed hernia after 3years

Table 8: Distribution of Patients According to risk factors and previous complications

Risk factor involved	No. of patients
Wound infection/dehiscence	6
Post-operative Cough	0
Repeat surgery	2
Anemia	1
Obesity	2
Diabetes Mellitus	1
BEP	1
No complications	17

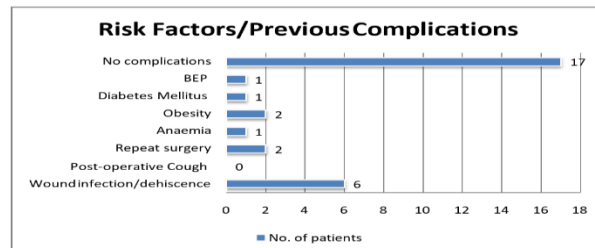


Fig 13: Distribution of Patients According to risk factors and previous complications

In our study, 13 patients had previous post-operative complications in the form of wound infection/ dehiscence (6 patients). The other risk factors were BEP (1patient), Obesity (2 patients), Repeat surgery(2 patients), anemia(1patient) and Diabetes Mellitus (1 Patient). 17 patients had no complications following previous surgery.

Table 9: Operating time during surgery

No. of Patients	Operating Time in Minutes
1	60
2	80
3	90
4	70
5	60
6	90
7	60
8	80
9	75
10	85
11	80
12	65
13	70
14	60
15	90
16	70
17	60
18	80
19	65
20	110
21	100
22	110
23	110
24	90
25	80
26	75
27	120
28	90
29	80
30	95

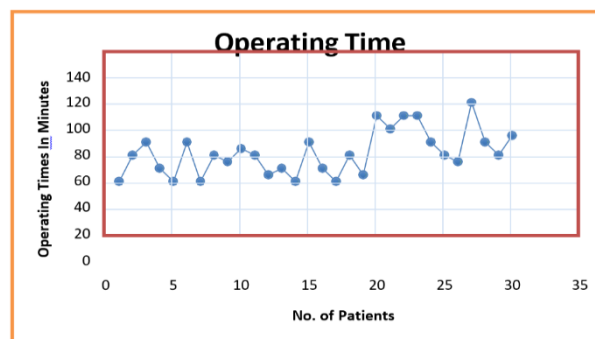


Fig 14: Operating time during surgery

Above table and graph showing Average operating time was 81.7 minutes in our study of 30 patients. Maximum operating time was 120 minutes, minimum operating time was 60 minutes.

Table 10: Distribution of Patients According to intra operative complications

Intra Operative Complications	Patients
Bleeding	3
Peritoneal Breach	5
Nil	22

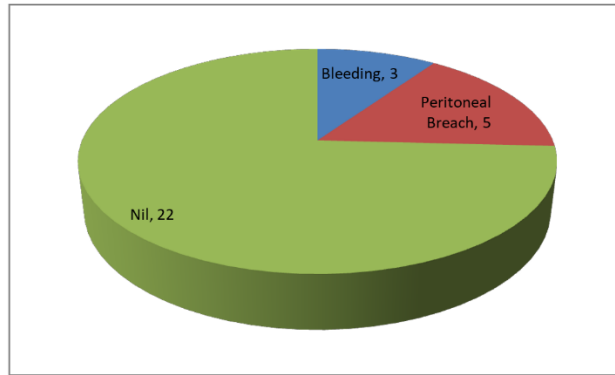


Fig 15: Distribution of Patients According to intra operative complications

In our study, out of 30 patients, 3 patients had intraoperatively bleeding and 5 patients had Peritoneal breach. And 22 patients do not had any complications

Table 11: Assessment of Pain using VAS SCORE

Assessment of Pain using VAS Score	
No of Patients	
Post of Day 1	Mild 0
	Moderate 19
	Severe 11
Post of Day 2	Mild 3
	Moderate 27
	Severe 0
Post of Day 7	Mild 28
	Moderate 2

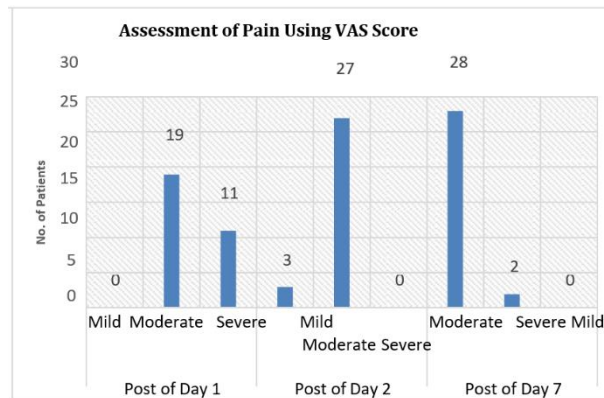


Fig 16: To Assessment of Pain using VAS SCORE

In our study, Post operative pain was assessed on Post Op Day 1, 2 and 7 using Visual Analog scale (VAS). Pain was graded in to mild (0-3), moderate (4-6) and severe (>7). It was seen that all the patient in our study had moderate (19) to severe (11). On day 2 only 27 patients had moderate pain, 3 had mild pain and no severe pain was reported. On day 7, 28 patients had mild, 2 patients had moderate pain.

Table 12: Post Operative Complications in Preperitoneal Mesh Repair in Incisional Hernia

Complications	Patients
Wound Infection	3
Seroma Formation	2
Post Op Ileus	1
Induration of Stich line	5
Recurrence	0
Nil	19

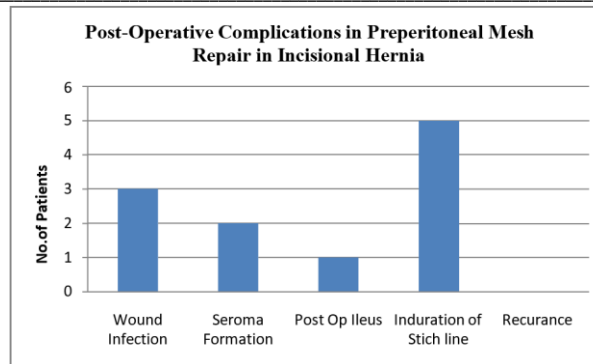


Fig 17: Post Operative Complications in Preperitoneal Mesh Repair in Incisional Hernia

In the present study, we encountered 36.66% of cases with postoperative complications of which 10% of cases had postoperative wound infection and 6.7% had seroma formation. There was no postoperative complication in 63.33% of cases. There is No recurrence was seen in a 6 months follow up period.

Discussion

The study was conducted in the Department of General Surgery, R.D.J.M. Medical College & Hospital, from January 2018 to September 2020. Total of 30 cases were included in this Prospective study. All the patients underwent preoperative evaluation and after pre anesthetic fitness were taken up for surgery. A preperitoneal mesh hernioplasty using a prolene mesh was done in all the patients.

In present study, age ranged from 16 years to 65 years with peak incidence in 36 to 45 age group (42%). As per the Maingot's studies, mean age was around 45 years [11, 12]. Ellis, Gajraj and George [13] in their study noticed a mean age of 49.4 years. There is a female preponderance noticed with 63.33%. In Bhutia WT *et al.* study, the female: male ratio was 3: 1.5 with female preponderance 84% [13]. Ellis, Gajraj and George [12] obtained an incidence of 64.6% female population in their study of 383 patients. This suggests that incisional hernia is more common in females.

In our study 53.3% patients presented with abdominal swelling with pain and 46.67% patients presented with lump abdomen. As compared to a study done by Sudhir dnyandeo bhamre and Nitin devidas pingale [14] in which maximum patients 55.5% presented with abdominal swelling and pain and 44.1% presented with swelling over abdomen. Most of cases in our series, had reducible hernia (90%) and 10% of cases had irreducible hernia. In a study done by Sushil D Akruwala, Vidhyasagar M Sharma [16] most of cases were reducible hernia (92.5%) and (7.5%) of cases had irreducible hernia.

In our study 53.33% of patients developed incisional hernia within 1 year of previous surgery, 16.67% within 1-3 years and 30.00% after 3 years. when compared to a study done by Sudhir dnyandeo bhamre and Nitin devidas pingale [14] 51.1% of patients developed incisional hernia within 1 year of previous surgery, 16.2% within 1-3 years and 32.5% after 3 years. In present study, over 46.67% of cases occurred following obstetrics and gynaecological operations, and around 22% of cases occurred following general surgical operations. Of 30 cases, 23.33% of cases had hysterectomy, 3.33% of cases had tubal ligation, 16.67% of cases LSCS, 40% of cases laparotomy, 3.33% of cases were of appendectomy, 6.67% of cases had undergone umbilical hernia repair and 6.67% of cases had recurrent incisional hernia (who had undergone anatomical repair). In present study, 6 patients (12%) had undergone more than one surgery and 2 patients (4%) had already been operated for incisional hernia by anatomical repair. Where as in a study done by Sudhir dnyandeo bhamre and Nitin devidas pingale. 53% of cases occurred following gynaecological procedures (Hysterectomy, Tubal Ligation, Caesarean sections). Ponka [13] in his study noted 36% incidence among gynaecological procedures.

In our study it was observed 56.66% of cases developed incisional hernia through lower midline incision, 20% through Pfannenstiel

incision, 13.33% through upper midline incision, 6.66% umbilical port site incision, 3.33% through para median incision. As compared to a study done by Sushil D Akruwala, Vidhyasagar M Sharma [15] 77.3% of cases developed incisional hernia through lower midline incision, 9.4% through Pfannenstiel incision, 7.6% through upper midline incision, 5.7% through paramedian incision.

Among the risk factors promoting incisional hernias, wound infection accounted for 20% in our study. The other risk factors observed were obesity (6%), repeat Surgery(6%), DM(1%) and BEP(3%). Which is comparable to that of Bose *et al.* studies in which wound infection (59 out of 110 patients-53.63%), obesity (33/110- 30%), COPD (23/110 - 20.90%) [17]. (7%) Patients had undergone more than one operation previously which is also one of the risk factors in our study which can be compared with Shah JB [18] series (25%). Brenden Devlin [19] which states that repeated wounds in the same region or just parallel to each other will often lead to the development of herniation.

Creation of adequate pre peritoneal space is the pre-requisite for a pre peritoneal mesh placement. Creation of this pre peritoneal space was technically more demanding and major time of surgery was spend in the creation of space. Patient with history of previous hernia repair were difficult as the planes for preperitoneal mesh placement was distorted. Common complication like bleeding and peritoneal breach were encountered in few of our patients, but was successfully managed intraoperatively.

In our study out of 30 patients, 4 patients had intraoperatively bleeding due to injury to vessels while creating pre peritoneal space. The bleeding was controlled immediately and no further incidence of bleeding was encountered postoperatively.

There was breach in the peritoneum during creation of pre peritoneal space in 5 patients. The breach was repaired with poly galactin suture and the surgery was proceeded in regular manner after that. In rest of the patients no significant intra operative complications was encountered. Average time taken for operation was 81.7 minutes in our study of 30 patients. Maximum operating time was 120 minutes, minimum operating time was 60 minutes. The operating time increased in patients where the intra op complications like bleeding and peritoneal breach was encountered.

In present study, all the patients were followed up after discharge for 15 days, 1 month, 3 months and few cases upto 24 months of duration. Post operative pain was assessed on Post Op Day 1, 2 and 7 using Visual Analog scale/(VAS). Pain was graded in to mild(0-3), moderate(4-6) and severe(>7). On 1st post operative day 19 patients had moderate pain and 11 had severe pain. On day 2 post op 3 patients had mild and 27 patients had moderate pain. Day on 7th post op day 28 patients had mild pain and 2 patients had moderate pain. No comparable study was found related to post op pain by VAS score in the literature.

36.66% patients in our study had post op complications, which was in the form of post op wound infection 3 cases(10%), 2 cases(6.66%) seroma formation, 1 patients(3.33%) post op ileus and 5 patients (16.66%) had induration of stitch line. No post operative complication was recorded in 19 patients(63.33%). No recurrence was seen in a 6

months follow up period, which were comparable to the other mesh repairs studies done by Leber *et al.* (38%) [17], Antonie hamy *et al.* (8%) [18], Manohar *et al.* [19] which was 14%.

Conclusion

The preperitoneal mesh repair an excellent method called as Rive's stoppa technique where mesh was placed between peritoneum and abdominal wall or rectus muscle and posterior rectus sheath. The main advantage of pre peritoneal mesh repair are - Less chance of mesh infection and erosion through skin because the graft lies in preperitoneal plane between posterior rectus sheath and peritoneum, avoids adhesions, bowel obstruction, enterocutaneous fistula and erosion of mesh, minimal morbidity and duration of hospital stay is less compared to other techniques. The main disadvantage is it is more time consuming, extensive preparation of preperitoneal plane and surgical experience. The present study aims at management of incisional hernia by preperitoneal mesh repair done at surgical department of R.D.J.M. Medical college & Hospital. In our study 30 patients of incisional hernia were subjected to preperitoneal mesh repair by Rive's stoppa technique. It was found that there were:

1. Less number of postoperative complications.
2. No recurrence was noticed in this study.
3. Preperitoneal mesh repair had excellent long-term results with minimal morbidity.
4. As Compared with other types of mesh repair techniques (in literature), the preperitoneal mesh repair is the gold standard treatment for incisional hernia repair.

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