

Research Article

Clinical study and management of incisional hernia by onlay or preperitoneal mesh repair: A Prospective study in rural set up

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Abstract

Background and Aim: Incisional hernias occur as a result of excessive tension and inadequate healing of a previous incision, which is often associated with surgical site infection. The aim of this study was to assess the magnitude of various factors leading to development of incisional hernias and to evaluate the technique of various mesh repair in incisional hernias in terms of postoperative complications, postoperative hospital stay and recurrences if any.

Materials and Methods: This Prospective study was conducted in NKPSIMS, Nagpur from July 2010- Nov 2012. A minimum of 64 patients of Incisional Hernia were included in the study. Factors were tabulated and statistically analysed to study their contributions.

Results : The mean age of the patient presenting with incisional hernia was 41.85 yrs. There were 52 (81.2%) women and 12 (18.75%) men. In our study 71% of incisional hernias occurred in infraumbilical midline scar. 78% of the incisional hernias followed operations on the female pelvic organs. Infection in post-operative period did seem to be the commonest predisposing factor (37.5%) for weakening of the scar. Incisional hernias were treated by mesh repair either Onlay or Preperitoneal.

Conclusion: - Incisional hernia is a common surgical problem as a result of a failure of fascial tissues to heal following surgical interventions. The seeds of incisional hernia are sown at the time of the operation or during convalescence. The choice of operative technique is critical. Preperitoneal mesh repair is better than the Onlay mesh repair.

Keywords: Incisional Hernia, Preperitoneal, Onlay, Mesh repair, Recurrence

1. Introduction

Incisional hernia is the only hernia considered to be truly iatrogenic. Ian Aird defines incisional hernia as a diffuse extrusion of peritoneum and abdominal contents through a weak scar of an operation or accidental wound. It occurs due to the failure of the lines of closure of abdominal wall following laparotomy^{1, 2}. More than 50% of incisional hernias present within first 2 years after primary operation^{3,4}. It is one of the most important complication of abdominal surgery specially performed for emergency conditions⁵.

Such hernias can occur after any type of abdominal wall incisions, although, the highest incidence is seen with midline and transverse incisions⁶. Post-operative ventral hernias following paramedian, subcostal, McBurney, Pfannenstiel and flank incisions have also been described in the literature. Laparoscopic port sites may also develop hernia defects in the abdominal wall fascia.

Several studies have shown that Incisional hernias have different etiologies, which are related to the patient⁷, the

surgical technique⁸, the suture material⁹ and the experience of the surgeon¹⁰. The Incidence of incisional hernia in literature is 2 to 11% following all laparotomies and it is a source of morbidity requiring high health care cost.¹¹ As a result of high recurrence rate in the repair of incisional hernia, various types of repairs have been used both anatomical and prosthetic. Surgical repair is difficult in cases of large abdominal defects, when the herniated viscera have “lost their right to reside” in the abdominal cavity. The results have been disappointing with a high incidence of recurrence of about 30-50% after anatomical repair¹² and 1.5-10% following prosthetic repair¹³. The introduction of prosthetics has revolutionized the hernia surgery with the concept of tension free repair.

This study has been undertaken to assess the magnitude of various factors leading to development of this condition and to evaluate the technique of preperitoneal and onlay mesh repair for incisional hernias with regards to post operative complications, hospital stay and recurrences if any.

2. Materials and Methods

This was a prospective study of 64 cases of incisional hernias admitted during the period of from July 2010-Nov 2012.

2.1 Inclusion Criteria: All patients who were previously operated for one or other reason and developed incisional hernia were included in this study.

2.2 Exclusion Criteria: Patients of incisional hernia with co-morbid diseases like cirrhosis, intra-abdominal malignancy or chronic obstructive pulmonary disease (COPD) were excluded from this study (ASA III). Incisional hernia in children, incisional hernia in pregnancy also excluded from study.

A detailed history of 64 patients admitted to surgical ward for incisional hernia repair were taken pre-operatively as this was very important to find out the cause of hernia. The age and sex of the patients, clinical presentation, site, size and duration of the swelling, pain and vomiting if any were noted. All patients were enquired about the history of cough, difficulty in micturation, chronic constipation and abdominal distension. Past history of previous operation was noted in detail and information especially the reason for operation, type of operation, whether emergency or elective, history regarding post-operative complications like wound infection, burst abdomen, post-operative abdominal distension, cough, retention of urine was noted. History of hypertension, diabetes mellitus, chronic bronchitis in males and number of deliveries in case of females were noted. All patients were thoroughly examined and importance was given to the built of the patient, site and size of the scar, site and size of the swelling, presence or absence of impulse on coughing and reducibility were noted. Size of the defect in the anterior abdominal wall was noted. Predisposing factors at the time of repair such as obesity, respiratory diseases, cardiovascular diseases, general nutritional status and presence of other systemic illness were taken into account. The diagnosis was made clinically in all the cases without difficulty. Routine investigations of blood, urine, X-ray chest, ECG was done to obtain fitness for surgery. Ultrasound abdomen was done in selective cases suspected to be having other abdominal pathology. In cases of diabetes and hypertension, suitable treatment was given to bring under control pre-operatively. The patients were subjected to various type of repairs like onlay, preperitoneal repair and anatomical repair. The post-operative course and complications were noted in all patients. Factors predisposing to recurrence in post -operative period such as post-operative abdominal distension, wound infection, wound disruption, seroma, persistent cough, vomiting, urinary retention were also documented. All patients were called for personal follow-up. All cases were followed up for atleast one year. In the follow-up, examination was done to know the recurrence of hernia.

2.3 Statistical Methods

Descriptive statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean $\pm$ SD (Min-Max) and results on categorical measurements are presented in Number (%). Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups Chi-square/ Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups.

3. Results

The study population consists of 64 cases of incisional hernias admitted in surgical wards of Nkp institute of medical sciences from July 2010 to Nov 2012 and later follow-ups for a period of about one year.

In the present study, the youngest patient was 20 yr old and the oldest being 75 yrs. The mean age of the patient

presenting with incisional hernia was 41.85 yrs. There were 52 (81.2%) women and 12 (18.75%) men. The chief complaints in the study group included swelling, pain and vomiting in combinations. History of swelling was present in all 64 cases; pain was noted in 43 patients and vomiting in 7 patients.

3.1. Nature of previous operation

Out of the studied 64 cases, 25 patients (39.06%) had undergone lower segment caesarean section (LSCS), 14 patients (21.8%) hysterectomy, 7 patients (10.9%) Tubectomy, 10 patients (15.6%) laparotomies, 4 patient (6.25%) incisional hernia, 2 patients cholecystectomy (3.12%) through the right sub coastal incision and 2 patients of pyelolithotomy. 78% of the incisional hernias followed operations on the female pelvic organs. The occurrence of hernia after elective surgery was 72% compared to 28% after emergency operations. This should be interpreted with caution because the great majority of operations are elective in nature. It was also noted that 4 patients (6.25%) had undergone previous incisional hernia repair – 2 following laparotomies, 1 following LSCS and 1 following hysterectomy.

Table 1 showing nature of previous operations.

Table no 1 : Previous Surgery

Previous Surgery	No. of cases (n- 64)	Percentage (%)
LSCS	25	39.06%
Hysterectomy	14	21.8%
Tubectomy	7	10.9%
Exploratory Laparotomy	10	15.6%
Incisional hernia	4	6.25%
Cholecystectomy	2	3.12%
Pyelolithotomy	2	3.12%

Table no 2 : Post-operative complications that lead to incisional hernia

Complications	No. of cases (n-64)	Percentage (%)
Wound infections	24	37.5%
Postoperative cough	3	4.68%
Wound gaping& disruption	2	3.12%
Seroma formation	6	9.3%
Urinary retention	2	3.12%
Nil	27	42.18%

Table no 3 : Type of Incision causing hernia

Type of incision	No. of Cases(n-64)	Percentage (%)
Lower Midline	46	71.8%
Upper Midline	10	15.6%
Pfannensteil incision	2	3.1%
Kochers subcostal incision	2	3.1%
Paramedian	2	3.1%
Lumbar incision	2	3.1%

3.2. Management of incisional hernia

Out of 64 cases studied, mesh repair was done in 63 cases (98.4%) and anatomical repair was done in the remaining 1 cases (1.5%). In 63 mesh repair cases, onlay mesh was put in 31 cases and 31 cases had preperitoneal mesh repair, 1 cases had mesh placed in Retro muscular space .. The mesh used was polypropylene mesh. The proportion of cases that underwent different operative techniques is depicted in table-4.

Table no 4: Procedure done

Procedure done	No. of cases (n-64)	Percentage (%)
Preperitoneal repair	31	48.4%
Onlay repair	31	48.4%
Anatomical repair	1	1.5%
Retromuscular	1	1.5%

Table no 5 : Post-operative Complications

Postoperative complications	No. of cases (n-64)	Percentage (%)
Absent	44	68.7%
Present	16	25%
Wound infections	9	14%
Seroma	4	6.25%
Wound dehiscence	2	3.1%
Haematoma	1	1.5%

3.3. Follow up and recurrence

Out of 64 cases, 63 cases were followed for one year and 1 cases lost follow up. During the follow-up period, 1 case of anatomical repair showed recurrence. Complication rate is significantly higher in onlay group than preperitoneal group. However none of the 62 mesh repair cases showed recurrence. Cases need to be followed up for longer periods to be able to meaningfully comment on the problem of recurrence related to the type of incisional hernia repair. Hospital stay is also significantly higher in onlay group than preperitoneal group.

sFisher's exact test

The two-tailed P value equals 0.29

Complication rate is significantly higher in onlay group than preperitoneal group. So in terms of complication rates and hospital stay, Preperitoneal mesh repair is better than the Onlay mesh repair.

Table no 6 : Comparision between Onlay and Preperitoneal Mesh Repair:

Outcome	Onlay Repair (n-31)		Preperitoneal repair (n-31)		P value
	No.	%	No.	%	
Complications					
Present	12	38.7%	8	25.8%	0.29
Absent	19	61.2%	23	74.1%	
Recurrence					
Present	0	0	0	0	
Absent	31	100%	31	100%	
Hospital stay in days	10.57+/-5.34		8.29+/-3.54		0.328
1-7 days	13	41.9%	15	48.3%	0.378
7-14 days	10	32.2%	10	32.2%	0.369
14-21 days	4	12.9%	2	6.45%	0.225
More than 21 days	1	3.1%	1	3.1%	1

4. Discussion

In the present study, the youngest patient was 20 yr old and the oldest being 75 yrs. The mean age of the patient presenting with incisional hernia was 41.85 yrs. In the present study, most of the cases of incisional hernia had reported in third, fourth, fifth and sixth decade. This may be because of the frequency with which certain operations are performed at this time of life. Carlson et al ¹⁴ found that many patients with incisional hernia were between 25 and 90 years with mean age of 60.3 yrs. Incisional hernia occurred at an early age in this study as compared to westerners, probably because of early marriage and multiple pregnancies in Indian women, which leave the abdominal wall weak. In this study, 81% were females with the sex ratio of males to females being 1:4. Although the exact male to female ratio varies in literature, Regnad et al ¹⁵, in their study on incisional hernia found that the sex ratio was 1:5. The female preponderance in the occurrence of incisional hernia is probably due to laxity of abdominal wall due to repeated pregnancy and associated obesity which usually is associated with a higher incidence of post-operative infection.

Table no 7 : Types of previous operation responsible for incisional hernia in 146 cases studied by Goel TC, Dubey PC ¹⁶ are as follows.

Type of operation	Goel TC, Dubey PC ¹⁶	Our study
LSCS	42	25
Tubectomy	22	7
Hysterectomy	14	14
Exploratory laparotomy	18	10
Appendicectomy	5	1
Cholecystectomy	5	2

The occurrence of hernia after elective surgery was 72% compared to 28% after emergency operations. Bucknall TE et al⁶ and Ellis H¹⁷ report no significant difference in the occurrence of incisional hernia between elective and emergency surgery.

Out of 64 cases studied, there were 24 cases of wound infection following the operation that gave rise to the current incisional hernia. Bucknall TE et al ⁶ in his study of 1129 abdominal procedures reported that index operation had been complicated by a post-operative wound infection in 48.80% of the patients who subsequently developed an incisional hernia. Larson et al¹⁸ had 35.85% and Ellis and colleague ¹⁷ had 35.85% wound infection rates. Bose¹⁹ reported in his study that 53.63% of patients had wound infection and concluded that it was the commonest precipitating factor. These studies correlates with the present study and it can be concluded that wound infection is a predominant risk factor in the development of incisional hernia. Thus elimination of wound infection may lead to lowering of the incidence of incisional hernia. Also 3 patients (4.68%) had cough in the post-operative period of previous surgery, which increases the intra-abdominal pressure and predisposes to wound gaping.

In the present study, in as many as 46 cases (71.8%), the site of old scar was lower midline. Carlson ¹⁴ found a 10.5% ventral hernia rate in 4129 midline incisions, compared with a 7.5% rate for transverse incisions and a 2.5% rate for paramedian incisions. Goel TC and Dubey PC¹⁶ also noted that lower abdominal incisions are the commonest site of incisional hernia. The frequency of female pelvic surgeries through the subumbilical incision where the linea alba is thinner and less well protected compounded by multiparity is probably the reason why lower abdominal incision are often followed by herniation. Also, it should be noted that the midline incision remains the most versatile and is frequently used in hemorrhage, trauma and peritonitis. Specific anatomic considerations suggest that vertical midline incisions have more risk of a post-operative incisional hernia.

The methods of repair employed in this study were 63 cases of mesh repair and 1 case of Anatomical repair. In 63 mesh repair cases, Onlay mesh was put in 31 cases, in 1 case mesh was placed in retro muscular space and 31 cases had preperitoneal mesh repair. The mesh used was polypropylene mesh. In a study on risk factors for recurrence of hernia, Gecim IE et al²⁰ has concluded that the basic principles of wound management, closure without undue tension, suturing through healthy tissues, use of non-absorbable suture materials, prevention of hematoma and infection hold good during the repair of incisional hernia. Read RC ²¹ says that if the defect is large and diffuse it is unlikely that the margins of it can be brought together in anything resembling an anatomical position. So it is best to replace the deficit with synthetic mesh.

In this study, 9 cases (14%) had surgical site infection, 4 cases (6.25%) had seroma formation and 2 case (3.1%) had wound gaping. Wound infections were treated by suitable antibiotics after culture and sensitivity. Post-operative cough and seroma were treated conservatively. Wound gaping had secondary suturing done after 4 weeks.

Most of the cases were followed-up for one year. Only few patients came for regular check-up afterwards. During the study period, one case of anatomical repairs showed recurrence. However none of the 63 mesh repair cases showed recurrence. Liakakos and colleagues²² found that the recurrence rate with mesh repair was only 8% compared with 25% after suture repair after 90 months of follow-up. Similarly, in a larger comparative study of 272 hernias, Schumpelick et al²³ found a recurrence rate of 7% for mesh repair and 33% for suture repair after a mean follow-up period of 64 months. Koller and colleagues²⁴ retrospectively compared the results of sutured repair in 70 patients with mesh repair in 26 patients. The recurrence rate after 24 months was 63% for the sutured group and 13% for the mesh group. The recurrence rate for sutured repair is the highest rate reported in the literature. Cases need to be followed up for longer periods to be able to meaningfully comment on the problem of recurrence related to the type of incisional hernia repair.

5. Conclusion

Less number of postoperative complications noticed in present study. No recurrence noticed in this study. Comparing with other types of mesh repair techniques (in literature), the preperitoneal mesh repair is the gold standard treatment for incisional hernia repair. In the present study, preperitoneal mesh repair had excellent long-term results with minimal morbidity & no recurrence rates. Preperitoneal mesh repair is safer and is the procedure of choice for complex multirecurrent incisional hernia.

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Figure 1 : Incisional Hernia Following Lower Segment Cesarean Section



Figure 2: Incisional Hernia following Hysterectomy



Figure 3: Incisional Hernia – Dissection of Hernial Sac



Figure 4 : Incisional Hernia – Preperitoneal Mesh placement

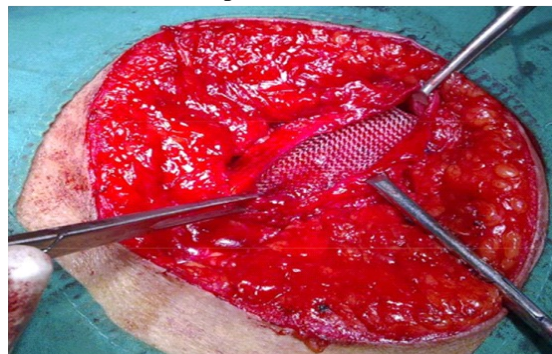


Figure 5 : Incisional Hernia – On Lay Mesh Placement

