

**A Clinical Study of Incisional Hernia: Retrospective Study from Tertiary Level Hospital**

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**Abstract**

**Background:** Incisional hernia has been defined as an abnormal protrusion of viscous through the musculoaponeurotic layers of a surgical scar. Even in the best surgical hands, incidence of postoperative hernia ranges from 2-10%. The present clinical study looked into the various presentations, predisposing factors and the different operative techniques used for incisional hernia repair.

**Material and Methods:** The present study is a retrospective analysis of the 50 cases of incisional hernia admitted and operated in our tertiary care level hospital in last three years whose complete record were available. The detailed history and other details were noted and analysed in MS Excel. A p-value < 0.05 was taken as statistically significant.

**Observation and Results:** The male: female ratio was 1:9 with peak incidence among 30-40 year of age. 66 % developed after various obstetrical and gynecological operations. 96% of hernias were primary and 4% recurrent. Incisions in the lower part of the abdomen 84% are most prone to develop incisional hernia. In 46% patients, incisional hernia appeared within one year of initial surgery suggesting technical shortcomings in initial operation. Obesity was present in 62%. All patients presented with swelling, in association with pain in 48% and 6% presented as acute abdomen with intestinal obstruction. Polypropylene mesh repair was used in 96% cases with anatomical repair reserved for emergency situation. Vacuum suction drain was placed in 47 (94%) patients. The mean (+ S.D.) hospital stay was 9.72 (+ 3.19) days

(Range 6 – 20 days). There was minimal (18%) morbidity and zero mortality.

**Keywords:** Incisional Hernia, Obesity, Mesh Repair, Abdominal Incision, Gynecological Surgery.

### Introduction

Incisional hernia (IH) has been defined as an abnormal protrusion of viscus through the musculoaponeurotic layers of a surgical scar [1]. Even in the best surgical hands, incidence of postoperative hernia ranges from 2-10%. [2, 3, 4] This has stimulated the surgeon's interest in the mechanics of incisional hernia formation and the techniques to solve this iatrogenic problem. Initially, silver wire filigree for repair of incisional hernia used [6,7]. Then, evolution of tantalum gauze, steel sheets, fascia lata grafts, skin strips and darning with sutures occurred [8, 9, 10]. The modern era of 'prosthetic hernia repair' begun in 1958 when Usher used polyamide mesh [11]. Recently, Polyester mesh, polypropylene mesh and Polytetrafluoroethylene (PTFE) mesh has revolutionized the surgery of incisional hernia. The present clinical study looked into the various presentations, predisposing factors and the different operative techniques used for incisional hernia repair.

**Table – 1 Demographic Features**

Age group (years)	No. of Patients	Percentage (%)
21-30	08	16
31-40	15	30
41-50	12	24
51-60	06	12
61-70	08	16
71-80	01	2
<b>Sex Distribution</b>		
Female	45	90

### Materials and Methods

The present study is a retrospective analysis of the cases of incisional hernia admitted and operated in our tertiary care level hospital in last three years. Indoor patients of either primary or recurrent incisional hernia whose complete record were available were included and patients with incomplete record were excluded from the study. The detailed history of their present illness, past illness, possible etiological and predisposing factors, the previous operative procedures, clinical examination and investigations findings, operative details and postoperative course was noted from the hospital records in an standard proforma. All findings were entered in a computerized data base and were analysed in Microsoft Excel® 2010, with statistical pack installed. A p-value < 0.05 was taken as statistically significant.

### Observations & Results

Records of 50 patients of incisional hernia, complete in all aspects were analysed. The observations and results of our study are presented below in table 1 to 5.

Male	05	10
<b>Type of IH</b>		
Primary IH	48	96
Recurrent IH	2	04
<b>Presenting Symptoms</b>		
Swelling / Bulge	50	100
Swelling + Pain	24	48
Swelling + Acute Abdomen	03	6
<b>Duration (months)</b>		
0-6 month	13	26
7-12 month	13	26
13-36 month	12	24
37-60 month	03	06
>60 month	09	18

**Table – 2 Predisposing Factors**

Characteristics	No. of patients	Percentage
<b>Body Weight (P value = 0.038)</b>		
Obese (above ideal weight)	31	62
Healthy (ideal weight)	14	28
Underweight (below ideal weight)	05	10
<b>Interval between Initial Surgery &amp; Appearance of IH (P value = 0.020)</b>		
0-1 month	07	14
2-6 month	09	18
7-12 month	07	14
13-24 month	08	16
25-60 month	06	12
5-10 years	06	12
>10 years	07	14
<b>Association between the Type of Incision and IH (P = 0.10)</b>		
Lower mid line	25	50
Upper mid line	06	12
Lower paramedian	01	02

Upper paramedian	02	04
Pfannenstiel incision	12	24
Grid iron incision	04	08
<b>Site of Incision</b> (p value < 0.0001)		
Upper Abdomen	8	16
Lower Abdomen	42	84
<b>Post-operative Complication in Initial Surgery</b> (P value= 0.06)		
Post-operative Wound Infection	12	24
Post-operative Abdominal Distension	02	04
Post-operative Cough	03	06
Anemia + Malnutrition	05	10
Presence of Diabetes Mellitus	06	12
Uneventful	22	44
<b>No. of Previous Operations</b> (P value = 0.19)		
One	29	58
Two	18	36
Three	01	02
Four	02	04

**Table – 3 Type of Previous Surgery Done in Incisional hernia Patients**

Operation	No. of male Patients	No. of female Patients	Total (Percentage)
Caesarean Section	0	25	25 (50)
Abdominal Hysterectomy	0	08	08 (16)
Appendectomy	01	03	04 (08)
Laparotomy for Perforation Peritonitis	04	06	10 (20)
Cholecystectomy(Right Paramedian)	0	03	03 (06)

P value=0.092

**Table – 4 Type of Repair Done**

Type of Repair of Incisional hernia	No. of patient	Percentage
Anatomical	02	04
Polypropylene Mesh- Onlay	24	48
Polypropylene Mesh-Sublay	18	36
Polypropylene Mesh-Preperitoneal	06	12

Vacuum suction drain was placed in 47 (94%) patients. The mean ( $\pm$  S.D.) hospital stay was 9.72 ( $\pm$  3.19) days (Range 6 – 20 days). The details of postoperative morbidity is presented in Table 5. There was no mortality in our study.

**Table – 5 Postoperative Complications after Incisional hernia Repair**

Post-operative Complications after IH Repair	No. of patient	Percentage
Wound Infection-Minor	03	06
Wound Infection-Major	01	02
Skin Flap Necrosis	01	02
Abdominal Distension	04	08
Uneventful	41	82

**Discussion**

The important inferences that can be drawn from our observations are: In this study, all patients were in range of 27-80 years of age. However, 70% patients were found between 27-50 years, with the maximum incidence i.e. 15 patients (30%) were in 31-40 years age group. Similarly, Harikrishnan CP et al. noted majority of patients were in the age group of 41-50 years [24]. The higher incidence of incisional hernia in the middle age group (31-50 years) may be explained by the child bearing period of females, as they constitute 90% of our study sample. Operations such as caesarean section and hysterectomy are primarily conducted in this age group which was the leading causes (Table – 3) of incisional hernia in our study. The majority, 45 (90%), of the patients were females with only five (10%) males ( $p < 0.0001$ ), the male: female ratio being 1:9. This can be again explained by the fact that the majority of IH were due to operations related to female reproductive tract. Similarly, Malloy et al. [16] and Harikrishnan CP et al. [24] noted higher incidence of incisional hernia in females. Forty-eight (96%) of patients were having a primary incisional hernia and only two (04%) patients were having recurrent type. Of these two patients, one patient had undergone mesh repair and the other had got anatomical repair done. All

the patients of incisional hernia presented with the complaint of swelling / bulge at the site of previous incision. However, 24 (48%) patients presented with pain along with the bulge, whereas three patients (6%) presented with acute abdominal pain that were found to have obstructed small intestine on exploration. None of the patient presented with strangulation. J.L. Ponka observed swelling in all cases and intestinal obstruction in 9% patients [15]. Harikrishnan et al. reported that maximum (70%) patients presented with pain and swelling and other patients with irreducible swelling (20%) and strangulation (10%) [24]. Obesity plays a major role in causation of Incisional hernia and recurrence after repair. Fat has got a mechanical distraction effect on incision line. In our study, we found that around two third (62%) patients were obese and above ideal body weight (overweight) according to their body mass index (BMI). This observation was similar to many other studies. [15,18,26] We observed that five (10%) patients were underweight due to malnutrition with anemia. Poor wound healing due to the nutritional deficiency may have had led to incisional hernia in these patients. The table no. 1 shows that, more than half ( $n=26, 52%$ ) patients reported to the surgeon within a year whereas another 24% approached between one to three years duration. It is

alarming to note that about 24% patients tolerated the disease up to five years or even beyond this period. This wide distribution of reporting time suggested that many patients are negligent towards this problem and do not consult doctor in time probably because of asymptomatic initial bulge and fear of second operation. Due to this late presentation, majority of hernias we observed were large in size. The interval between initial surgery and appearance of incisional hernia provides the natural history of abdominal incisions. We found that (Table - 2) in 23 (46%) patients, incisional hernias appeared within one year of initial surgery. The high percentage of onset of hernia shortly after the previous surgery points towards some deficiency in surgical technique as the causative factor for incisional hernia. Overall in 74% (37) cases, hernias appeared within 5 years of surgery and remaining 26% (13) continued to appear during 5-10 year or even after this period. This shows that even in an apparently healthy scar continuous vigilance is required up to 10 years and beyond for appearance of incisional hernia. Read R.C. and Yoder G. reported the incisional hernia appearance rate as 56.1% at one year, 71.1% at two years and 86% at five years [27]. Similar finding were noted by Harikrishanan CP et al. that 62% patients developed incisional hernia within a period of 1 year of previous surgery. [24] Wantz et al. pointed out that patient dependent factors in tissues leads to late wound failure, in addition to surgeon dependent technique failure in early phase. [23] Table - 2 shows that 50% of hernias developed in lower mid line incision. Pfannenstiel incision was the second most common incision (24%) with other incisions making up the remaining 26% which was statistically insignificant. (P value=0.10). But on dividing the incisions in terms of lower and upper abdomen, 42 (84%) incisional hernia

occurred in the lower abdomen with just eight (16%) occurring in the upper abdominal incisions. The difference was highly statistically significant ( p value < 0.0001). This shows that the site of incision, lower or upper abdomen, is more important than the type of incision used. Leber et al. reported 60% incisional hernias in midline incision. Most hernias in Pfannenstiel incision were present at the angle of the incision. In this incision, 20% incidence of hernia may be explained by probable ill identification of angle of sheath and its faulty closure. [17] Ponka reported 61% hernia through vertical incision, 26% in lower mid line and 11% in paramedian incisions [15]. We found that 66% (33) of hernias (Table - 3) developed after gynaecological operations in females. Harikrishanan et al [24] found that the incisional hernia occurred in over 74% of cases due to gynecological procedure most of which were done through lower mid line incisions [24]. This shows the need to take special precaution in female patients undergoing obstetrical and gynecological operations. In our study, we found that 33 (66%) patients had got association with some kind of predisposing factor, although it was impossible to ascribe the incisional hernia to a single cause, since often more than one factor was operative. The difference was not statistically significant (P value= 0.06) In our study, 12 (24%) patients were found to have suffered post operative wound infection in initial surgery which was similar to the result of Bucknall, Cox and Ellis [4] Harikrishanan CP et al. reported a higher percentage (40%) patients that had complication of wound infection in their previous surgery [24]. In our study, we found postoperative abdominal distension and ileus in only 2 (4%) patients. Ponka found ileus was a problem in 8% of the patients studied. Ileus contributes to poor healing through increase intra-

abdominal pressure, with resultant impairment of circulation to incision site [15]. Postoperative cough was responsible for herniation in 3 (6%) patients in our present study. This is exactly similar to Ponka [15] who reported 6% of patients under this category. In contrast, Harikrishnan CP et al. reported 60% of patients had a complication of recurrent cough in the previous surgery [24]. We found that in six (12%) patients, diabetes was present at time of previous surgery. Leber et al. reported a higher, 21% patients, having diabetes as a predisposing comorbid factor [17]. Diabetic patients are likely to be obese and develop wound infection easily which once established becomes difficult to treat. All these mechanisms may be responsible for predisposition of diabetic patients to development of incisional hernia. Anaemia and malnutrition were present in five (10%) patients. Incisional hernia development may be ascribed to deficiency in oxygen supply to tissues due to anaemia and probable hypoproteinemia leading poor wound healing. We had corrected anemia and malnutrition and had good control of diabetes before taking these patients for incisional hernia repair. This study reveals that 29 (58%) patients had undergone only one operation prior to the development of incisional hernia which was not statistically significant ( $P$  value = 0.19). Among the remaining 42%, two (4%) patients were having recurrent incisional hernia as they had previously undergone incisional hernia repair. Ponka found that 73% of patients developed incisional hernia following only one operation, 16% developed following two operations, while 6% had undergone three operations and remaining 5% exposed to four or more operation which was similar to our finding. [15] In this study, as most of the patients were having large hernias of considerably long duration with variable amount of

tissue loss, herniorrhaphy (without prosthesis) was not possible without putting excessive tension on suture line. Therefore, in 48 (96%) patients, polypropylene mesh was used to strengthen the weak abdominal wall. In 24 (48%) patients, the mesh was placed in the Onlay position. This was the easiest approach and was used when dissection between rectus muscle and posterior lamina of sheath was very difficult due to adhesions. In 18 (36%) patients, retromuscular prefascial, sublay mesh hernioplasty was done. In six (12%) patients preperitoneal placement of mesh was done. In just two patients (4%) patients repair was done with monofilament polypropylene suture. Both cases were operated in emergency operation theatre for obstruction of incisional hernia. Leber et al. concluded that technique of placement of mesh had no influence on outcome [17]. Plastic vacuum suction drain was placed in majority (94%) patients as dissection was extensive and dead space was present with threat of serum and blood collection. In our study, majority (82%) patients experienced very smooth recovery in post operative period and had no wound related complications. Most of them were discharged within 10 days of surgery. However, a few patients suffered some complications and their duration of hospitalizations was up to 20 days. Three (6%) patients got minor wound infection and in one patient (2%) major wound infection developed (Table-5) The infected stitches were removed, wound irrigation and daily dressing done with coverage of antibiotics. All wound healed satisfactorily in 20 days. There was no mortality in our study. This shows that incisional hernia repair can be done with minimal morbidity and zero mortality rate.

### **Summary**

In the present clinical study of incisional hernia, we have analyzed the records of 50 patients of incisional



hernia. The main findings were: The peak age incidence was found in the age group of 31-40 years of age, incisional hernia was nine times more common in females and majority (96%) of the incisional hernia were primary. Swelling was the commonest presenting symptom found in all patients with a minority (6%) presenting as acute abdomen. 56% hernia appeared within a year of surgery, suggestive of technical fault in surgery. Majority (84%) of the incisional hernia occurred in incision in lower abdomen of which lower mid line incision was most common incision in which 50% incisional hernia developed. Gynaecological and pelvic operations in females were the commonest operations after which incisional hernia developed (74%). Two third (66%) of the patients were observed to have association with some kind of predisposing factors. Obesity (62%) and postoperative wound infection (24%) were major predisposing factors. Similarly, anemia, malnutrition, Diabetes Mellitus and postoperative cough had also played an important role in development of hernia. 96% (48) of incisional hernias were repaired by placement of prosthetic polypropylene mesh and anatomical repair were done in just 2 (4%) cases. In most of patients (82%) no postoperative complications were observed with a zero mortality.

### Conclusion

Incisional hernia is a relatively common problem among middle aged females. The vast majority of incisional hernia developed due to various obstetrical and gynecological operations. Incisions in the lower part of the abdomen were most prone to develop incisional hernia. The early presentation of incisional hernia suggests technical shortcomings in initial operation which can be easily avoided. Polypropylene mesh repair was used in all most all cases with anatomical repair reserved for emergency situation. The

repair of incisional hernia can be done with minimal morbidity and zero mortality.

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