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Original Research Article

Incisional hernia: risk factors, clinical presentations, and pre-peritoneal polypropylene mesh repair

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ABSTRACT

Background: Incisional hernia is a common surgical condition accounting for 15% to 20% of all abdominal wall hernias. Of all hernias, they can be the most frustrating and difficult to treat. Several technical and patient-related factors have been linked to their occurrence. There is no conclusive evidence that demonstrates that the type of suture or technique of incisional closure at the primary operation affects hernia formation. Recurrence rates (10-50%) and are typically reduced by more than half with the use of prosthetic mesh. People of all ages and ethnic backgrounds may develop an incisional hernia after abdominal surgery. This study was an effort to evaluate the risk factors, clinical presentations and polypropylene mesh repair (pre-peritoneal) management of incisional hernia.
Methods: A total of 50 patients having incisional hernias admitted in our hospital between 2009 to 2011 have been studied. Strangulated, incarcerated, unfit patients with recurrent hernias and pregnancy have been excluded. Preperitoneal mesh repair was done in all the patients and follow up was done for 2 years.
Results: Incisional hernia is more common in the obese and in middle aged females. Common risk factors are post op infection, obesity and multiparity. Most of the patients had incisional hernia within a year of previous surgery.
Conclusions: Females are more prone. Most patients present as abdominal swelling with cough impulse and reducible on lying supine. Most of them occur within a year of previous surgery. Common risk factors include obesity, post op infections and multiparity.

Keywords: Incisional hernia, Mesh, Preperitoneal

INTRODUCTION

Incisional hernia is a common surgical condition encountered in day to day practice. It is most often seen in obese individuals. Based on national operative statistics, incisional hernias account for 15% to 20% of all abdominal wall hernias. Of all hernias encountered, incisional hernias can be the most frustrating and difficult to treat. Incisional hernias occur as a result of excessive tension, postoperative abdominal distension and inadequate healing of a previous incision, which is often associated with surgical site infection, persistent postoperative cough, infection. Several technical and patient-related factors have been linked to the occurrence of incisional hernias. There is no conclusive evidence that demonstrates that the type of suture or technique of incisional closure at the primary operation affects hernia formation.[1]

Primary repair of incisional hernias can be done when the defect is small (≤2 cm in diameter) and there is viable surrounding tissue. Larger defects (>2-3 cm in diameter) have a high recurrence rate if closed primarily and are repaired with a prosthesis. Recurrence rates vary between 10% and 50% and are typically reduced by more than half with the use of prosthetic mesh. Prosthetic material

may be placed as an onlay patch to buttress a tissue repair, interposed between the fascial defect, sandwiched between tissue planes, or put in an intraperitoneal position. Depending on its location, several important properties of the mesh must be considered.

As many factors contribute to formation of incisional hernia, which can occur at the site of any type of abdominal surgery previously performed on a wide range of individuals, there is no outstanding profile of an individual most likely to have an incisional hernia. Men, women, and children of all ages and ethnic backgrounds may develop an incisional hernia after abdominal surgery.

This study is an effort to evaluate the risk factors, clinical presentations and polypropylene mesh repair (pre-peritoneal) management of incisional hernia.

METHODS

Aims of the study was to study clinical presentation of incisional hernia, to study the risk factors involved in formation incisional hernia, to develop a strategy for an effective management of incisional hernia with preperitoneal mesh repair technique using polypropylene mesh.

Patients admitted in various surgical wards of VIMS Bellary, having incisional hernia are included in our study by applying the following inclusion and exclusion criteria. The study was conducted during the period from December 2009 to August 2011 total number 50 cases were taken for study.

Patient selection for the study has been on random basis.

Inclusion criteria

- All patients with Incisional Hernia between 8 to 70 years
- Both the sexes

Exclusion criteria

- Patients with uncontrolled diabetes mellitus and COPD
- Recurrent incisional hernia
- Strangulated and incarcerated incisional hernia
- Pregnancy with incisional hernia

All the patients were inquired about the duration of hernia, progression and the main associated symptoms like pain, vomiting, cough, dysuria, reducibility of the swelling, association with pregnancy.

Past-history pertaining to previous surgery- its nature, duration, type of surgery and closure was recorded. Patients were also asked about the complications associated with previous surgery like infections. Recording about the scar of the previous surgery, the hernia defect its position, size, shape, cough impulse, reducibility and the overlying skin over the defect were made. Other comorbidities like anaemia, jaundice, hypertension, hypoproteinemia, obesity, benign prostatic hypertrophy were recorded. Chest screening was done to rule out COPD.

Multiparity was recorded for female patients with more than 2 children. If patient was found to have ascites, Ultrasound abdomen was done. Data was collected from a specially designed case recording Proforma (CRF) pertaining to patient's particulars, proper history, clinical examinations, investigations, diagnosis and surgical procedures, infection following surgery, length of stay in the hospital.

Following pre-operative investigations were done and recorded for all the patients

Hb%, random blood sugar, urea, serum creatinine, chest X-ray, ECG and ultrasound abdomen (when indicated).

Pre surgery work up constituted informed consent, NPO a night before the surgery, inj. cefotaxime 1 gm IV stat immediately before the surgery (as preoperative antibiotic), inj. tetanus toxoid 0.5 cc IM and indwelling urinary catheterization.

RESULTS

Table 1: Incidence of incisional hernia.

Type of hernia	No. of cases	Percentage
Inguinal hernia	267	77.61
Incisional hernia	50	14.53
Para-umbilical hernia	12	3.48
Epigastric hernia	12	3.48
Femoral hernia	3	0.87

The study shows that incidence of incisional hernia is 14.53 % (amongst other hernia) and incisional hernia is second most common type of hernia, most common being inguinal hernia.

Table 2: Sex distribution of incisional hernia.

Sex	Number	Percentage
Male	16	32
Female	34	68

This study shows that incisional hernia is more common in females than males with female to male ratio 2.1:1.

The study shows that the majority of the patients are in the age between 21 years and 60 years. The study showed that all the patients (100%) presented with swelling in the abdomen. 22% Patients had associated pain in the swelling.

Table 3: Age distribution of incisional hernia.

Age in years	No. of cases	Percentage
10-20	3	6
21-30	12	24
31-40	11	22
41-50	11	22
51-60	9	18
61-70	3	6
71-80	1	2

In this study 72 percent of patients presented with infra umbilical swelling, 14 percent presented with supra umbilical swelling, 8 percent with right iliac fossa swelling and 6 percent with right lumbar swelling.

Table 4: Clinical presentation of patients.

Clinical presentation	No. of cases	Percentage
Swelling	50	100
Pain and swelling	11	22

Table 5: Position of the swelling in the abdomen.

Position of swelling	No. of cases	Percentage
Supra umbilical	7	14
Infra umbilical	36	72
RLR (lumbar region)	3	6
RIF (iliac fossa)	4	8

Table 6: Nature and type of previous incisions (previous surgery).

Type	Surgery	No. of cases	Percentage
Lower midline	Hysterectomy/caeserian section	14	28
Right paramedian	Laparotomy	7	14
Pfannenstiel	LSCS	11	22
Mc burneys	Appendicectomy	1	2
Midline	Laparotomy	17	34

From the study it was concluded that majority of incisional hernia occurred below the umbilicus (50 %).34 percent of cases had midline incision in previous surgery. 14 percent of the cases had incisional hernia following previous right paramedian incision. Only 2 percent of cases were found with previous McBurney's incision.

Table 7: Time of onset of incisional hernia after previous surgery.

Time of onset	No. of cases	Percent
0 to 1 year	23	46
1-2 year	11	22
2-5 year	10	20
>5 year	6	12

Table 8: Obstetric history (31 patients).

Parity	No. of cases
1	5
2	10
3	11
4	4
5	1

From the above data it is interpreted that 46 percent of the patients presen;ted with incisional hernia within a year of previous surgery. 22 percent of patients presented between 1 to 2 years. Another 20 percent in 3 to 5 years of the previous surgery.

While only 12 percent of patients presented after 5 years of previous surgery. Out of 31 patients, more than 50 percent had three or more children.

Table 9: Post-operative complications of previous surgery.

Complication	No. of cases
SSI	18
RTI	11
UTI	2
Burst abdomen/dehiscence	4

This study showed that 18 patients has surgical site infection, 11 patients had respiratory tract infection, 4 patient had wound dehiscence and 2 patients had Urinary tract infection in the post-operative period of previous surgery.

Table 10: Elective versus emergency surgery.

Type	No. of cases	Percent
Elective	14	28
Emergency	36	72

Table 11: Risk factors.

Risk factor	Number of cases
Obesity	21
Anaemia	11

Table 12: Size of hernial defect.

Size of defect	No. of cases	Percent
1-5 CM	14	28
5-10 CM	18	36
>10 CM	18	36

In this study 72 percent of the patients who underwent the previous surgery on an emergency basis had incisional hernia. 28 Percent of the patient had a defect size of less than 5 cm, 36 percent patients had a defect size of 5-10 cm and the rest had a defect size of greater than 10 cm.

Table 13: Post-operative complications.

Complication	No. of cases	Percentage
Wound infection	7	14%
Seroma	7	14%
Skin necrosis/suture line necrosis	0	0
RTI	5	10%

In the study 7 patients had surgical site infection and 7 patients had seroma formation. 5 patients had Respiratory tract Infection.

Table 14: Period of follow up.

Period	No. of cases
Less than 6 months	24
6 months to 1 year	10
1-1.5 year	3
1.5 - 2 year	1

Almost half the patients in the study group were followed for complications, including recurrence. 10 patients were followed up for up to one year duration.

DISCUSSION

In this study a total number of 50 patients with incisional hernia, were admitted in VIMS Bellary and treated with pre peritoneal polypropylene mesh repair from period of December 2009 to August 2011. These patients were evaluated for various risk factors which lead to formation of incisional hernia and its clinical presentation. As the study group is small and it's not a comparative study, it may not reflect all the aspects of incisional hernia.

The incidence of incisional hernia has been stated variously. In 1887 John Himans of Boston reported an incidence of 10percent of incisional hernia in 184 cases of laparotomies. Rodney Maingot reported an incidence of 1 - 14 percent of incisional hernia in patients undergoing Trans peritoneal abdominal operations. In 1933 Cave reported an incidence of 6 percent of incisional hernia in laparotomy wounds.[2]

In this study the incidence of incisional hernia in VIMS Bellary from period of December 2009 to August 2011 has been 14.53%. The study shows that the majority of the patients are in the age between 21 years and 60 years. Brendan Devlan states that in most series, the incidence is more around 40 years.

The sex incidence of incisional hernia among the cases studied 2.1: 1 (female:male), which clearly means that females have higher incidence incisional hernia. The incidence is more in females because of laxity of abdominal muscles due to multiple pregnancies. In males the incidence of incisional hernia is relatively less as most of the surgeries are above the umbilicus, and the strength and integrity of abdominal wall is good because of well-developed muscles and fascia.

All the patients under study presented with swelling in the abdomen. 22 % of the patients presented with dragging nature of pain in the swelling.

In this study 72 percent of the incisional hernia have occurred in midline infra umbilical incisions. This can be attributed to the fact that posterior rectus is absent below the arcuate line in the lower abdomen. Vertical incisions are under more stress compared to transverse incisions.

Also the intra peritoneal pressure is hydrostatic and in the erect position, the upper abdominal pressure remains at 8 cm of water while the lower abdominal pressure increases to 20 cms of water, with change of posture from recumbency to standing.

In this study 46 % of the patients presented with incisional hernia within a year of previous surgery, and 68% within 2 years of surgery. Only 12% of patients developed hernia after 5 years of surgery. In Akman's series (1962) more than 65 % of the incisional hernia developed within 1 year of the previous surgery.

In a 10 year prospective trial involving 337 patients, Mudge et al showed that of the 62 patients who developed incisional hernia, 56 % did so after the first post operative year and 35 % manifested hernia after 5 years.[3]

One of the important etiology for incisional hernia is obesity. This study showed that 21 cases (42%) patients of the total 50 were obese. Obesity is associated with 3 fold increase in herniation in Buknell's study. Thus the prevalence of obesity among the patients is clearly established.

Out of 50 cases, 72 % of the cases underwent the previous surgery on an emergency basis. Emergency operations have been identified as a risk factor for wound dehiscence. Study done by Pollock in 1989, where only 1.2% of the patients operated on elective basis had incisional hernia while 23.9% of the patients operated on emergency basis had incisional hernia.[4,5]

Also study done by Israelsson et al reflected that 9.9% of the patients who underwent elective surgeryhad incisional hernia while 15.8 % patients who underwent emergency surgery had incisional hernia.

Out of 31 patients who had incisional hernia, more than 50 percent had three or more children. This clearly shows the association between incisional hernia and multiparity. The incidence of incisional hernia is more in multiparous women due to repeated stretching and laxity of the abdominal muscles. Poor muscle tone can be attributed for the incisional hernia in these cases. Poor muscle tone was especially noted in patients who had 3 or more children.

Diagnosis in all the cases was made by clinical examinations. Ultrasound abdomen was done when necessary. Patients who were smokers were advised to stop smoking preoperatively for at least a fortnight before the surgery. These patients were also given chest physiotherapy and chest exercises.

Obese patients were advised to reduce weight. Anaemic patients were given supplementation with iron and folic acid, and when necessary blood transfusion was done to build up hemoglobin.

All the patients underwent pre-peritoneal polypropylene mesh repair under general/spinal anaesthesia. The content of the sac (small bowel/omentum/colon) was reduced. In a few cases where the omentum was devitalized, it was excised.

The size of hernia defect was recorded meticulously and ranged from 3 cm to >10 cm. 28% of the patient had a defect size of less than 5 cm, 36% patients had a defect size of 5 - 10 cm and the rest had a defect size of greater than 10 cm. All the patients were treated with pre peritoneal poly propylene mesh, irrespective of the size of the defect.

Closed suction drain was kept in patients where extrafascial accumulation of fluid was expected. Daily monitoring of the output was recorded, and the drain was removed when the output was negligible/nil. In the study 7 patients had seroma formation, 7 patients had surgical site infection and 5 patients had respiratory tract infection. Complications were managed conservatively.

All the patients received preoperative antibiotic (cephalosporin) and continued up to 6 days post-operative period.

None of the patients required removal of mesh due to wound infection. There were no cases of mesh extrusion. Patients were advised to come for regular follow-up. Patients were asked to come on weekly basis for the 1st month and every 3 months after that. Almost half the patients in the study group were followed for complications, including recurrence. 10 patients were followed up for up to year duration. There were no recurrences of hernia in the follow-up patients.

Table 15: Comparison of suture and mesh techniques in different series.

Study	Year	No. of cases	Type of repair	Recurrence
		Suture techniques		
Langer[6]	1985	21	Suture	42.9
George[7]	1986	12	Nylon	41.6
Vdlinden	1988	74		20.3
Read	1989	16	Prolene	43.8
Liakakos[8]	1994	53	Nylon	24.5
		Mesh techniques		
Usher[9,10,11]		96	Mesh repair	10.6%
Read	1989	20	Intraperitoneal	40
Liakakos[8]	1994	49	Intra or pre peritoneal	8.2
This study		50	Pre peritoneal polypropylene mesh repair	No recurrence

CONCLUSION

In this study, various risk factors, clinical presentation of incisional hernia were evaluated and pre-peritoneal polypropylene mesh repair was done for all the cases which were admitted during the period of in Vijayanagar Institute of Medical Sciences, Bellary, Karnataka, India. It was found that incisional hernia is the second most common type of hernia in the hospital. It is more common in females, especially the multiparous. Incisional hernia is more common in patients who underwent the previous surgery on an emergency basis.

All the patients present with swelling and pain can be an associated symptom. Cough impulse was present in all the cases and the swelling reduced on lying supine. Over

half the patients had undergone the previous surgery within 2 years. Common post op complications in the previous surgery were surgical site infection and respiratory tract infection.

Risk factors associated with incisional hernia are Lower abdomen incision, multiparity, obesity, surgical site infection and wound dehiscence in post op period. Patients with anaemia are more prone to develop Incisional hernia.

Size of the defect can vary, and in our study ranged from 3cm diameter up to >10 cm diameter. All the patients in the study underwent pre-peritoneal polypropylene mesh repair. Seroma formation and surgical site infection were the common complications in the post-operative period. No recurrence was seen in the follow up of the patients.

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