

ORIGINAL ARTICLE

MANAGEMENT OF INCISIONAL HERNIA BY PREPERITONEAL MESH REPAIR

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ABSTRACT –

BACKGROUND :

Incisional hernia is a common complication of abdominal surgery and an important source of morbidity. A wide spectrum of surgical techniques has been developed ranging from suturing techniques to the use of various types of prosthetic mesh repair. Use of preperitoneal mesh repair technique showed reduced number of postoperative complications and recurrence compared to other techniques.

OBJECTIVES:

- To study the role of Preperitoneal mesh repair in incisional hernia.
- To study the postoperative complications in this procedure.

METHODS :

Prospective clinical study consisting of 50 patients with incisional hernia managed by preperitoneal mesh repair in Kempegowda Institute Medical Sciences and Research Centre, Bangalore during the period from October 2003 to December 2005.

RESULTS:

- Less number of postoperative complications noticed in the present study.
- The duration of hospital stay is increased when risk factors are present.
- No recurrence notice in the present study.
- Comparing with other techniques of mesh repair (in literature), the preperitoneal mesh repair has got less postoperative complications and recurrence.

INTERPRETATION AND CONCLUSION

- Preperitoneal mesh repair had excellent long-term results, with minimal morbidity.
- In preperitoneal mesh repair, less number of postoperative complications noticed and with no recurrence.
- Comparing with other techniques (in literature) it is a gold standard treatment for incisional repair.

KEYWORDS

Incisional hernia; Mesh repair; Preperitoneal mesh repair; Postoperative complications; Recurrence.

INTRODUCTION :

Ian Aird defines incisional hernia as a diffuse extrusion of peritoneum and abdominal contents through a weak scar after a operation or accidental wound (1). The exact incidence at incisional herniae has not been well defined, although a number of reports in the literature suggest that the incidence is probably between 2% and 11%. Recent studies however show that about 2/3 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, older age group. Jack Abrahamson 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 is 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 (2). 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 (3,4,5). 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 (6). 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 surgical experience. The present our study aims at management of incisional hernia by preperitoneal mesh repair in our surgical department.

MATERIAL AND METHODS :

This prospective clinical study consisting of 50 patients with incisional hernia managed by Preperitoneal mesh repair in Kempegowda

Institute of Medical Sciences and Research Centre, Bangalore during the period from October 2003 to December 2005. The patients who were admitted to surgical wards of Kempegowda Institute of Medical Sciences Hospital diagnosed to have incisional hernia and these patients managed by Preperitoneal mesh repair are included in this study and patients less than 15 years of age and incisional hernia in pregnant patients were excluded.

All patients underwent thorough clinical examination and a detailed history and details of earlier operation were asked for. All patients were evaluated for systemic disease or precipitating cause.

Patients who had hypertension, diabetes mellitus or cough were controlled preoperatively. Routine investigations were done for all patients including chest x-ray and ultrasonography of the abdomen.

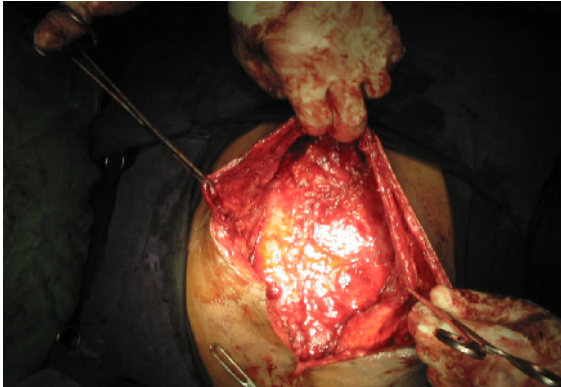
A day prior to surgery, shaving of the abdomen and genitalia was done. Overnight nil orally was advised and practoclysis enema was advised once in night and once in morning the day of surgery. A nasogastric tube and Foley's catheter was passed and broad-spectrum antibiotics was given to all patients before the procedure. Patient was 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 were used 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 was excised, peritoneum was closed with absorbable synthetic suture. Adequate preperitoneal plane was prepared between the posterior rectus sheath and peritoneum (fig 1); mesh was placed and fixed with prolene number 2-0 or 3-0 sutures (fig2). Suction drains were laid on the mesh and brought out through separate stab wounds. Muscular aponeurotic structures repaired with prolene number 1. Skin

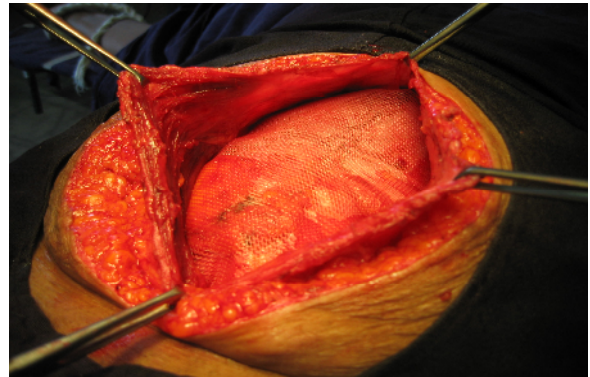
was closed after insertion of suction drain in

Fig 1



subcutaneous plan.

Fig 2



In the postoperative period, nasogastric aspiration was done, second hourly in first 24 hours. The nasogastric tube was removed once the patient passed flatus. Foley's catheter was removed on postoperative day one. Suction drain was removed once the drainage falls to 25 to 30 cc. Antibiotics were continued for five days. Postoperatively, deep breathing exercises, movement of limbs in bed was advised as soon as patient recovered from anaesthesia. Early limited ambulation was done once the patient was able to bear the pain. Skin sutures removed on 10th day and in few cases after 10th day.

At discharge, patients were advised to avoid carrying heavy weights and advised to wear abdominal belt. Patients were reviewed after one month and three months in all cases and few cases upto two years. At review, symptoms were asked for and operative site examined for any recurrence.

These cases were then analyzed and results were compared with existing literature. An extensive review of literature is carried out.

Statistical Methods

Chi-square and Fisher exact test have been used to test the significance of proportions of postoperative complications between PPMR and Other Mesh Repairs (Other Studies). Two tailed Student t test has been used to find the

significance difference of hospital stay between the patients presented with risk factors.

Statistical software -The statistical software namely SPSS 11.0 and Systat 8.0 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.

RESULTS :

Study Design: A prospective clinical study consisting of 50 patients with Incisional hernia who undergone preperitoneal mesh repair is undertaken to investigate the role of preperitoneal mesh repair and its postoperative complications.

The age distribution of these 50 cases ranged from 25 years to 70 years (male, n= 6 / female, n= 44) with peak incidence 31-40 age group, with female preponderance seen. All patients presented with history of swelling of which 18 cases also presented with history of pain. On examination, swelling was reducible in 45 cases (90%) and irreducible in 5 cases (10%). We had approximately, 30% of cases with early onset of incisional hernia (within one year), 70% of cases had late onset of incisional hernia > 1 year. In present study, 78% of cases following obstetric and gynaecological operations. Of 50 cases, 74% of cases had surgery through lower midline incision (**Table – 1**). In presenting risk factors, , postoperative wound infection (PWI) accounts

for 26%, obesity (20%), diabetes mellitus (16%), pulmonary disease (2%), grand multipara (10%) and chronic obstructive

Table 1 - Type of Incision causing hernia

Incision type	Number	%
Lower Midline	37	74
Upper Midline	4	8
Pfannensteil incision	6	12
Transverse	2	4
Mc Burney's	1	2
Total	50	100

Table 2 - Postoperative complications of preperitoneal mesh repair

Postoperative Complications	Number	%
Nil	43	86
Wound infection	1	2
seroma	5	10
DVT	1	2
total	50	100

In present study, there were no postoperative complications in 86% of cases. Only 2% had wound infection, 10% had seroma and 2% had deep vein thrombosis (**Table – 2**).

Table 3 - Association of risk factors with duration of hospital stay

Hospital Stay (Mean ± SD)	Risk Factors		p value
	Absent (n=29)	Present (n=21)	
Total duration of hospital stay	14.41±6.07	17.18±5.68	Student t=1.661, p=0.103
Duration of hospital stay after surgery	11.50±5.51	12.79±4.95	Student t=0.868, p=0.390

In present study, total duration of hospital stay is increased when risk factors are present with p=0.103 and duration of hospital stay after surgery also increased when the risk factors are present with p=0.390 (Table -3).

Table 4-Follow-up and recurrence status

Duration of Follow up	Follow up status	Recurrence
Up to 3 months	4 (8.0)	Nil
3-6 months	6 (12.0)	Nil
6-12 months	9 (18.0)	Nil
12-24 months	31 (62.0)	Nil

In present study, there was no recurrence noticed (**Table -4**).

DISCUSSION :

In present study, age ranged from 25 years to 70 years and with peak incidence in 31 to 40 age group (42%). As per the Maingot's studies, mean age was around 45 years (**6**). There is a female preponderance noticed with 88%. In Bhutia WT et al study, the female : male ratio was 3 : 1.5 with female preponderance 84% (**7**), in this study all patients are presented with history of swelling followed by of which 18 cases presented with history of pain. Most of cases in our series, it was reducible hernia (90%) and with 10% of cases has irreducible hernia. We had approximately 30% of cases with early onset of incisional hernia (within one year of previous surgery) whereas 70% of cases had late onset of incisional hernia (> 1 year of previous surgery), of which 28% of cases presented with > 10 years. In present study, over 78% of cases occurred following obstetrics and gynaecological operations, and around 22% of cases following general surgical operations. Of 50 cases, 32% of cases had hysterectomy, 26% of cases tubectomy, 20% of cases LSCS, 12% of cases laparotomy and procedure, 2% of cases appendicectomy, 4% of cases had undergone umbilical hernia and 4% 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. Repeated wounds in the same region or just parallel to each other will often lead to development of herniation as shown by Ponka series (**8**). In this study, 74% of cases developed incisional hernia through lower midline incision, 12% through Pfannensteil incision, 8% through upper midline incision, 4% through transverse incision, 2% through McBurney's incision. In present study, postoperative wound infection was occurred in 13 cases (26%), which healed by secondary intention. In Ponka series, it accounts for 24%. Bucknell, Cox and Ellis in their of 1129 laparotomy closures, found that 48% of their patients with incisional hernia had previous wound infection and those with wound infection developed hernias almost four times more often (**9**). Prevention of wound sepsis is therefore a prime objective in all abdominal operations. Associated risk factors like diabetes mellitus (16%). Obesity (20%), grand multi para(10%), COPD (4%) seen. In the present study, we encountered 14% of cases with postoperative complications of which 2% of cases with postoperative wound infection, seroma in 10% of cases and deep vein thrombosis in 2% of cases. There was no postoperative complications in 86% of cases.

Table 5 - Comparison of postoperative complications in preperitoneal mesh repair (Present study) and other mesh repairs (Other Studies)

Postoperative Complications	PPMR (Present Study) (n=50)	Other Mesh Repairs – Onlay, inlay and underlay (Leber et al)¹⁰ (n=200)	Onlay Mesh repair (Machiras A et al)¹¹ (n=43)	Underlay Mesh repair (Antoine Hamy et al)¹² (n=350)
Cellulites	-	14 (7.0%)	-	-
Wound Infection	1(2.0%)	8(4.0%)	3 (7.0%)	14 (4.0%)
Seroma	5(10.0%)	6(3.0%)	6 (14.0)%	-
Wound Gapping	-	-	-	-
Postoperative Ileus	-	16 (8.0%)	-	-
Pneumonia	-	2 (1.0%)	-	-
Pulmonary Embolism	-	2 (1.0%)	-	-
DVT	1 (2.0%)	1 (0.5%)	-	-
Chronic Infection/Sinus tract	-	12 (6.0%)	-	-
Small Bowel Obstruction	-	11 (5.5%)	-	-

Enterocutaneous Fistula	-	7 (3.5%)	-	-
Chronic Pain	-	-	3 (7.0%)	2 (0.6%)
Death	-	-	-	2 (0.6%)
Recurrence	-	34(17.0%)	4(9.0%)	11(3.1%)

Postoperative complications was less in present study (14%) when compared with other mesh repair techniques by Leber et al which was 48%. Postoperative ileus (p=0.047) and recurrence rate (p=0.002) are significantly less in the present study when compared to Leber et al study. But seroma is significantly (p=0.046) more in present study compared to Leber et al study (10). In comparison with onlay mesh repair by Machiras A et al (11), wound infection was noticed in 7%, seroma 14% and chronic pain 7%, whereas in the present study wound infection was 2%, seroma 10% and DVT 2%. In comparison with underlay mesh repair by Antonie Hamy et al (12), wound infection was noticed in 14% of cases, recurrence rate was 3% and death in 0.6% of cases.

In our study, the most of the hospital stay spent in preoperative workup and in the treatment of associated medical illness, if any, to reach the normal parameters for safe surgery. Total duration of hospital stay is increased when risk factors are present with p=0.103 and duration of hospital stay after surgery also increased when the risk factors are present with p=0.390.

In present study, we had followed up all the patients after discharge for 15 days, 1 month, 3 months and few cases upto 24 months of duration. There was no recurrence of incisional hernia noticed in the present study. Luidendi JK et al reported a recurrence rate of 46% with suture repair technique and 23% with mesh repair technique (13) de Vries Relingh TS et al reported a recurrence rate of incisional

hernia following different techniques of mesh repair as follows: In onlay technique it was 28.3%, inlay technique 44%, and underlay technique 12% (14). Macharias A et al reported a recurrence rate of incisional hernia following onlay mesh repair with 9% of cases (11). Antonie Hamy et al reported a recurrence rate of incisional hernia following underlay mesh repair with 3.1% of cases (12) .

CONCLUSION-

1. Less number of postoperative complications noticed in present study.
2. No recurrence noticed in this study.
3. In the present study, preperitoneal mesh repair had excellent long-term results with minimal morbidity.
4. Comparing 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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