ORIGINAL ARTICLE

Comparative evaluation of "Sublay" versus "Inlay" meshplasty in incisional and ventral hernias

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Abstract:

Objective: To compare "sublay" versus "inlay" meshplasty in incisional and ventral hernias with regards to, post-operative complications early and late

Design: Prospective comparative study

Setting and duration of Study: This study was carried out in department of surgery at Ghulam Muhamad Mahar Medical College Sukkur from July 2005 to June 2009.

Methodology: This study includes 200 cases of elective incisional and ventral hernias with defect size 5-10 cm and more than 10 cm were randomly placed in sublay (preperitoneal) 100 cases in group A and inlay (intraperitoneal) 100 cases in group B. Patients with obstructive or strangulated ventral hernia were excluded from this study. Outcome of the two techniques in terms of post-operative complications early and late were observed, with follow up of 18 months.

Results: 200 patients were included in our study (100 patients in "sublay" Meshplasty (GROUP A) and 100 patients in inlay Meshplasty (GROUP B).

The mean age was 43.5 years. Superficial wound infection was found in 5 patients (5%) and seroma formation in 3%,flap necrosis in one patient(1%), sinus formation in 2 patients and no recurrence seen in period of 18 months of follow up in sublay technique group A, while in inlay technique group B superficial wound infection was found in 6 patients (6%) and in seroma and haematoma formation in seven patients (7%) ,flap necrosis in five patients(5%) and sinus formation in 3 patient (3%) and four cases of recurrence (4%) and 6 patients (6%) had bowel related complications was seen in period of 18 months of follow up and no mortality seen in both groups.

Conclusion: Sublay meshplasty in incisional and ventral hernia is more effective, with less complications and no recurrence then inlay intraperitoneal meshplasty.

Keywords: Incisional hernia, mesh repair, Inlay graft, Sublay graft.

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Introduction:

Ventral hernias refer to fascial defects of the anterolateral abdominal wall through which intermittent or continuous protrusion of abdominal tissue or organs may occur[1,2]. They are either congenital or acquired. In adults more than 80% of ventral hernias result from previous surgery hence the term incisional hernias. They have been reported to occur after 0-26% of abdominal procedures. Although these hernias mostly become clinically manifest between 2 to 5 years after surgery, studies have shown that, the process starts within the first postoperative month. They are said to occur as a result of a biomechanical failure of the acute fascial wound coupled with clinically relevant impediments to acute tissue repair and normal support function of the abdominal wall, during post-operative period[3].

Factors associated with formation of incisional hernias are grouped into those that impair

wound healing such as wound infection, diabetes, corticosteroids use, smoking, connective tissue disorders, malignancies, radiotherapy, multiple surgeries and advanced age; conditions that increase intraabdominal pressure like obstructive airways diseases, constipation, lower urinary tract obstruction, pregnancy and ileus; and surgical factors such as type of incision, suture type and technique[4,5].

Incisional hernia has been a frequent complication of abdominal surgery for a long time, with a current incidence of 2-20% in most series[6,7].

They can subsequently develop after major surgical procedures (intestinal surgery, gynaecological surgery (C-section), vascular surgery) to small procedures (Appendicectomy or laparoscopic port-site hernia). Several hernia repair methods have been described.

The use of permanent prosthetic mesh for the repair of incisional and ventral hernias has been shown to reduce the overall risk of recurrent hernia 10-25%[8,9] compared with primary suture repair 30-35% on long term follow up[6,9,10].

The techniques of placement of mesh include onlay, inlay and sublay sandwich but the best position for inserting the mesh has not been conclusively established till date as per literature. Rives and stoppa described preperitoneal (sublay) technique as gold standard for abdominal wall hernia repair[11].

Although polypropylene mesh has long been regarded as the implant of choice for repairing abdominal wall defects, there is still controversy regarding the best site of its placement.

We did a prospective study to compare "sublay" preperitoneal versus inlay intraperitoneal meshplasty in influencing the final outcome in incisional and ventral hernia with regards to post-operative complications and recurrence.

Methodology:

This prospective study includes 200 patients of incisional and ventral hernias admitted in Department of surgery at Ghulam Mohammad Mahar Medical College Hospital Sukkur (GMMC) during a period of last four years from July 2005 to June 2009. All patients were randomly placed into sublay (mesh in the retromuscular layer 100 cases) and inlay (mesh in intraperitoneal 100 cases) meshplasty for incisional and ventral hernias.

Clinical data of all patients was recorded in proforma and routine investigations were carried out. All operative findings and post-operative complications were recorded.

All operations carried out under general or regional aneasthesia with antibiotic cefotaxime sodium 2g I/v daily for initial 3-5 days.

In sublay mesh repair, mesh is placed broadly under the defect in the retromuscular layer of abdominal wall. The mesh extends well beyond the under edges of the defect (3-4cm) and is not merely sewn to the hernia edges. In this technique peritoneum protect the abdominal viscera intestine from injury from the mesh and avoid intestinal adhesions[12,13]. But in inlay mesh repair, mesh is placed under the peritoneum, may damage the intra-abdominal viscera i.e erosion into bowel resulting in fistulas and bowel obstruction, infection of the mesh, chronic erosion of mesh via the wound and chronic pain due to a foreign inflammatory reaction.

Observation in both the groups were made with regards to postoperative wound complications, hospital stay, return to daily activity and recurrence. Follow up was done every 3 monthly for 18 months to see late complications like small bowel obstruction, sinus formation, neuralgia and recurrence of hernia etc.

The results were analyzed on SPSS version 10 and compared with national and international literature.

Results:

Out of 200 patients 140 (70%) were females and 60 (30%) were male. Age ranged from 25 to 65 years with mean age 43.5 years and median aged 45 years. The female to male ratio

Table 1:

Type of Hernia	No. of Patients (Percentage)
Incisoinal Hernia	86 (43%)
Recurren Incisional Hernia	24 (12%)
Para-umbilical/ Umbilical hernias	64 (32%)
Epigastric hernias	20 (10%)
Right Sub-costal Hernias	4 (2%)
Post appendicectomy Incisional Hernia	2 (1%)

Table 2: *Post-operative complications in sublay & inlay groups*

Post-Operative Complication	Sublay Meshplasty (Group A) n=100 %	Inlay MeshPlasty (Group B) n=100 %
Superficial wound infection/Erythema/cellulitis	5 (5%)	6 (6%)
Seroma/Haemotoma formation	3 (3%)	7 (7%)
Flap Necrosis	1 (1%)	5 (5%)
Sinus formation	2 (2%)	3 (3%)
Enterocutaneous fistulae	0 (0%)	0 (0%)
Erosion of mesh into intestines → Adhesions Small bowel obstruction	0 (0%)	6 (6%)
Mesh Rejection	0 (0%)	0 (0%)
Mesh removal	0 (0%)	6 (0%)
Recurrence	0 (0%)	4 (4%)
Neuralgia	0 (0%)	5 (5%)

was 2.3:1.

Different type of ventral hernia and incisional hernias in this study are summarized as under. (Table-I)

The primary operations in cases of incisional hernias were intestinal surgery in 37 cases, Gynaecological in 43, cholecystectomy in 4, appendicectomy in 2 cases.

Thirty five patients had hernial defect >10 cm in diameter, 165 patients had defect b/w 5-10 cm in diameter. The mean total time for surgery in sublay group was (40-100) minutes compared to (30-90) in Inlay group. Suction drain was kept in all cases of sublay and inlay meshplasty. Drains in sublay group were removed after 72 hours an average except in 5 cases in which drain were removed on 5th day. In inlay group drain was removed after 96 hours an average except in 7 patients where seroma was present and drain was kept for 7 days. Post-operative complications like erythema/cellulitis, haematoma, seroma and wound infection bowel related problems were compared in both the groups groups as shown in table-II.

Mean duration of hospital stay in sublay group was 2-4 days where as it was 3-5 days in inlay group. Time off work in patients in sublay group was 4.24 weeks as compared to 5.3 weeks in inlay group. There was no bowel related complications in sublay group while in inlay group 6 patients presented with intestinal obstruction due to adhesions of small bowel with mesh. In all these patients, laparotomy was done to relieve the obstruction and mesh was removed. There was no recurrence in sublay group where as in inlay group 4 cases of recurrence was seen after a follow up of 18 months. Out of 200 patients, 170 came for follow up that ranged from 3 months to 18 months remaining 30 patients did not report for follow up after removal of stitches.

Discussion:

Ventral hernia in the anterior abdominal wall included both spontaneous and most commonly incisional hernias after an abdominal operation. It is estimated that 2 to 10% of all abdominal operations result in an incisional hernia small hernia < 2 ½ cm in diameter are often successfully closed with primary tissue repair. However, larger ones have a recurrence rate of up to 30-40% where a tissue repair alone is performed[14].

Hernia recurrence is distressing to patient and embarrassing to surgeons. Nowadays tension free repair using polypropyelene mesh is an ideal hernia repair technique which has decreased the incidence of recurrence to negligible 0-10%[15,16]. In this study out of 200 patients, 100 patients operated by sublay technique (retromuscular) mesh repair with minimal complications. It is associated with haematomas or seroma formation (fluid collection in front of mesh) is a frequent finding in the immediate post-operative period. In this study the incidence of seroma is 3% compared with 2.7% in local series and 5% and 7.6% in another study[17,18].

Septic complications of the prosthesis (Mesh) have been reported to occur in 0.2 to 0.8%. The superficial wound infection rate in this series was 5% in sublay groups and 6% in inlay groups which is comparable with international figure of 3-8%[19]. In this study no deep infection has been observed around the mesh. There was no bowel complications such as erosion of bowel or bowel obstruction, due to adhesions to mesh and no recurrence were seen as shown in literature the incidence between 0.06% to 0.2%[20].

Another 100 patients of ventral and incisional hernia operated by inlay (intraperitoneal) meshplasty. In this series the incidence of seroma / haematoma is 7% ,superficial wound infection 6% ,flap necrosis in 5 patients 5% ,neuralgia in 5 patients 5% and recurrence was seen in 4 patients(4%), in 18 months period of follow up, 6 cases (6%) bowel complications such as intestinal obstruction due to adhesion formation were seen in this series. In inlay technique contact of viscera with foreign material such as the prolene mesh may lead to an inflammatory response and adhesion formation which can induce chronic pain, intestinal obstruction, enterocutaneous fistula and infertility. In addition adhesions complicate any future intraabdominal surgery. A 2-5% fistula rate has been reported with polypropylene mesh used intraabominally leading to the suggestion the great care must be taken to separate it from the bowel if it has to be used at all[21]. However some studies do not support this view. Bingener et al[22] found no association of visceral adhesion when prolene was used with adequate omental interposition between it and the bowel. Vrijland et al[23] concluded that enterocutaneous fistula appears to be very rare after prolene mesh repair regardless of intraperitoneal placement, omental coverage or closing the peritoneum. Hernia recurrence rate in our study in inlay series is 4% as compared with other study 4-11% has been observed[24]. Poor surgical technique and post operative wound infection are two most important factors in the development of incisional hernia and its recurrence.

Conclusion:

The sublay preperitoneal meshplasty is safe, effective and with less complication rate and no recurrence then inlay intraperitoneal meshplasty. Now it is a gold standard technique for repair of incisional and ventral hernias.

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