Incisional hernia repair: Open suture repair versus open mesh repair

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ABSTRACT
Background: one of the important complication of abdominal surgery is incisional hernia. Procedures for the repair of these hernias with sutures and with mesh have been reported, but the question is which type of the two procedures is the best.

Methods: In the period between January 1999 and February 2003, we retrospectively evaluate 98 patients presented to Diwanyiah teaching hospital and private hospital who underwent repair of incisional hernia or a first recurrence of hernia at the site of a vertical midline incision of the abdomen. The patients were followed up by physical examination at 1, 6, 12, 18, and 24 months. Recurrence rates and potential risk factors for recurrent incisional hernia were analyzed with the use of life-table methods.

Results: Among the 98 patients with incisional hernias who were eligible for the study, 56 patients treated by open suture repair, and 42 patients treated by open mesh repair. 18 had recurrences during the follow-up period. The three-year cumulative rates of recurrence among patients who had suture repair and those who had mesh repair were 25 percent and 9.5 percent, respectively. The risk factors for recurrence were suture repair, infection, prostatism (in men), and previous surgery for abdominal aortic aneurysm. The size of the hernia did not affect the rate of recurrence.

Conclusions: Among patients with midline abdominal incisional hernias, mesh repair is superior to suture repair with regard to the recurrence of hernia, regardless of the size of the hernia.

Introduction:
Incisional/ventral hernias are defects that appear at the site of a prior surgical incision. An incisional hernia can develop in the abdominal wall around a previous incision. It usually arises in the abdominal wall where a previous surgical incision was made. This results in a bulge or a tear in the area where the abdominal muscles have weakened. Incisional hernias can increase in size with time.

Incisional hernia develop in 3.8 – 11.5% of cases after abdominal surgery. The incidence depends on a number of factors including old age, male sex, obesity, bowel surgery, suture type, chest infection, abdominal distension and wound infection. Ninety percent of incisional hernia occur within 3 years of operation.

Repair of large abdominal incisional hernia is a difficult surgical problem with recurrence being a common complication. Recurrence rates of up to 33% after first
repair and 44% after second repair have been reported – most occurring within 3 years of the repair. Numerous methods of repair have been described – primary repair in 1 or 2 layers or Mayo-type overlap, use of fascia (local or flaps) with suture, and the use of fascia with synthetic mesh (polypropylene or Marlex mesh, stainless steel, mersilene or expanded polytetrafluoroethylene). In a literature review Loh et al state that overlapping techniques produce impressive results and that techniques combining fascia with mesh have the advantage of overcoming excessive tension.
I describe our experience with a technique using polypropylene mesh.

Materials and methods: Retrospective study of suture repair and preperitoneal mesh repairs was done from January 1999 to February 2003. In all, 42 preperitoneal mesh repairs were done. The data and details of 37 (90.%) patients were collected from operation registers and medical records. A computerized database was created for all these patients. Patients were either requested to attend the outpatients department (OPD) personally for follow-up or attend to private clinic, if they could not attend the OPD. A few of the patients who could not do either were questioned over the phone and the results of repair or complaints, if any, were recorded. 34 patients attended our follow-up. Details were entered in our database and results statistically analyzed.

Our technique involves the placement of a permanent prosthetic mesh (polypropylene) in a preperitoneal plane. After incising the subcutaneous tissue, the sac is dissected and delineated. The defect, most often in the midline, is opened along the linea alba. A plane is created between the posterior rectus sheath and the rectus muscle for the placement of the mesh. The posterior rectus sheath along with the peritoneum is closed with continuous 1/0 polypropylene sutures. A polypropylene mesh cut to size is placed in the plane created. The mesh is secured with a few interrupted 3/0 polypropylene sutures. A suction drain is placed over the mesh. The anterior rectus sheath is closed with continuous 1/0 polypropylene sutures. Another suction drain is placed in the subcutaneous plane and the skin closed. The sheaths are lax and redundant due to the hernia and associated weakness. Due care is required not to excise any of the redundant tissue until final closure of the tissues. This will ensure good availability of the layers to close without any tension at the end. The peritoneum, posterior rectus sheath and anterior rectus sheath sometimes become short for closure. This is usually due to early excision of the sac / sheath during dissection. We have used a separate mesh to close the peritoneum to prevent tension in few cases.

Results: The 98 patients with incisional hernias treated by open suture repair (56 patients), 34 male, and 22 female. 14 patients (25%) presented in the period of follow-up with recurrence of hernia. 42 patients with incisional hernias, 25 male, and 17 female treated by open mesh repair using permanent prosthetic polypropylene mesh. After the same period of follow-up 4 patients (9.5%) came back with signs and symptoms of recurrence of hernia. The risk factors for recurrence were suture repair, infection, prostatism (in men), and previous surgery for abdominal aortic aneurysm. The size of the hernia did not affect the rate of recurrence.
Table 1: Patients treated by the two methods and recurrence rate.

<table>
<thead>
<tr>
<th>Type of surgery</th>
<th>No of patients</th>
<th>Male</th>
<th>Female</th>
<th>Recurrence</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suture repair</td>
<td>56</td>
<td>34</td>
<td>22</td>
<td>14</td>
<td>25%</td>
</tr>
<tr>
<td>Mesh repair</td>
<td>42</td>
<td>25</td>
<td>17</td>
<td>4</td>
<td>9.5%</td>
</tr>
</tbody>
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The advantages of placing the mesh in this plane is as follows:
This plane is highly vascular, hence, it prevents infection.
Any infection occurring in the subcutaneous plane does not affect the mesh, as the mesh is retromuscular in a deeper plane. The prosthesis adheres to the posterior rectus sheath and renders it inextensible, permitting no further herniation. The prosthesis unites and consolidates the anterior abdominal wall. The prosthesis in this plane cannot be dislodged or ruptured by intraabdominal pressure, but instead is held in place by the force that caused the hernia.
6. Usually a virgin plane for recurrent incisional hernia repairs.

Table 2: Post-operative complications occurring in the 98 patients

<table>
<thead>
<tr>
<th>Complication</th>
<th>Number (%)</th>
</tr>
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<tbody>
<tr>
<td>Seroma formation</td>
<td>16 (17)</td>
</tr>
<tr>
<td>Wound haematoma</td>
<td>4</td>
</tr>
<tr>
<td>Superficial wound infection</td>
<td>9</td>
</tr>
<tr>
<td>Urinary retention</td>
<td>3</td>
</tr>
<tr>
<td>Deep vein thrombosis</td>
<td>2</td>
</tr>
<tr>
<td>Non-fatal pulmonary embolus</td>
<td>1</td>
</tr>
</tbody>
</table>

DISCUSSION

Five recent studies, one prospective and four retrospective have compared mesh repair and primary closure (table 1). Liakakos and colleagues 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 al, 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 colleagues 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. In the study by clark , in which 13 patients had suture repair and eight had mesh repair , the recurrence rate was 39 per cent for the former group after 25 months and 25 per cent for the latter group after 13 months of follow-up. The only randomized prospective trial comparing open suture repair and mesh repair was that reported by luijendijk, this was a multicentre trial, which randomly assigned 200 patients to suture or mesh repair. Apolyporplene mesh was used and this was sutured in asubfascial position of the 181 patients included in the study. 97 had suture repair and 84 mesh repair. the recurrence rate was 46 per cent in the suture group and 23 per cent in the mesh group (p=0.005) after a mean duration of follow-up of 26 months. the complication rate did not appear to be significantly different between the two groups although this was not analysed statistically in the study.
Our study provides evidence that in the long-term mesh repair of incisional hernia is superior to suture repair. Recurrence is more frequent after suture repair, while the incidence of hernia repair-related complications, scar pain, cosmetic result, and patient satisfaction is comparable for both groups. Two findings in particular are new and important. First, the incidence and intensity of abdominal pain are lower after mesh repair than after suture repair. Second, recurrence of incisional hernia continues to occur up to 8 years after hernia repair.

The current study established that the recurrence rate after suture repair of incisional hernia rises to an unacceptable level 10 years after surgery (63%). Although the results of mesh repair are disappointing as well, its recurrence rate is approximately half of the recurrence rate after suture repair. For small incisional hernias (\(</=10 \text{ cm}^2\)), the difference was even more apparent. Not only did mesh repair patients suffer fewer recurrences than suture repair patients, they also underwent fewer successive repairs of a recurrence.

Remarkably, recurrence continues up to 10 years after incisional hernia repair, also after mesh repair. It is therefore likely that recurrence rates are generally underestimated, because most studies are either not prospective or do not include long-term follow-up. Our results show that long-term follow-up is mandatory in any study dealing with recurrence of incisional hernia repair. Comparison of our data with the results of others is troublesome, because of the lack of randomized controlled trials. In 2001, Korenkov et al published the results of a randomized controlled trial of incisional hernia repair. Korenkov et al concluded that suture repair of incisional hernia was safe and did not result in higher recurrence rates. However, the trial was discontinued due to the severity of mesh infections. In our study, we encountered only few mesh infections (incidence 3.7%), and the course of these infections was mild. In 2001, Arroyo et al published a randomized controlled trial on umbilical hernia repair. Although umbilical hernia may differ from incisional hernia etiologically, treatment modalities for ventral hernia repair are similar and results may therefore be compared. In line with our results, Arroyo et al reported that even for small umbilical hernias, mesh repair results in significantly fewer recurrences than suture repair.

Mesh repair of incisional hernia has been associated with complications, such as enterocutaneous fistula and small bowel obstruction. In our study, we found no significant difference in the incidence of complications. In a study by Leber et al, the incidence of small bowel obstruction following mesh repair of incisional hernia was 5.4%, which compares well to our 11.7%. The incidence of enterocutaneous fistula following mesh repair of incisional hernia is thought to be low. Leber et al, reported a 3.5% incidence of enterocutaneous fistula and a 5.9% incidence of mesh to skin fistulas. In the current study, 5% of patients...
developed a fistula from mesh to skin (sinus tract), while 3% developed an enterocutaneous fistula. Although numbers were too small to reach significance, we believe that the importance of this finding is determined by the severity of the complication. On the other hand, others have reported the intra-abdominal use of meshes to be safe. Moreover, the occurrence of burst abdomen and strangulated hernia in the suture repair group may equal the enterocutaneous fistulas in complication severity.

Because physical complaints are an important reason for performing incisional hernia repair, any analysis of incisional hernia repair should include discomfort. Others have suggested that up to 50% of patients having undergone mesh repair of an incisional hernia developed complaints because of a reduced mobility of the abdominal wall. Our study does not reveal any difference in scar or superficial pain between mesh and suture repair patients. Moreover, abdominal pain was less frequent (18% versus 39%) and less intense in patients having undergone mesh repair. We think that discomfort following incisional hernia repair is caused by tension on the abdominal wall and that the relative decrease in pain after mesh repair may be caused by the tension-free technique that is applied in mesh repair, but not in suture repair.

Cosmetics too may play a key role in the patient's wish to have an incisional hernia repaired. Remarkably, in our study, only 47% to 52% of patients considered the cosmetic result satisfactory.

It is important for surgeons to be aware of this general discontent among incisional hernia repair patients. Adequate information preoperatively may result in some patients refraining from incisional hernia repair.

In conclusion, this study provides retrospective long-term follow-up of incisional hernia repair. It proves that mesh repair is superior to suture repair for both small and large incisional hernias. Mesh repair results in lower recurrence rates and less discomfort in the long term, while mesh repair is not associated with an increased incidence of complications. We suggest that to reduce the morbidity and the costs associated with incisional hernia repair and to prevent patients from undergoing pointless surgery, suture repair of incisional hernia should be completely abandoned.

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