A New Technique of “Marlex®-Peritoneal Sandwich” in the Repair of Large Incisional Hernias

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Repair of a large abdominal wall incisional hernia is a difficult surgical problem with recurrence being a common complication. In addition, other complications such as hematomas, seromas, and sinus formation result from the use of foreign material. A new technique to obviate these complications was used in 60 patients with large incisional hernias repaired over the last 15 years. Marlex® polypropylene mesh was used for repair, sandwiched between 2 layers of peritoneum of the overstretched hernia sac. There was no operative mortality and no recurrence in follow up from 3 years to 7 years. Postoperative complications encountered could be managed conservatively, without necessitating any major surgical procedure or mesh removal.

A patient with an incisional hernia is a living document of failure of surgical skill, a constant reminder of the need for furthering our understanding and development of basic concepts in this field. Recent statistics show that the incidence [1, 2] of incisional hernias varies from <1% to >10% despite this being a theoretically preventable complication. The large number of surgical techniques described in the literature for repair of incisional hernias is a testimony to the fact that no single technique has been developed that can be considered ideal for such repair.

Methods

Sixty patients with large incisional hernias formed the basis of this study, spanning over 15 years. The hernia was considered large when the defect was >10 cm in its greatest dimension [3]. There were 24 men and 36 women ranging in age from 26 years to 52 years. Postoperatively each patient was followed for 3 years to 7 years.

Operative Technique

The operative scar of the previous operation is excised. The hernial sac is exposed and freed from the surrounding area 3 cm to 5 cm beyond the hernial ring, depending upon the site and the size of herniation. No extensive dissection is done beyond the hernial ring margins. The sac is lifted, isolated, and incised in the middle of the defect along the long axis taking care to avoid injury to underlying viscera (Fig. 1). The adhesions are separated by blunt and sharp dissection. The free border of the left leaf of the hernial sac is sutured to the inner surface of the opposite side of peritoneum about 1 cm to 2 cm beyond the palpable hernial ring with interrupted monofilament No. 1 prolene sutures placed at a distance of 0.5 cm to 1 cm. Also 1 edge of Marlex mesh is sutured anterior to the left leaf of the hernial sac (Fig. 2). The sutures pass through the free edge of the left hernial sac, the inner surface of right peritoneum beyond the palpable hernial ring, and the rectus muscle and its sheaths. Through and through sutures pass back to the inner surface of the right peritoneum, the free edge of the left leaf of the hernial sac, the right edge of the Marlex mesh, and knots are tied (Fig. 2).

In this way the left leaf of the hernial sac is sutured so that the cut edge of the peritoneum and Marlex mesh remain outside and peritoneal lining continuity is maintained. The other edge of the Marlex mesh is stretched, made wrinkle free, and stitched to the aponeurotic sheath well beyond the hernial ring margin on the opposite side of defect (Fig. 2). Special care is taken to avoid any wrinkles or folds in the mesh at the time of suturing. Finally the free border of the right leaf of the hernial sac is spread over the Marlex mesh and stitched to the left aponeurotic sheath beyond the hernial ring margin and is thus bridged by Marlex-peritoneal sandwich only.

Silk sutures are scrupulously avoided during this technique. Two suction drains are inserted anterior to the mesh graft in the Marlex-peritoneal sandwich and brought through the skin in separate stab incisions (Fig. 3). Two corrugated drains are kept in the subcutaneous plane for drainage. The wound is closed after ensuring hemostasis.

Postoperatively patients are kept on intravenous fluids and nasogastric aspiration until bowel sounds return. Corrugated drains are removed within 24 to 28 hours. Suction drains are removed when the drainage is insignificant, usually 5 days to 7 days. Stitches are removed on the 10th postoperative day.

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Results

The patients under study were followed for a period of 3 years to 7 years. No recurrence was noted in these patients. The majority of the patients were extremely satisfied with the postoperative result. The complications encountered were of a minor nature and managed conservatively (Table 1). There was no incidence of seroma, hematoma, or abdominal wall sinuses. In 4 patients major wound infection occurred. Mesh removal was not required in any of these patients. One patient complained of local pain and discomfort postoperatively which subsided with analgesics and reassurance.

Discussion

Incisional hernias, representing partial failure of surgical therapy, constitute a common but neglected problem. Repair of a large incisional hernia may be not only a difficult operation but also one followed by a considerable rate of recurrence [1, 4–7]. The latter may be due partly to the high incidence of infection and partly to the effect of the tension required to close the hernial defect. There is no dearth of literature concerning the techniques for repair of incisional hernias. With the introduction of synthetic meshes, the concept of hernia repair has undergone a revolutionary change and, at present, Marlex mesh appears to be the most widely employed artificial prostheses [8].

There are advantages in implanting Marlex mesh between 2 layers of peritoneum. First, the graft lies deep in the abdominal wall, well protected and quite safe even in the presence of infection. In 4 patients where major wound infection was encountered with wound gaping, the anterior peritoneal layer acted as an effective barrier and prevented the mesh from infection. Therefore, mesh removal was not required in any of the patients. All of these patients responded satisfactorily to conservative treatment. In 6 patients, minor wound infection was noted. These included cases with wound edge necrosis and disruptions due to jeopardized blood supply of overstretched hernial skin. This was obviated in later repairs by excising freely the thinned out skin edges.

Second, mesh is covered by a peritoneal layer which is a passive semipermeable membrane. This facilitates absorption of serous collection. Also, the peritoneum traps large numbers of macrophages which in addition to their known phagocytic activity, also secrete a variety of physiologically active products such as prostaglandins and leukotrienes. Normal mesothelial cells of the peritoneum are a rich source of plasminogen and the fibrinolytic nature of these compounds prevents blood clots [9] and facilitates absorption. This is why we feel we did not encounter seromas postoperatively in this study, unlike other studies where seromas were a troublesome complication requiring frequent aspirations [5, 7].

Third, since no extensive dissection beyond the hernial ring margins is required, there is less dead space with the attendant complications such as seroma and hematoma.

Fourth, no attempt is made to approximate the anterior aponeurotic sheaths; the hernial defect is bridged by the Marlex-peritoneal sandwich only. This avoids a sudden increase in the intra-abdominal pressure and cardiopulmonary embarrassment postoperatively.

Among the postoperative complications (Table 1), wound infection was the most common. Major infection was noted in 4 patients (6.6%) but in none of these was the mesh infected and they were managed conservatively. Immunity of the mesh to

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Table 1. Postoperative complications following incisional hernia repair.

<table>
<thead>
<tr>
<th>Complication</th>
<th>No. of pts.</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major wound infection</td>
<td>4</td>
<td>Wound drainage, dressings, systemic antibiotics, secondary suturing.</td>
</tr>
<tr>
<td>Minor infection</td>
<td>6</td>
<td>Antiseptic dressing, removal of offending stitch.</td>
</tr>
<tr>
<td>Local discomfort and pain</td>
<td>1</td>
<td>Reassurance, symptomatic treatment.</td>
</tr>
<tr>
<td>Delayed peristalsis</td>
<td>2</td>
<td>Intravenous fluids, Ryle's tube aspiration.</td>
</tr>
</tbody>
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Fig. 1. Hernial sac divided into a right and a left leaf.

Fig. 2. Mesh placement.

Fig. 3. Completed repair with drains in place.