

## ORIGINAL ARTICLE

# MANAGEMENT OF GIANT VENTRAL HERNIA BY POLYPROPYLENE MESH AND HOST TISSUE BARRIER

By

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**Aim:** Surgical management of giant ventral hernias is a surgical challenge due to limited abdominal cavity. This study evaluates our experience in the management of massive ventral hernias using polypropylene mesh.

**Methods:** From January 2005 and September 2006, we operated on 30 patients with giant ventral hernias by using polypropylene mesh. The mesh was separated from the viscera by a small part of the hernial sac and the greater omentum.

**Results:** The age ranged from 39 and 64 years. Seventeen had post-operative incisional and 13 had para-umbilical hernias. The vertical and horizontal diameters of defects ranged from 10-to 22 cm. Mean body mass index was 33. Follow up ranged from 6-18 months. No patient required ventilation after operation. Recurrent seroma, which responded to repeated aspiration, was experienced in 3 patients. Minor wound infection was observed in 4 patients. Small hernia recurrence occurred in one patient.

**Conclusion:** The use of polypropylene and host tissue barrier is relatively simple, safe, and reliable surgical solution to the problem of giant ventral hernia.

**Keywords:** prosthetic mesh, surgical results, wound complication.

## INTRODUCTION

The management of giant hernia with loss of abdominal domain remains a surgical challenge. Loss of abdominal domain occurs when the intra-abdominal contents can no longer lie within the abdominal cavity. <sup>(1)</sup> Huge hernias are more liable to complications and poorly controlled by external support. There are many problems associated with the management of such giant hernias. Firstly, reduction of the contents is difficult. Postoperative disorders in the cardiovascular system, tissue oxygenation, increased intra-abdominal pressure, and pulmonary embolism expose the patient to severe risks.<sup>(2,3)</sup> As the hernia is large, the risk of

recurrence is high. Lastly the residual skin needs excision for cosmetic reasons.

The objective of this study is to evaluate our experience in the management of giant ventral hernia using polypropylene mesh. For tension free closure, no attempt at approximation of the muscle to close the defect was done. The mesh was separated from the viscera by a host tissue barrier composed of a small part of the hernial sac and the greater omentum.

## PATIENTS AND METHODS

Patients booked for elective repair of giant hernia had complete preoperative fitness. The patients were admitted 2 days before the day of surgery. All elective patients kept on low residue diet two days before operation and receive a mechanical bowel preparation the day before surgery. At the onset of anesthesia, a cephalosporin was administered intravenously. A nasogastric tube and Foley's catheter were introduced after induction of anesthesia. An elliptical skin incision was done incorporating any redundant skin and fat. The incision was deepened laterally to expose the musculoaponeurotic abdominal wall of at least 6 cm from the margin of the defect. The sac of the hernia was often quite large, long, and multilocular. The sac was opened and its surface is cleared off all adherent omentum and intestine. Most of the sac was excised except a small part that is used as a flap to close the defect over the replaced content. Where possible, the omentum was spread over the reduced bowel. No attempt at approximation of the muscle to close the defect was done. After securing hemostasis, a giant polypropylene mesh was inserted to cover the area so that at least 3 to 5 cm of the mesh overlapped the edges of the fascia and sutured to the outer surface of musculoaponeurotic abdominal wall. All redundant skin and fat were removed before insertion of two suction drains and skin closure. The patients were closely observed postoperatively for adequate pain control, urine output, and blood gases. As soon as practical, the patient was raised to about 45-degree flexion of the trunk in order to allow maximum pulmonary ventilation. The intravenous infusion was continued until return of bowel

sounds. Semisolid and solid diets were then gradually advanced. The patient remained catheterised until he/she can get out of bed. Antibiotics cover was given for 5 days. The drains were removed when the output was less than 30 cc within 24-hours period.

**Statistics:** Data were described by simple descriptive statistics as range; mean and percentages.

## RESULTS

From January 2005 and September 2006, 30 patients, 18 men and 12 women, with a mean age of 52 (range 39-64) years had giant ventral hernias. Seventeen patients had giant post-operative incisional hernias (Fig. 1) and 13 patients had giant para-umbilical hernias (Fig. 2). The vertical and horizontal diameters of defects of these hernias ranged from 10-to 22 cm. All the patients were overweight or obese with a mean body mass index 33 (range 28-to 43). Follow up ranged from 6-18 months. Three patients (10%) were operated on as emergency because of bowel obstruction; however no bowel resection was needed. All other cases were partially irreducible and done electively. All patients were discharged home within 7-15 days. Raised intra abdominal pressure was not found to be a problem and no patient required ventilation after operation. Recurrent seroma, which responded to repeated aspiration, was experienced in 3 patients (10%). Minor wound infection was observed in 4 patients (13.3%). Small hernia recurrence occurred in one patient (3.3%). The recurrence was asymptomatic and the patient declined re-operation.



*Fig 1. (Left) Preoperative view of giant postoperative incisional hernia (Right) Appearance of the patient after hernial repair by polypropylene mesh and host tissue barrier.*



**Fig 2. (Left) Preoperative view of giant paraumbilical hernia  
(Right) postoperative view of the same patient**

## DISCUSSION

All hernias, particularly the massive one, should be repaired unless the patient is unable or unwilling to undergo surgery. Hernias increase gradually in size, are unsightly, and liable for grave complications. There are two methods proposed to help repair of massive hernia. The first is abdominal rooming and the second is to decrease the bulk of the content.

For abdominal rooming phrenicectomy,<sup>(4)</sup> musculoskeletal flaps<sup>(5-7)</sup> and pneumoperitoneum,<sup>(8,9)</sup> are described. Older techniques like phrenicectomy are no longer used. Pneumoperitoneum is an invasive and tedious procedure with occasional complications, as viscera perforation, air embolism, peritonitis, and hematoma of the abdominal wall.<sup>(9-11)</sup> Musculoskeletal flaps require much dissection with the possibility of significant blood loss, flap necrosis and donor site related complications.<sup>(6)</sup>

To decrease the bulk of the contents, Moss has suggested the use of elemental diets to reduce fecal residue and gastrointestinal secretions.<sup>(12)</sup> A more effective method is resection of parts of omentum, small bowel or colon.<sup>(13-14)</sup> However, bowel resection contaminates the field and is liable for serious complications. Historically, the use of synthetic mesh in the presence of potential contaminations has been strongly discouraged on the basis of high rates of morbidity.<sup>(15,16)</sup>

Prosthetic mesh is widely used in the repair of ventral hernias. The use of sheets of nonabsorbable mesh has revolutionized the repair of abdominal wall defects and rendered obsolete most of other older types of operations.<sup>(10,17)</sup> Mesh repair of the ventral hernia have

superiority over suture repair with regards to the recurrence.<sup>(18)</sup> Polypropylene is most commonly used because it is easy to handle and relatively low in cost. Because polypropylene causes a pronounced inflammatory reaction, the mesh is well incorporated in the surrounding tissue of the abdominal wall. However, for the same reason, polypropylene causes a strong stimulus for the formation of adhesions.<sup>(19-21)</sup>

Many physical barriers are used in closure of large abdominal defects to prevent contact of the nonabsorbable mesh with bowel including the use of absorbable mesh as a screen or double mesh. However, it now appears that the absorbable mesh does not have any special characteristic as far as fewer adhesions and fistulae are concerned.<sup>(10,22-24)</sup> Other materials that act as a protective layer on the visceral side of the nonabsorbable mesh have been introduced in surgery. The aim is to provide sufficient separation between the mesh and viscera while regeneration takes place. The use of antiadhesive liquids as Sepracoat and Icodextrin solutions are investigated. Coating the polypropylene mesh with seprafilm or collagen or the use of physical barriers as human amniotic membrane are also studied.<sup>(19,,25-28)</sup> However, the use of coatings or foreign physical barriers may increase the rate of mesh infection.<sup>(26,28)</sup>

The possible complications when mesh comes into contact with the bowel include adhesions, chronic pain, bowel obstruction, and erosion into the bowel with enterocutaneous fistula formation.<sup>(10)</sup> None of these complications were experienced in this study. The contact between the bowel and the prosthesis was prevented by interposition a natural barrier. This barrier composed of the hernial sac and the greater omentum, both shield the

bowel from contact with nonabsorbable mesh. To provide a larger abdominal cavity, No attempt to close the musculoaponeurotic defect was done. Therefore, the hernial contents can be replaced without tension and without compromising respiratory or cardiac functions. No patient required ventilation or suffered from compartment syndrome after operation in this series.

The data in this study demonstrate the low complications rate with the use polypropylene mesh and host tissue barrier in the repair of giant hernias. Small asymptomatic hernia recurrence occurred in one patient (3.3%). No significant infection, mesh exposure or fistulae were experienced. There was no need to remove any of meshes.

**In conclusion:** careful preoperative preparation, operative technique, and postoperative care are required for successful management of massive ventral hernias. The use of polypropylene and host tissue barrier is relatively simple, safe, and reliable surgical solution to the problem of massive ventral hernia.

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