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Repair of giant hernias using more prosthesis

Received: 7 June 2000 / Accepted: 14 June 2001 / Published online: 19 September 2001
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Abstract Giant incisional hernias with total loss of substance are an ominous pathological condition characterized by massive depletion of muscular and fascial tissue, by complete loss of the anatomical and physiological function of the abdominal wall and by severe respiratory and visceral involvement. Over a 10-year period we operated 270 patients with voluminous incisional hernias, 12 of which had a total loss of substance. There was no intraoperative mortality. One patient died of myocardial infarction on the fifth and one died of intestinal occlusion and peritonitis the 11th postoperative day. Early postoperative complications occurred in only one patient who had skin necrosis with an infection at the polypropylene mesh. This was successfully treated with systemic antibiotic therapy and topical medication of the wound. There was also one minor recurrence over the pubis 1 year after the operation that required a new operation to replace the mesh. No respiratory complications occurred and all patients were normally active. The good results reported in our series encourage us to continue in this direction even though these patients are at high risk.

Keywords Giant incisional hernia · Respiratory insufficiency · Prostheses

Introduction

Despite new developments in sutures, materials and surgical techniques, complications after surgery for incisional hernia of the abdominal wall remain important, occurring in 2–11% of all laparotomies [1].

Giant incisional hernia with total loss of substance is an ominous pathological condition characterized by a massive depletion of muscular and fascial tissue, by the complete loss of the anatomical and physiological function of the abdominal wall and by severe respiratory and visceral involvement [5, 23]. These patients usually have chronic respiratory problems and altered synergism of the chest wall due to low intra-abdominal pressure (PAD) and to the presence of the hernia sac which produces a mechanical impairment of ventilation. An obstructive or restrictive lung disease may also be present [18, 19, 25].

The muscles of the abdominal wall are completely diverted from the middle line, are atrophic, and may frequently be found near the anterior superior iliac spine. These cases can be identified as M4–W4 R+ using Chevrel’s classification of incisional hernia, of the abdominal wall [9].

This pathology involves all organs of the abdominal wall. The skin that covers the sac is very thin, the subcutaneous tissue is very poor and devascularized by the expansion of the hernia sac through the hole in the muscle wall. Infected ulcers, hemorrhages and skin dermatitis are very frequent. The peritoneum is usually abundant but it could be missing after re-recurrences due to its stratification on the entire bowel [12].

Here we report our experiences with giant incisional hernias over a 10-year period, focusing on those hernias involving a complete loss of the substance of the abdominal wall.

Patients and methods

Between 1990 and 2000 we treated 270 patients affected by giant incisional hernias, 12 of whom showed a complete loss of anatomical and physiological function of the abdominal wall. These comprised three males and nine females with a mean age of 60 years (range 45-80 years).
Preoperative treatment

It is mandatory in these patients to evaluate the total risk of mortality and morbidity, to consider the risk/benefit of surgery, to normalize all metabolic functions and to ensure the possibility of intensive care support. Indications for surgical treatment must be reserved only for patients with recurrent intestinal sub-occlusion or oedema, with a major skin lesion and repeated hemorrhages or with a substantial loss of quality of life. The major problems experienced by these patients involved respiratory distress during the postoperative period, and the need to adjust to eventual metabolic and cardiac disorders.

Even the reduction of the bowel in the abdomen is usually difficult, due to the elongation of the meso- and to the chronic dilation of the intestinal lumen as a consequence of low intra-abdominal pressure and of an altered balance between visceral and parietal tone [7].

In order to evaluate chronic respiratory distress due to the abnormal movement of the chest wall, a endogastric manometry associated with spirometry and emogas analysis were always requested [25].

An abdominal CT scan may help the surgeon to verify anatomical variation and to show other associated pathological conditions that may require surgical treatment, such as cholelithiasis which is frequently present in obese patients [15].

Careful disinfection of the skin is needed for at least 7 days before surgery. In the case of severe skin ulcer, a culture must be made and antibiotic therapy is mandatory.

The patient must be submitted to physiotherapy and to respiratory exercise for at least 15–30 days in the ambulatory period. Physiotherapy allows the patients to take full advantage of their lung capacity and also aims to improve the cough reflex. Mucolytic and antibiotic therapy may be associated to reduce respiratory complications.

The distension of the intestinal loops is corrected by using an aspirating gastroduodenal catheter for at least 2 days before the operation. This treatment helps to reduce the intestinal loops in the abdominal cavity. During this period the patient is nourished through IV infusion.

Procedure

The surgical approach is defined after an accurate clinical and anesthesiological evaluation. In massive incisional hernias the following rules are strictly followed:

1. Skin: the excision of the skin has to be done at the end of the operation because this is the only way to ensure well-vascularized skin margins and to obtain good wound closure. If infected ulcers are present, their excision must be done immediately and another sterile operative field must be prepared. Flament proposes the division of the operation into two phases for cases involving ulcer excision and hernia repair once the ulcers are treated successfully [12, 13].

2. Hernia sac: in elderly patients the hernia sac is not always reduced. Cardiopulmonary disease, obesity and chronic obstructive pulmonary disease (COPD) are typical in these patients and for this reason it is not proper to vary intra-abdominal pressure (PAD) and thoracic and pulmonary compliance. Moreover, the gut must not be compressed in the abdominal cavity.

3. Reduction of the intestine: if the peritoneum is insufficient for closure, it is necessary to widen the abdominal cavity using a polyglactin 910 prosthesis fixed to the remaining peritoneum.

4. Reconstruction of the wall in xiphopubic midline incisional hernias: after the closure of the peritoneum, two or more polypropylene prostheses are sutured together and positioned in the preperitoneal space, in a retro-muscular position as in Stoppa’s technique [22, 26]. These are laid to cover the entire peritoneum. This can be done only if trophic muscular tissue is still present laterally. These prostheses are fixed inferiorly to the Cooper ligament, superiorly to the ribs and laterally under the muscle with transparietal stitches (Figs. 1, 2, 3, 4). If muscle atrophy is present, the mesh is fixed with metal supports to the iliac spine and to the pubis (Fig. 5).

When the peritoneum is absent, a large polyglactin 910 prosthesis must be positioned over the intestine or the omentum and fixed to the remaining peritoneum as proposed by Chefrél in 1983 [16]. Later, two or more polypropylene prostheses are used to contain the intestine [6, 23] (Figs. 6, 7, 8, 9, 10).

Before surgical wound closure, two aspirating drains are positioned over the prosthesis and left in place for 2–4 days.

The patient should be treated with systemic antibiotic therapy and should follow deep vein thrombosis prophylaxis [14].

Postoperative monitoring

The patient should be mobilized on postoperative days II–III in order to avoid deep vein thrombosis and respiratory pathologies. Microbiological monitoring is useful in preventing postoperative infection. This examination must be started in the operating theatre with bacteriological culture of the prosthesis.

The following controls are made on the fluid present in the drains:

![Fig. 1 Giant incisional hernia. Complete loss of the abdominal muscles that can be found near the iliac spines](image)

![Fig. 2 Voluminous hernia sac that, after accurate lysis of the adherent intestine, is closed and not reduced in volume in patients with severe cardiorespiratory problems](image)