Abstract. – Background and Objectives: Despite the improvement of the surgical technique and several experiences reported in literature about prosthetic incisional hernioplasty, the prevalence rate of recurrence and of the classic complications has not changed over the years. We analyze our caseload, establishing some technical cornerstones in order to reduce their occurrence.

Patients and Methods: 283 patients underwent incisional hernioplasty in our Department of Surgery in the decade 1999-2008. They were retrospectively divided into four groups (A-D) according to the surgical technique adopted for a comparative analysis: A, 37 primary direct closure; B, 207 Rives-Stoppa procedures; C, 9 Chevrel procedures; D, 30 intraperitoneal repairs. The outcomes were considered in terms of postoperative surgical complications.

Results: In total, we observed 11 cases of hernia recurrence (3.9%), 13 cases of infections (4.6%), 7 cases of seroma/hematoma (2.4%) and one case of acute respiratory insufficiency.

Discussion: The Rives-Stoppa procedure is, among all those practised, the treatment of choice in incisional hernioplasty. Thanks to the introduction of some simple modifications to this technique and preventing the postoperative infections, we obtained excellent results in terms of recurrence rate (only 1 case on 207 patients, 0.48%) and morbidity.

Key Words:

Incisional hernia surgery, Prosthetic mesh, Rives-Stoppa procedure, Complications in incisional hernioplasty.

Introduction

Laparocele is the protrusion under the skin of internal bowels through a previous surgical scar of the abdominal wall. It is a progressive disease and its prevalence has not changed over the years, despite the improvement of the surgical technique of repair1-5 and the introduction of valid prosthetic materials6-9. The use of prostheses has significantly reduced the rate of recurrences, from 30-50% of the traditional surgery up to 5-10% of the current “tension free” procedures7,9, yet considered high. Several factors are involved in the etiopathogenesis of laparocele recurrence, as patient age, associated chronic diseases, metabolic disorders, alterations of the interstitial collagen and, as consequence, of the wound healing process10,11.

The prosthetic repair of the abdominal wall by laparoscopic or “open” approach is the current standard of care: reducing the number of recurrences and complications, minimizing the risk of respiratory deficit typical of no “tension free” techniques and obtaining a more acceptable aesthetic outcome are the goals of this kind of surgery12. Only in few cases a direct closure of the parietal defect may be considered a valid solution.

The currently practised surgical techniques differ from each others for the collocation of the prosthesis, which can be over the rectus muscles plan according to Chevrel’s procedure (“onlay technique”), between the rectus muscles and the posterior rectus sheath or peritoneum according to the Rives-Stoppa’s (“inlay technique”) or intraperitoneally in direct contact with the bowel (“underlay technique”), being performed by either laparoscopic or laparotomic approach13,14.

The prevalence of recurrences is still significant in laparocele surgery, despite different surgical approaches and the range of prosthetic materials employed. The Authors analyse the causes of this complication through the exam of their caseload, trying to formulate some suggestions in order to reduce its occurrence.
**Materials and Methods**

Our caseload includes 283 patients, 158 women (mean age 62, range 34-84) and 125 men (mean age 58, range 33-80) undergone to surgical intervention for laparocele in our Department of Surgery between January 1999 and December 2008.

We had 67 (23.7%) small laparoceles (up to 5 cm on the largest diameter), 112 (39.5%) middle laparoceles (from 5 to 10 cm) and 104 (36.8%) large laparoceles (over 10 cm); 246 of them were midline (109 epigastric locations, 31 hypogastric, 55 periumbilical and 51 above-below umbilical), 20 subcostal and 17 of the flank.

Patients underwent preoperative biochemical assessment, chest X-ray, cardiovascular and respiratory evaluation.

We performed 37 primary direct closures (13.1%) for very small incisional hernias (group A), 216 abdominal reconstructions (76.3%) using a polypropylene mesh, whose 207 according to Rives-Stoppa’s (group B) and 9 according to Chevrel’s procedure (group C); 30 intraperitoneal repairs (10.6%) by using Dual or Composix Mesh (group D) (Table I). At least one suction drain was placed in peri-prosthetic site and removed once the output was considered insignificant, from 2 to 6 days after surgery. Anticoagulant prophylaxis by low-molecular-weight heparin was taken into account for high risk patients. All patients received a single prophylactic administration of intravenous cephazoline preoperatively, being continued only in the operations considered at high risk of infection.

All patients were submitted to postoperative follow-up, with at least three consultations within the first year after surgery (one month, three months and twelve months).

**Results**

The 30-day postoperative mortality and morbidity rates were 0 and 10.9%, respectively. We registered a total of 11 cases of hernia recurrence (3.9%) and 13 cases of infections (wound infections and mesh infections occurred in 3.1% and 1.4% of our patients, respectively). The prevalence rate of seroma/hematoma was 2.4% (n=7); one case of acute respiratory insufficiency, caused by pulmonary trombo-embolism, occurred in the second postoperative day, treated with anticoagulants and antibiotics. No case of intestinal subocclusion was registered. Table I summarizes the peri-operative outcomes of our series.

The deep infections were faced with the enlargement of the fistula, the drainage of the abscess and the administration of oral antibiotics; neither of these required the removal of the prosthesis. The seromas were aspirated with eco-assistance.

The mean operative time was 30 minutes (range 15-45) for primary direct closures (group A), and 100 minutes (range 70-130) for prosthetic plastics (groups B, C, D). The mean hospitalization was 9 days (range 5-18).

**Discussion**

The high rate of recurrence is the main drawback of the conventional plastics for the treatment of incisional hernia. Patient age, hernia size, history of previous hernia surgery, obesity are some factors associated with laparocele re-

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**Table I. Hernia characteristics and complications rate.**

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<tbody>
<tr>
<td><strong>Group A:</strong> Primary direct closure</td>
<td>37</td>
<td>37</td>
<td>-</td>
<td>-</td>
<td>7</td>
<td>1</td>
<td>-</td>
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<td><strong>Group B:</strong> Rives-Stoppa technique</td>
<td>207</td>
<td>88</td>
<td>99</td>
<td>-</td>
<td>1</td>
<td>7</td>
<td>2</td>
<td>4</td>
<td>1</td>
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<td>(with partial contact)</td>
<td>(22)</td>
<td>1</td>
<td>(3)</td>
<td>(18)</td>
<td>(-)</td>
<td>(1)</td>
<td>(-)</td>
<td>(1)</td>
<td>(-)</td>
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<tr>
<td><strong>Group C:</strong> Chevrel technique</td>
<td>9</td>
<td>6</td>
<td>3</td>
<td>-</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1</td>
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<tr>
<td><strong>Group D:</strong> Intraperitoneal repair</td>
<td>30</td>
<td>5</td>
<td>-</td>
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<td></td>
<td>283</td>
<td>67</td>
<td>112</td>
<td>104</td>
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S: small; M: middle; L: large; Rec: recurrence; W. Inf.: wound infection; M. Inf.: Mesh infection; Ser.: seroma; R.I.: respiratory insufficiency.
currence\textsuperscript{15,16}; but, according to clinical observations of surgical physiopathology, the abnormal tension in the site of repair is the most responsible for this complication. From this point of view, the development of prosthetic materials has drastically changed the course of the hernia surgery, introducing the concept of “tension free” technique\textsuperscript{17}. The ideal prosthesis has yet to be found, although the Authors indicate polypropylene and expanded polytetrafluoroethylene (ePTFE) as the best available materials for alloplasty\textsuperscript{18-20}.

We have developed some technical considerations in order to reduce hernia recurrence and the other surgical complications:

1. Primary suture closure is always an undersized repair, also in the smallest laparoceles. We registered 7 cases of recurrence (18.9\%) among 37 patients (group A) undergone to abdominal plastic without prosthetic devices. These patients were operated for very small hernia defects, closing with two-three stitches at maximum, in local anesthesia, with short operative times (always under 30 minutes) and early discharge. Only one case of superficial infection occurred.

2. The prosthesis placement over the rectus muscles plan must be avoided because it cannot assure a resistant alloplasty and it is directly exposed to potential subcutaneous infections. We had 3 cases of infection (33.3\%), two deep and one superficial, and 3 of recurrence (33.3\%) among 9 patients operated according to Chevrel’s procedure (group C).

3. A too small mesh for the hernia defect is at risk of postoperative displacement and of undersized closure, especially where there is an increased intra-abdominal pressure. So, it is advisable to perform at least a 5 cm overlapping between the edge of the hernia defect and the lateral border of the mesh, which can be fixed on the large abdominal muscles through an absorbable U-stitch suture (anterior muscles sheath $\rightarrow$ large muscles $\rightarrow$ mesh and vice versa). Starting from the clinical observation of recurrent hernias occurring at the upper and in the lower pole of the prosthesis insertion in the midline, we adopted the approach of performing a vertical cut to each edge of the mesh (Figure 1) in order to extend it – forklike – in the midline over the surgical incision, then recomposing the prosthesis with no-absorbable knots.

4. In front of some long-date ventral incisional hernias, where the rectus muscles are hypotrophic, laterally retracted and completely substituted in the midline by a redundant scarred fascial tissue, we perform a combined mesh and fascia reconstruction. After skin and subcutaneous dissection, the hernia sac is isolated and incised in the midline obtaining two opposed fibrotic flaps. Then, an incision is practiced on the lateral border of both fibrotic flaps, opening the anterior rectus sheath on one side and the posterior on the contra-lateral side. The intervention is concluded by a mesh-fascia “sandwich” repair, with the prosthesis placed between the two fascial layers (Figure 3).

5. Occasionally, the tissue loss or fascial scarring do not allow to completely reapproximate the midline fascia over the prosthesis, which can
be let in partial contact with the subcutaneous tissues (Figure 2). We performed this approach in 22 patients (group B), reporting no case of recurrence and one case of wound infection.

5. Every attempt should be made to remain extraperitoneally, but in front of very large parietal defects and when it is proved that an extraperitoneal repair without tension cannot be obtained, the use of a composite prosthesis fully intraperitoneally is mandatory, with the ePTFE side facing the abdominal cavity and the polypropylene side facing the abdominal wall. Thirty patients underwent this procedure with no recurrence of disease and two cases of seroma, successfully resolved.

Currently, the Rives-Stoppa procedure is the most practiced approach and the treatment of choice with the lowest recurrence rates reported in literature. The placement of the prosthesis in a plane with wide overlapping of the fascial defect and adjacent to the vascular-rich rectus muscle, promotes host tissue incorporation with a tension-free closure and protects the mesh from the potential superficial infections. Thanks to the introduction of some simple technical modifications and preventing the postoperative infections, we obtained acceptable results in terms of recurrence rate and morbidity.

References


