Rives technique is the gold standard for incisional hernioplasty. An institutional experience

Angelo Forte*, Antonio Zullino*, Simone Manfredelli, Gioacchino Montalto, Francesco Covotta, Piergiorgio Pastore, Marcello Bezzi

AIM: We report our clinical experience with incisional hernia surgery and we retrospectively analyze the outcomes obtained with the different techniques of repair used, confirming that Rives-Stoppa procedures actually represent the gold standard for incisional hernia.

MATERIAL OF STUDY: 334 patients were observed for incisional hernia at our Department of Surgery from 1996 to 2007. They were treated according to the following surgical procedures: 44 primary direct closures; 246 Rives-Stoppa procedures; 9 Chevrel procedures; 35 intraperitoneal repairs. The outcomes were considered in terms of postoperative surgical complications.

RESULTS: In total, we had 13 cases of hernia recurrence (3.9%), 14 cases of infections (4.2%), 7 cases of seroma/hematoma (2.9%) and one case of acute respiratory insufficiency.

DISCUSSION: The choice of the surgical technique depends on several factors, such as the size of the hernia defect and the representation of the anatomical structures, essential for the reconstruction of the abdominal wall. We abandoned Chevrel technique due to high rate of recurrence and infective complications and reserved the intra-peritoneal repair only for cases where a fascial layer could not be reconstructed. Instead, the primary direct closure should be considered for high risk patients because of its low surgical impact, although it is characterized by higher incidence of recurrence. Combining the Rives-Stoppa technique with some personal technical modifications, we obtained acceptable results in terms of recurrence rate and morbidity.

CONCLUSIONS: Rives-Stoppa procedures are the current standard of care for the surgical repair of incisional hernia and our treatment of choice.

KEY WORDS: Incisional hernia surgery, Prosthetic mesh, Rives-Stoppa technique.

Introduction

Incisional hernia is the most common complication of abdominal surgery occurring within six months after surgery in 50% of cases and within the first year in 75% 1-8. Despite the introduction of “tension free” techniques of repair, the use of suction drainages, antibiotic prophylaxis and accurate asepsis, its incidence has not really decreased over the last years: it still reaches 8-10% after elective surgery and 10-40% after emergency or complicated surgery 6,8.

The main problem in treating this complication is the loss of wall substance caused by muscular detachment and the following defect during the muscular traction. The surgeon will have to reconstruct the abdominal wall without any tension, in order to avoid a reduction of abdominal diameters and the possible appearance of a
restrictive respiratory syndrome which increases the risk of hernia recurrence [1-10]. This can be partly achieved by the use of prosthetic materials whose introduction has resulted in a reduction of recurrence rate from 30-50% (reported for direct suture repair) to 5-10% (mesh repair) in most series [6-9], although the use of mesh itself does not imply a good outcome unless associated with a meticulous surgical technique [11-13]. The availability of meshes suitable for contact with abdominal viscera has further reduced the rate of complications [1-5]. Nowadays the most common incisional hernia repair techniques include pre-fascial (Chevrel), pre-peritoneal (Rives-Stoppa) and intraperitoneal mesh placement. Implanting the mesh over the fascial plane has a very limited use in surgical practice, given the infection risk and occurrence of seroma. Intraperitoneal mesh placement can be necessary when the peritoneal layer cannot be reconstructed; however, despite the wide range and reliability of prosthetic materials, foreign body reaction and postoperative adhesions are still matter of concern. Rives-Stoppa technique, avoiding contact with the abdominal bowels and minimizing the risk of infection, seems to offer the best guarantees of successful repair.

Material and methods

The study group includes 334 patients with abdominal wall hernia, observed at our Institution from January 1996 to December 2007. Patients’ characteristics are illustrated in Table I: 78 (23.4%) had a small laparocele (up to 5 cm on the largest diameter), 126 (37.7%) middle laparoceles (from 5 to 10 cm) and 130 (38.9%) large laparoceles (over 10 cm); 295 of them had a midline localization (139 epigastric, 41 hypogastric, 55 periumbilical and 60 above-below umbilical), 22 subcostal (whose 13 on the trocar port site after laparoscopic surgery) and 17 on the flank. 33 patients (9.9%) had already undergone at least one surgical intervention for hernia in the same site. All patients underwent anesthesia preoperative evaluation and respiratory function tests were carried out in case of large ventral hernia. All patients underwent antibiotic prophylaxis with the exception of high risk patients who received postoperative antibiotic treatment. We performed a primary direct closure without any mesh in 44 of the 78 patients referring with small incisional hernias (13.2%). A polypropylene mesh was used for a pre-peritoneal repair in 246 cases (73.7%): 194 (78.9%) had a Rives repair, 27 patients (11%) had a Stoppa repair and 25 patients (10.1%) had a pre-peritoneal repair with the prosthesis left in partial contact with subcutaneous tissues (Fig. 1). Some cases of hernia recurrence were observed amongst the first 21 patients treated according this procedure, always at the top of the midline scar; this event carried us to modify the technique by modulating the mesh with two vertical incisions, to the upper

![Opening of the anterior rectus sheath bilaterally, in order to redevelop the posterior fascial wall](image1)

![Reconstruction of the fascial wall and insertion of the prosthesis behind the rectus muscle plane in partial contact with the subcutaneous tissues](image2)

**Fig. 1:** Rives-Stoppa technique “with partial contact”.

<table>
<thead>
<tr>
<th>Surgical technique</th>
<th>n</th>
<th>Hernia size</th>
<th>rec</th>
<th>F</th>
<th>M</th>
<th>w.i.</th>
<th>m.i.</th>
<th>s/h</th>
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<tr>
<td>Rives-Stoppa technique</td>
<td>246</td>
<td>23</td>
<td>104</td>
<td>119</td>
<td>2</td>
<td>130</td>
<td>115</td>
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<tr>
<td>(with partial contact)</td>
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<td>Chevrel technique</td>
<td>9</td>
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<td>Primary direct closure</td>
<td>44</td>
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<td>8</td>
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<td>Intraperitoneal repair</td>
<td>35</td>
<td>5</td>
<td>19</td>
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s: small; m: middle; l: large; rec: recurrence; F: female; M: male; w.i.: wound infection; m.i.: mesh infection; s/h: sieroma/haematoma; r.i.: respiratory insufficiency
and lower pole of it, and then inserting it, forklike, in the midline over the surgical incision to reinforce the hernia defect poles (Fig. 2). In all cases the mesh was positioned far beyond the lateral margin of the rectus muscles, underneath the large muscles of the abdomen. Finally, in 9 cases (2.7%) Chevrel repair was performed and in 35 cases (10.5%) intraperitoneal Dual-Composix mesh were used because we were unable to reconstruct the fascial layer.

At least one suction drain was placed in peri-prosthetic site and left in all patients for 2-6 days after surgery. No superficial drains were positioned. All patient had early mobilization and low molecular weight heparin was given only to high risk patients.

All patients underwent post-operative follow-up for a period of time ranging between one and four years, and outpatient clinic appointments were given at one, three and twelve months and, annually where indicated. About 50% of patients attended the follow-up for the first year.

Results

No perioperative mortality was observed and the mean hospital stay was 7 days (range 4-18). We observed thirteen cases of hernia recurrence (3.9%), 8 in patients with no mesh repair (18.2%), 3 in patients with Chevrel repair (33.3%) and 2 recurrences occurred amongst the 246 patients who underwent pre-peritoneal mesh repair (0.8%).

Other complications observed were: 10 superficial infections (3%), 4 deep infections (1.2%), 7 seromas (2.1%) and one case of respiratory insufficiency. Patients with wound dehiscence were treated in outpatient clinics. Of 4 deep infections, 2 were observed in patients undergoing Chevrel technique and 2 in the Rives-Stoppa group. The seromas were all treated successfully with ultrasound-guided aspiration. Finally, the single case of respiratory failure caused by pulmonary embolism occurred on the second postoperative day, was treated with intravenous anticoagulant therapy. No bowel obstruction or fistulas were observed.

Mean operating time was 100 minutes (range 70-130) in prosthetic repairs, 30 minutes (range 15-45) for primary direct closures.

Discussion

Our experience, developed through different techniques, showed that Rives-Stoppa procedure, with some modifications, can offer good guarantees of successful repair and low short and long-term complications 14-16.

We decided to abandon Chevrel technique due to frequent deep infections and high recurrence rate. The intraperitoneal mesh placement was reserved only for cases where the pre-peritoneal layer could not be reconstructed. With regards to the cases with no mesh repair (in all cases for very small hernia defects), a high recurrence rate was observed but this should be compared with the short operating time (always under 30 minutes) and the possibility to operate under local anesthesia 17.

Thus, the 18% recurrence rate might be acceptable as first option especially for high risk patients 17-20.

The Rives-Stoppa technique, positioning the mesh between the rectus muscles and the posterior rectus sheath or peritoneum, can be considered the “gold standard” of hernia repair; once the plan between posterior rectus sheath and pre-peritoneal plan is developed, the opposite layers have to be sutured in order to obtain a
complete separation from the intra-abdominal content and to offer a barrier against bacterial contamination. The prosthesis has to be fixed by a U-stitch suture: anterior muscles sheath → large muscles → mesh and vice versa. Polypropylene meshes have a macroporous structure, allowing the macrophages, fibroblasts, neo-formed vessels and collagen fibers incorporation into the host tissue.

Obviously, the choice of the repair technique is substantially indicated by the tissue representation. The size of the hernia defect and the available anatomical structures are essential for the reconstruction of the abdominal wall. In some cases, the tension of the fascial layer repair requires lateral relaxing incisions or a components separation technique as described by some authors. In some cases, we used the hernia sac to reapproximate the peritoneal layer. 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 (Fig. 3), with the prosthesis placed between the two fascial layers.

Conclusion

Combining the Rives-Stoppa technique with some personal technical modifications, we obtained acceptable results in terms of recurrence rate (only two cases) and morbidity. We conclude that this surgical approach is the current standard of care for the surgical treatment of incisional hernia.

Riassunto

Obiettivo: Il laparocele rappresenta ancora oggi un problema di frequente riscontro in chirurgia generale con un’incidenza pari a circa l’8-10% dopo chirurgia elettiva e il 10-40% dopo chirurgia d’urgenza e complicata. L'introduzione delle tecniche chirurgiche tension free e la disponibilità attuale di dispositivi protesici idonei alle diverse situazioni ha apportato migliorie indiscusse nei risultati chirurgici ottenibili, riducendo il tasso di recidive e complicanze generalmente rispetto al passato. La tecnica di Rives-Stoppa è considerata nella letteratura, quando praticabile, la più sicura ed efficace nel trattamento delle ernie incisionali. In questo studio abbiamo rivisitato la nostra esperienza istituzionale (dodicennale), esponendo i risultati e proponendo una serie di interfacciale di microfibrilli e cellule che si aggregano e inglobano il materiale protesico, con aderenza a lungo termine. I risultati ottenuti possono essere confrontati con quelli pubblicati in letteratura, dimostrando una riduzione di recidive e complicanze.

Risultati: Nei 246 pazienti sottoposti a plastica addominale secondo la tecnica Rives-Stoppa sono state registrate sole recidive (su tredici in totale), due infezioni superficiali e una profonda, risolti con medicazione ed antibiototerapia. Dieci sieromi sono stati risolti con antibiototerapia. Non è stato riscontrato nessun caso di aderenza.

Conclusioni: I risultati del nostro studio confermano che la tecnica di Rives-Stoppa rappresenta il “gold standard” nel trattamento delle ernie incisionali e dimostrano che, con opportuni accorgimenti tecnici, possa avere margini di miglioramento in termini di riduzione di complicanze a breve e lunga distanza.

References


