

## Dynamic suture less repair of incisional hernia

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**Abstract.** *Background and aim of the study:* An incisional hernia is represented by the escape of organs from their physiologic position through an area of weakness on the surgical scar. An original technique, based on a Rives intervention, which is the golden standard in the treatment of incisional hernias, is presented in this study. *Methods:* From January 1995 to December 2003, 93 patients underwent surgery for incisional hernia in our Division. The intervention was performed in 52 cases (Group A) with a classic Rives technique, with apposition of a prolene mesh in the subaponeurotic space, and fixation of the mesh with transcutaneous stitches. In 41 cases (Group B) the intervention was performed with a personal technique, with apposition of an "Hertra 0", a rigid and memory controlled mesh between the rectum abdomini muscle and its posterior fascia, tension free without fixation with stitches. *Results:* The mean follow-up was of 23 months. In Group A we observed immediately 3 postoperative cases (5%) of intraparietal haematoma, 2 (4%) of subcutaneous haematoma, 4 (7%) of retrofascial haematoma, 4 (7%) of wound infection (in 1 it was necessary to remove the prosthesis), 3 (6%) of respiratory complications, and 1 case (2%) of cardiovascular complication. In Group B we observed only 3 cases (7%) of subcutaneous seroma. The mean postoperative stay was 6 days in both groups. There was no postoperative mortality or relapses. *Conclusions:* The presented technique seems to offer advantages in the management of incisional hernia; the use of "Hertra 0" mesh simplifies Rives technique, improving its resistance to infections.

**Key words:** Incisional hernia, dynamic repair, suture less repair

### Background and aim of the study

An incisional hernia is represented by the escape of organs from their physiologic position through an area of weakness on the surgical incision scar (1). This pathology is more frequent in complicated laparotomies, and its incidence reaches 10% in septic laparotomies (2). It is more frequent in the VI and VII decade, with a male-female ratio of 3:1, and is often observed before the 3<sup>rd</sup> year following surgical intervention (2). The surgical treatment of this pathology consists in reconstructing the abdominal wall without creating tensions, avoiding forced reduction of abdominal diameters, which could lead the patient to re-

spiratory insufficiency. There are many options for the surgical management of incisional hernias, from a simple plastic of abdominal wall muscles to the apposition of prostheses in suprafascial, subfascial or intraperitoneal layers (1). The use of simple plastic reconstruction is to avoid due to the high incidence of relapses, while the apposition of prostheses in the suprafascial area does not seem to be the best choice due to the high incidence of infection and prostheses displacement observed for the colliquation of subcutaneous tissue (3). The reconstruction with subfascial properitoneal prostheses, as described by Stoppa and Rives, seems to be the golden standard in this disease, due to the favourable effect of endoabdominal pressure on

prosthesis adhesion, which is enhanced by an adequate superposition of musculo-cutaneous layers (4, 5). The choice of intraperitoneal prostheses, unavoidable in large size incisional hernias, requests the use of special expensive prostheses, which can be positioned in contact with endoabdominal viscera (6). Sometimes, when a giant incisional hernia is observed, the use of preoperative therapeutic pneumoperitoneum (Goni-Moreno technique) may be useful, making easier the repositioning of abdominal viscera without creating excessive tensions (1, 7).

## Methods

From January 1995 to December 2003, 93 patients (64 males and 29 females, mean age 64, 3) underwent surgery for incisional hernia repair in our Division. In 79 cases (85%) the hernia was in medial supraumbilical area, in 7 cases (8%) it was sub umbilical, in 4 cases (4%) it was in sub costal area and in 3 cases (3%) it was positioned in the left iliac space. In 82 cases (88%) the abdominal wall defect was of middle-large size ( $\leq 10$  cm), while in 13 cases we observed the presence of a large loss of tissue. A preoperative ultrasonography and respiratory function analysis was made in all cases, while in the most complicated hernias (7 cases, 7,5%) a preoperative CT scan was found to be necessary.

When respiratory functionality resulted to be low, a preoperative medical and physical therapy, together with the use of curative pneumoperitoneum, was done for 3 months.

The surgical intervention was performed in 52 cases (Group A) with a classic Rives technique, with apposition of a prolene mesh in the subaponeurotic space, and fixation of the mesh with transcutaneous not reabsorbable stitches (1, 4, 5).

In 41 cases (Group B) the intervention was performed with a personal technique, with apposition of an "Hertra 0" rigid, memory controlled mesh between the rectum abdomini muscle and its posterior fascia, without fixation with stitches. In all cases drainage was positioned at the end of the intervention, and was pulled when it was draining less than 10cc of serum/die (2, 9).

## Results

The mean follow-up was of 23 months (5-59). In Group A we observed 3 cases (5%) of intraparietal haematoma, 2 cases (4%) of subcutaneous haematoma, 4 cases (7%) of retrofascial haematoma, 4 cases (7%) of wound infection (in 1 case it was necessary to remove the prosthesis), 3 cases (6%) of respiratory complications, which solved with medical and rehabilitative therapy, and 1 case (2%) of cardiovascular complication. The drainage was pulled in this group on average of 72 hours after surgery. In Group B we observed only 3 cases (7%) of subcutaneous seroma. The drainage was pulled in this group on an average of 48 hours after the intervention. The mean postoperative stay was 6 days in both groups. We observed no postoperative mortality or relapses.

## Discussion

Rives technique is considered the golden standard for incisional hernia repair (5). The intervention is safe, quick and free from relapses, due to the insertion of a prosthesis, which is quickly "cemented" into the parietal wall. The fault of this technique seems to be in its adynamy, with the creation of parietal tensions, and in the high incidence of postoperative sepsis and seromas.

In fact, in Rives technique, the fixation of the mesh with transcutaneous stitches opens a contact between the periprosthetic space, which is easily infectable, and the outside. The fixation of the prosthesis to the abdominal wall, besides, is an obstacle to adaptation of the mesh to the movements of the abdominal wall and to the changes of dimension in the mesh (2). A study published in 2003 by Coda et al. showed a modification of the size in implanted meshes which varied from -40% to +80% (10).

Our personal modification to Rives technique, based on the "Hertra 0" rigid mesh, consists in the positioning of the mesh between the rectum abdomini muscle and the posterior fascia, using the closed box of posterior and anterior aponeurosis of the muscle and the rigidity of the mesh to avoid displacements. This approach results in a dynamic technique, and reduces

the creation of dead spaces, being the mesh pulled against the anterior abdominal wall by the abdominal pressure, and adaptable to the parietal conformation because not fixed to it. Moreover, the described technique avoids communications between the prosthesis space and the external space (transcutaneous stitches), being effective in reducing the incidence of septic complications. The contraindications to this technique are the same as in Rives intervention (1, 4, 5). In fact the mesh cannot lie in contact with internal viscera, due to its inclination to produce adhesions, so that in case of difficulty in closing the posterior fascia of recti abdominis, a PTFE or dual mesh prosthesis will be indispensable, with increase of the costs (11-13). A yet unpublished experimental study we are conducting on 40 rats, to prove the biocompatibility of "Hertra 0" prosthesis, showed very good preliminary results. In fact, in this study, where a dosage of fibronectine on implanted "Hertra 0" and Polypropylene classic meshes was made, the new meshes showed to have a minor tendency to product adhesions, maybe due to their minor porosity, and, in a second part of the study, they showed to be nearly fully refractory to the creation of adhesions when covered with a layer of hyaluronic acid gel. This kind of approach could be useful, in a near future, to reduce costs in all situations when an intraperitoneal positioning of the mesh is required.

## Conclusions

The technique above presented seems to show unquestionable advantage in the management of incisional hernias. In particular, the use of "Hertra 0" mesh simplifies Rives technique, improving its resistance to infections and bettering esthetical outcome of patient's wounds. The use of more expensive PTFE and bi-layer prostheses is already necessary for very large incisional hernias, but the research of new biomaterials will soon lend itself to less expensive solution, maintaining the effectiveness of the techniques.

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