

Brief Reports

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Laparoscopic Parastomal Hernia Repair with Titanium-coated Mesh: Technique Principles and Personal Experiences

Parastomal hernias (PHs) continue to be one of the greatest challenges which a surgeon has to face. The surgical options range from relocating the stoma to defect repair using direct suture or mesh reinforcement through an open or laparoscopic approach. The deep mesh reinforcement technique is considered to be the most appropriate and the laparoscopic approach the least traumatic, but both the keyhole and the Sugarbaker techniques can have high rates of recurrence.¹⁻³ The aim of this study is to present results for the laparoscopic treatment of parastomal hernias performed in a specific unit, which is highly experienced in laparoscopy and hernia treatment, and to discuss the principles of the surgical technique.

Since 2008, five patients have undergone surgery on symptomatic parastomal hernias in an abdominal wall unit performed by an expert surgeon in laparoscopy and hernia surgery. All the patients were included in a study protocol and signed the suitable consent papers. The preoperative study included a tomography scan to evaluate the defect (size of the ring and the sac), the state of the lateral musculature (whether there was any atrophy), and the existence of any concomitant hernias. The data were collected prospectively and registered in a database for subsequent computer analysis.

The patient is placed under general anesthetic in the supine position. Pneumoperitoneum is created with a Veress needle in the subcostal space in the anterior axillary line, a 10-mm trocar for the optics is placed midlevel between the rib and iliac crest, and two equidistant 5-mm trocars. The technique is decided on depending on the size of the defect. The keyhole is performed with a preformed mesh with a flap. The

Sugarbaker is performed with a flat 20 × 20-cm mesh without fenestration, which gives sufficient overlap and should always be greater than 5 cm in all directions. Our technique adds to the keyhole principles (total contact/integration of the mesh on the posterior abdominal wall), and the Sugarbaker principles (creation of a stomal valve and tunnelization of a segment of the intestine) with fixation to the stable and solid structures of the lateral hemiabdominal wall (superiorly, the costal margin, and inferiorly, the iliac crest), with a 30 × 20-cm lightweight polypropylene titanium-coated mesh (TiMesh^R; Cologne, Germany). It is fixed using reabsorbable staples at 2-cm intervals (Scurestraps; Ethicon, New Jersey), and the rest of the surface of the mesh is fixed with a synthetic tissue adhesive cyanoacrylate (IfabondTM; Fimed, Lyon, France). No holes are cut to adapt to the size of the loop so that this emerges sandwiched between the two meshes (Fig. 1A–B). Patients were clinically re-evaluated seven days and one, three, six, and 24 months after surgery, at which times the primary and secondary outcomes were documented. The primary end point was recurrence (confirmed by clinical examination and tomography at one year), and secondary end points were morbidity.

Five consecutive patients with symptomatic parastomal hernias have undergone surgery: three who had previously been admitted with intestinal obstruction (incarceration) and two with pain. The demographic data are presented in Table 1. The operation was converted to open surgery in one case because of complete abdominal adhesion obstruction (20%). The mean operating time was 104.4 minutes (range, 83 to 138 minutes). A concomitant incisional hernia was found in three patients (60%), which were repaired in the same surgical time using an additional mesh. There have been no intraoperative or postoperative complications. There were no problems with stenosis or obstruction of the colostomy. No recurrences have been detected during an average follow-up of 22 months (range, 16 to 28 months) (Table 2).

The options for surgical treatment of PH are relocation of the stoma, local repair, or repair using prosthesis,

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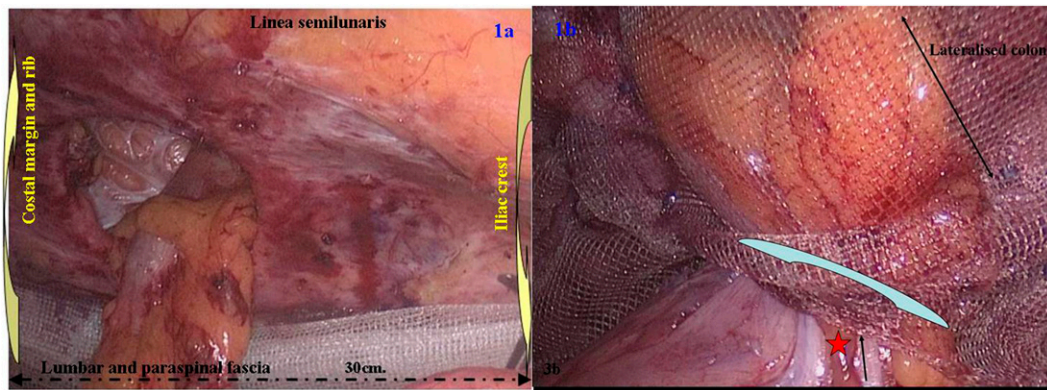


FIG. 1. Technique proposed by the author. Reinforce the entire hemiabdominal wall with fixation to anatomic structures. (A) Stable fixation points in the lateral abdominal wall: the costal margin and rib superiorly, the linea semilunaris anteromedially, the inguinal ligament and iliac crest inferiorly, and lumbar and paraspinous fascia posteriorly. (B) Section of the mesh, tunnelization of the intestinal loop between two sheets of mesh (black line). The new superficial parietal orifice is shown (red star) through which the ostomy loop enters the abdominal cavity (black line) (Case 5).

TABLE 1. Characteristics of Patients Diagnosed with Parastomal Hernia

	Case 1	Case 2	Case 3	Case 4	Case 5
Age (years)	58	56	63	68	72
Gender	Male	Female	Male	Male	Male
Body mass index (kg/m ²)	30.5	27	29	25.8	32.3
Stoma type	Colostomy	Colostomy	Urostomy	Urostomy	Colostomy
Indication for stoma	Colorectal neoplasm	Colorectal neoplasm	Bladder carcinoma	Bladder carcinoma	Colorectal neoplasm
Symptoms	IBO	Pain + CC	IBO	IBO	Pain + CC

IBO, intermittent bowel obstruction; CC, cosmetic complaints.

TABLE 2. Postoperative Data for Patients Operated on Using the Laparoscopic Approach

	Case 1	Case 2	Case 3	Case 4	Case 5
Mean operating time (minutes)	110	95	83	138	96
Defect size (cm)	4 × 2.8	3.5 × 4	6.9 × 3.8	8.6 × 12.8	7.5 × 8.2
Technique	Keyhole	Keyhole	Sugarbaker	Berger	Author technique
Concomitant hernia	No	No	Yes	Yes	Yes
Hospital stay (days)	4	4	3	5	3
Morbidity	—	—	Seroma 8 × 4 cm	—	—
Chronic pain (> 3 months)	No	No	No	No	No
Recurrence (follow-up) (months)	No (28)	No (24)	No (23)	No (19)	No (16)

Author technique: slit without central hole, bone fixation iliac crest and rib; Mesh: polypropylene–titanium-coated mesh (TiMesh^R).

but none of these seems to have gained a suitable level of consensus. The laparoscopic approach has been proposed as an alternative because it offers the advantages of minimally invasive surgery, a reduction of morbidity as well as the possibility of repairing any concomitant hernias at the same time. At present, this method of approach is constantly evolving and the range of techniques, meshes, and fixation methods means that there is enormous variation between the results published and, thus, it is difficult to be able to come to a reliable conclusion.^{1–4}

There are two possible surgical options: 1) keyhole and 2) Sugarbaker, with recurrence rates according to

the literature of 34.6 and 11.6 per cent, respectively.⁴ The failures of the keyhole technique could be explained by two reasons: 1) the preformed hole, which is in itself impossible to adjust to the size of the colostomy while at the same time should be advised against because of inevitable individual variation, which cannot be catered for by a mesh with a standard-sized hole; and 2) the use of meshes that shrink a lot, which seems to favor the progressive increase in the size of the central hole. Fenestration creates a weak area, lacking in fibrosis on the posterior abdominal wall, which predisposes herniation. The author used a fenestrated mesh made of polypropylene but with the upper sheet

as a complete flap, thereby managing to 1) completely annul the weak part of the fenestration, because the complete mesh is in contact with the posterior abdominal wall around the stoma; and 2) reduce the size of the hole by adapting it to the stoma in the same way as a skirt does to a belt by rotating the upper flap in a clockwise direction (Fig. 2).

The Sugarbaker technique uses an unsectioned mesh, avoiding the problems of the first option, but it leaves part of the posterior abdominal wall without the support of the mesh and there is danger of obstructing the ostomy if too narrow a valve is formed around it. This option is considered less demanding, requires less surgical time, and seems to have a lower recurrence rate. Cases of recurrence have been justified by insufficient fixation. The author proposes combining the principles of the first two technical options (reinforcing the complete abdominal wall and a segment of tunneled loop) with just one mesh.

The mesh choice is another important factor to be taken into account in laparoscopic PH repair. The polytetrafluoroethylene mesh has been the most used, but in recent years, some authors have suggested substituting it for a polypropylene mesh to avoid recurrences derived from less integration (fibrosis) and greater shrinkage. It is clear that the ideal PH mesh does not yet exist.²⁻⁴ Analysis of the literature shows no reference to the use of polypropylene titanium-coated mesh.

The hernia factor may contribute to the failure of those repairs that are limited to treating the defect without sufficient overlapping and without taking into account how the PH changes the dynamics of the whole lateral abdominal wall. The PH is a type of lateral hernia, which shares certain characteristics common to all the others (progressive weakness and increase in size, muscular lesion and possible atrophy because of denervation, absence of dense fascias, soft tissue lesions, and presence of osseous limits) and thus the same treatment principles need to be considered. None of the two options described take this fact into account and they all use parietal fixation, when the lateral abdominal wall should be repaired as a whole, from its osseous limits. The author proposes that the repair should include “the complete lateral hemiabdominal

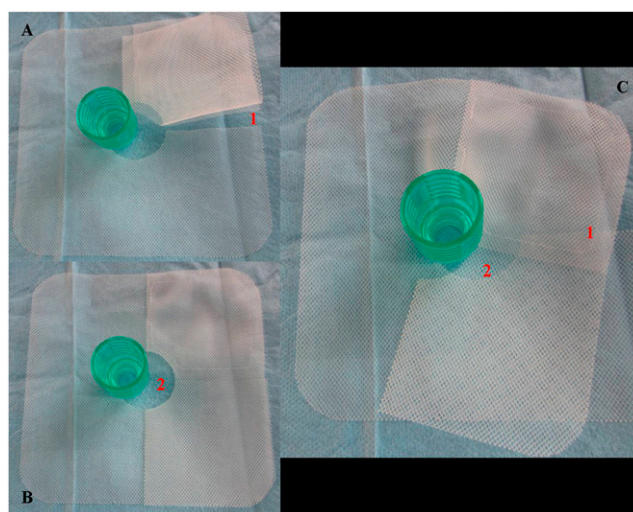


FIG. 2. Keyhole technique. Weak areas: (1) fenestration; (2) preformed central hole. (A) Preformed polypropylene titanium-coated mesh. (B) The flap covers and avoids the weak area of the fenestration (1). (C) When the upper sheet is twisted, it adapts the central hole to the stoma (2).

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wall” using just one mesh with the greatest possible overlap and osseous fixation, which establishes the defect and avoids as far as is possible progressive bulging and weakness. In conclusion, laparoscopy is a safe and effective approach for treating PH. It seems reasonable to try to adjust the technique to the type of PH and not treat them all using the same surgical option.

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