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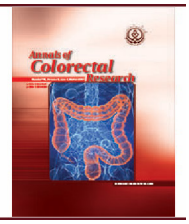

Concomitant Enterostomy Closure and Ventral Abdominal Wall Reconstruction Using the Lázaro da Silva Technique

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Abstract

Introduction: We present a small series of patients who underwent concomitant treatment of external digestive bypass (stoma) and incisional hernia, using the Lázaro da Silva technique - a special method of purely tissue repair. The rationale was not to use meshes on contaminated wounds.
Methods: Initially, five patients were enrolled (mean age of 60 years) and all were operated on by the same group. Some demographic data were recorded, along with the time interval until making a stoma (or the appearance of an enterocutaneous fistula). Some characteristics of the hernia and data related to surgical procedures were also pointed out. The primary outcome was to verify the rate of hernial recurrence along with surgical site occurrences in the first 30 days.
Results: Only one patient had superficial wound infection and in none of them was a recurrence detected.
Conclusion: Our work raises some questions about the best approach in these more complex cases, such as dissociating or not dissociating the procedures, the use of meshes in general, and the employment of mini-invasive surgery in some steps.

Keywords: Constipation, Outlet obstruction, Rectal prolapse, Resection rectopexy, Laparoscopy

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Introduction

The use of synthetic meshes (polypropylene, polyester, polyvinylidene) in ventral hernia repair (VHR) has been proposed as the standard treatment regardless of the size of the parietal defect, higher incidence of chronic pain, and occasional infections (1-3). Unfortunately, all these complications resulting from the presence of any biomaterial in human tissues are cumulative, often requiring reoperations at similar rates due to recurrences (4). Thus, it becomes a choice between recurrence or a major problem related to the prosthesis, and both may require surgical reintervention.

Despite some favorable evidence (5, 6), the use of non-absorbable meshes at sites with a higher risk of infection seems questionable in some cases, including patients with an ileostomy, colostomy, or enterocutaneous fistula, associated with bulging of the laparotomic scar of the original diversion

surgery (Figure 1). In such cases, enterostomy closure (EC) concomitantly with VHR using mesh might compromise both results, especially if there is any visceral complication such as a deep abscess, fistula, or complete anastomotic dehiscence. Once peritonitis develops, reoperation is required with a new digestive diversion and, at times, removal of the mesh leading to an almost immediate recurrence of a larger hernia.

When the surgeon decides to do both procedures at the same time (this occurs when the access to the peritoneal cavity has to be done through the parietal defect and hernial sac), the option of tissue repair of the ventral hernia seems tactically more justifiable than a prosthetic one. Another option is to perform them separately, prioritizing EC. Once the anastomosis has healed and bowel function is fully restored, the hernia can be repaired under more favorable conditions.

In the early 1970s, the Brazilian surgeon Alcino Lázaro da Silva published his technique for correcting midline defects without using mesh, but rather employing the hernial sac (HS) as an autologous prosthesis, with alternating relaxing incisions in the rectus abdominis muscle (RAM) sheath (Figure 2). He named this technique 'plastic surgery with the hernial sac in the correction of incisional hernias', later adopting more descriptive terms such as 'bilateral longitudinal peritoneum-aponeurotic transposition'. Currently, it is referred to as 'hernial sac transposition' (HST). In addition to completely restoring the ventral abdominal wall with

Figure 1: Patient with colostomy and midline incisional hernia; relaxed (a) and under Valsalva maneuver (b).

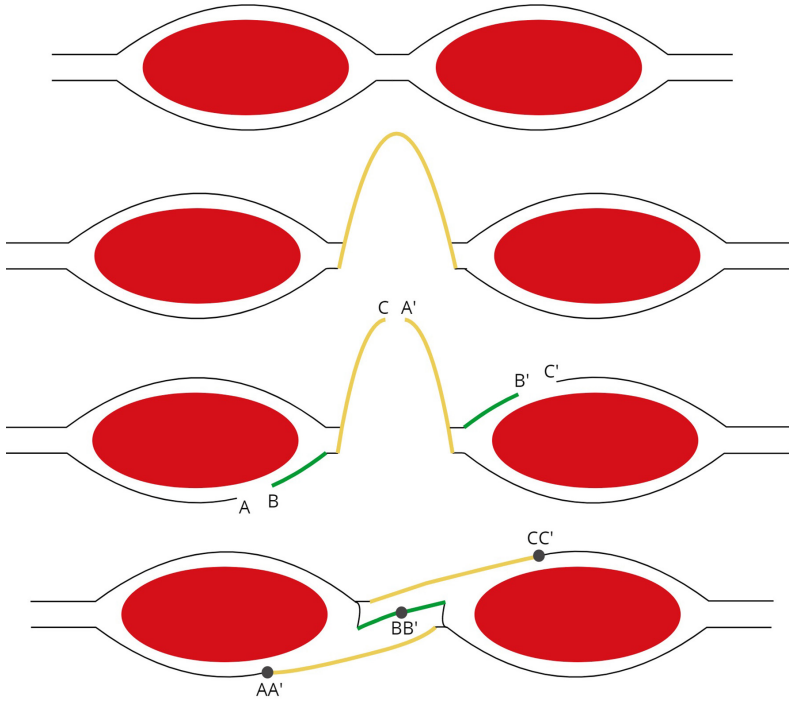

Figure 2: Diagram representing a cross-section of the ventral abdominal wall, normal (first upper), with the midline incisional hernia - diastasis and hernia sac in yellow (just below), and showing the transposition technique with the hernia sac (THS) by Lázaro da Silva (two lower ones). A and B, lateral and medial leaflets of the relaxing incision in the posterior layer of the left rectus abdominis muscle sheath. C, the free edge of the left half of the hernial sac after its longitudinal section, and A', that of the right half of the sac. B' and C', medial and lateral leaflets of the relaxing incision in the anterior layer of the right rectus abdominis muscle sheath. 1st suture layer (AA'), 2nd layer (BB'), and 3rd layer (CC'). Diagram prepared by Guilherme Seronni, 2020.

a new fibro-aponeurotic linea alba, this method does not cause excessive tension on its three suture lines (allowing the use of absorbable sutures) or abdominal hypertension, thus preventing the highly lethal abdominal compartment syndrome. His personal results revealed a recurrence rate of 7.7% over a long period (7, 8). An HST is a great option for midline VHR, whose parietal defect is single (or multiple, but convertible into one), has an elliptical shape, with a width not exceeding 15 cm, and with a large hernial sac (9, 10).

This study aimed to evaluate the concomitant reconstruction of the intestinal tract and abdominal wall using the Lázaro da Silva technique as an alternative to meshes for these cases. The primary outcome was the recurrence rate at 12 months postoperatively, and secondary outcomes were intraoperative variables and main surgical site occurrences (Figure 3).

Methods

The project was approved by the Research Ethics Committee of the institution where the study was conducted (Protocol No. 4.334.771/2020) and all patients provided written informed consent.

This was a retrospective study of patients with an enterostomy (ileostomy or colostomy) or enterocutaneous fistula (especially stercoral fistula) associated with midline ventral hernia, who underwent EC and VHR during the same surgical procedure between July 2017 and July 2020. All operations were proceeded by two authors (RMM and PDOS).

Demographic characteristics of patients, such as gender, age, and body mass index (BMI), were collected together with information regarding the ventral hernia, including location (infra and/or supra-umbilical) and dimensions of the parietal defect, as proposed by the European Hernia Society (11). The interval between the intestinal diversion or the fistula formation and the surgical procedure was recorded. Total time spent in the operation and in each of the procedures (EC and HST), as well as rates of surgical site occurrences (SSO) in the first month, and recurrence at 12 months postoperatively were recorded.

The procedures were performed under general anesthesia and an associated neuraxial block for preemptive analgesia. Antibiotic prophylaxis was used according to the pre and post-operative protocols of the Goiania General Hospital (Goiania, Brazil). Intestinal anastomoses were performed using handmade or mechanical sutures, and the ventral hernia was repaired using the Lázaro da Silva technique without synthetic mesh, as mentioned above.

The steps recommended in the original method were followed as outlined below:

a) Complete dissection plus midline longitudinal opening of the HS, followed by viscero-parietal adhesiolysis; next, the surgeon made the bilateral relaxing incisions on the rectus abdominis muscle (RAM) sheath 1-2 cm from its medial edges: posteriorly in the left, and anteriorly in the right side. These incisions produced two flaps on each side (the medial and the lateral one).

b) First layer: suturing of the right half of the HS to the lateral-posterior flap on the left, closing the abdominal cavity, and covering the exposed surface of the left RAM.

c) Second layer: suturing of both medial (anterior with posterior) flaps of the relaxing incisions; thus, both RAMs move medially again, and a new fibro-aponeurotic linea alba is retraced. This is the most important step during which the hernial gap is closed;

d) Third layer: suturing of the left half of the HS to the lateral-anterior flap on the right, also covering the exposed surface of the right RAM.

Absorbable monofilament sutures were used for herniorrhaphy; those of short duration profile (0-gauge poliglecaprone) were used in the first and third layers, while the slowly absorbable type (0-gauge polydioxanone) was used in the second layer. After the stoma or fistula was reversed and before the hernia was repaired, the parietal defect on the posterior side of the stoma was closed using

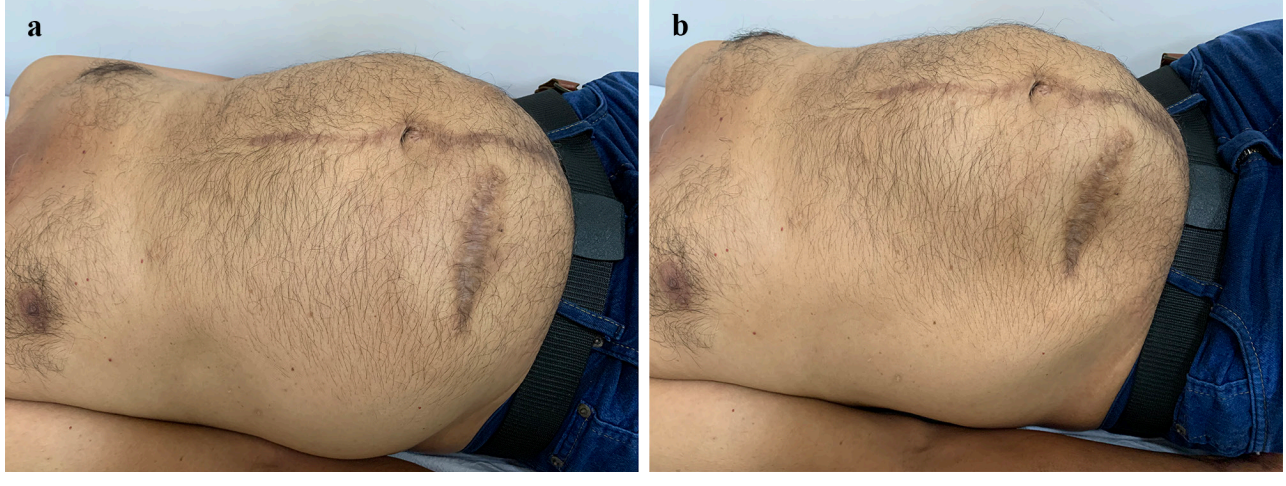

Figure 3: The same patient of Figure 1 in the late postoperative period of combined reconstruction of the intestinal transit and ventral abdominal wall by THS; relaxed (a) and under Valsalva maneuver (b).

a continuous anchored suture with polydioxanone of the same gauge. The subcutaneous tissue and the skin were closed, and no drains were used.

The presence of early local complications (within the first 30 days) was checked during the follow-up, both in the abdominal wall (hematoma, seroma, infection, and cutaneous necrosis) and/or the digestive tract (distension by adynamic ileum, stenosis, and dehiscence or anastomotic leakage, requiring reoperation). The incidence of hernia recurrence was evaluated by physical examination at 12 months postoperatively by one of the authors. The integrity of the sites of the former stoma or fistula and that of the midline scar were evaluated. If deemed necessary, the medical evaluation would be complemented by computed tomography of the abdomen.

Results

Five patients with an indication for EC (three for colostomy; two for stercoral fistula) and concomitant VHR were operated on during the study period and followed up for medical evaluation. At the time of completion of this study, one of them had completed only 10 postoperative months. Although she had no clinical signs of recurrence, she was excluded from the analysis, and four patients who met the inclusion criteria were enrolled.

Gender and age of patients were evenly distributed, with a mean age of 60 years (ranging from 55 to 65 years). All cases involved the sigmoid colon: one patient with loop colostomy, two with terminal colostomy (Hartmann type), and one with stercoral fistula to the laparotomic scar. Colostomy was indicated due to the diagnosis of complicated diverticulitis in three patients and severe Fournier syndrome in one. The mean interval between the intestinal diversion or the fistula formation and EC-HST surgery was 14 months (ranging from 10 to 22 months).

No serious postoperative complications were observed, except for superficial surgical site infection in the only obese patient (BMI > 30 kg/m^2). She was treated with dressings, symptomatic drugs, and antibiotics and progressed satisfactorily. There were no visceral complications.

The mean duration of HST was 96 min, including the dissection and longitudinal opening of the hernial sac, an extensive adhesiolysis, and the entire parietal synthesis. The mean duration of EC was 137 minutes, which was almost one-and-a-half times that of HST, even though the adhesions had already been lysed and parietal synthesis was included in the HST step. The exception was the patient with Fournier's syndrome, whose derivation was a loop sigmoid colostomy, thus shortening the duration of the EC. This procedure was performed before performing the HST to reduce the possibility of contamination of the VHR operative field. If each procedure was performed separately, the total duration would be at least two times longer.

In the late postoperative period, a mean follow-up of 22.5 months (16-30) was achieved and all four patients were asymptomatic with a firm midline scar during physical examination under full Valsalva maneuver. No imaging test was necessary. However, the patient with Fournier's syndrome had a painless small bulging (1.5 cm) on exertion, next to the lateral angle of the scar of the first colostomy (left). Initially, his colostomy was located on the left lower quadrant, and then it was moved to the right side.

The demographic data are provided together with the characteristics of the stoma/fistula, parietal defect, and postoperative variables in Table 1.

Discussion

This case series highlights the possibility to treat two challenging surgical conditions, i.e., a stoma and a ventral hernia, without using mesh.

One of the direct benefits of this approach is treating two conditions in the same operation. This advantage has a definite positive impact on the patients' quality of life. However, patients at risk of severe septic complications have an unfavorable prognosis in the

Table 1: Demographic and operative data of patients undergoing EC-HST*.

Variables	Patients			
Age (years)	56	63	55	65
Gender	F	M	F	M
BMI (kg/m^2)	23.2	27.9	30.2	29.7
Indication for stoma	Hartmann colostomy (diverticulitis)	Loop colostomy (Fournier)	Hartmann colostomy (diverticulitis)	Stercoral fistula (diverticulitis)
Interval until EC (months)	13	22	10	12
Incisional hernia**	M3-M5/W2	M1-M5/W2	M1-M5/W2	M1-M5/W3
EC procedure	Sigmoidectomy	Suture closure	Sigmoidectomy	Sigmoidectomy
Duration: total, EC/HST	4h30min, 3h20/1h10	3h25min, 1h35/1h50	6h05min, 4h15/1h50	5h25min, 3h50/1h35
SSO (first month)***	-	-	SSI (superficial)	-
Recurrence (months)	No (16)	No (16)	No (28)	No (30)

*Enterostomy closure and hernial sac transposition; **Location and dimensions according to the European Hernia Society classification (11). ***Surgical site occurrences (hematoma, seroma, surgical site infection/SSI, and skin necrosis) in the first 30 days. BMI: THS.

presence of meshes. Fortunately, in the only case of postoperative infection, it was limited to the skin and subcutaneous tissue and was treated conservatively.

The number of procedures for diversion of the digestive tract, such as ileostomies or colostomies (loop or terminal), though temporary, has significantly increased in recent years. This is due to the increasing number of surgeries for tumors, complicated diverticular disease (perforation, peritonitis, and/or abscess), accidental intraoperative injury, and also trauma. However, these stomas have not been well positioned, stable, continent, and usually have an associated hernia, which makes their management challenging (12, 13).

The incidence of enterocutaneous fistulas is variable and they usually occur at the site of the laparotomy scar, which is a site with less resistance. Since they behave like a true stoma, they need to be treated by resecting the entire fistulous path until involved intestinal segment, which is often removed "en bloc" and anastomosed.

Moreover, challenges such as the difficulty in finding good quality collection bags with adequate sealing for gases and feces, dermatitis caused by the adhesive fixing of the bag's coupling plate, and the time spent in changing the bag affect the social life of these patients, further stigmatizing them.

These and other problems are accentuated in less developed countries, where poorer patients do not receive adequate social assistance from the government, and specialized nurses are unavailable; thus, their quality of life is much more compromised.

A ventral hernia (VH) develops in 10 to 20% (1) of midline laparotomies despite advances in techniques and materials for the closure of the abdominal wall, which have reduced its incidence by about 5% (14-17). Its incidence can be further reduced if such wounds are reinforced by prophylactic prostheses in the presence of risk factors, such as smoking, chronic obstructive pulmonary disease (COPD), obesity, and previous surgery for an abdominal aortic aneurysm. Fortunately, the use of videolaparoscopy (VL) has been increasing in the surgical scenario, even in emergency circumstances, which helps to keep the abdominal wall more intact than in conventional surgery (laparotomy).

Among the various VHR techniques described, meshes have always been recommended, irrespective of the dimensions of the parietal defect (1, 3). However, the Lázaro da Silva technique, as originally described, has shown satisfactory and reproducible results, which are equivalent even to those prosthetic repairs. Nevertheless, as with any conventional or open procedure, wide dissection of the superficial tissues (skin and subcutaneous tissue) increases the risk of surgical site occurrences (SSO) such as hematomas and seromas, with a possibility of infection and skin necrosis (8, 10). Conversely, in larger and complex hernias, VL simply covers the abdominal wall with the largest possible mesh. In such cases, surgeons perform separation of the anterior (section of the aponeurosis of the external oblique muscle) and/or posterior (section of the transverse muscle) abdominal wall components, which must be secured with even larger meshes. Although these maneuvers were designed to advance the musculoaponeurotic tissue, they have been used more frequently to expand the space for the placement of prostheses, which are increasing in size, especially when the parietal defect cannot be completely closed (18-20).

Although the use of HST was feasible in all cases and there were no serious postoperative complications or hernial recurrence, it is preferable to perform these procedures separately. This is especially true for cases involving a terminal stoma as they require intestinal resection. This is to avoid the possibility of dehiscence or anastomotic leakage and fistulas, which require reoperation and could make combined treatment impossible. When separating the procedures, EC should be performed first through mini-invasive access since the laparotomy route, which involves the parietal lesion, would inevitably aggravate the hernia. Videolaparoscopy would have no role in the hernia repair step other than adhesiolysis, which is essential for the re-anastomosis of the intestine and/or colon. The greater definition of the image obtained with optical magnification facilitates lowering the splenic angle of the colon if this procedure is required.

Our study highlights an important question about the most appropriate approach for cases involving two major diseases in the same anatomical segment, in which the results of one will have a direct influence on the other. The answer requires a thorough risk-benefit analysis with a thoughtful decision by the surgeon, as any intermediate outcome may compromise the entire endeavor. Our surgical strategy in these cases now can be summarized as follows:

a. Reconstitute the intestinal transit first, preferably by a minimally-invasive (VL) access.

b. If there is no major complication that requires a surgical approach, and the digestive tract is functioning properly, then correct the VH. The recommended interval between the procedures varies from 3 to 6 months at the discretion of the medical team. The selected technique may include or exclude the use of a prosthesis according to the surgeon's experience.

c. Once you have decided on concomitant treatment, VHR without prosthesis is the most appropriate choice. Among those, the HST technique seems to be a very good option.

Until patients with similar problems might be treated with safer and more effective procedures, surgeons need to master at least one of the several techniques for the simple and effective tissue-anatomical reconstruction of the abdominal wall.

Conflicts of interests: None declared.

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