



Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Component separation of abdominal wall with intraoperative botulinum A presents satisfactory outcomes in large incisional hernias: a case report

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ARTICLE INFO

Article history:

Received 1 September 2017

Accepted 5 September 2017

Available online 12 October 2017

Keywords:

Incisional hernia

Hernioplasty

Liver transplantation

Component separation

Botulinum A toxin

ABSTRACT

PURPOSE: Transplantation patients have a series of associated risk factors that make appearance of incisional hernia (IH) more likely. A number of aspects of the closure of large defects remain controversial. In this manuscript, we present the repair of a large IH following liver transplantation through the technique of posterior components separation combined with the anterior, together with the intraoperative use of botulinum toxin A and the placement of mesh. As a secondary objective, we analyze the incidence of IH following liver transplantation in our service.

METHODS: Between the years 2013 and 2016, 247 patients underwent liver transplantation in the Liver Transplantation Service at the Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo, Brazil. We analyzed the incidence of IH in these patients. One of these cases operated in March 2017 presented a defect in the abdominal wall of 22 × 16.6 × 6.4 cm in the median and paramedian regions. We present the details of this innovative surgical technique.

RESULTS: The total operating time was 470 min. During the postoperative phase the patient presented ileus paralysis, without systemic repercussions. Resumption of an oral diet on the fifth postoperative day, without incident. Hospital discharge occurred on the 12th postoperative day, with outpatient follow up.

CONCLUSION: In our service, the incidence of incisional hernias following liver transplantation is 14.5%. We described a successful approach for selected patient group for whom there is no established standard treatment. Given the complexity of such cases, however, more studies are necessary.

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1. Introduction

The development of incisional hernias is a common complication of organ transplantation surgery. Transplantation patients have a series of associated risk factors that make their appearance more likely. The literature shows an incidence rate of up to 35% among liver transplantation patients [1–5]. In Brazil, 1816 liver transplantations were carried out in 2015. In other words, there is a significant number of patients susceptible to developing this complication [6].

The success of therapeutic correction of the hernia depends on a variety of factors, among them, the technique employed and the patient's characteristics such as the size of the hernial defect.

The European Hernia Society (EHS) defines large incisional hernias (W3) as those with a diameter of 10 cm or larger [7].

The bigger the hernia, the more difficult it is to repair without tension, which is fundamental for myofascial closure of the abdominal wall and reducing the risk of recurrence. Large hernial defects treatment are related to postoperative complications, including compartment syndrome; this is a concern for the surgeon because of the difficulty of treatment, as well as high rates of recurrence after surgical correction [1,8–11].

In this context, there are many techniques applied to achieve a first incisional hernial repair without tension. The posterior component separation of the abdominal wall increases the size and guarantees fascial closure; it was described recently in the treatment of large ventral hernial defects [11–13].

In some cases, the anterior or posterior components separation alone is not sufficient to guarantee the closure of the hernial defect. Other treatment options may be necessary for the repair

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Fig. 1. Image of the computed tomography of the abdomen. Incisional hernia is in the median and paramedian region of the abdominal wall, measuring $22 \times 16.6 \times 6.4$ cm, resulting in herniation of the left hepatic lobe and the stomach, bowel loops, loops of the small intestine, without signs of acute complications.

of incisional hernias with a lower risk of complications, such as progressive preoperative pneumoperitoneum and the placement of expanding tissues on the abdominal wall [12].

With the same logic, a recent proposal is the preoperative application of botulinum toxin A (BTA) for hernial correction, in order to relax and stretch the musculature [12,14,15].

BTA has been widely used in medical practice for treatment of a variety of conditions because of its capacity to provoke a sustained and reversible flaccid muscular paralysis. Its preoperative application, as well as aiding the closure of the abdominal wall, can help to lower the recurrence rate. The benefits of intraoperative BTA application for incisional hernioplasty, however, are not well established in the literature [10,14,16].

The objective of this study is to present the repair of a large incisional hernia (W3) following liver transplantation through the technique of posterior components separation combined with the anterior, together with the intraoperative use of BTA and the placement of mesh. As a secondary objective, we analyze the incidence of incisional hernias following liver transplantation in our service.

2. Materials and methods

2.1. Data collection and patient selection

Between the years 2013 and 2016, 247 patients underwent liver transplantation in the Liver Transplantation Service at the Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo, Brazil. Of these, 36 developed incisional hernias as a postoperative complication, indicating an incidence of 14.5% in the service.

According to the classification of incisional hernias by the EHS, 30.5% of these patients ($n=11$) presented large incisional hernias (W3) [7]. One of these cases operated in March 2017 presented a defect in the abdominal wall of $22 \times 16.6 \times 6.4$ cm in the median and paramedian regions (Figs. 1 and 2). The primary surgery was carried out without intraoperative complications, and details are presented here of this innovative surgical technique, for selected patient groups for whom there is no established standard treatment. This study has been reported in line with PROCESS criteria [17].

2.2. Surgical technique

Antibiotic prophylaxis (cephazolin 2 g) was used during induction of anesthesia, according to the protocols of the center in which it was carried out. Surgery begun with accessing the abdominal wall, making an incision along the scarring from previous liver

transplantation. Dissection was carried out to expose the abdominal wall defect components and contents.

Hernial contents were reduced through the abdominal cavity. An important retraction of the abdominal wall was noted to the right, with muscular atrophy of the ipsilateral abdominal rectus. We explored and identified the three muscle groups of the right abdominal wall. The external, internal and transversal oblique muscles of that side were dissected and separated.

The posterior components of the left abdominal wall were identified and separated, combined with a vertical relaxing incision made in the anterior aponeurosis of the abdominal muscles. As a result, we were able to free up the posterior sheath of the rectus abdominal muscle and left oblique external muscles fascia.

Closure of the posterior layer defect was made with approximation of the right transversal muscle with the posterior sheath of the rectus abdominal muscle on the left (Fig. 3). A continuous suture was made with non absorbable thread (Prolene® 1.0, Johnson & Johnson).

Following this, closure of the defect in the anterior layer was made by placing the internal and external oblique muscles together with aponeurosis of the contralateral rectus abdominal muscle (Fig. 4). A continuous suture was made with non absorbable thread (Prolene® 1.0, Johnson & Johnson).

After closure of the abdominal wall, a dilution of 300 UI of BTA (Botox®, Allergan) in 150 mL of saline solution 0.9% (2UI/mL) was prepared. BTA was applied in the whole musculature of the abdominal wall, reaching the internal obliques, external obliques and the transversals of the abdomen bilaterally, as well as the left rectus abdominal muscle. 16UI was applied to each point, 18 injections in total (9 in each side), as previously described.^[8] BTA was not applied to the right rectus abdominal muscle because of the atrophy present when the procedure was carried out.

Following the applications, an inorganic polypropylene onlay mesh was placed, weight 120 ± 10 g/m², pores 0.9 ± 0.1 mm (Abdotex®, Barone, Campinas-SP, Brazil) 30×30 cm, covering the whole area of the hernia (Fig. 5). The mesh was fixed with absorbable thread (Vycril® 2.0, Johnson and Johnson), allowing complete incorporation [11].

Before closing the skin, two vacuum closed surgical drains were fitted. Fig. 6 shows the final aspect of the procedure.

3. Results

Repair of an incisional hernia was carried out following liver transplantation, with components separation, intraoperative application of BTA and placement of onlay mesh. The total operating time was 470 min.

Following surgery, the patient was sent to the intensive care unit, remaining under observation for three days. During the postoperative phase the patient presented ileus paralysis, without systemic repercussions, with the resumption of an oral diet on the fifth postoperative day, without incident. The drain was removed once a return of less than 50 mL in 24 h was reached. Hospital discharge occurred on the 12th postoperative day, with outpatient follow up.

4. Discussion

The incisional hernia is the most common delayed complication following liver transplantation [5]. Diabetes, obesity, male sex, advanced age, incision type, immunosuppression therapy, wound infection and pulmonary complications are the most prevalent risk factors for its development [1–3,8,18]. The incidence of incisional hernias in our service is 14.5%, consistent with the 35% reported in the literature.

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