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CASE REPORT

Simultaneous Surgical Management of Colon Neoplasia and Giant Ventral Hernia: a Case Report

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ABSTRACT

Introduction: *Although simultaneous treatment of abdominal wall defects associated with visceral surgery (cholecystectomy, intestinal resection, Hartmann reconstruction) has been described, the simultaneous surgical treatment of colon pathology associated with abdominal wall pathology is controversial.*

Simultaneous surgical treatment of a colon neoplasm associated with complex abdominal wall pathology has not been described.

Objective: *We present a case of multidisciplinary management and surgical treatment of colon cancer associated with complex abdominal wall pathology, in a single time, with little associated morbidity.*

Case report: *64-year-old female patient with morbid obesity and two long-standing hernias, who was diagnosed with colon carcinoma.*

After the multidisciplinary assessment of the case, optimization of the comorbidities was started and, given the complexity of the hernia pathology, preoperative preparation was performed with: infiltration of botulinum toxin in the abdominal wall and preoperative progressive pneumoperitoneum.

Subsequently, surgical intervention was performed: sigmoidectomy and polypropylene mesh repair of the abdominal wall defect.

The postoperative course was favorable and she was discharged on the 7th postoperative day. 48 hours after discharge, she went to the emergency room for fever that was attributed to infection of the surgical site that was treated with antibiotics, progressing favorably.

The definitive result of the pathological anatomy was Adenocarcinoma, intestinal type, moderately differentiated, pT2 N0 (0/21), without signs of poor prognosis.

Currently, the patient is free of neoplastic disease and without hernia recurrence.

Conclusion: *We consider that by means of multidisciplinary management, optimization and previous preparation of the patient, it is possible to perform a colon surgery and repair of complex abdominal wall pathology, in a single time, with success and low morbidity.*

Key words: *Ventral Hernia; Colon Cancer; Botulinum Toxin, Preoperative Progressive Pneumoperitoneum*

INTRODUCTION

Simultaneous treatment of complex abdominal wall defects associated with visceral surgery (cholecystectomy, intestinal resection, Hartmann reconstruction) has been described.[1] However, a retrospective study does not recommend simultaneous colon surgery (Hartmann reconstruction) with abdominal wall surgery because it would increase the incidence of complications.[2] Another prospective study suggests prophylactic treatment of the abdominal wall, placing a supraponeurotic mesh in high-risk patients undergoing colon surgery by laparotomy, without significant increase of morbidity and with benefit on the incidence of incisional hernia.[3]

To date, the simultaneous treatment of a neoplasm of the colon associated with complex pathology of the abdominal wall has not been documented. We present a case of multidisciplinary management and single-stage surgical treatment of colon neoplastic pathology associated with complex abdominal wall pathology, with little associated morbidity.

CASE REPORT

A 64-year-old female patient with a history of arterial hypertension, diabetes mellitus, dyslipidemia, morbid obesity (BMI: 42.19 kg/m2) and two long-standing ventral hernias was diagnosed with colon neoplasia after a positive fecal occult blood test. She had no digestive symptoms. On physical examination, an abdominal apron and two voluminous hernias, supraumbilical and umbilical were observed, which did not reduce with decubitus and increased in volume with standing (Fig. 1A).

Blood tests confirmed an elevation of the carcinoembryonic antigen (5.87 ng/mL), without other alterations. Colonoscopy revealed an exophytic and ulcerated tumor

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(Fig. 1B) 40 cm from the anal margin (Biopsy: adenocarcinoma). Computed tomography (CT) of the thorax and abdomen did not show distant spread of the disease and allowed us to assess the characteristics of the hernias (Table 1), (Fig. 1C).

After a multidisciplinary assessment (nursing, colon and abdominal wall surgery, anesthesiology, endocrinology and rehabilitation), an optimization of comorbidities was started through diet, physical activity, respiratory physiotherapy and skin care.

Given the complexity of the hernia pathology, the patient underwent a preoperative preparation[1,4] consisting of:

1. Infiltration of botulinum toxin type A (BTA) in the lateral muscles of the abdomen. The procedure was performed by an anesthesiologyst with experience in ultrasound and abdominal wall anesthetic blocks. With ultrasound guidance and using an 18 G lumbar needle, six injections of 30 U of Botox ©, three on each side of the abdominal wall, located equidistant between the costal edge and the iliac crest at the level of the anterior axillary line were made. The toxin was injected between the transverse abdominal, internal and external oblique muscle planes. We used a total of 180 U of Botox ©, instead of 500 U of Dysport © described in the literature, since that is the BTA that we have in the hospital, being 1 U of Botox © equivalent to approximately 3 U of Dysport ©.
2. Placement of intraperitoneal pig-tail catheter. After infiltration of BTA, a percutaneous intraperitoneal 8 Fr pig-tail catheter was placed under ultrasound control using the Seldinger technique, in the left upper quadrant, at the Palmer's point used usually for Veress needle placement in laparoscopic procedures. Both procedures were carried out on an outpatient basis.
3. Twenty-one days after the infiltration of BTA, the preoperative progressive pneumoperitoneum (PPPN) was started, by ambulatory insufflation of 500 to 1000 ml per day of room air (according to patient's tolerance), for 14 days. A total of 12 liters of pneumoperitoneum we administered. After preparation, the control CT showed a significant increase in the volume of the abdominal cavity at the expense of the pneumoperitoneum, with complete reduction of the supraumbilical hernial content and partial reduction of the umbilical hernial content (Table 1 and Figure 1D).

Surgical intervention was scheduled 5 days after the last pneumoperitoneum insufflation. The patient underwent mechanical bowel preparation along with oral and intravenous antibiotic prophylaxis in the immediate preoperative period, according to protocol.The surgical procedure lasted 220 minutes. A colorectal surgeon and two abdominal wall surgeons participated and it consisted of (Figures 1E and 1F):

- Marking and design of the dermo-adypose resection pattern at the level of the lower abdomen, for the subsequent dermolipectomy.
- Initial approach through medial laparotomy without exceeding the limits of the previously marked area.
- Dissection and excision of the hernial sacs, placement of a double-ring plastic protector and release of adhesions.
- Sigmoidectomy and lymphadenectomy with ligation of the inferior mesenteric vessels at the base.
- Performance of a 28 mm circular stappled end-to-end colorectal anastomosis.
- Fascia closure according to the "small bites" technique with MonoPlus © 2/0 (it was not necessary to perform any component separation technique).
- Dermolipectomy using en-bloc excision of the redundant dermo-adypose tissue and subsequent dissection of the upper abdominal flap.
- Onlay placement of a low density polypropylene mesh (30 x 30 cm) We chose this location of the mesh be-

TABLE 1: TOMOGRAPHIC EVALUATION OF HERNIA PATHOLOGY.

	Pre TBA + NPP	Post TBA + NPP
Diameter of abdominal wall defects	Epigastric: 8 cm Umbilical: 6 cm	Epigastric: 6.8 cm Umbilical: 5.2 cm
Lateral abdominal wall muscle thickness[4]	Right: 15.2 mm Left: 18.5mm	Right: 12.4 mm Left: 11.5 mm
Lateral abdominal wall musculature length[4]	Right: 81.5 mm Left: 137.1mm	Right: 223.5 mm Left: 252.2 mm
Hernia sac volume (HSV)	2.3 liters	0.9 liters
Abdominal cavity volume (ACV)	12.1 liters	22.3 liters
HSV/ACV ratio (Tanaka index)[5]	19%	4%

**BTA: Botulinum toxin type A. PPN: Preoperative progressive pneumoperitoneum.*

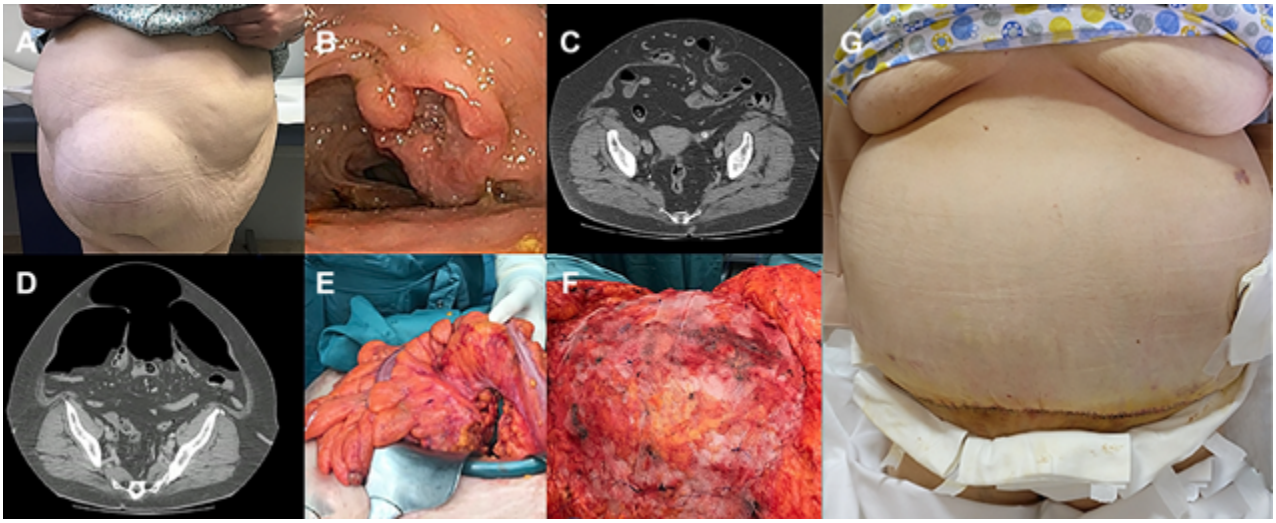

Figure 1: A. Preoperative clinical assessment. B. Endoscopic view of colon neoplasia. C. CT pre BTA + PPPN. D. CT post BTA + PPPN. E. Sigmoidectomy. F. Polypropylene mesh onlay. G. Postoperative result.

cause the supraponeurotic space was already dissected due to the dermolipectomy and to avoid increasing the "trauma" and the surgical time required for sublay placement, in order to reduce morbidity.

- Placement of three subcutaneous drains.
- Approximation of the subcutaneous tissue with absorbable sutures and closure of the skin with staples.

The postoperative course was favorable, following multimodal rehabilitation recommendations: progressive oral diet, early ambulation, prophylaxis of deep vein thrombosis, and respiratory physiotherapy. The surgical wound did not present complications during hospitalization. The control blood tests on the fourth postoperative day did not show alterations. For low output two subcutaneous drains were removed, while the third was maintained due to high output (300cc/day of serous fluid), to continue daily outpatient monitoring. The patient was discharged on the 7th postoperative day (Figure 1G). As the only incidence, during the discharge process, she presented an accidental withdrawal of the subcutaneous drainage, which was replaced under antisepsis rules. The patient went to the emergency department 48 h after discharge from hospital due to a fever peak (38.5ºC), with no other accompanying symptoms. The clinical examination revealed no complications. The drain continued with serous fluid that was cultured. Lab tests and CT showed no significant alterations. Given the absence of significant findings in the complementary tests and the suspicion of a possible infection of the surgical site after the repositioning of the drain, empirical antibiotic treatment was established, later adjusted according to the antibiogram of the cultured fluid, positive for S. aureus sensitive to Methicillin. The patient completed three weeks of oral antibiotic treatment. The drain was removed when it stopped being productive. The patient remained asymptomatic during readmission and was discharged after five days. She had no complications or subsequent readmissions.

The definitive result of the pathological anatomy was moderately differentiated intestinal type adenocarcinoma, pT2 N0 (0/21), without signs of poor prognosis, so she did not require adjuvant treatment.

Currently, two years after the surgical intervention, the patient is asymptomatic, in good general condition, free of neoplastic disease and without hernia recurrence.

DISCUSSION

The treatment of the complex pathology of the abdominal wall constitutes a challenge, which requires a refined surgical technique and the use of specific techniques such as the separation of components. It must be accompanied by a multidisciplinary assessment and preparation in order to improve surgical results and decrease postoperative morbidity and mortality. The preoperative preparation techniques described are PPPN, infiltration of the abdominal wall with BTA and more recently the combined use of both. Associated with the treatment of the complex pathology of the abdominal wall, the performance of other surgical procedures in the same act has been described, among them, abdominoplasty, intestinal resection, cholecystectomy, reconstruction of the intestinal transit.

In our case, after studying the neoplasm of the colon which did not show evidence of local or distant spread (Stage I), two therapeutic possibilities were posed: 1) carry out the surgical treatment of the neoplastic pathology and leave the treatment of the pathology of the abdominal wal for a second stage or 2) the combined treatment

of the neoplastic pathology and the abdominal wall in a single-stage procedure.

After the multidisciplinary evaluation of the case and in agreement with the patient, we opted for the treatment in a single act, since the preoperative preparation time (approximately 1 month) would not worsen the prognosis of the neoplastic disease and we would also solve the problem of the abdominal wall , which at that time was the one that most affected the quality of life of the patient. In the case of an oncological stage greater than I, we consider that the treatment of the neoplastic process should be prioritized.

Regarding the preoperative preparation, we opted to perform the infiltration of BTA in the abdominal wall and posterior PPPN, since in this way several benefits are obtained:

The use of BTA reduces the duration time of PPN to a third of the usual, with the consequent reduction of discomfort for the patient.

PPN conditions the reduction of hernial content to the abdominal cavity. This allows the chronic inflammatory process to which chronically incarcerated viscera are subjected to subside, important for our case in which we would have to perform a resection and anastomosis of the colon.

BTA causes temporary paralysis of the lateral abdominal muscles and PPN conditions a distention of the lateral abdominal musculature, both effects facilitate surgical repair of the wall, reducing the need to use more invasive techniques. In our case, it allowed a primary closure without the need to associate component separation techniques.

Muscle paralysis produced by BTA (approximately six months) would "protect" the abdominal wall repair from muscle tension on the fascial suture during the healing process.

An analgesic effect of BTA has also been described, which would contribute to better control of postoperative pain.

Finally, despite the fact that the postoperative course of our patient was favorable, we believe that the incident of accidental wihdrawal and repositioning of the subcutaneous drain conditioned her subsequent readmission due to fever and although it was an adverse Clavien-Dindo II effect, it could have brought greater consequences.

As a point to improve, in addition to the aseptic and antiseptic measures used to drain replacement, it would have been appropriate to administer a dose of prophylactic antibiotic to prevent infection of the surgical site.

CONCLUSIONES

Consideramos que, mediante un manejo multidisciplinar, la optimización y la preparación previa del paciente, es posible realizar una intervención quirúrgica combinada de patología de colon y patología compleja de la pared abdominal, en un solo tiempo, con éxito y baja morbilidad. Sin embargo, se debe individualizar cada caso y los recursos disponibles en cada centro.

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