

## **Rivera Technique for Containment of Enteroatmospheric Fistula in Björck IV Hostile Abdomen: Case Report**

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### **ABSTRACT**

The term "hostile abdomen" refers to a severe clinical condition characterized by the presence of acute and diffuse inflammation in the abdominal cavity, with life-threatening surgical complications. This clinical entity arises as a result of various etiologies, including severe infections, acute pancreatitis, abdominal trauma, intestinal obstruction, mesenteric ischemia, and postoperative complications. Uncontrolled inflammation in the abdomen leads to a systemic inflammatory response, physiological and biochemical alterations, and compromises the function of multiple organs and systems.

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### **INTRODUCTION**

The concept of "hostile abdomen" refers to a complex and potentially life-threatening clinical condition characterized by the presence of severe and diffuse inflammation in the abdominal cavity. This clinical entity is often associated with surgical complications, such as intestinal perforation, mesenteric ischemia or generalized peritonitis. The term "hostile abdomen" suggests the presence of a pathological environment that makes successful surgery difficult and carries a high risk of morbidity and mortality.<sup>1</sup>

Hostile abdomen presents a major clinical challenge due to the complexity of its pathophysiology and the severity of associated complications. Acute and diffuse inflammation in the abdominal cavity can result from a variety of etiologies, such as severe infections, acute pancreatitis, abdominal trauma, intestinal obstruction, mesenteric ischemia, or postoperative complications. These conditions trigger an uncontrolled systemic inflammatory response, leading to significant physiological and biochemical changes in the abdomen, compromising the function of multiple organs and systems.<sup>2,3</sup>

Enteroatmospheric fistula containment in the context of hostile abdomen refers to a therapeutic strategy aimed at managing an enteroatmospheric fistula in a patient with a severe and complex clinical condition characterized by diffuse inflammation in the abdominal cavity.<sup>4</sup>

An enteroatmospheric fistula is an abnormal communication between the bowel and the abdominal cavity, allowing outflow of gas and intestinal contents into the peritoneal space. In the context of the hostile abdomen, this complication may arise as a result of conditions such as severe infections, acute pancreatitis, abdominal trauma, intestinal obstruction, mesenteric ischemia, or postoperative complications. The presence of an enteroatmospheric fistula further aggravates the inflammation and systemic inflammatory response in the abdomen, increasing the risk of morbidity and mortality.<sup>5,6</sup>

The goal of enteroatmospheric fistula containment in the hostile abdomen is to reduce contamination and the negative impact of intestinal contents in the abdominal cavity. To achieve this, several therapeutic strategies can be employed. First, adequate control of the fistula is sought, which may include placement of closed drainage systems, such as collection bags, to capture and safely remove intestinal contents. This helps to minimize the spread of infection and maintain adequate hygiene in the abdominal cavity.<sup>7</sup>

In addition, further measures can be implemented to optimize healing and close the enteroatmospheric fistula. These may include adequate nutrition, correction of nutritional deficiencies, control of sepsis, administration of broad-spectrum antibiotics, and optimization of hemodynamic support. In some cases, specific surgical interventions may be

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necessary, such as repair of the fistula or resection and reconstruction of compromised intestinal segments.<sup>8,9</sup>

Enteroatmospheric fistula containment in the setting of the hostile abdomen is a complex therapeutic challenge and requires a multidisciplinary approach. Collaboration between surgeons, gastroenterologists, intensivists, and other healthcare professionals is essential to determine the optimal management strategy and achieve favorable outcomes. In addition, constant monitoring and comprehensive care are needed to control inflammation, prevent complications, and improve the patient's gastrointestinal and overall function.<sup>10</sup> The open abdomen method is a surgical strategy that consists of deferred closure of the abdominal cavity after laparotomy, as a management alternative for cases of intra-abdominal sepsis, whether traumatic or non-traumatic. In the Björck IV hostile abdomen, entero-atmospheric fistulas are managed by primary closure or splinting with probes. However, not in all cases intestinal leakage is controlled. Here we present a case report on the management of a complex intestinal fistula treated with Rivera condom. <sup>10</sup>

The Björck classification for hostile abdomen is a stratification system used in the medical field to categorize the severity and complexity of an abdomen presenting as hostile during a surgical intervention. This classification is of utmost importance for surgeons as it allows them to assess and foresee the difficulties that may arise during the procedure, consequently making more informed decisions about the surgical technique to be employed.<sup>10-11</sup>

The term "hostile abdomen" refers to a clinical scenario in which the abdomen exhibits anatomical and/or physiological conditions that hinder or prevent proper access and visualization of intra-abdominal organs and structures. This can be due to various causes such as previous surgeries, adhesions, fibrotic tissue formations, chronic inflammatory processes, intra-abdominal infections, or advanced malignancies.<sup>7</sup>

The Björck classification system is based on a scale ranging from grade I to grade IV, where each grade represents an increasing level of complexity. Below, I will briefly describe each grade:<sup>6,7</sup>

1. Grade I: Corresponds to a relatively straightforward abdomen to approach, with minimal adhesions or anatomical alterations. The surgeon can access and visualize the organs with ease, and the risk of complications is low.<sup>8</sup>
2. Grade II: Characterized by the presence of moderate adhesions, posing a greater challenge for the surgeon. Although identification of the structures is possible, more careful manipulation is required to avoid injuries.<sup>8</sup>
3. Grade III: At this level, the abdomen presents extensive adhesions and significantly altered anatomy. Identification and separation of structures become difficult, increasing the risk of damage to nearby organs and tissues.<sup>8</sup>

4. Grade IV: This is the most complex and challenging grade. It is characterized by severe inflammation, massive adhesions, and significant anatomical changes. The surgeon faces extreme difficulties in accessing the organs and may require advanced surgical techniques, such as laparoscopy or even robot-assisted surgery.<sup>8</sup>

Björck classification for hostile abdomen is a useful tool in the field of surgery, as it allows for a systematic evaluation of the difficulty of the intervention and helps surgeons plan and perform procedures more safely and effectively. It is essential to emphasize that, in cases of grade III and IV hostile abdomen, surgical approaches should be carried out by an experienced team with advanced skills to minimize risks and ensure the best possible outcome for the patient.<sup>10</sup>

### OBJECTIVE

To know the current importance of the Rivera Technique whose purpose in the intestinal stoma is the exteriorization of the secretion by means of a latex splint in order to avoid chemical and bacterial contamination of the abdominal cavity.<sup>10</sup>

### CASE PRESENTATION

45 year old male with no chronic degenerative history, who started his condition on 05.11.21 with a picture of intestinal occlusion referring last bowel movement 7 days before despite soapy enema, with inability to channel gases, so he went to his first level clinic on 07.11.21 where he was referred to our unit to the emergency department. Intravenous hydration was started and then exploratory laparotomy was performed on 10.11.21 showing evidence of a stenosing sigmoid tumor affecting the serosa, 15 cm from the beginning of the rectum, measuring 5x3x2cm, so 36cm of colon with a diameter of 5cm was resected, with no evidence of adenomegaly or metastasis in the liver. The surgical specimen was placed in 10% formalin and sent to pathology.

On the same day, a report was made showing a moderately differentiated colon adenocarcinoma of the intestinal type infiltrating to serosa with annular growth of 5.5cm of major axis, located 2 cm from the nearest surgical margin free of tumor. The patient was sent to oncology for treatment with chemotherapy with capecitabine for 6 months. On 17 11 21 she reported that secondary to evacuation efforts there was dehiscence of the 10cm surgical wound, causing yellowish fecaloid material to come out and exposure of the intestinal loops, so she went to the emergency department.

FAST ultrasound was performed showing subdiaphragmatic spaces with scarce free fluid on the right, free hepatic and splenorenal space, parietocolic slide with heterogeneous free fluid by echoes. Therefore, the patient was reintervened, finding subcutaneous tissue with scarce seropurulent material, abdominal cavity with 300 ml of fecal fluid in the pelvic cavity, inter-asa abscess and right subphrenic abscess of 100 ml, as well as dehiscence of the colorectal anastomosis in the posterior wall of 50% diameter; dismantling of

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anastomosis with descending terminal colostomy in Hartmann bag, surgical cleaning, exploratory laparotomy with abscess drainage and remodeling of colostomy was performed. On 11.26.21 necrosis of the colostomy stoma occurred and on 12.14.21 the stoma was remodeled and the penrose was removed. Therefore, an enteroatmospheric fistula of the terminal ileum was subsequently confirmed.

A control carcinoembryonic antigen was requested on 06.13.22 giving a result of 1.40 ng/ml. A control thoraco abdomino pelvic tomography was performed on 07.10.22 showing diastasis of the anterior rectum, functional left colostomy, hepatomegaly and hepatic steatosis, splenomegaly, without evidence of tumor activity.

On 02.03.23 it was decided to place a Bogotá bag for contamination control, but it was removed on 03.03.23 due to a high cost entero-atmospheric fistula.

### RESULTS

On March 07.03.23 it was decided to place a Rivera condom (Fig.1) to prevent secretions from coming into contact with the skin due to the 15 mm defect in the intestinal wall. This allowed control of the leakage and a favorable evolution of the wound. The previous anastomosis was found to be well confronted, partially peritonized. It was also decided to place a central venous catheter to start parenteral nutrition. The Rivera condom was removed on 13.03.23. Since then, the patient continues with parenteral nutrition and daily wound dressings, showing favorable improvement.



**Fig.1 Rivera Condom**

### CONCLUSION

The word "stoma" comes from the Greek word "stoma", meaning "mouth", and refers to a surgical opening created between a hollow viscus and the body surface or another viscus. Among the associated early complications, an incidence of up to 82% has been reported, the most common being skin irritation (55%), fixation problems (46%) and leakage (40%). In the case of skin complications, a higher incidence is observed in ileostomies, due to the fact that stool is more liquid and alkaline, which damages the epidermis and causes excoriation.<sup>10</sup>

There are several options available to control leakage, which must be adapted to each specific situation. In this case, the method known as the "Rivera condom" was used, which proved to be effective in achieving adequate temporary control of both intestinal leakage and surrounding skin. In the presence of a fistula that is difficult to manage, we recommend considering the use of this technique, which has been shown to be low cost and to achieve effective, simple and precise control of intestinal leakage, thus improving the quality of life of patients suffering from this complex pathology.<sup>11</sup>

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