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CASE REPORT

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Catastrophic abdomen after appendicular peritonitis, multidisciplinary experience: A case report

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Abstract

The term 'catastrophic abdomen' describes a series of complex and severe medical situations that combine significant inflammation, severe infections and a history of multiple abdominal surgeries that alter the normal anatomy. In these conditions, the internal organs become especially vulnerable, presenting fragility and an edematous state, i.e. swelling due to fluid accumulation. In addition, in certain cases, there may be the presence of fistulas or intestinal leaks that are difficult to control, further complicating the patient's clinical situation. When this situation is combined with the presence of extensive adhesions or significant scarring, it is referred to by the term 'hostile abdomen'. Finally, in the case of intestinal fistulas connecting directly with the granulation tissue overlying the viscera, a phenomenon known as enteroatmospheric fistulation is generated. 13-year-old male patient diagnosed with catastrophic abdomen. He underwent laparotomy due to generalized peritonitis and intestinal perforation. During the procedure, the Bogota bag, the Bates system and a fistula were used, and abdominal wall closure through "component separation" with fasciotomy of the rectus abdominis, in addition to parenteral nutritional support. The incidence of 'catastrophic abdomen' is extremely low, with an estimated prevalence of approximately one case per-100,000 population, according to the World Health Organization (WHO). By presenting our case, we aimed to highlight the multidisciplinary approach and surgical management strategies in addressing catastrophic abdomen resulting from appendicular peritonitis, emphasizing complex interventions and patient outcomes.

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Introduction

The need to undergo multiple surgeries in the abdominal area can result in a serious condition known as catastrophic abdomen. This term refers to a medical condition in which the abdominal cavity is exposed or open, with the edges of the opening retracted and compressed, forming a conglomerate of fibrous tissue that makes adequate dissection difficult (1). Moreover, in this situation, the fragile loops of the small bowel may adhere to each other, further complicating the clinical picture. The presence of enterocutaneous or enterosatmospheric fistulas often aggravates the problem, as these complications are associated with a high level of morbidity and, alarmingly, a mortality rate that can reach 40% (2). This severely impacts the quality of life of the patient who faces multiple challenges and health risks. Catastrophic abdomen is a significant complication in those who have undergone three or more laparotomies, as repeated surgical manipulation alters the normal anatomy of the abdomen, leaving the internal organs vulnerable (2).

The situation is the result of various emergency interventions to address critical problems such as septic processes and anastomotic leaks. It can also derive directly from complications such as secondary peritonitis, severe acute pancreatitis or damage control surgeries in emergency situations. It is essential to note that this condition is more frequent after decompressive laparotomy, especially in cases of compartment syndrome (3).

Most of the patients admitted to the Intensive Care Unit present dysfunction in multiple organs, in addition to complex infections that are highly resistant to various treatments. In this situation, a multidisciplinary approach involving close collaboration between different medical specialties is recommended. While it is crucial to tailor treatment to the specific needs of each patient, it is also important to prioritize the way in which each case is managed globally to ensure effective management (3). The five essential fundamentals that constitute the therapeutic approach to dealing with the hostile abdomen comprise the following aspects:

1. Stabilization of the patient's hemodynamic parameters is a crucial process that involves ensuring that blood circulation and blood pressure are maintained within normal, healthy limits.
2. Implementing a responsible and rational use of antibiotic therapy.
3. Adequate nutrition.
4. Implementation of meticulous control of the source of bleeding, using specific temporary abdominal closure techniques. These techniques are designed to minimize the trauma that can be caused to the abdominal wall, thus facilitating multiple revisions of the abdominal cavity without generating additional damage.
5. Effective methods and techniques for final abdominal wall closure.

Table 1: The classification of catastrophic abdomen

Grade		Description
I	A	Clean open abdomen, without adhesions between the intestine and the abdominal wall
	B	Contaminated open abdomen without adhesions or attachments
	C	Enteric leakage without fasteners
II	A	Clean open abdomen, with developing adhesion/fixation
	B	Contaminated open abdomen with developing adhesions or attachments
	C	Enteric leak with fasteners
III	A	Clean frozen abdomen
	B	Contaminated frozen abdomen
IV		Established an entero-atmospheric fistula, frozen abdomen.

To ensure adequate abdominal wall closure, it is essential to adopt an interdisciplinary approach and to have a thorough knowledge of the possible complications that may arise. In addition, it is crucial to master the necessary specialized techniques, always considering the particularities and needs of the patient (4).

The classification of catastrophic abdomen according to Björck is as follows (Table 1).

The surgical procedure for catastrophic abdominal surgery consists of several steps.

Stage 1: Infectious focus control: The patient is admitted to the hospital with a clinical picture suggestive of a complicated intra-abdominal infection, usually after having undergone more than two surgical procedures. During the physical examination, there is evidence of an abdomen considered "hostile", marked by the loss of the normal spaces that allow separation between the organs within the abdominal cavity. She also presents signs of alterations in intestinal transit, a worrisome finding and clear symptoms of sepsis. The situation is further complicated by the presence of leaking sutures or intestinal anastomoses, which significantly aggravates his state of health (5,6).

Stage 2: Metabolic and nutritional support: The patient presents signs of acute malnutrition, classifiable as kwashiorkor, or in a mixed form combining features of kwashiorkor and marasmus. In addition, there is an imbalance in fluid and electrolyte levels, and his general condition is in a hypercatabolic phase. This situation is aggravated by the lack of access to safe enteral nutritional support, which also increases the risk of intestinal leakage. The presence of complex intestinal fistulas, ileus and a septic state contributes to an increased caloric and protein demand to maintain balance and diversion. (6).

Stage 3: Surgical management of the catastrophic abdomen: Many patients in consultations or emergencies have an open abdomen. The condition is classified according to Björk and Kirtpatrik as category II B, II C, III B or IV. This means that these patients often have severe complications, such as adhesions, infections or intestinal leakage. Abdominal inflammation and contagion cause severe and complicated adhesions. This hinders proper exploration of the abdomen and causes contractions and further swelling of themesentery. This puts patients at an increased risk for further bowel injury (3,6).

Surgeons consider and analyze different stages and critical moments in the process of treatment and management of the open abdomen:

- A temporary closure of the abdomen will be performed to perform planned relaparotomies. This procedure is key to decontaminating the abdomen and checking for leaks or undetected visceral organ damage. To achieve this, we use a double Laparotomy bag, called a modified Bogota Bag, for its advantages.
- The implementation of a temporary closure of the abdomen using Negative Pressure Systems has as its main objective to achieve an effective decontamination of the abdominal cavity. This process not only seeks to minimize the risk of associated complications, but also focuses on shortening the time required for the definitive closure of the abdomen (7). This is carried out under strict criteria, which include verification of the absence of intra-abdominal infection, and clinical improvement of the patient is observed, or negative cultures are obtained. We do not use the system in situations where the patient presents coagulation-related disorders, bleeding manifestations or clear signs of intestinal leakage.
- Second intention abdominal closure. Open abdominal wounds in stage III B or IV have little chance of effective closure. This is true if the wound is greater than 7 cm in diameter and the skin thickness at the edges is less than 2.54 cm. With adequate control of intestinal leakage, either by ostomy or drainage, a negative pressure system can be applied. This system should be used with a primary dressing in contact with the abdominal viscera to apply negative pressure and promote closure by second intention (6). This process involves splinting the abdominal cavity, promoting contraction of the wound edges, and finally, promoting epithelialization, with the intention of generating a controlled eventration, which can occur with or without the presence of mucosal and intestinal fistulas.

Stage 4: Ostomal and periostomal therapy: The patient needs surgery for decontamination and control of intestinal leakage. The procedure will be done with proximal enterostomy in the first re-laparotomy. However, organs such as the esophagus and duodenum make it difficult to control an ostomy (8). Therefore, in such situations, it will be necessary to resort to the use of probes to facilitate proper drainage of fluids. Uncontrolled intestinal fistulas may develop into an ostomy. This intervention seeks to redirect intestinal leakage to the outside of the body. We use local

negative pressure therapy to treat these complications.

Stage 5: Evaluation and management of the various conditions that can affect the intestinal system: A patient with a severe abdomen often suffers intestinal failure due to post-surgical complications. It is crucial to note that other bowel conditions may be the cause of or have contributed to the postoperative complication. These include intestinal ischemia, which may result from coagulation imbalances or hemodynamic problems. There are also inflammatory bowel diseases, such as Crohn's disease and intestinal tuberculosis, as well as motility and nutrient absorption disorders (9). The performance of an endoscopic study, together with an anatomy-pathological analysis, is of utmost importance to adequately consider possible medical therapies or surgical procedures. Therefore, we suggest the following:

- Perform comprehensive endoscopic studies, including endoscopy of the upper digestive tract, endoscopy and colonoscopy, if the patient's condition allows it and there is adequate access to carry out the exploration.
- Endoscopic studies will be performed at different times: before starting medical therapies, during their application and after they have been completed. The aim of these studies is to assess in detail the current state of the intestinal mucosa and to ensure that there are no signs of active intestinal disease. In addition, biopsies will be performed to analyze and determine any changes that may have occurred in the cellular structure of the intestinal tissue.
- It is essential that the endoscopic studies performed are complemented with an abdominal angio-CT scan, as this provides us with the possibility of evaluating the bowel circulation in a more detailed and effective manner.
- Endoscopic evaluation is a fundamental and extremely important procedure that should be performed especially when intestinal reconstruction is being considered. It would be most appropriate for this evaluation to be performed in the pre-surgical phase. However, there are situations in which, due to the impossibility of accessing the necessary areas or complications related to the patient's underlying disease, it is necessary to plan and perform an exploration during the operation (6).

Reconstructive surgical procedure using autologous tissue to repair the gastrointestinal tract.

Intestinal surgery is common in patients with catastrophic abdomen, since only in a few cases does medical treatment allow closure of the fistula without surgery. Rehabilitation of the bowel must be performed after completion of all phases of treatment. This process depends on factors such as the patient's disease, the time since the last surgery, the type of nutritional support received, and an optimal nutritional status at the time of surgery (10). In the process of performing gastrointestinal tract reconstruction, it is essential to consider certain considerations that are crucial to ensure the success of the surgical procedure.

- It is a surgical procedure that is quite complicated and technical, which has the capacity to extend over several hours.
- It is necessary to have all the medical supplies, as well as the proper equipment and trained personnel, that can help to carry out this procedure effectively and help to reduce the time required during the operation.
- In situations where the patient has undergone multiple surgical procedures or has been under the condition of having an abdomen that has remained open, it is suggested that the recommended intervention be performed after a period ranging from six to twelve months since the last operation. It is essential that the complete release of the entire portion of the small bowel be performed, starting from the ligament of Treitz and continuing to the ileocecal valve (10).
- In general terms, all existing enterostomies in the patient are eliminated, and it is considered essential to perform only the minimum number of anastomoses necessary to ensure optimal and efficient bowel function. In certain specific situations, it could also be feasible to carry out a reconstruction in phases, one of the methods that could be used being the so-called ileal recruitment, which allows the intestinal recovery process to be optimized.
- The objectives that have been established, according to medical priorities, include the following fundamental aspects: reconstruction of the intestine, recovery of the peritoneal cavity and reconstruction of the abdominal wall. It is of utmost importance that the patient is rigorously monitored in a designated critical area, where the possible complications that may arise as a result of this type of surgical procedure must be taken into account, with leakage and bleeding being the most relevant concerns (11). Oral feeding can be

started five to seven days after surgery. Oral intake should be started after a radiological bowel transit test with water-soluble contrast medium. During this time, the patient will receive total parenteral nutrition (TPN).

- Reconstruction of the abdominal wall may be performed using suitable prosthetic material, such as a visceral contact mesh, if the circumstances of the case warrant it. This may be performed during the same surgical procedure or, failing that, it could be scheduled for a second operation, depending on the criteria and evaluation of the surgeon in charge of the procedure (6).

By presenting our case, we aimed to highlight the multidisciplinary approach and surgical management strategies in addressing catastrophic abdomen resulting from appendicular peritonitis, emphasizing complex interventions and patient outcomes.

Case description

A 13-year-old male patient reports that symptoms began in the early morning, with abdominal pain, nausea and vomiting, accompanied by unquantified thermal rises. Positive peritoneal and appendicular signs are found.

History and anamnesis:

- Birth by cephalovaginal delivery at term, with complete prenatal controls and vaccination schedule.
- History of COVID-19 in 2022, without hospitalization.
- No known allergies.

Physical examination:

- Blood pressure: 113/63 mmHg.
- Heart rate: 107 bpm
- Respiratory rate: 20 rpm
- Oxygen saturation: 92%.Peso: 44 kg
- Glasgow scale: 15 (conscious and oriented).
- Afebrile, dehydrated oral mucous membranes, distended and tympanic abdomen, painful on palpation, with hydroaerial sounds present.

Laboratory findings:

- Leukocytes: 6500/mm^3
- Neutrophils: 85%.
- CRP: 285 mg/L

The examinations reported an acute infectious process, abdominal ultrasound, which reported appendiceal plastron with 800 ml of free interassociated fluid.

Generalized peritonitis secondary to perforated appendicitis with appendiceal plastron and obstructive syndrome was diagnosed (Figure 1).

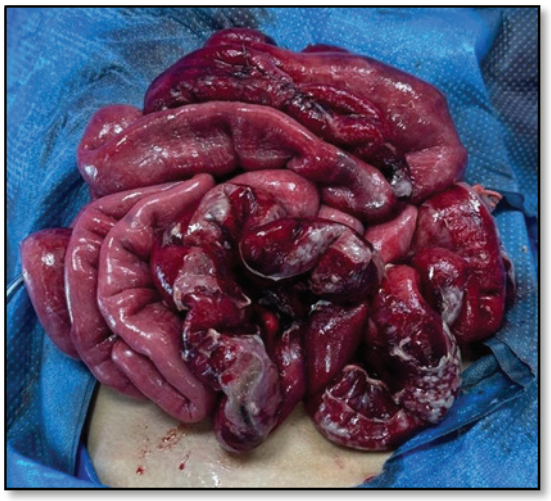

Figure 1: Generalized peritonitis

First intervention

The following findings are found: Perforated appendicitis, appendicular plastron, generalized peritonitis, obstructive syndrome.

An urgent surgical procedure was performed where diagnostic laparoscopy was performed, converting the procedure to laparotomy and performing appendectomy, lavage of the cavity and placement of a Jackson Pratt drain.

Admission to the Intensive Care Unit after surgery: On admission his initial condition was orointubated in poor general condition, with diagnoses of septic shock of abdominal focus and immediate postoperative laparotomy for perforated appendicitis. Patients required vasopressor support (norepinephrine, dobutamine) and Sed analgesia, indicated hemoderivatives despite normal hemoglobin and hematocrit, due to poor clinical condition, hyperglycemia due to hyper catabolism. febrile with leukocytosis, in treatment with

broad antimicrobial scheme.

The evolution of the patient was hemodynamically stable without vasopressor support, which allowed the start of ventilatory weaning and the suspension of sedation. He remained febrile and with leukocytosis, although with less intensity, continuing the antimicrobial scheme. Abundant bile leaks through the nasogastric tube, without other organic failures, and the enteral route was suspended. The patient in better condition was discharged to the ICU.

Evolution on the hospitalization floor: Day 1 and 2: The patient presents favorable evolution. Abdomen slightly distended and slightly painful in the right flank. He has two drains:

- Drain 1: 75 mL of serohematic fluid, scarcely purulent.
- Drain 2: Small amount of serohematic fluid. The dressings are clean and dry. No complications have been reported at this time.

The patient developed fever (38-39°C), tachypnea (40 rpm) and desaturation up to 84%, which required increasing the flow of oxygen through a mask with subsequent clinical improvement. Serohematic drains were observed in the abdomen. Despite being without vasopressor support, he continued under observation, and pediatrics did not rule out the possibility of returning to the ICU. The need to continue with intravenous antibiotics for at least 15 days was determined. In addition, a consultation with psychiatry was requested for comprehensive management because the patient reported anxiety, despite the medication.

Day 3 to 5: He presents a fever of 38.9°C, tachycardia and tachypnea (40 rpm), but maintains a Glasgow of 15. The drains have increased in volume after mobilization of 200 ml of serous fluid, which is expected in his clinical picture. The drains show between the two. The abdomen is soft, depressible, with hydro-aerial sounds present.

The fever peaks persist during the day, and the blood culture was positive for Escherichia coli, sensitive to meropenem, piperacillin/tazobactam and amikacin, so it was decided to consult with infectious diseases and change the antibiotic regimen. There is evidence of purulent secretion, although in smaller amounts, from the surgical wound.

The patient presented an unfavorable clinical evolution with persistent fever. Surgical wound infection was detected, with microbiological report of Candida albicans and extended-spectrum beta-lactamase, both sensitive to the established treatment. The control radiograph of the abdomen showed an ileus pattern with hydro-aerial levels and gastric dilatation, in addition to a moderate amount of fecal matter in the colon and rectum sigma. It was decided to perform surgical cleaning due to partial dehiscence of the wound with purulent material coming out.

Figure 2: Large dilatation of intestinal loops.

Second intervention

The patient underwent re-laparotomy due to surgical site infection and intestinal obstruction.

The surgical findings are: Great dilatation of intestinal loops, especially in the jejunum, multiple adhesions (Zülke III and IV). Obstruction at the level of the jejunum at 40 cm from the ligament of Treitz. Wide jejunal perforation (5 cm long), compromising the entire intestinal circumference, there is no evidence of infection or abscesses in the cavity (Figure 2).

Surgical procedure:

- Digital release of interascial adhesions in the small bowel.
- Intestinal resection of 10 cm.

- End-to-end anastomosis in jejunum with longitudinal extramucosal serous-serous suture.
- Verification of intestinal lumen and exhaustive lavage.
- Management of open abdomen with placement of Bogota bag (Figure 3).
- Drainage of 600 ml of biliary fluid and 500 ml of blood.

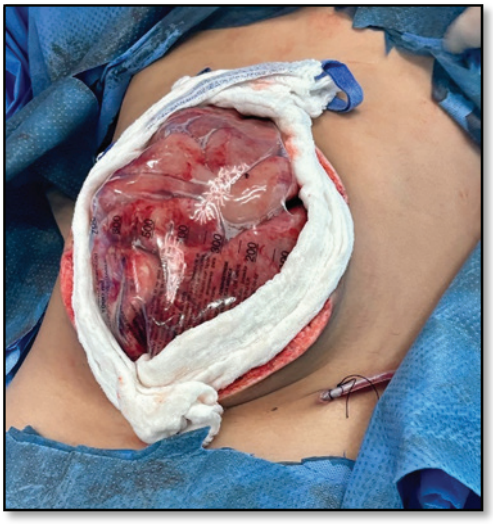

Figure 3: Placement of Bogota stock exchange

Admission to the immediate postoperative ICU due to poor general condition: The patient was received in the ICU in the immediate postoperative period, under manual ventilation (Ambu) and in the company of the medical team. He presented blood pressure of 100/54 mmHg, heart rate of 85 bpm, and respiratory rate of 20 rpm, under the effects of anesthesia. Pupils were reactive, with a Glasgow of 10T/15. Cardiovascular and respiratory, heart sounds were rhythmic and vesicular murmur was present. The abdomen was with dry dressings, with serohematic drainage by Jackson Pratt drainage. There was no extremity edema, and capillary refill was adequate (2 seconds).

In ICU, the patient presented persistent bleeding of 500 ml from the drainage, requiring multiple changes of dressings soaked with red glistening blood.

Second (Reintervention)

Surgical reintervention was decided to control the bleeding.

- Revision of the abdominal cavity for hemoperitoneum.
- Significant amounts of blood and clots in all quadrants, without a specific bleeding point. The "sheet" type bleeding came from the gastro-colic ligament and omentum, which were resected.
- Packing of parietocolic and Douglas spaces with 6 compresses.
- Control of a small leak in the anastomosis with a serosal suture and serosal reinforcement.

The patient came out of surgery with an open abdomen, Bogotá bag and a mean arterial pressure of 62 mmHg. Diuresis of 200 ml and 500 ml of blood was transfused. The abdominal cavity contained approximately 600 ml of fluid at the final surgical review.

The patient is still under intensive management for complicated peritonitis, initially caused by perforated appendicitis. He is under treatment with a contained open abdomen and Bogotá bag. After 72 hours of abdominal packing due to bleeding, the family is informed that a new surgical revision will be necessary in 48 hours, keeping him in intensive care.

Third (Reintervention)

Procedure performed:

- Unpacking.
- Placement of hemostatic agent.
- Enterostomy.
- Repositioning of Bogota bag.

Findings: Bleeding control: 90% of bleeding was controlled; it persists in peri rectosigmoid pelvic fossa with fibrinous-purulent areas.

Intestinal loops: Less distended, but edematous and thickened. There is no intestinal obstruction. Two small holes (0.3 cm each) were identified in the intestinal loop with thick bile content coming out.

Intervention: Enterostomy was performed through fistulous orifices with Foley tubes (24 and 20 Fr) fixed with STAM technique (Figure 4).

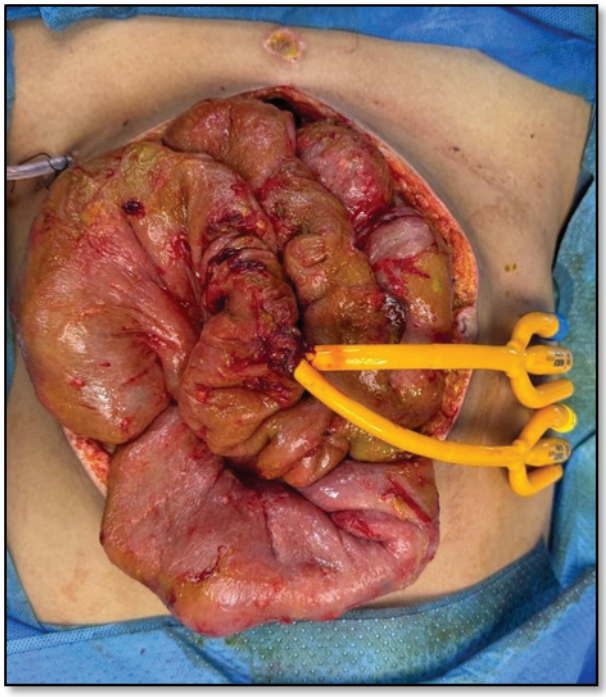

Figure 4: Enterostomy through fistulous orifices with Foley catheters.

Fourth reintervention

Clean abdominal cavity, without bilious fluid, fecaloid or bleeding. The intestinal loops pink, less edematous. Enterostomy tubes are functioning properly.

The Bogota bag was removed, a cavity lavage was performed and end-to-end jejunal suture was performed in fistulous enterostomy orifices (double layer) (Figure 5).

Figure 5: Termino-terminan Suture (Vadcum System)

Subsequent interventions

When total closure of the abdominal wall was not achieved despite release of the aponeurosis of the recruits abdominis, oblique and transverse muscles, fasciotomies were performed in the aponeurosis of the rectus and placement of the VACUM system at 127 mm of continuous aspiration pressure.

Reconstruction phase: Fistula suturing and abdominal wall dissection were performed. Active extra-abdominal bleeding and hypogastric hematoma formation were reported.

Vacum device extraction: Visible bowel loops were observed without lesions. Successful hemostasis control and abdominal wall closure with subdermal drainage (Figure 6).

Figure 6: Removal of the Vadcum system and abdominal wall closure.

Figure 7: Management of low output enterocutaneous fistula.

Subsequently, in the management of the low-expenditure enterocutaneous fistula, it is important to highlight the role of the nursing team performing enterostomal therapy. Their intervention was key to the successful change of the ostomy pouch and skin care, which contributed significantly to the adequate recovery of the patient (Figure 7).

General evolution: The patient has shown satisfactory evolution with adequate wound and fistulae management. He presents a slight febrile record, but his general condition has improved. Tomographic and ultrasound controls were performed, showing collections and abscesses, with favorable response to antibiotic treatment.

Discussion

Patients who, because of complications arising after having undergone gastrointestinal surgeries, develop what is known as "catastrophic abdomen", experience a complicated clinical condition that is aggravated when they undergo repeated surgeries (8). This process leads to the formation of an invasive and unmanageable abdomen. Normally, when these individuals are evaluated in isolation, or when they attend general surgery services that have a low incidence of facing this type of complication, their treatment requires considerable effort on the part of a few specialists who show interest in their situation. However, it should be noted that, on many occasions, these specialists do not have the level of technical knowledge or experience necessary to ensure that positive results are achieved in the management of these complex cases (12).

On the other hand, it is important to note that the demand for material resources is extremely high and, on numerous occasions, this situation leads to the complete consumption of all the resources available in the hospital of origin. The progression of a patient in a complicated surgical situation, culminating in a catastrophic abdomen, begins with a sequence of significant drawbacks. These problems include, but are not limited to, delays in both proper diagnosis and timely administration of treatment. This delay may result in deterioration to more advanced stages of the underlying disease and may also lead to the early onset of septic complications, which further aggravates the clinical situation of the patient with peritonitis and significant bowel damage (13).

During the procedure, efforts are made to adequately decontaminate the abdominal cavity and to remove the organ that is involved, with the aim of achieving effective control of the infectious focus. It is important to point out that, on many occasions, bypass surgery, commonly known as ostomy, is not considered as an initial procedure in this type of cases (13). The absence of adequate focus control in medical complications may result in infection that becomes persistent, either due to the presence of infected collections or as a consequence of intestinal leakage, which may manifest in forms such as dehiscence or fistula. The infection that presents in the abdominal cavity is the one that predominates in the patient's clinical picture. When there is an intestinal leakage that is not adequately resolved, this can lead to further deterioration of the general state of health and an urgent need for surgical interventions, which in turn further worsens the situation, leading to new intestinal leaks. During all this time, the patient is unable to receive food, and due to this prolonged fasting, his body enters a state of hyper-metabolism, followed by a state of hypercatabolism, resulting in the rapid loss of his essential nutritional reserves. In addition, repeated surgeries and the implementation of a temporary closure of the abdominal wall led to the use of the "open abdomen" technique (5,9).

The presence of an open abdomen increases the risk of contamination and the likelihood of intestinal leakage. This can lead to the development of an entero-atmospheric fistula, which connects the bowel directly to the external environment. The patient presenting with the condition known as "catastrophic abdomen" shows a significant need for medical and emotional support, and, unfortunately, his prognosis is considered unfavorable (14,15). The situation known as "catastrophic abdomen" represents, without a doubt, the most adverse scenario that a surgeon could face in his medical practice. This is not only due to the complications presented by the patient's condition, but also because the surgeon is in a critical position, having already exhausted all available resources and treatment options, which makes the prognosis of the situation extremely discouraging and full of uncertainty.

Conclusions

The incidence of 'catastrophic abdomen' is extremely low, with an estimated prevalence of approximately one case per 100,000 inhabitants, according to the World Health Organization (WHO). Since this medical

condition is quite rare and uncommon, in addition to the scarcity of research on this specific topic, there is no updated information available on its prevalence in Latin American countries.

In the field of medical management, specifically when faced with a case of low-grade Björck abdomen (clean open abdomen, without adhesions between the bowel and the abdominal wall), the use of techniques involving traction of the fascia is recommended. This can be achieved through the implementation of meshes or sutures, highlighting especially the use of the Wittman patch (It is a temporary prosthesis of the abdominal fascia in those cases in which the abdomen cannot be closed due to abdominal compartment syndrome). This method has proven to be effective, as significantly high rates of primary fascial closure have been reported, but it is important to note that these positive results have been observed only in this clinical situation.

The combination of wound therapy using negative pressure (VAC System), regardless of the specific type of therapy, along with various fascial traction techniques, has shown clear evidence of providing significantly better results about the abdominal wall closure process. In addition, it has also been evidenced that this combination helps to reduce complications such as bacterial overgrowth, excessive fluid and granulation tissue buildup, which can arise associated with such interventions. Therefore, should the possibility be found, the joint use of the VAC therapy system and the ABRA method to treat Björck abdomen with a high degree of involvement and severe infection is strongly suggested.

The use of VAC (Vacuum Assisted Closure Therapy), which acts as a primary closure system, is associated with the occurrence of significantly higher rates of closure in such procedures. It is suggested that its application be carried out considering the specific environment in which it is used, as well as the availability of this resource, considering that its implementation implies certain associated costs.

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Contributions

Research concept and design: JOMA, FAAV, JAMJ, JHYA

Data analysis and interpretation: JOMA, FAAV, JAMJ, JHYA

Collection and/or assembly of data: JOMA, FAAV, JAMJ, JHYA

Writing the article: JOMA, FAAV, JAMJ, JHYA

Critical revision of the article: JOMA, FAAV, JAMJ, JHYA

Final approval of the article: JOMA, FAAV, JAMJ, JHYA

All authors read and approved the final version of the manuscript.

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