

Multi-Traumatized Patient with a Dehiscent Fistulized Abdomen and a Central Venous Line-Associated Infection Successfully Treated with a New Medical Device II

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Received: 23 Mar 2022

Accepted: 14 Apr 2022

Published: 20 Apr 2022

J Short Name: ACMCR

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Citation:

Bert E, Multi-Traumatized Patient with a Dehiscent Fistulized Abdomen and a Central Venous Line-Associated Infection Successfully Treated with a New Medical Device II. *Ann Clin Med Case Rep.* 2022; V9(1): 1-3

Keywords:

Enterocutaneous fistula (ECF); Central venous line-associated infection; Carbohydrate Polymer with Zinc Oxide (C.P.Z.O)

Abbreviations:

Pebisut® Patents: USPTO, USA, #8,252,333. Canada #2,661,686. European Union #2,062,602. Mexico #280,754. External application in Mexico, #350080, USA #9,808,484, Canada #2,926,115.

1. Abstract

We present the case of a patient involved in a multiple-vehicle accident with massive thoracoabdominal trauma who was admitted to a Social Security specialized trauma center in Mexico City. He went through a very complicated postoperative course, including abdominal burst with evisceration, two low-output enterocutaneous fistulas (ECFs) and a central venous line-associated infection. Daily application of C.P.Z.O was carried out in the sites of infection. A substantial improvement of the abdominal septic ECF was achieved with the daily application of C.P.Z.O and strict wound care measures. Currently, the patient takes self-care of his wound at home. Even though he has not regained full recovery, he has managed to have a functional lifestyle.

2. Introduction

Abdominal wound dehiscence and evisceration, also known as abdominal burst, is a severe postoperative complication that has a very high mortality and morbidity rate as high as 20.9% [1]. Immediate urgent treatment needs to take place in a hospital setting because of its higher morbidity and mortality [2]. Also, abdominal fistulas have a very poor prognosis, mainly when they are associated with intra-abdominal infection, they have increased morbidity, elevated costs of treatment and mortality rates reported as high as 20 to 50% [3-4]. Up to 65 to 85% of ECFs are attributed to iatrogenic consequences because of trauma and/or surgery [5]. About

50% of them arise from an anastomotic leak [5]. Proper wound care, and postoperative control of infection and adequate nutrition are essential to promote natural healing of chronic lesions [6].

3. Case Report

A 52-year-old patient involved in a multiple-vehicle accident was admitted to a Social Security specialized trauma center in Mexico City. At the time of admission, it was necessary to perform resuscitation with volume restitution, RBCs and plasma transfusions, and insertion of a chest tube was required because of pneumothorax. Once stabilized, he was taken to the operating room for an exploratory laparotomy due to signs of an acute abdomen. He was found to have an abundant hemopneumoperitoneum due to multiple liver and splenic lacerations, intestinal resection and an ileostomy were performed due to an extensive segment of small bowel necrosis. Five days later the patient was reported in another clinic of the same Social Security system and an end-to-end anastomosis was constructed which was complicated with vomiting and drainage of abundant fecal material through the incision. Subsequently, the patient requested to be discharged against medical advice and was transferred to a private clinic. In this clinic, a third laparotomy was performed where dehiscence of the anastomosis was found with several intra-abdominal purulent collections which were drained. Closure of the dehiscence and lavage of the cavity was done, and a plastic bag was placed for treatment of a “partially

open abdomen". The patient remained seven days in the ICU because of "abdominal sepsis and SARS secondary to postoperative pneumonia". Total parenteral nutrition was started on the 4th P.O. day and his antibiotic scheme was again changed according to the cultures (they were not specified in his medical report); Two RBCs packages were also transfused. Again, due to persistent fever and a dehiscent surgical wound, the patient requested voluntary discharge and left the clinic.

At the time of examination in the office, the patient presented with a dehiscent abdomen and two low-output ECFs. After removing soaked malodorous dressings, partial evisceration and purulent drainage with intestinal content were observed (Figure 1). Also, around the site of placement of the central venous line (CVL) there was an extended area of cellulitis and abundant purulent discharge. The severity of these complications and the uncertain prognosis were discussed with the patient and his wife. The patient was told that he should be admitted to a medical center for multidisciplinary treatment because of persistent peritonitis. Due to economic, personal and logistical reasons the patient declined to be hospitalized against medical advice and decided to be treated outside of a hospital setting.

The area of the central venous line- associated infection was cleaned and, using a sterile technique, the CVL was immediately removed and the tip was sent for cultures sensitivities which showed the presence of *Pseudomonas aeruginosa* and *Staphylococcus aureus* resistant to all common antibiotics used in the hospital. A new antibiotic scheme was started and subsequently C.P.Z.O. [1] was applied covering the affected area and a petrolatum-coated gauze was placed to keep the area moistened and isolated from the external environment (Figure 2) [6].

At the same time, C.P.Z.O was locally applied in the dehiscent abdomen once a careful cleansing and debridement were done daily by the wife outside of the hospital setting. Also, the fistulas were isolated from the surrounding tissue and constant wound care was done to prevent additional skin loss and adequate healing (Figure 3). A TIME protocol was strictly followed to enhance the healing of the fistulas.



Figure 1: Intense inflammation and purulent material in the site of the placement of the right subclavian CVL.



Figure 2: Site of puncture five days after removal of the catheter and application of CPZO with residual cellulitis and remnant CPZO after removing the gauze and cleaning the area.



Figure 3: Dehiscence and partial evisceration of the abdomen with purulent material at the time of our first clinical examination.

4. Discussion

It is estimated that patients with serious traumatic injuries have lower mortality and morbidity when they are treated in a specialized trauma center (10.4 vs. 13.8 percent; relative risk [RR] 0.75, 95%) [7]. Initial management and surgical treatment are critical factors for a successful primary stabilization and postoperative course [7]. The multiple surgical procedures, such as an ill-advised anastomosis performed in a septic abdomen, contributed to a more complicated postoperative course in this patient.

ECFs are described as an abnormal connection between the gastrointestinal tract and the skin [5]. When there is no overlying soft tissue, ECF is subcategorized as enteroatmospheric fistulas (EAFs) (Figure 4). These usually arise as a consequence of an open abdomen after an exploratory laparotomy due to trauma or emergency surgery [8,9]. Usually EAFs appear approximately eight days after the abdomen has been left open [5].

Management of ECFs should be planned into three phases: stabilization of the patient (metabolic and sepsis), development of an interim plan for wound care and nutrition, and definitive closure of the fistula when possible [3]. An acronym for a well-known protocol for this is "SNAP". ("S" stands for skin and sepsis, "N" for nutrition, "A" for anatomy and "P" for procedure). Intra-abdominal sepsis is responsible for 77% of deaths related to ECF [5] usually associated with a poor nutritional status. Skin care is a must for the placement of a stoma appliance. Control of the septic process and improvement of the nutritional state should be the cornerstone of

treatment [3].

Even with advanced wound care and parenteral nutrition, most studies demonstrate closure rates of only 20 to 30% [5]. It is of utmost importance to isolate the fistula from the surrounding tissue to improve nursing care, and in general, the very high intestinal fistula produces more complications [3]. Mortality rates vary from 5.5% to 33% , this is related to favorable or unfavorable factors of the location of the fistula [5]. Treating these complicated patients in a medical center with significant experience and a multidisciplinary approach has shown to decrease the mortality rate to 50% [5].



Figure 4: Dehiscent abdomen with fecal fistulas and purulent material.

5. Conclusion

After eight days of daily treatment with C.P.Z.O, the central venous line- associated infection healed and the inflammation disappeared. On the other hand, after 4 months of treatment with daily local applications of C.P.Z.O, without the use of antibiotics, the dehiscent abdomen improved significantly. An intermittent low output fistula remained for fifteen months (Figure 5).



Figure 5: Intermittent low output fistula and almost complete closure of the abdominal incision after fifteen months of applying daily CPZO

Some factors contributed to the improvement of the fistulas in this patient, like the most unusual and constant family support for the care needed. At present, the patient tolerates a low residue liquid fragmented high protein diet. Another favorable fact was the loca-

tion of the fistula in a distal portion of the ileum.

Currently, the patient takes self-care of his abdominal wound at home with the help of his wife. He uses a gauze with petrolatum and C.P.Z.O in the smaller ulcerated area as a plug to prevent drainage. At present he has regular bowel movements rectally, so he was advised to continue with this treatment daily. Even though he claims to be tired on some occasions, he has managed to have a functional lifestyle, including normal sexual life and working as a part-time painter.

6. Conflict of Interest

None of the authors have any conflicts of interest or financial ties to disclose

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