

Mesh Preservation in a Patient with Severe Abdominal Sepsis Managed with an Open Abdomen and Negative Pressure Wound Therapy Delivered Via the ABTHERA™ Open Abdomen Negative Pressure Therapy System

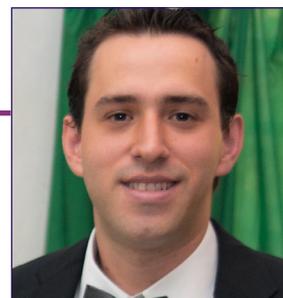
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NOTE: As with any case study, the results and outcomes should not be interpreted as a guarantee or warranty of similar results. Individual results may vary depending on the patient's circumstances and condition.

ABSTRACT

Severe intra-abdominal sepsis is a potentially lethal condition requiring complex medical and surgical treatments. In special cases, due to the underlying conditions of patients, special care is required when dealing with complex and uncommon complications that lead up to abdominal sepsis. Negative pressure wound therapy (NPWT) appears to be the ideal temporary abdominal closure technique and the ABTHERA™ Open Abdomen Negative Pressure Therapy system is an optimal choice for its delivery. The preservation of biological meshes in patients with abdominal sepsis appears to be an adequate strategy since the mesh does not become an added source of infection.

We present the case of a 51-year-old male who, after suffering a work-related fall, had a perforated viscus that was managed with a colostomy and an incisional hernia. During the colostomy reversal procedure a biological mesh was put in place. Afterward, the patient suffered an anastomotic leak on two different occasions and developed a severe abdominal infection requiring management with NPWT.

The patient had a good response to treatment and the abdominal mesh did not require removal.

INTRODUCTION

The management of the open abdomen (OA) has been widely studied during the past three decades and has undergone significant changes. There have been many different modalities of Temporary Abdominal Closure (TAC) devices, such as zippers, meshes, dynamic retention, polyvinyl covers and negative pressure devices. Additionally, there are different conditions that can be addressed with an open abdomen, such as abdominal hypertension¹, abdominal compartment syndrome, pancreatitis, loss of abdominal wall and the need for a "second look" surgery². Severe sepsis (SS) as defined by Dellinger³ (organ dysfunction and hypoperfusion concomitant to infection) is the main causes of death in non-coronary ICUs⁴. In the United States of America the incidence of SS is 300 cases per 100 000 population⁵ with approximately 934,000 cases diagnosed every year and 215,000 deaths. In Europe, the

number of deaths per year attributed to SS is 150,000^{6,7}. The most frequent cause of severe sepsis in surgical ICU patients is peritonitis⁸.

Certain characteristics are linked to a higher mortality in patients with SS such as delayed medical attention, advanced age (≥ 65 years), malnourishment and a weakened immune response⁹⁻¹¹. Overall, current mortality rates for intra-abdominal sepsis are 10.5%¹². Advances in antibiotic therapy, renal and respiratory support, as well as newer and more effective forms of surgical techniques have all contributed to the reduction of morbidity and mortality in cases of SS.

The application of "damage control" surgery¹³ has yielded positive results in the management of non-trauma patients as well¹⁴. Different OA techniques have been used in this context, in which, negative pressure therapy appears to be the modality of choice¹⁵.

The risk of abdominal meshes being infected is about 3- 13%, although this varies greatly and is influenced by the use of different materials. The use of newer biological meshes appear to have gained adoption both as a replacement for

infected synthetic meshes, as well as the material of choice in patients who have a higher risk of developing a contaminated abdominal cavity, such as in our current case study.

We report the case of a 51-year-old male who suffered an intestinal perforation through a work-related injury that required a colostomy to be performed. Ten months later, during the colostomy reversal procedure, the patient had an anastomotic leak that led to an intra-abdominal sepsis that was managed with an open abdomen technique utilizing NPWT delivered via the ABTHERA™ Open Abdomen Negative Pressure Therapy system and a later abdominal wall reconstruction with a biological mesh placement (STRATTICE™ Reconstructive Tissue Matrix; Allergan, NJ). Subsequently, the patient had another anastomotic leak that required a second round of NPWT that allowed the mesh to be preserved.

CASE REPORT

A 51-year-old male with no past medical history presented to us after having suffered a work-related fall, which led to an intestinal perforation and an associated abdominal sepsis.

The initial infection was treated with an open abdomen and twelve surgical lavages of the abdominal cavity; the patient underwent a Hartmann colostomy (also known as a proctosigmoidectomy), after which, he was discharged.

Ten months after the initial treatment, the patient was admitted for an elective colostomy reversal. During the procedure, multiple peritoneal adhesions and a fixed left colon was observed. The lateral/end anastomosis was achieved with some difficulty. On post-operative day # 5 fecal matter was observed through one of the surgical wounds and an open exploration of the abdomen was performed, where a dehiscence of the intestinal anastomoses was observed. The patient was treated with an OA and NPWT delivered via the ABTHERA™ Open Abdomen Negative Pressure Therapy system (figure 1-2), with continuous pressure applied at -125 mmHg and dressing changes every 48 hours.

After the third cycle, the patient's clinical condition was stable and fascia closure was performed. Due to the presence of a large ventral hernia, a biological mesh (STRATTICE™ Reconstructive Tissue Matrix; Allergan, NJ) was used (Figure 3).

On the POD# 4 following fascia closure, fever and wound cellulitis was observed. The



Figures 1-2: Negative Pressure Wound Therapy via the ABTHERA™ Open Abdomen Negative Pressure Therapy system utilized to help manage the patient's abdominal sepsis. Note the external foam covering of the colostomy wound after initial reversal.



Figure 3: Biological mesh fitted to treat the ventral hernia caused by the Open Abdomen approach.

wound exploration showed signs of sepsis and the abdominal cavity was reopened. During the exploration, it was observed that the anastomoses had leaked once again, therefore V.A.C.® Therapy utilizing V.A.C.® GRANUFOAM SILVER™ Dressing was initiated over the surgical wound with the biologic mesh (Figure 4). Two dressing changes every 48 hours were performed. Due to the recurrent dehiscence of the colonic sutures, the initial colostomy was reinstated. During this process it was observed that the mesh was intact and that there was no need to remove it.

The patient had a satisfactory outcome and was discharged. A three-week follow-up was performed where it was observed that the surgical wound had healed and there was no evidence of abdominal sepsis. (Figure 5).



Figure 4: Application of V.A.C.® Therapy with V.A.C.® GRANUFOAM SILVER™ Dressing over surgical wound.



Figure 5: Closed abdomen with no signs of wound dehiscence or infection.

DISCUSSION

Patients that require the use of an open abdomen approach have a high rate of ventral hernias, especially those in which primary fascia closure cannot be performed¹⁶ or the hernia is a planned outcome¹⁷. The use of different types of mesh materials have shown to be of great use in the treatment of these hernias¹⁸. Both synthetic and biological meshes have their benefits and downfalls. It appears that synthetics have a higher rate of complications¹⁹, especially when it comes to mesh related infections. The use of biological meshes, in conjunction with NPWT appears to be a good therapeutic strategy for abdominal sepsis in patients in which mesh preservation is to be performed²⁰.

Our patient had multiple instances of abdominal sepsis that required management with an open abdomen, in the latter two events, the patient's infectious foci was

adequately treated with V.A.C.® Therapy placed over the surgical wound with the biologic mesh, but due to the recurrence of his anastomotic leak, the source of the infection was not fully addressed until the colostomy was reinstated.

This case exemplifies that maintaining the biological mesh, thus limiting surgical trauma on a patient with a previously addressed ventral hernia, while managing the abdominal infection with NPWT delivered via the ABThera™ Open Abdomen Negative Pressure Therapy system is a viable treatment option.

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