Negative Pressure Wound Therapy in a Neonate with a Complex Abdominal Wound

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Abstract: Negative pressure wound therapy (NPWT) is used successfully in managing abdominal wounds in neonates, but wounds with stomas present additional challenges. This case study evaluates the effectiveness of NPWT on such a wound, using pediatric urine collection bags to manage stoma output. Methods: Negative pressure wound therapy was applied to a dehisced abdominal surgical wound, located between a jejunostomy stoma and mucous fistula, along with separate pediatric urine collection bags for each stoma. Results: The wound had sufficiently healed after 14 days. Conclusion: Neonatal abdominal wounds, in the presence of stomas and fistulae can be effectively treated with NPWT when separate collection bags are used.

Negative pressure wound therapy (NPWT) has been used successfully in the management of complex abdominal wounds in infants and neonates. Abdominal wounds with stomas and fistulas present the additional challenge of managing the stoma output and working with a much smaller surface area on which to apply an NPWT dressing. A review of the literature does not demonstrate widespread use of NPWT in the presence of a fistula in the neonatal population. In fact, it has been suggested that NPWT can cause a fistula. This has not been the authors’ experience in their facility, where NPWT has been used extensively on a variety of wounds, including abdominal wounds, in the adult and pediatric population since 1998 without the occurrence of a fistula during treatment. In the authors’ facility, a stoma pouch used in conjunction with NPWT has been widely used in the adult population as found in the literature. If the wound bed is thought to be compromised, a nonadherent barrier is utilized for protection with the NPWT dressing. However, this same practice is limited in the neonatal population as even pediatric stoma bags or drainage pouches (Wound Manager Sterile Drainage Pouch with Durahesive Skin Barrier™, Convatec, Skillman, NJ) are often too large for the surface area. This report describes 1 method of treating a complex abdominal wound in the presence of a jejunostomy stoma and a mucous fistula in a neonate with a complicated medical history, and provides an example of the positive outcomes experienced with treating such a complex abdominal wound.
This case study describes the effectiveness of NPWT on a complex abdominal wound with a jejunostomy stoma and a mucous fistula using 2 separate pediatric urine collection bags in a neonate with multiple co-morbidities.

**Material and Methods**

The subject was a premature infant male born at 32 weeks gestation via emergent cesarean delivery due to suspected placental abruption. The patient’s pertinent history included low birth weight (1450 g), respiratory distress syndrome (RDS), metabolic acidosis, significant perinatal asphyxia resulting in multiorgan dysfunction, neonatal hypoglycemia, gastrointestinal bleeding, and pneumoperitoneum. On day of life (DOL) 8, the subject was taken to the operating room for an exploratory laparotomy where a large perforation in the ileum and a small perforation in the jejunum were identified, as well as multiple areas of patchy ischemia throughout the small intestine. The enterotomy in the proximal jejunum was repaired and 3 cm of small bowel were resected in the ileum. A 6 cm silicone ventral wall defect silo bag was placed. On DOL 9, the patient returned to surgery where an 8 cm area of ischemic mid-to-distal jejunum required resection and jejunostomy with mucous fistula.

On DOL 25, physical therapy was consulted for a dehisced abdominal surgical wound. Patient presented to the physical therapist intubated with significant anasarca.

Patient was receiving amphotericin B for Candida peritonitis and Candida albicans fungemia as well as fluconazole for additional Candida coverage.

The abdominal wound measured 8.0 cm x 2.0 cm x 0.6 cm. The wound bed presented with yellow and green coagulum with a small area of exposed bowel (Figure 1A). The wound edges and surrounding skin were edematous and erythematous. Necrotic debris was removed by selective debridement. Tissue samples were taken for wound cultures where Candida albicans was identified. To treat the wound infection, gauze moistened with a solution of liquid mafenide mixed with Nystatin powder was applied in wet-to-moist dressings every 8 hours for 2 days before it was determined the wound was appropriate for NPWT.

In this case, the wound volume was large on a small abdominal surface area, and it was located between a jejunostomy stoma on the infant’s left side and a mucous fistula on the right side. In an effort to prevent contamination of the wound by the stoma output, the wound needed to be isolated from the jejunostomy stoma and the mucous fistula. The wound edges were protected with the application of the hydrocolloid dressing (Exuderm OdorShield.)

**Key Points**

- Negative Pressure Wound Therapy (NPWT) has been widely used in the treatment of adults with complex abdominal wounds.
- This case study demonstrates NPWT was used successfully in a preterm infant with multiple medical comorbidities and a dehisced abdominal surgical wound with a fistula and stoma present.

This case study describes the effectiveness of NPWT on a complex abdominal wound with a jejunostomy stoma and a mucous fistula using 2 separate pediatric urine collection bags in a neonate with multiple co-morbidities.
A nonadherent barrier (Mepitel®, Mölnlycke, Göteborg, Sweden) was placed in the wound bed in an effort to protect the exposed bowel. A saline-soaked gauze was placed in the wound bed, an all-purpose urethral catheter (Davol®, Bard, Covington, GA) was inserted into the gauze, and the dressing was sealed with a transparent drape (Tegaderm™ Film, 3M, St. Paul, MN) in such a way that the drape overlapped the stomas. The drape was cut away over the 2 stomas, and each had a urine collection bag sized for premature infants (U-Bag® Single Specimen, Briggs Healthcare, Waukegan, IL) placed on it. The gauze dressing was sealed under a continuous subatmospheric pressure of 20 mmHg via existing hospital central wall suction (Figure 1B). Nursing staff emptied the collection bags as needed without removing it from the NPWT dressing. Physical therapists assessed the dressing and suction setting daily and provided dressing changes every 2 days to 3 days as considered necessary.

**Results**

Negative pressure wound therapy continued for 14 days when the abdominal wound was determined to be sufficiently healed. The wound decreased in size from 8.0 cm x 2.0 cm x 0.6 cm to 3.5 cm x 1.0 cm x 0 cm. (Figure 3A). At this time, it was determined stoma pouches could be utilized to manage the stoma output. To achieve a good surface for adhering the stoma pouches, Brava™ Strip Paste (Coloplast, Minneapolis, MN) was applied over the superficial wound, which was then and covered with Tegaderm Film (Figure 3B). A small pediatric stoma pouch was applied to both the jejunostomy stoma and the mucous fistula (Figure 3C). The stoma pouch was changed once every 5 days or if leaks occurred.

**Discussion**

This case study describes the authors' own method of NPWT stoma management in the treatment of a challenging complex wound in a neonatal patient. Positive outcomes were achieved with maintaining the subatmospheric pressure at 20 mmHg. This method was derived based on the same principles described in the literature to treat wounds concurrently with fistulas in adults: cessation of tissue destruction, prevention of sepsis, increased rate of granulation formation and wound contracture on peri-fistula wound in preparation for skin grafting.2-6,8,9

**Conclusion**

Complex abdominal wounds with stomas and fistulas can be effectively treated in the neonatal population with NPWT when separate pediatric-sized urine collection bags are used to manage output from the stomas.

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**References**

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