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Negative Pressure Wound Therapy Makes Management of Fournier's Gangrene Easy: Description of The Procedure from A Case Report

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Introduction: Negative Pressure Wound Therapy (NPWT) has evolved over the past decade because of its remarkable effects on healing of chronic and difficult wounds and has become the mainstay of their treatment, including Fournier's gangrene (FG). In this case report we describe the procedure and discuss the difficulties of NPWT in such a patient.

Case report: A 58 year old patient with a FG was put on NPWT on the 15th postoperative day after initial wound debridement. Wound changes were performed every 2-3 days with the patient in a lithotomy position under local anesthesia. The pressure in the vacuum pump was set in a constant mode in -80mmHg. The process of wound change and application of the device was simple and quick. Nine days after the treatment, the wound was fully covered by granulation tissue and its size was remarkably decreased. On the 10th day, the wound was reconstructed and repaired with split thickness skin graft. Aggressive management with this therapy, accelerated wound healing and also simplified the final reconstruction of the wound.

Conclusion: NPWT constitutes the modern method of treatment of GF wound. The technique of application is easy and reproducible and simplifies reconstruction. It should be included in the urologist's armamentarium.

Keywords: Fournier's Gangrene; Negative pressure; Wound care

Introduction

Fournier's gangrene (FG) is a rare disease first described in 1764 [1]. It is a rapidly expanding necrotic multi microbial inflammation of perineum and scrotum with high mortality rate [2]. Extended and repeated surgical wound debridement may lead to extensive wound defects which later require complex reconstruction. Negative pressure wound therapy (NPWT) has evolved over the past decade because of its remarkable effects on healing of chronic and difficult wounds and has become the mainstay of their treatment, including FG [3,4]. In this case report, we describe the procedure and discuss the difficulties of NPWT.

Case report

A 58 year old patient with a previous history of alcoholism was presented in our department with clinical symptoms of severe sepsis. Clinical examination revealed a FG. After fluid resuscitation and initiation of broad spectrum of antibiotics, the patient was taken to the operating theatre for surgical debridement of the anterior perineum, scrotum and inguinal areas under general anesthesia (Figure. 1).

Figure.1: The extensive skin defects are obvious. Both the testicles are denuded of their scrotum.

Postoperatively local wound care with wet to dry changes was applied and surgical debridement was repeated twice. On the 15th postoperative day, the trauma was still covered by pseudo membranes (Figure. 2).

Figure. 2: Appearance of the wound after 15 days of reatment with conventional dressings

Also, the granulation tissue was scant. It was decided the patient to be put on NPWT. The necessary equipment for NPWT application is outlined on (Table 1).

Table 1. Equipment for NPWT application
Vacuum pump
Special canister for the collection of exudate
Gauze or sponge of polyurethane
Special flat drain
Connecting tubes
Transparent adhesive membranes
Hydrocolloid membrane
Colostomy paste

The steps for application of the device are the following: The patient is placed in lithotomy position under local anesthesia. Initially, wound cleaning and debridement is performed. We then place the first layer of the special sterile gauze to cover both the wound and the testicles. We ensure the gauze fits the contours of the wound. The special flat drain is placed onto the first gauze layer. We make sure that the proximal part of the drain comes out of the groin area. Following, we place the second layer of the gauze to fill the wound and apply a transparent adhesive membrane to cover part of the wound. A sterile tongue depressor is used to seal with stoma paste the edges of the wound in the inguinal folds, the posterior perineum and the area under the film layer where the drain tube and the catheter enter (Figure. 3). Finally, we place the remaining of the adhesive membranes onto the trauma and we connect the tube to the vacuum pump.

Figure. 3: Sealing of the perineal wound.

The pressure of the vacuum device is set in a constant mode in -80mmHg. If the wound is completely sealed, both the gauze and the film layer contract and harden (Figure. 4).

Figure. 4: Appearance of the wound after successful application of the vacuum device.

In case of failure of the airtight mechanism, the device alarms (table 2). In such a case, we inspect the trauma for any leak and we may need to seal it with extra film layer, hydrocolloid membrane or stoma paste. Wound change is performed every 2-3 days. If the trauma drains heavy and infected exudate, especially in the early phases of the treatment or there are frequent failures of the airtight mechanism, then the wound may require earlier change and inspection. The process is usually simple and quick and its duration is less than half an hour. No surgical debridement was required after the application of the treatment. After nine days of treatment, the wound was completely covered by granulation tissue (Figure. 5).

Table 2. Causes of leak of airtight mechanism during NPWT
Failure of airtight mechanism at the entry site of the drain and urinary catheter under the film layer
Uneven trauma e.g. groins and perineum stretches and detaches the film layer prior to the next wound change
Detachment of the film around the anus
Detachment of the film due to increased wound discharge.
Failure of the connection between the tubes Mobile patient

Figure 5: Appearance of the wound at the end of the treatment with NPWT.

The following day the wound was reconstructed with spit thickness skin graft. The final result was cosmetically acceptable and the patient was fully satisfied (Figure. 6).

Figure 6: Twenty days after the reconstruction the final result is cosmetically acceptable.

Discussion

The popularity of NPWT for the treatment of difficult wounds is due to its unique mechanisms on wound healing physiology [5]. It produces a microstrain that removes the exudate from the trauma, increases the local blood flow and promotes local angiogenesis and the formation of granulation tissue. Proteins and enzymes which act as inhibitors of wound healing decrease their concentration in the wound area [6]. The macrodeformation causes a reduction of wound size and depth which in some cases may reach up to fifty percent [6,7]. Moreover, local edema decreases, thus enhancing the delivery of local nutrients. Finally, there is not any scientific evidence to support that NPWT decreases bacterial load [7]. Generally, NPWT is contraindicated in the presence of necrotic tissue and wound infection. However, a vacuum assisted closure dressing may be applied after initial wound debridement if the trauma is simple with uncomplicated infection. In such, a case the wound must be inspected on a daily basis for signs of infection and necrosis. Also, the device itself should be inspected regularly for loss of its watertight mechanism. Reasons for that are presented on the (table 2).

The rarity of the disease itself is a barrier for randomized control studies. However, all the published studies and case reports show a substantial benefit of NPWT to conventional dressings [8,9]. In a recent publication, it was also mentioned that early reconstruction has a positive impact on quality of life [9]. NPWT combined with other modalities, such as parenteral nutrition, astronauts' diet and a fecal collector may obviate the need for diverting colostomy which increases the overall morbidity [8].

Although some patients may experience pain with this treatment, the pain is not usually so severe to lead them to withdraw the treatment. We agree with other authors that the decrease in surface area and the depth of the trauma makes final reconstruction simpler and easier.

Conclusion

NPWT constitutes the modern method of treatment of GF wound. The technique of application is easy and reproducible and simplifies reconstruction. It should be included in the urologist's armamentarium.

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