

Study of two types of filler materials for Negative Pressure Wound Therapy (NPWT)

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Aim

To assess the suitability of gauze and foam as a negative pressure wound therapy (NPWT) filler material, in two patients with extensive irregular wounds. Observed comparisons of clinical efficacy and ease of use were documented.

Methods

Two patients with large irregular shaped wounds were selected on an intention to treat basis. Patient 1 had lost the entire scrotum, anterior perineum and penile skin as well as the entire lower half of abdominal panniculus to Fournier gangrene; patient 2 had severe crush injury to his upper thigh, gluteal area and scrotum with extensive skin avulsion and muscle crush. Kerlix™ gauze was used in patient 1 and Smith & Nephew polyurethane foam in patient 2 as the filler material to apply NPWT following extensive surgical debridement. Wounds were closed with split thickness skin grafts when ready.

Results

Case Number	Filler	Initial wound size	Days NPWT	Dressing changes	No. of Stsg	Fixation method	Days post STSG to 100% graft take
1	Gauze	40cm x 20cm x 2.5cm	11	4	2	Tie over	8
2	Foam	35cm x 14cm x 0.4cm	7	2 (2)	2	NPWT	7

Case 1

Initial Presentation

An electrician working for a subcontractor in Iraq visited the Army clinic in the morning of April 29th, 2008 complaining of being unable to pass urine since the previous night. Tobacco chewing +. O/E tachycardia 112, low BP 83/58, major tenderness in lower abdomen and genitalia with extreme swelling, heat, tenderness and discoloration. He was given medication (Ciprofloxacin, pyridium) for a urinary tract infection (UTI) but returned much worse after few hours. US ruled out retention. BP 74/49, pain 9/10 testes, urinalysis bacteria 2+, proteinuria.

Continued Treatment

He was transferred to Base hospital, Bagram. Diagnosed Fournier gangrene, underwent radical debridement. Transferred to intensive care unit (ICU), septicemia. Re-debrided on 2/05/2008. Pneumonia on 4th, tracheostomy on 5th, colostomy diversion and feeding jejunostomy done on 6th. Testes were put in thigh pockets. Vacuum dressings changed every 2 days and removed on 10th before transfer to Dubai. Airlifted to Dubai on 11th May, 13 days post incident.

Further Treatment and Outcome

Since 11/05/2008, the patient underwent several dressings with NPWT using a gauze-based filler and VISTA pump set at -80 mmHg aided by silver dressings (ACTICOAT®) as a wound contact layer. His support lines were progressively removed and he was advanced to an oral diet. He was breathing naturally and maintaining good vital signs. On 22/5/08, 9 days post admission and 24 days post illness he underwent extensive skin grafting of lower abdomen, perineum and scrotal reconstruction. Dressing changes: 11th, 13th, 16th and 19th with NPWT. Skin grafting 22nd fixed with tie-overs. First inspection on 26th + supplementary grafting. Next dressing 30th May full graft take. Attempted colostomy closure 8.6.2008 but unsuccessful. Discharged on 14.6.2008 after 34 days stay in hospital. Colostomy to be closed after 2-3 months.

Case 2

Initial Presentation

A worker got crushed accidentally between a fork-lift and a stack of steel plates. He was caught by the high tyres at the level of high thigh and toppled over the plates of steel - 26.11.2008.

Resulted in a massive crush-avulsion type wound with muscle disruption of quadriceps and segmental loss of skin-muscle. Resuscitated with fluids and blood transfusion.

Managed with thorough debridement of the wound and application of ACTICOAT silver dressings. Shifted to high dependency unit (HDU) for pain control.

Next day second look operation, debridement and application of NPWT with foam (Smith & Nephew foam with VISTA pump). Foam attached to wound edges by staples.

Continued Treatment and outcome

Dressing repeated on 30th and grafted on 4th December. Cultures taken on 26th, 27th and 30th were sterile. Hence grafted on 4th December. Graft immobilized by NPWT. ACTICOAT wound contact layer.

Culture of 4th grew Escherichia coli (suspected anal source) but this was already covered by antibiotic. Dressing inspection on the 9th December showed 100% graft take. Repeat dressing NPWT together with ACTICOAT as a wound contact layer.

Conventional dressing changes from 11th to 19th December. After that twice daily showers with Chlohexidine. Supplementary grafting on the 22nd.

Grafts are spreading, he has started walking and has remained infection free all though temporary colonization of the black foam with Pseudomonas noted after the 4th day after first grafting, but did not affect the graft.

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Case 1



Case 2



Conclusion

NPWT was effective in preparing the large wounds quickly for skin grafting in both cases. The Kerlix gauze and the polyurethane foam were able to interface with, and transmit the negative pressure to the wound effectively and exudate management was made easy in both cases. Although valid comparisons cannot be made in such a small study, gauze was felt to be easier to pack into the crevices of complex cavities. A combination of the two fillers in one wound has not been described but is worth studying.

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