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An Innovative and Cost-Effective Management of a Large De-Gloving Injury Using Sub Atmospheric Pressure Dressing and Split Skin Grafting.

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ABSTRACT

Sub atmospheric pressure dressing for wounds is already an established method on effective wound management. Sub atmospheric pressure dressings help in faster wound healing with the formation of granulation tissue by increasing local blood flow thereby decreasing oedema and bacterial count. The main limitation of this type of dressing is the difficulty encountered in achieving a complete air tight seal in certain areas of the body such as the hip and the perineum. In our attempt to overcome this difficulty we innovated a novel technique of sub atmospheric dressing for this patient in a very cost effective manner.

Keywords: De-gloving injury, Sub atmospheric pressure dressing, innovation, cost-effectiveness, split skin graft, physiotherapy.

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INTRODUCTION

Sub atmospheric pressure dressings are costly and usually difficult to apply in certain areas of the body such as the hip and perineum. They involve obtaining an air tight sealed dressing around the wound which is then connected to a suction pump [1-6].

We treated a 26 year old male from Chennai who met with a road traffic accident in which his right lower limb was partially run over by a heavy vehicle resulting in a complete circumferential de-gloving injury of his right thigh. Upon initial evaluation there was no neuro-vascular deficit of the right lower limb extremity. He was shifted to the operating room where an epidural catheter was secured taking into account pain management during subsequent dressings and a thorough debridement was done of the devitalised tissue followed by an extensive wash of the degloved area. He was started on prophylactic antibiotics and anti-coagulants and a normal dressing was done as we contemplated further debridement maybe necessary. In the next two days it was observed that the posterior compartment muscles were gangrenous and hence further appropriate wound debridement was carried out.

Subsequently we decided to apply sub atmospheric dressing to the entire length of the wound. We successfully devised a low cost dressing technique which was used on the patient which showed drastic improvement of the wound in the next few weeks. He was ready for Split skin grafting in three weeks and has since readily recovered from the same.

MATERIALS AND METHODS

In our attempt to apply sub atmospheric dressing for this patient the main limitation was the difficulty in obtaining a complete air-tight seal of the entire wound; as the wound extended from the groin superiorly to 10 centimetres below the knee joint inferiorly and anteriorly, from the anterior superior iliac spine laterally, the gluteal region posteriorly and around 3 centimetres from the anal verge and perineum medially. The maximum length of the wound was around 100 centimetres.

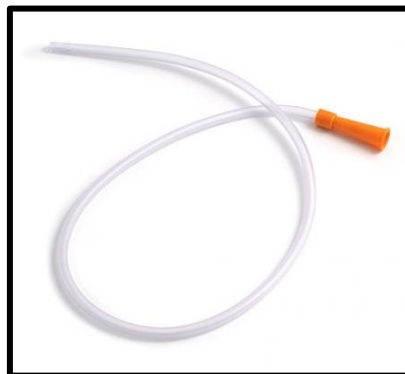
Since the cost of the dressing was an important limiting factor it was not possible to use an adhesive drape over the entire wound from end to end. Special gauzes and pads were tailor-made for this patient from the normal gauze rolls available in the hospital ward itself, each pad measuring 110 x 70 centimetres and were separately sent for autoclaving along with normal dish washing sponges which were procured from the market. The patient was asked to purchase one 45 x 28 centimetre sterile adhesive drape, one 15 x 28 centimetre sterile adhesive drape and one 100 x 70 centimetre disposable underpad which cost Rs. 350, Rs. 130 and Rs. 30 respectively for each dressing.



Underpad



Foam



Suction catheter

The wound was thoroughly washed with almost 2 litres of saline during every dressing and subsequently wrapped with a single large pad which covered the entire wound. The autoclaved foams were placed as the second layer and one more pad as the third layer around the thigh. One 16 F suction cannula was placed between the second and third layers of the dressing and brought out from the distal end of the dressing. The autoclaved underpad was then placed as a fourth layer around the thigh with the impermeable plastic side facing outwards. The upper and lower ends of the dressing was carefully wrapped circumferentially using the sterile adhesive drapes and the suction cannula was connected to central suction with pressures ranging from -50 mmhg to -120mmhg thereby creating an airtight sub atmospheric dressing. The suction was switched off for 30 minutes once every 2 hours. The dressing was changed once in two or three days depending on soakage. Wound swabs were sent for culturing and antibiotic sensitivity during the first and third dressings and antibiotics given appropriately.



Picture of the dressing

RESULTS AND DISCUSSION

A total of only four sub-atmospheric pressure dressings were done by which time the wound granulated very well and was fit for split skin grafting. The first two dressings were done once in two days and the next two dressings were done once in three days. Swabs taken from the wound during the first dressing showed Staph. aureas growth and appropriate antibiotics were administered parentally. A repeat swab done during the fourth dressing revealed that there was no growth.

The cost of each dressing worked out to only Rs. 510/- (350+130+30) as against at least Rs. 2500 for a conventional Sub atmospheric pressure system dressing. A total of four dressings were done over a period of two weeks with the total expenses amounting to only Rs. 2040/- for the dressing alone.



24 hours after first debridement (Normal Dressing)





After One sub atmospheric pressure dressing





After the Third sub atmospheric pressure dressing

Three weeks after initial presentation to the ER, two debridements, and four Sub atmospheric pressure dressing changes later the patient was taken up for split skin grafting. The grafts were harvested from the left thigh. Almost the entire wound was covered except at the level of the knee joint to permit for flexion-extension exercises and further grafting at a later date.





After split skin grafting

CONCLUSION

The main advantage of sub atmospheric pressure dressing over conventional dressings is that the number of dressings required for the wound to heal is substantially reduced [7-9]. It has been observed that in wounds that have significant amount of slough sub atmospheric pressure dressings reduces the need for extensive debridement when compared to conventional dressings [10-12]. Sub atmospheric pressure dressings were also less painful when compared to conventional dressings, mainly because of two factors; the total number of dressings were found to be less and also the amount of debridement done with each dressing was substantially lesser. When the total cost of the dressings was calculated it was found that sub atmospheric pressure dressings were substantially cheaper in comparison to conventional dressings.

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