Negative pressure wound therapy

Spinal infection treatment continues to be a challenge. Negative pressure wound therapy (NPWT) has been an effective method in the context of infection therapy, and its use has gained popularity in recent decades.

Negative-pressure wound therapy (NPWT) is a method of drawing out fluid and infection from a wound to help it heal. A special dressing (bandage) is sealed over the wound and a gentle vacuum pump is attached.

A study by Rickert et al. aimed to analyze the impact of known risk factors for postoperative wound infection on the efficiency and length of NPWT therapy until healing.

They analyzed 50 cases of NPWT treatment for deep wound infection after posterior and posteroanterior spinal fusion from March 2010 to July 2014 retrospectively. We included 32 women and 18 men with a mean age of 69 years (range, 36-87 years). Individual risk factors for postoperative infection, such as age, gender, obesity, diabetes, immunosuppression, duration of surgery, intraoperative blood loss, and previous surgeries, as well as type and onset (early vs. late) of the infection were analyzed. We assessed the associations between these risk factors and the number of revisions until wound healing.

In 42 patients (84%), bacterial pathogens were successfully detected by means of intraoperative swabs and tissue samples during first revision. A total of 19 different pathogens could be identified with a preponderance of Staphylococcus epidermidis (21.4%) and S. aureus (19.0%). Methicillin-resistant S. aureus (MRSA) was recorded in two patients (2.6%). An average of four NPWT revisions was required until the infection was cured. Patients with infections caused by mixed pathogens required a significantly higher number of revisions (5.3 vs. 3.3; $p < 0.01$) until definitive wound healing. For the risk factors, no significant differences in the number of revisions could be demonstrated when compared with the patients without the respective risk factor.

NPWT was an effective therapy for the treatment of wound infections after spinal fusion. All patients in the study had their infections successfully cured, and all spinal implants could be retained. The number of revisions was similar to those reported in the published literature. The present study provides insights regarding the effectiveness of NPWT for the treatment of deep wound infection after spinal fusion. Further investigations on the impact of potential risk factors for postoperative wound healing disorders are required. Better knowledge on the impact of specific risk factors will contribute to a higher effectiveness of prophylaxis for postoperative wound infections considering the patient-specific situation [1)].

A combination of wound debridement, local scalp flap repair, the use of NPWT device and double cannula irrigation provides effective treatment method for chronic erosion post DBS surgery [2)].

To investigate the effect of modified double negative-pressure wound therapy combined with debridement and tension-reduced suture in treatment of stage 4 pressure sores and infection in

sacrococcygeal region and its surrounding area. Methods: From January 2015 to June 2019, 20 patients with stage 4 pressure sores and infection in sacrococcygeal region and its surrounding area were admitted to Department of Burns and Plastic Surgery and Cosmetology of Linyi People's Hospital. Among them, there were 11 males and 9 females, aged 48 to 88 years. The wounds of 13 patients were located in the sacrococcygeal region, and 8 of them had exposed sacrococcyx. The wounds of 4 patients were located in the greater trochanter area of femur, and the wounds of 3 patients were located in the ischial tuberosity area. All the patients had fever in different degree, bacterial infection, hypoproteinemia, and electrolyte imbalance, etc. at admission. After thorough debridement and dressing change, routine negative-pressure wound therapy with negative pressure value of -16.6 kPa was performed according to the scope of lesions in period Ⅰ. When granulation tissue was fresh with less exudate and without residual necrotic tissue, modified double negative-pressure wound therapy in combination with debridement and tension-reduced suture was performed immediately in period Ⅱ. Modified double negative-pressure wound therapy were persistently performed through negative pressure drainage tube inserted into deep part of wounds and negative pressure drainage tube on surface at the same time, with superficial negative pressure value of -19.9 kPa. Meanwhile, systemic anti-infection and nutritional supports were given. The wounds were monitored for the grade of wound healing and whether skin necrosis, split, or fluid accumulation develop at the suture site. The patients were followed up for 1 to 6 months after discharge to monitor wound healing. Length of hospital stay, infection condition before and after the debridement and tension-reduced suture, and complications during treatment were recorded. Results: All wounds achieved first grade healing, with the skin at the suture site healed without split, fluid accumulation, or necrosis. The patients were followed up for 1 to 6 months after discharge, with good shape of surgical incision, little pigmentation on the skin, no hypertrophic scar or contracture, and no recurrence of pressure sores. Length of hospital stay of patients was 24 to 33 d, with an average of 28.5 d. Before debridement and tension-reduced suture, 2 cases were infected with Pseudomonas aeruginosa, 1 case was infected with Escherichia coli and Staphylococcus aureus, and 1 case was infected with Proteus mirabilis. The results of bacterial culture were all negative after debridement and tension-reduced suture. During the treatment, all patients were not complicated with bone or joint infection, necrotizing fasciitis, septicemia, etc. Conclusions: Modified double negative-pressure wound therapy combined with debridement and tension-reduced suture for treatment of patients with stage 4 pressure sores and infection in sacrococcygeal region and its surrounding area is easy to operate with minimal injury, easy for patients to accept with a very high level of satisfaction, and is suitable to popularize and applicate for primary hospitals [3)].

1)
Rickert M, Rauschmann M, Latif-Richter N, Arabmotlagh M, Rahim T, Schmidt S, Fleege C. Management of Deep Spinal Wound Infections Following Instrumentation Surgery with Subfascial Negative Pressure Wound Therapy. J Neurol Surg A Cent Eur Neurosurg. 2021 Jan 27. doi: 10.1055/s-0040-1720999. Epub ahead of print. PMID: 33506474.
2)
Tao R, Xue C, Yang C, Simfukwe K, Hu X, Wu X, Bi H. Reconstruction of chronic scalp erosion after deep brain stimulation surgery. J Plast Reconstr Aesthet Surg. 2020 Dec 9:S1748-6815(20)30666-5. doi: 10.1016/j.bjps.2020.11.045. Epub ahead of print. PMID: 33358678.
3)
Miao YY, Zhang WC, Han XB, Wang ZX. Zhonghua Shao Shang Za Zhi. 2020;36(7):540-546. doi:10.3760/cma.j.cn501120-20200304-00118