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ENDOMETRİAL KANSER CERRAHİSİ SONRASINDA ŞİDDETLİ YARA ENFEKSİYONLU BİR OLGUDA NEGATİF BASINÇLI YARA TEDAVİSİNİN UYGULANMASI

APPLICATION OF NEGATIVE PRESSURE WOUND THERAPY IN A CASE OF SEVERE WOUND INFECTION AFTER ENDOMETRIAL CANCER SURGERY

Ulaş Solmaz[1], Atalay Ekin[1], Emre Mat[1], Cenk Gezer[1], Gülşah Selvi Demirtaş[1], Mehmet Gökçü[1], Pınar Solmaz Hasdemir[2], Muzaffer Sancı[1]

ÖZET

Cerrahi alan enfeksiyonu her cerrah için hala zorlu bir durumdur ve morbidite ve mortalitenin önemli bir sebebi olmaya devam etmektedir. Literatürde debridman, antibiotic tedavisi ve pansumanlar gibi çeşitli tedavi protokolleri önerilmektedir. Yakın zamanda, negatif basınçlı yara tedavisi enfeksiyon bulguları olan yaraları tedavi etmek için yeni bir yardımcı yöntem olarak önerilmektedir. Endometrial kanser cerrahisi sonrasında şiddetli yara enfeksiyonu gelişen bir olgunun negatif basınçlı yara tedavisi ile yönetimi sunulmaktadır.

Anahtar Kelimeler: Cerrahi Alan Enfeksiyonu; Negatif Basınçlı Yara Tedavisi; Vakum Asiste Kapama.

ABSTRACT

Surgical site infection is still a challenging situation for every surgeon and it is continuing to be a significant cause of morbidity and mortality. Various treatment protocols such as debridement, antibiotic therapy and dressings have been recommended in the literature. Recently, negative pressure wound therapy has been suggested as a new adjunctive modality for treating wounds with signs of infection. We describe the novel application of negative pressure wound therapy for the management of a case with severe wound infection after endometrial cancer surgery.

Key Words: Negative Pressure Wound Therapy; Surgical Site Infection; Vacuum Assisted Closure.

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[1]Department of Obstetrics and Gynecology, Tepecik Training and Research Hospital, İzmir
[2]Department of Obstetrics and Gynecology, Celal Bayar University Faculty of Medicine, Manisa

İletişim: Dr. Ulaş Solmaz
Department of Obstetrics and Gynecology, Tepecik Training and Research Hospital, İzmir

Tel: 0506 448 6358
E-posta: drulassolmaz@gmail.com

INTRODUCTION

Wound infections are one of the most commonly encountered problems in surgical patients. Although most gynecological operations are considered as clean-contaminated, surgical site infection was 1.69 times higher for malign neoplasms (1). Patients are more likely to develop surgical site complications after gynecologic oncology operations due to the size of incision, operation time and association with colorectal surgery.

The treatment of surgical site infections generates a significant burden for patients and healthcare systems. Various treatment protocols like debridement, antibiotherapy, topical applications and wound dressings have been recommended. Negative pressure wound therapy (NPWT) is a new tool which consists of a foam sponge, adhesive cover, fluid collection apparatus and a suction pump (2). The system makes a 50-175 mmHg negative pressure over the wound via a special vacuum-sealed sponge (2). Mechanisms of action for NPWT include removing edema fluid, increasing blood flow, decreasing the bacterial load, and stimulating the proliferation of reparative granulation tissue (3). NPWT has been shown to effectively manage non-healing open wounds after surgical treatment in various disciplines (3).

Here, we describe our experience of the use of NPWT to manage a case with severe wound infection developed after endometrial cancer surgery.

Figure 1 • Severe wound infection after endometrial cancer surgery.

CASE REPORT

A 60-year old gravida 6, parity 5 woman admitted to the Tepecik Training and Research Hospital because of post-menopausal bleeding. Her past medical history included hypertension and type 2 diabetes mellitus. She is considered overweight with a body mass index of 26 kg/m^2. Fractional curettage revealed a grade 2 endometrioid adenocarcinoma. Diagnostic modalities did not find any other pathologies in the abdominal cavity. After performing upper and lower abdominal midline incisions, the patient underwent complete surgical staging including total abdominal hysterectomy, bilateral salpingoopherectomy, omentectomy, pelvic and paraaortic lymphadenectomy. For postoperative antibiotic prophylaxis, metronidazole was combined with a second generation cephalosporin to ensure anaerobic coverage because extensive dissection of adhesions might have resulted in ischemia to bowel segments.

On postoperative day 5, increased redness and heat at the incision site was diagnosed. 3-cm area of the incision is slightly opened, with the wound edges separated. Laboratory investigations demonstrated a white blood cell count of 13.7 x10^3/L and C-reactive protein level of 21 mg/L. After culture was taken, wound was dressed daily with povidone iodine solution. Due to fluctuations in blood glucose level, insulin doses were adjusted. On postoperative day 7, physical examination revealed gray, malodorous, infected-appearing tissue along the incision with exposed suture (Figure 1). Clinical appearance of the wound was suspected as necrotizing fasciitis. However, the fascia was evaluated as uninvolved and intact. Pseudomonas aeruginosa was isolated from the culture and broad spectrum antibiotic therapy with piperacillin was started. An increased level of white blood cell (21 x 10^3/L) and C-reactive protein (150 mg/L) was detected. Urgent surgical debridement and excision of necrotic tissue was performed on the same day with the help of a plastic surgeon. Due to presence of clear signs of infection, the inferior margin of incision extended about 5cm lateral to the midline. All necrotic and non-viable tissues were completely removed. One cm margin of healthy tissues from each edges were also resected to establish a negative margin for debridement. Subsequently, the wound was irrigated with sterile saline.

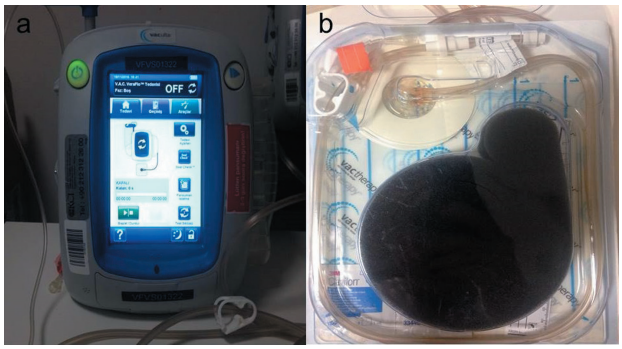

Figure 2 • a, b. Vacuum assisted closure device used for negative pressure wound therapy.

As a result of the extensive tissue separation, the decision was made to proceed with an alternative therapy. The wound defect was covered with NPWT (Vacuum Assisted Closure, Kinetic Concepts, San Antonio, TX, USA) system that provided a continuous vacuum force across a closed wound dressing (Figure 2). The tissue defect was filled with foam and a waterproof adhesive seal was placed along the infected area (Figure 3). The vacuum suction was activated at 125 mmHg. The wound was irrigated by hydrogen peroxide instillation three times a day. The vacuum system was exchanged two or three times weekly.

During follow up, a gradual improvement of the patient's general condition was observed. The white blood cell and C-rective protein levels were significantly decreased and blood glucose level was strictly regulated with insulin therapy. At day 12 following initiated NPWT, complete healing of the wound was observed, the patient had no local or systemic signs of infection, and negative pressure wound therapy was discontinued. Wound culture was repeated and revealed negative for bacterial growth. When there was no drainage from the wound, the NPWT dressings were removed under spinal anesthesia and sterile conditions in the operating room. Complete formation of granulation tissue was observed and primary suture of the defect was performed (Figure 4). Histopathologic examination confirmed the diagnosis of grade 2, stage 3C endometrioid adenocarcinoma with pelvic lymph node metastasis. Patient was discharged on postoperative day 21.

DISCUSSION

Surgical site infections are associated with increased need for additional medications and procedures to treat the infection and also increased lengthened cost of postoperative hospital stay. It is reported that 2.6% to 4.3% of all surgeries are complicated with surgical site infection (4). Among gynecologic cancers, the rate of surgical site infection within 30 days was found to be 8% for endometrial cancer, 6% for ovarian cancer and 5% for cervical cancer (4). Comorbid conditions such as diabetes, obesity and hypertension have been shown to increase risk for surgical site infections. Similarly, all of our patients had at least one comorbid disease.

Pseudomonas aeruginosa was isolated from wound culture of our patient. It is known to be one of the leading pathogens associated with nosocomial infections, In hospitals, Pseudomonas can be spread on the hands of healthcare workers or by equipment that gets contaminated and is not properly cleaned. Nosocomial infections are major causes of morbidity and mortality as well as prolonged hospitalization and increased costs.

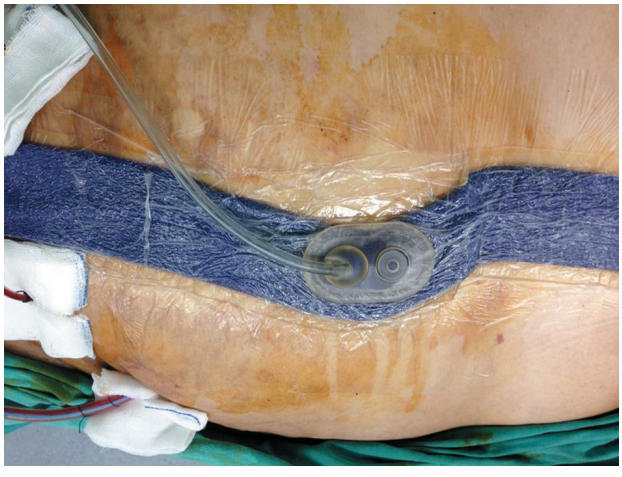

Figure 3 • Application of negative pressure wound therapy for postoperative wound infection.

Figure 4 • Healed wound after 12 days application of negative pressure wound therapy.

Risk factors that predispose to nosocomial infections included advanced age, malnutrition, chronic lung disease, diabetes, surgery, trauma, burns, immunsupression, blood transfusion and use of multiple catheters. Preventive and protective measures for nosocomial infections that need to be implemented are careful attention to routine infection control practices, removal of infected medical devices, debridement of granulation and necrotic tissue and initiation of antibiotic therapy.

Standard treatment modalities in wound infection to improve healing process include debridement, antibiotic administration and use of wound dressings. Identification of new techniques for preventing postoperative infection is essential to reduce burden on health care expenditures and also to improve the quality of surgical care for patients with gynecologic cancer. Recently, NPWT has been suggested to be a potentially effective treatment option for surgical site infections particularly in high risk patients with comorbidities.

Successful use of NPWT systems in orthopedic and general surgery was reported previously. NPWT has been used to treat diabetic ulcers, pressure ulcers, open abdominal wounds, chest wounds, traumatic wounds and dehisced surgical wounds (5). Lehner et al. used NPWT system in 32 patients who had infected orthopedic implants and they treated 84.6% and 80% of patients with acute and chronic infections, respectively (6). Brangewitz et al. described 32 patients in which NPWT was used in the management of endoscopic closure of esophageal intrathoracic leaks and concluded that successful wound closure was independently associated with NPWT (7). In addition, a meta-analysis demonstrated association between the use of NPWT and reduction in surgical site infection (8).

In wounds affecting the pelvis, NPWT has been used after skinning excision for a case of recurrent Paget's disease and in the treatment of complex perineal traumatic wounds (9, 10). Mark et al. evaluated the efficacy of NPWT in 63 morbidly obese patients following cesarean section and observed a potential decrease in wound complications (11). However, there are few reports of NPWT for treating wound infections after gynecologic oncology surgery and here, we demonstrated successful application of NPWT in three cases. In all patients, NPWT was performed along with aggressive debridement and antibiotic therapy. With these findings, we could propose that NPWT may add more benefit than open-wound treatment, simple irrigation and debridement. The proposed mechanisms of action of NPWT are formation of granulation tissue, increased local blood flow and angiogenesis and decreased local edema (5). In addition, NPWT helps to approximate skin and fascia due to the reverse tissue expansion effect of negative pressure.

Potential complications associated with NPWT use have also addressed in some studies. The most common complication is infection caused by inadequate drainage and retension of thick necrotic tissue. Patmo et al. reported that it is not clear whether NPWT can be safely used on any wound without causing or worsening wound infection (12). Moue's et al. observed a shift in the bacterial species contaminating the wound after NPWT therapy (13). In addition, Ren et al. presented two cases of severe complications after treatment with NPWT in burned patients. They suggested that too high pressure led to bleeding and the too low pressure led to fluid accumulation and infection (14). Other complications that do not cause much trouble are skin erosion around the suction tube, minor bleeding at dressing changes, growth of granulation tissue into the sponge and pain due to the sponge volume and negative pressure (15). Therefore, sufficient irrigation, proper preparation of the wound beds and close observation are crucial for avoiding complications. Contrast to these publications, we had no adverse effects. The reason of this is that we did not apply NPWT in cases complicated by malign invasive infection, exposed bone and active bleeding, which are considered as contraindications for NPWT (16).

In conclusion, NPWT provides perfect wound drainage and closure of defects and promotes tissue granulation. Therefore, NPWT could be considered as an alternative option for the treatment of wound infections in patients after gynecologic cancer surgery.

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