

Case report: Necrotising fasciitis after removing the intrauterine device

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ABSTRACT

Necrotising fasciitis is a rapidly progressive, destructive soft tissue infection that mainly involves fascia and subcutaneous tissues. Rapidly spread necrosis in tissues is often caused by systemic sepsis, toxic shock syndrome, multiorgan failure and thrombosis in the subcutaneous vasculature. Necrotising fasciitis can be seen in all the anatomical regions of the body; the extremities and perineum are frequently affected. In this case report, we emphasised the importance of nursing care of a necrotising fasciitis patient who has been treated for a long time with aggressive surgical treatment. Vacuum-assisted closure application is a non-invasive method with controlled and localised negative pressure on the wound to accelerate healing in acute/chronic wounds. Necrotising fasciitis can be successfully treated with early

diagnosis, adequate debridement, and appropriate antibiotic therapy. A multidisciplinary approach is necessary for the comprehensive care of these patients.

Keywords: Care, necrotising fasciitis, vacuum-assisted closure, wound.

INTRODUCTION

Necrotising fasciitis (NF), commonly known as flesh-eating disease, is caused by a bacterial infection that results in the death of the body's soft tissue¹. Hippocrates described this condition as "Diffused erysipelas caused by trivial accidents, [where] flesh, sinews, and bones fell away in large quantities, [leading to] death in many cases"². NF is a rare and lethal bacterial infection characterised by progressive necrosis of the skin, subcutaneous tissue, and fascia³⁻⁵. NF initially begins as a localised infection, with only mild redness and swelling on the skin⁶. Then, with the synergistic effects of microorganisms and some risk factors, it progresses rapidly within 3–4 days and causes bulla and necrosis of the skin^{5,6}. Pain may occur hours before infection⁴. Pain is one of the most sensitive symptoms, seen in almost all patients and disproportionate to the lesion⁵. Rapidly spread necrosis in tissues is often caused by systemic sepsis, toxic shock syndrome and multiorgan failure and thrombosis in the subcutaneous vasculature^{4,7}. Regardless of the causative pathogen, early diagnosis is difficult because there is no deep involvement of the necrotic area during the initial period³.

Although NF can be seen in all ages and both genders, it occurs more frequently in males and aged 50–60 years⁴. The incidence is 0.4 in 100,000 cases^{3,5}. Mortality is reported to be 6–76%⁵. The principle of surgical management is immediate and extensive radical debridement of necrotic tissues and fasciotomy^{1,2}. The delay of the first surgical debridement may increase the mortality³.

There are some risk factors that facilitate for NF: immune system disease, ageing, diabetes, obesity, debility, alcohol dependence, intravenous drug use, peripheral vascular disease, smoking, cancer, advanced liver and kidney diseases, trauma or surgery^{4,5,8}. In the literature, diabetes has been reported in 60% of patients^{5,6}. Although there are many identified risk factors, half of the cases occur in healthy individuals⁵.

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NF can be seen in all the anatomical regions of the body⁴. However, the most common sites of infection are the lower extremities (28%), perineum (21%), trunk (18%), and head or neck (5%)². NF is usually characterised by minor injuries such as surgical incision, insect insertion, incision, abrasion, contusion, injection, skin ulcer, perirectal abscess, incarcerated hernia, burns, splintering, birth and penetrant trauma⁵. Extremities often develop after trauma, injection, or insect bites, and frequently in the abdominal region as an operative complication⁷.

After the description by Jean Alfred Fournier in 1883, it was called “Fournier’s gangrene” when external genital organs and perineum were affected⁵. Fournier’s gangrene typically begins in the labium region in women and in the scrotum region in men and spreads rapidly to the perineal, gluteal, and abdominal regions⁴. Other anorectal aetiological factors include perianal abscess, diverticulum perforation, cancer, rectal perforation, acute appendicitis perforation, anal dilatation, anal fistula, and strangulated inguinal hernia⁷. The common aetiological factors among urogenital lesions are urethral stenosis and instrument use⁸. If NF occurs after a known aetiology, it is classified as secondary NF. In 45% of cases, no definite cause can be detected, and it is called primary or idiopathic NF⁵.

Depending on the body area and underlying predisposing factors developed by the infection, different types of microorganisms are isolated⁶. The most frequently isolated bacteria are *Streptococcus*, *Staphylococcus* and *Escherichia* species⁹.

Amputation in limb involvement can be life-saving. However, there is a higher mortality rate because amputation cannot occur in the trunk and perineal involvement⁵. In cases where the perineum is affected, early diagnosis, early debridement, and close monitoring are the only options to reduce mortality rates³. It has been shown that a 12-hour delay in surgical debridement leads to an increase in the incidence of septic shock and acute renal failure and a 24-hour delay in surgical debridement increases mortality⁶.

In this case report, we aimed to emphasise the importance of the care and treatment of a patient who developed uterine rupture and NF during removal of an intrauterine device.

Ethical consideration

The study was carried out according to the principles of the Declaration of Helsinki. Verbal and written permission was obtained from the patient.

CASE REPORT

History

A 39-year-old female patient lives with her husband and four children. The uterus rupture developed while the intrauterine device was removed from the patient. The patient, who was sent home without noticing the rupture, began complaining

of severe abdominal pain, fever, nausea, vomiting and incontinence after one month. On clinical examination, the patient was found to have lethargy and fever, with a temperature of 38 °C. The patient was admitted to our emergency clinic. Necrotic tissue was found inside the anterior abdominal wall (20x10 cm in width). Blood investigation showed leukocytosis.

Treatment

Emergency surgery was performed after examination and evaluation. A colostomy was opened due to sigmoid colon perforation in the patient and Vacuum-Assisted Closure® (VAC) was applied to the abdomen because the frontal wall of the abdomen was necrotic. Culture samples from necrotic tissue and blood culture were taken and sent to the microbiology laboratory. Intravenous fluid therapy was initiated by opening vascular access. Until culture results were available, broad-spectrum intravenous antibiotics were started. The patient was taken to the operating room. Around the wound, black polyurethane sponges were cut with scissors in the appropriate sizes. Empty spaces in hollow wounds were whipped with black polyurethane sponges. The wound areas were covered with adhesive, semi-permeable covers. A small hole was made through the closures to place the TRAC™ (Therapeutic Regulated Accurate Care) pad and the VAC device was connected to the wound. Dressing changes were made in 48–72 hours according to the condition of the wound. During the dressings, superficial debridement was made when needed (Figure 1). The patient and her family were informed about the gravity of their condition. The VAC application was performed until the wound was ready to surgically close.

During the third VAC, the perforation of the small intestine was observed, and two ostomies were made. On the 15th day, the general condition of the patient was deteriorated, and the signs of sepsis were seen. The patient was



Figure 1: Application of debridement to the wound.



Figure 2: On the 90th day of wound healing.

transferred to the critical care unit. In order to correct the patient's haemodynamic instability, antibiotic treatment, hypoalbuminaemia treatment, and blood supplements were applied. After three days in the critical care unit, when her haemodynamic parameters were stable, she was taken to the general surgery clinic again. Triple antibiotherapy was started for wound infection treatment. The application of VAC to the abdominal region continued for a month and VAC was changed every three days.

Prognosis

The VAC application was finished because of wound infection to a minimal level, and reduction of wound area measurements (7X12). The patient was discharged well after 90 days (Figure 2).

DISCUSSION

NF is a rare but rapidly progressive and potentially fatal infection¹⁰. The care for a patient with NF is multidimensional and multidisciplinary, requiring nursing interventions¹¹. In this case report, a 39-year-old female patient developed uterine rupture and NF after intrauterine device removal. This infection can occur at any age or in any location and is not specific to gender¹¹. Older age (>60) is a risk factor for NF¹⁰. Özgenel *et al.*⁷ retrospectively examined 30 cases of NF (4 female and 26 male) for a 5-year period; the mean age was 55 years. Bozkurt *et al.*¹² reported a 22-year-old male patient with NF due to razor self-mutilation in the forearm. Vayvada *et al.*⁵ examined a total of 68 patients who had NF in a 10-year period and found that 76.4% (n=52) of patients had risk factors such as diabetes, smoking, obesity, and the use of corticosteroids. The most common predisposing factor in the study of Demir and Kunt¹³ was diabetes mellitus (71.4%), followed by peripheral vascular disease (21.4%) and malignancy (14.3%), respectively. No predisposing factor was detected in our case, but most patients have a history of trauma or may have a history of surgical or penetrating injury¹⁰. In this case, weakening of the immunity system after uterine rupture may also have contributed.

NF is difficult to diagnose because the symptoms are many and varied¹³. Early diagnosis and aggressive surgical treatment reduce mortality risk¹². The basis of the treatment is an early diagnosis, broad-spectrum antibiotic therapy, debridement reaching intact tissues with no necrotic tissue left behind, regulating liquid-electrolyte balance, adequate oxygenation of the infected area and sufficient nutritional support and analgesia supply⁴. Sepsis is a frequent complication of NF. Bacterial cultures and antibiotic sensitivity can help in the treatment process¹⁴. Laboratory findings include leukocytosis with an elevated number of neutrophils¹¹. The usual infection control precautions such as hand hygiene are important. The patient should be in a private room and under contact isolation.

The patient with NF has many psychological needs¹¹. Our patient had two ostomies, which resulted in impaired body image; her husband couldn't accept the stoma. Body image refers to a subjective concept of the physical appearance of the person based on her own self-observation and the reaction of others¹⁵. Changes in physical appearance, function and body integrity are typically central to disease experience and medical treatment¹⁶. Our patient and husband were informed that these changes in her body were temporary and that the stoma would be closed after a while.

Third-degree pressure injury developed due to immobility and reluctance to meet self-care needs. A deterioration of skin integrity, lack of knowledge, malnutrition due to oral intake impairment, weight loss and prolonged sleep were observed. Replacing the patient's nutritional requirements is necessary to promote wound healing¹¹. Total parenteral nutrition and enteral nutrition started for weight loss. In these patients, arterial blood pressure and central venous pressure, and daily urine output should be monitored. In addition, correction of metabolic acidosis and electrolyte imbalance is one of the most important interventions¹⁴.

The timing of surgery is extremely important and is predicated on prompt diagnosis¹⁴, and VAC application; it is a non-invasive method with controlled and localised negative pressure on the wound to accelerate healing in acute and chronic wounds¹³. This therapy helps remove infectious materials and other fluids from the wound. VAC is typically applied to the wound after debridement when clear edges have been obtained¹¹. The VAC system consists of polyurethane and polyvinyl alcohol sponges to fill the wound, semi-permeable caps with adhesive to cover the wound, a device that provides device connection with the wound, a pressure regulator, a collecting container and a device that produces a negative pressure⁸. It both reduces bacterial burden by removing from the environment the excretion of the bacteria and allows the capillary to overcome the pressure and bring more blood, thus more oxygen and accompanying growth factors⁵. The VAC is changed every two to three days. By the VAC applied to the wound in our case, the wound surface was reduced at the end of one

month and the VAC was removed. VAC is now becoming an alternative treatment option that is becoming increasingly widespread in acute and chronic wound treatment.

During the VAC application, superficial debridement was applied when necessary. Early surgical debridement is necessary to remove all necrotic tissue and prevent the spread of the infection¹¹. Without surgical intervention, mortality approaches 100%¹⁰. Özgenel *et al.*⁷ found that 96.6% of patients required more than one debridement. In the study of Demir and Kunt¹³, they reported that all patients had to have received wound care at least twice a day. Pain is an important issue in the patient with NF¹¹. For this reason, pain control was provided by appropriate painkillers before the procedure. Two ostomies were performed in this patient due to small intestinal perforation. Firstly, patients and their relatives were informed. Her husband was taught stoma care. When managing these patients, intensive care facilities should be provided and long-term follow-up with the patient and treatment of complications should be discussed and planned.

CONCLUSION

NF is a form of infection that affects soft tissues and fascia is rapidly progressing and life-threatening. NF can be successfully treated with early diagnosis, adequate debridement, and appropriate antibiotic therapy. A multidisciplinary approach is necessary for the comprehensive care of these patients. For this reason, a multidisciplinary approach is needed in the diagnosis and treatment of NF cases.

AUTHORSHIP AND ACKNOWLEDGEMENTS

The manuscript has been read and approved by all authors and all authors agree to the submission of the manuscript.

All authors must have agreed on the final version of the paper and must meet at least one of the recommendations in the International Council of Medical Journal Editors criteria.

CONFLICT OF INTEREST

The authors declare that there is no any conflict of interest for this work.

FUNDING

The authors received no funding for this study.

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