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INTRODUCTION

Necrotizing fasciitis is an uncommon and life-threatening soft tissue infection caused by pathogenic bacteria that spread rapidly along the fascia and produce enzymes and toxins that destroy soft tissues (1). Necrotizing fasciitis, if left untreated, can cause tissue necrosis, sepsis, toxic shock syndrome, and even death (2). Early detection and treatment are, therefore, crucial (2). Diagnosis in the early stage of this condition can be difficult, and it may be mistaken for a direct infection such as cellulitis (3). Imaging reveals uneven or extensive soft tissue thickening with fluid or gas accumulation, though the diagnosis is often clinical (4,5). Immediate surgical debridement, intravenous antibiotics, hydration, and electrolyte management are the foundations of treatment (6). Large wounds caused by aggressive debridement require rapid closure either by secondary intention, flap, or graft (7). In some circumstances, negative pressure wound therapy (NPWT) may be beneficial (8). NPWT is reportedly helpful for increasing tissue perfusion, lowering edema, speeding up the healing process, and preparing the wound bed for definite coverage by several methods of tissue reconstruction (9). This

A combined approach of surgery and negative pressure wound therapy in post intramuscular injection necrotizing fasciitis: A case report

Abstract

Necrotizing fasciitis is one of the most severe soft tissue infections, having substantial fatality rates even in facilities with the highest standards. Typically, it first affects the muscular fascia before spreading to the muscles and subcutaneous tissues. Thus, the therapy for this illness depends on early detection. In this report, we present the case of an 18-year-old male who developed severe necrotizing fasciitis in the right gluteal area following an intramuscular injection of diclofenac sodium. The patient received significant surgical debridement, negative pressure wound therapy (NPWT), and antibiotics as part of their care. A split-thickness skin graft was used for reconstruction. Our results were outstanding as the wound totally healed. Overall, our findings portrayed the importance of taking serious action against soft tissue infections.

Keywords: Fasciitis, necrotizing, negative pressure, wound therapy, intramuscular injection, case report

case study describes the treatment of an 18-year-old male with post-intramuscular injection necrotizing fasciitis of the right gluteal area using NPWT in conjunction with scheduled surgery. We do believe that the outcomes of our current case report show that soft tissue infections should not be underestimated.

CASE REPORT

An 18-year-old male presented with necrotizing fasciitis involving the right gluteal region. He had a history of respiratory failure brought on by Covid-19 disease. He was a heavy smoker (more than 20 cigarettes per d), yet neither had diabetes mellitus nor any other kind of immunosuppression. The intramuscular injection of diclofenac sodium was performed by a non-medical person. The patient was hospitalized at an outpatient facility for about one week following the injection because of excruciating gluteal discomfort. It was then treated with ampicillin-sulbactam as an abscess and then drained. The patient was brought to the emergency room while receiving antibiotic treatment due to deterioration in general health and skin discoloration that spread from the right gluteal region to the right iliac region (Table 1).

Table 1. Patient characteristics		
1	Patient (gender, age)	18-year-old male
2	Final diagnosis	Post intramuscular injection necrotizing fasciitis
3	Symptoms	Deterioration of general condition, significant area of skin necrosis and soft tissue discharge in the right gluteal and iliac region
4	Medications	Antibiotic treatment, intravenous hydration
5	Clinical procedure	Aggressive surgical debridement, Negative pressure wound therapy, skin graft

Physical examination revealed a significant area of skin necrosis and soft tissue discharge in the right gluteal and iliac region (Figure 1). The patient's blood pressure was about 90/60 mmHg, and he was tachypneic with a heart rate of 120 bpm. Leukocytosis ($18.5 \times 10^3/L$), an elevated erythrocyte sedimentation rate (ESR) of (37 mm/h), and an elevated C-reactive protein (CRP) of 49.8 mg/L were all detected in the findings of his initial laboratory tests. The hemoglobin concentration was low at 8.9 g/dL. The patient got intravenous hydration and had extensive surgical debridement. Deep soft tissues were found to be grey necrotic during surgery, and there was no bleeding, no resistance to blunt dissection, a bad odor, or purulent discharge (Figures 2 and 3). *Staphylococcus aureus* and *Klebsiella pneumoniae* were identified by tissue culture. As a result, the intravenous antibiotic schedule was adjusted to include 500 mg of vancomycin every 12 h and 1 g of meropenem every 8 h. 2 days after surgery, negative pressure wound treatment (NPWT) was used (Figure 4). The patient got continuous NPWT dressings at 100 mmHg. After 4 weeks, the wound looked clean and had pink granulation tissue (Figure 5). Meshed split-thickness skin graft taken from the back of the right thigh was used to cover the defect. After a month, the patient made a full recovery, and the results of the wound's full healing were satisfactory (Figures 6 and 7).



Figure 1. An 18-year-old man with necrotizing fasciitis of the right gluteal region. It shows a large necrotic area of skin and soft tissue



Figure 2. Intraoperative photo shows grey necrotic soft tissue, serosanguineous purulent offensive secretions, and necrosis of perforating vessels

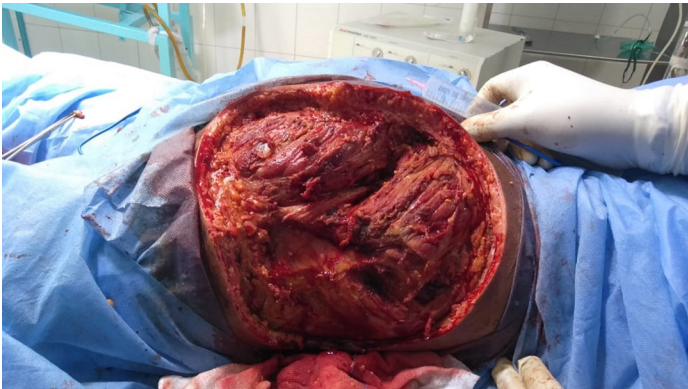


Figure 3. Immediate postoperative photo after aggressive debridement



Figure 4. After two days post-debridement photo showing a large area of necrotic tissue that was excised



Figure 5. A four weeks photo after the use of negative pressure wound therapy (NPWT) following surgical debridement shows pink granulation tissue



Figure 6. An immediate intraoperative photo after application of split-thickness skin graft



Figure 7. After one-month postoperative photo showing nearly complete healing of the wound

DISCUSSION

Necrotizing fasciitis is one of the most serious soft tissue diseases, with significant mortality rates even in the most highly qualified facilities (10). To increase the existing survival rates, all researchers believe that early diagnosis and treatment are demanded (11). It may be confused with mild infections such as cellulitis (3). A study comparing the symptoms and signs of cellulitis with necrotizing fasciitis concluded that patients with fasciitis often had a diffuse rash and a more toxic appearance (11). In addition, individuals with necrotizing fasciitis have decreased platelet counts. Pain that appears disproportionate to the findings of physical examination should also be suggestive of an early stage of necrotizing fasciitis (11). A spontaneous or post-traumatic bacterial invasion of the fascia is thought to be the cause (12).

Furthermore, a history of trauma, crush injuries, intravenous substance misuse, cancer, and autoimmune illnesses are also risk factors (5). Through deep fascial planes, this infection penetrates the muscles and subcutaneous tissue. Necrotoxins, especially

the enzymes hyaluronidase, collagenase, and heparinase, are the cause of this. This causes ischemia, liquefactive necrosis of soft tissue, and thrombosis of the arteries that supply the skin (10).

In the case discussed, the patient experienced necrotizing fasciitis after diclofenac sodium was injected intramuscularly into the right gluteal area. Intramuscular injection of anti-inflammatory drugs and necrotizing infections are known to interact (13). Muscle necrosis is also a known but rare side effect of intramuscular administration of drugs in which non-steroid anti-inflammatory drugs are often implicated (14). Therefore, the intramuscular injection, which served as the entry site for the bacteria, was probably the most important cause of disease development. Even when administered appropriately, intramuscular injections can cause serious tissue damage and serve as a local entry point for infection. Otherwise, it is crucial to avoid injecting drugs into the subcutaneous region, where blood vessels are less susceptible to infections (5). The patient also had a history of Covid-19 disease. The association between necrotizing fasciitis and Covid-19 infection has not been well clarified in the literature however some authors assumed that the lymphopenia associated with Covid-19 infection may predispose the patient to develop necrotizing fasciitis and enhance the secondary bacterial superinfection (15).

In our patient, a comprehensive fasciectomy was used to perform aggressive debridement of all necrotic tissues as well as draining of the affected fascial planes. To get control of the necrotizing process, further debridement and re-exploration is frequently necessary. Despite this, no more debridement treatments were required because all devitalized tissues had been extensively removed. To speed up the healing process and manage infection, the NPWT was then used as an outpatient regimen. Skin grafting was used to provide coverage once the recipient bed was ready. This lowers the incidence of reinfection and death as well as the loss of fluid, electrolytes, and proteins (10).

CONCLUSION

Necrotizing fasciitis is a serious condition that damages the fascia and soft tissues. Without an appropriate diagnosis and successful treatment, high death rates can be seen. When necrotizing fasciitis is suspected, infection control measures should be taken as quickly as feasible, including prompt surgical debridement and appropriate antibiotic therapy. In addition to these therapies, NPWT promotes faster wound healing and early coverage with high-quality granulation tissue.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

Ethical approval is not required at our institution to publish an anonymous case report.

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