

Necrotizing Fasciitis Following Tetanus Vaccination

Tetanoz Aşısı Sonrası Nekrotizan Fasiit

Elif Emel ERTEN¹, Tuğba ORNEK DEMİR¹, Medine Ezgi OCAL¹, Suleyman Arif BOSTANCI¹,
Can Ihsan OZTORUN², Emrah SENEL²

¹ Department of Pediatric Surgery, Ankara City Hospital, Ankara, Turkey

² Department Of Pediatric Surgery, Ankara Yıldırım Beyazıt University Faculty of Medicine, Ankara, Turkey



ABSTRACT

Necrotizing fasciitis (NF) is a rare infection that is characterized by rapidly progressing necrosis into the superficial and deep tissues. NF can result in serious morbidity and mortality as a life-threatening condition. Early diagnosis is one of the most important factors in reducing mortality. Therefore, we aimed to describe a case of severe necrotizing fasciitis in the left arm after tetanus vaccination administration and to discuss the benefits of early surgical management in the light of the literature.

Key Words: Children, Necrotizing Fasciitis, Tetanus Vaccine

ÖZ

Nekrotizan fasiit (NF), yüzeysel ve derin dokulara hızla ilerleyen nekroz ile karakterize nadir görülen bir enfeksiyondür. NF, yaşamı tehdit eden bir durum olarak ciddi morbidite ve mortaliteye neden olabilir. Mortaliteyi azaltmada en önemli faktörlerden biri erken tanıdır. Bu olgu sunumunda, tetanoz aşısı sonrası sol kolda şiddetli nekrotizan fasiit gelişen bir olguyu sunmayı ve literatür ışığında erken cerrahi tedavinin faydalarını tartışmayı amaçladık.

Anahtar Kelimeler: Çocuk, Nekrotizan Fasiit, Tetanoz Aşısı

INTRODUCTION

Necrotizing fasciitis (NF) can be defined as a severe bacterial infection that occurs as a result of soft tissue infection. NF, which may also be caused by ischemia and/or lack of defense mechanisms, can become a vicious circle causing tissue necrosis (1). NF is more likely to affect adults than children. But, healthy children appear to be affected more often by NF, which is in contrast to the association of adults with NF (2). Identification of a small lesion that triggers the progression to fasciitis can be possible in 50-80% of children (3). Circumcision, umbilical vein catheterization, inguinal hernia operation, chickenpox superinfection, omphalitis, limb lesions, perineal infections,

head-neck lesions, trauma, and insect bites can be the cause of NF. In most cases, the virulent form of group A *Streptococcus* is responsible for the development of NF. Clinical suspicion may be useful for the early diagnosis and treatment. If not treated in the early period, morbidity and mortality increase significantly in cases where the diagnosis is delayed. Besides the use of broad-spectrum antibiotics, aggressive surgical debridement constitutes the main principles of treatment. Negative Pressure Wound Therapy (NPWT) is an efficient treatment in the case of acute and chronic wounds and this treatment method accelerates healing by the topical negative pressure (4). This case report presents the management of NF in a pediatric case that developed after tetanus vaccination administration.



0000-0002-3666-295X : ERTEN EE
0000-0002-8664-9032 : ORNEK DEMİR T
0000-0002-3436-3497 : OCAL ME
0000-0002-7512-3895 : BOSTANCI SA
0000-0002-5408-2772 : OZTORUN CI
0000-0002-0383-4559 : SENEL E

Conflict of Interest / Çıkar Çatışması: On behalf of all authors, the corresponding author states that there is no conflict of interest.

Financial Disclosure / Finansal Destek: The authors declared that this case has received no financial support.

Confirmation / Onay: The written consent was received from the patient who was presented in this study.

How to cite / Atıf Yazım Şekli : Erten EE, Ornek Demir T, Ocal ME, Bostanci SA, Oztorun CI, Senel E. Necrotizing Fasciitis Following Tetanus Vaccination. Turkish J Pediatr Dis 2023;17:71-73.

Additional information / Ek Bilgi: All photographs belong to the archive of our clinic and used with the permission of Dr. Emrah Şenel.

Correspondence Address / Yazışma Adresi :

Can Ihsan OZTORUN

Department of Pediatric Surgery, Ankara City Hospital, Ankara, Turkey
E-posta: canoztorun@mynet.com

Received / Geliş tarihi : 16.05.2022

Accepted / Kabul Tarihi : 24.06.2022

Online published : 23.09.2022

Elektronik yayın tarihi

DOI:10.12956/tchd.1117600

CASE REPORT

A 13-year-old patient with no known systemic diseases in his medical history presented with a rash and pain in the left upper arm. Upon questioning, it was learned that he had a tetanus vaccination at school one week earlier. He presented to an external medical center with complaints of pain, redness, and fever, and his complaints did not regress despite oral amoxicillin/clavulanic acid and intravenous ampicillin/sulbactam treatment.

On the 17th day after vaccination, his complaints continued and he was transferred to our hospital. The patient was admitted to the infection service, and intravenous ampicillin/sulbactam and clindamycin treatments were initiated. Upon arrival, his body temperature was 37.4°C, respiratory rate was 24/minute, and heart rate was 72/minute. We were consulted because of the rapid increase in redness and pain. There was no pathology in the other system examinations. The principal findings were swelling, hyperemia, increased temperature, and tenderness in the anterolateral region of the left arm.

It was observed that the abscess drained spontaneously in the anterolateral aspect of the left arm, and fluctuation and crepitation were palpated around it, and the patient was taken into emergency operation (Figure 1). During the surgical exploration performed in the area with tissue defects, it was observed that the infection and necrosis progressed from the graft site to the proximal shoulder, distal to the forearm, and into the subcutaneous, fascia, and muscle tissues, with the infection dissecting the tissues (Figure 2). Extensive purulent discharge between the muscle tissues was drained, necrotic tissues were debrided in places reaching the bone tissue, and the entire region was washed with antiseptic solutions. Subsequently, all dead tissues were removed by debridement two more times at 24-hour intervals (Figure 3). On the third day, when it was seen that the inflammation had regressed, the tissue defect in the shoulder area was approximated somewhat, and TNP vacuum-assisted closure (VAC; Kinetic Concepts Inc., San Antonio,



Figure 1: The abscess drained spontaneously in the anterolateral region of the left arm, and an obvious exposed subcutaneous fat is also seen.

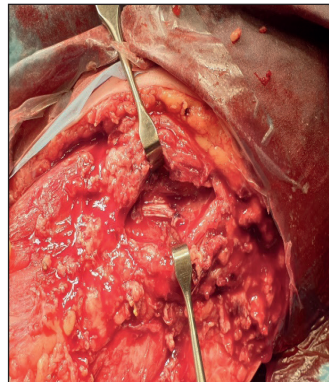


Figure 2: The deep tissue infection and necrosis progressing through the fascia planes extending to the bone.



Figure 3: View after serial debridement.



Figure 4: Final outcome of reconstruction with a free skin graft in postoperative 6th month.

TX) was applied to the remaining open areas. Intravenous teicoplanin was added to the treatment. Due to the limitation of movement in his left elbow, he began a physical therapy program. VAC was repeated for three sessions, four days apart. *Bacillus flexus* growth was observed in the pus culture sample obtained during the first debridement, so treatment was continued. No growth was observed in subsequent pus and blood cultures. Thirteen days after the first debridement, when the patient's VAC was opened, it was observed that granulation tissue was developing. A partial thickness skin graft was taken from the right thigh and applied to the patient, and VAC was placed on the graft again. When the VAC was opened four days later, it was seen that the grafts were adapted. The patient did not need a blood transfusion during this period. He was treated with clindamycin for 19 days, teicoplanin for 16 days, and ampicillin/sulbactam for 16 days. Physical therapy recommendations were provided, and Vaseline application

was recommended to the graft areas. It was observed that the patient had no problems during the follow-up appointment 10 days after discharge (Figure 4).

DISCUSSION

NF is a rare bacterial infection that has many etiologies. Although it is frequently seen in the extremities and perineum, it can occur anywhere in the body. The most important factor affecting the treatment process is early diagnosis, which is mainly based on clinical findings. It can easily be confused with other soft tissue infections associated with clinical erythema. NF should be suspected if there is pain and sensitivity in the affected area that is accompanied by a subfebrile fever and rapid clinical deterioration despite antibiotic treatment. Radiological imaging methods alone are not diagnostic due to nonspecific findings.

Because of the high morbidity and mortality caused by NF, emergency treatment should be started immediately after diagnosis. Broad-spectrum antibiotherapy that includes coverage of various organisms, including *Streptococcus*, *Staphylococcus*, gram-negative bacteria, and anaerobes, should be initiated, and immediate, effective, and adequate debridement should be performed. The only way to control infection in NF is to debride all necrotic tissue effectively and adequately. In our case, debridement continued until live bleeding tissue was reached, and all necrotic tissue was removed. There are many publications in the literature suggesting that early aggressive debridement decreases the mortality rate (5). It should be performed by an experienced surgeon who is familiar with the anatomy of the region in order to protect functional structures during debridement. The patient should be followed up closely, and debridement should be repeated if necessary. Some authors recommend mandatory reassessment in the operating room within 24 hours to ensure adequate debridement (3). Rabuel et al. (6) shows that patients who do survive NF have decreased (self-reported) quality of life in multiple domains with a focus on decreased physical functioning.

A plan should be made to close the defect after the necrotic tissue is cleaned and the spread of the infection is under control. We applied VAC in this patient to support granulation development. This application reduces bacterial load by removing exudate in the environment, increases local blood flow, causes the release of growth factors, removes proteases that prevent wound healing, contributes to the development of granulation tissue, and ensures rapid and high-quality wound healing (7). The tissue defect in this patient was approximately 40 cm². Some tissue defects were primarily closed, VAC was applied to the remaining area, the defect area was reduced, and then a partial thickness skin graft was applied. The application of VAC on the graft facilitated the adaptation of the graft in the current infectious environment by ensuring its safety.

CONCLUSION

NF is a rapidly progressing and life-threatening infection that involves soft tissues and fascia. If not treated promptly and correctly, the mortality rate can be high. Amputation can be life-saving, especially in NF cases occurring in the extremities. After the diagnosis is made, early and serial debridements and acute treatment with appropriate antibiotic therapy should be instituted.

REFERENCES

1. Nawijn F, Kerckhoffs MC, van Heijl M, Keizer J, van Koperen PJ, Hietbrink F. Impact of Comorbidities on the Cause of Death by Necrotizing Soft Tissue Infections. *Surg Infect (Larchmt)*. 2022 Sep 6. doi: 10.1089/sur.2022.135. Online ahead of print.
2. Noor A, Krilov LR. Necrotizing Fasciitis. *Pediatr Rev* 2021;42:573-5.
3. Sarani B, Strong M, Pascual J, Schwab CW. Necrotizing fasciitis: current concepts and review of the literature. *J Am Coll Surg* 2009;208:279-88.
4. Phelps JR, Fagan R, Pirela-Cruz MA. A case study of negative pressure wound therapy to manage acute necrotizing fasciitis. *Ostomy Wound Manage* 2006;52:54-9.
5. Watkins RR, David MZ. Approach to the Patient with a Skin and Soft Tissue Infection. *Infect Dis Clin North Am* 2021;35:1-48.
6. Rabuel V, Guillier D, Zwetyenga N, Moris V. Necrotizing fasciitis: A highly fatal infection. *Ann Chir Plast Esthet* 2022;S0294-1260(22)00111-X.
7. Butter A, Emran M, Al-Jazaeri A, Ouimet A. Vacuum-assisted closure for wound management in the pediatric population. *J Pediatr Surg* 2006;41:940-2.