# Necrotizing Fasciitis Complicated by Tetanus in a Sixteen Month Old Child

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**ABSTRACT**

Necrotizing fasciitis (NF) is an infection of the soft tissue which causes necrosis of the fascia as well as subcutaneous and fat tissues, especially in children. It is rare, and fewer than 10,000 cases per year are seen in Nigeria. It is reported to be more common in children than adults in Northwestern Nigeria. It is associated with high mortality. This report aimed to highlight the significance of early reporting of cases to the appropriate health centers for prompt and timely management. Immunization against other lethal infections like tetanus and early reporting are crucial in the management of cases of NF.

**Keywords:** Necrotizing fasciitis, Child, Tetanus, Immunization

**Fasciite nécrosante compliquée par le tétanos chez un enfant de seize mois**

**Abstrait**

La fasciite nécrosante (NF) est une infection des tissus mous qui provoque une nécrose du fascia ainsi que des tissus sous-cutanés et adipeux, en particulier chez les enfants. C'est rare, et moins de 10 000 cas par an sont observés au Nigeria. Il serait plus fréquent chez les enfants que chez les adultes dans le nord-ouest du Nigéria. Il est associé à une mortalité élevée. Ce rapport visait à souligner l'importance de la notification précoce des cas aux centres de santé appropriés pour une prise en charge rapide et rapide. La vaccination contre d'autres infections mortelles comme le tétanos et la notification précoce sont cruciales dans la prise en charge des cas de NF.

**Mots-clés:** Fasciite nécrosante, Enfant, Tétanos, Vaccination

## Introduction

Necrotizing fasciitis (NF) is a severe form of soft tissue infection that spreads rapidly from subcutaneous tissue to the fascia and surrounding soft tissue. If not detected and treated early and effectively, it can lead to septic shock, organ failure, and death. Fluid resuscitation, broad spectrum antibiotics and most importantly urgent surgical debridement of contaminated and necrotic tissue are the recommended therapeutical approach.[1] The mortality rate is doubled when surgical therapy is delayed for more than 24 hours.[2] Necrotizing fasciitis is often misdiagnosed as cellulitis due to its rarity, with a prevalence of 0.02 percent in the pediatric population, leading to delayed treatment.[3]

Necrotizing fasciitis is mostly found in the immunocompromised, but it may occur in the immune competent who have not had any previous injuries. Legbo et al[4] in Sokoto Nigeria reported malnutrition as the most common predisposing factor for NF in children followed by boils and intravenous cannulation. The most common causes are Group A streptococci and polymicrobial, synergistic infections. Monomicrobial infections such as non-Group-A Streptococci like groups B, C, and G, are also dangerous.[5] Necrotizing fasciitis is more common in children who were previously healthy than adults.[6] Minor procedures, such as circumcision, umbilical vein catheterization and inguinal hernia repair have been confirmed to cause NF in infants.[7] We report a 16-month-old child with necrotizing fasciitis seen at Murtala Muhammad Specialist Hospital Kano, Nigeria.

## Case Presentation

The boy was a 16-month-old Hausa child who was apparently well until 10 days prior to presentation

when he had a febrile illness and was taken to a nearby patent medicine store by the parents. He was given paracetamol and other medications as injections on the left buttock. A small reddish lesion was noticed to have developed at the site of the injection by the mother, and this rapidly progressed to involve the whole of the left lower limb within 24 hours of the injections. The skin of the limb became dusky with some areas of blisters. Both upper limbs and parts of the trunk became involved in less than 48 hours. The child was then taken back to the same patent medicine store and was placed on some medications including amoxicillin suspension and oral paracetamol but there was no improvement in the child's condition. The parents then resorted to applying some herbs and traditional medications which further worsened the child's condition. Refusal to eat, fever, sloughing of the tissue from the affected area prompted the parents to report to the paediatric dermatology clinic after 10days of home treatment.

The child was full-term at birth; pregnancy and child birth were un-eventful and unsupervised. The child was not immunized and was fed mainly breast milk. Father is a peasant famer and mother, a house wife in a monogamous non-consanguineous marriage. The child was the first and only child of the parents.

Physical examination revealed an axillary temperature of 39.5$^{o}$C, pulse rate was 160 beats per minutes. Respiratory rate was 38 breaths/minute. There was no pedal oedema, no evidence of dehydration. The child was 6.1kg at presentation (moderately malnourished with weight for age z-score of <2SD from the mean). There was an extensive skin necrosis involving mostly the buttocks, both upper and lower limbs and the face with little affectation of the trunk; and some greenish colored areas. The lesions were foul smelling; and the elbow joint was exposed due to sloughing of the necrotic tissue. Other systemic examinations were not contributory. Diagnosis of necrotizing fasciitis was made based on the clinical profile suspicion from the history and examination findings.

The child was immediately admitted in the paediatric surgical ward of Murtala Muhammad Specialist Hospital and the surgical team was informed. Wound debridement was done on the same day. Results of investigations are as follows:

Full blood count showed white blood cell count of 14.8 x 10$^{3}$mg/dl (4-11x10$^{3}$mg/dl), neutrophil count 80%, Haemoglobin count was 10g/dl and platelets count was 95,000 µl. Urea, creatinine and electrolytes were within normal limits. Random blood sugar was 5.5mmol/l. Wound swab was taken for microscopy, culture and sensitivity.

The child was commenced on intravenous metronidazole, Intravenous Amoxicillin (50mg/kg/dose 8hourly), intravenous Gentamicin (2.5mg/kg/dose 12hourly) and Oral paracetamol 10mg/kg/dose 8-hourly. Nasogastric tube feeding with expressed breast milk to alternate with F100 was commenced at 75mls/kg/ day every hours and increased at the rate of 10ml/kg/day. The child was also given anti-tetanus serum (ATS) 500iu after a test dose and intramuscular tetanus toxoid 0.5ml stat. He was commenced on twice daily cleaning with eusol. Wound swab microscopy, culture and sensitivity showed poly-microbial infection.

On the 3$^{rd}$ day of admission, the condition of the child significantly improved with an axillary temperature of 37.5$^{o}$c, the wound was clean and no longer foul smelling, child also started tolerating oral feeds. On the 4th day of admission, the child was noticed to have abnormal clenching of the teeth. Clinical examination then showed a fully conscious child with intermittent clenching of the teeth and board like rigidity of the abdomen. A diagnosis of superimposed Tetanus infection was made. Child was placed on sedatives (chlorpromazine, phenobarbitone, and diazepam) via nasogastric tube, spasm chart was initiated, Anti tetanus serum 10000iu was prescribed after a test dose, Intravenous antibiotics and other managements were continued. On the evening of the 6$^{th}$ day the child's condition deteriorated and the child died on the 6$^{th}$ day of admission.

## Discussion

Necrotizing fasciitis is mostly reported in previously healthy children compared with adults.[7] Necrotizing fasciitis is a serious infection and when it occurs, early diagnosis and institution of proper management are vital to the outcome of the infection. Intra operatively the diagnosis of

necrotizing fasciitis is confirmed by finding of grey subcutaneous tissue without bleeding and the necrotic tissue can easily be stripped from fascia. When the fascia is infected, it results in thrombosis of the skin that nourishes the perforators which further causes patches of skin necrosis. The deep dermis is infiltrated by neutrophils with thrombosis of the microvascular tissue and infecting organism is found in the necrotic tissue.[8, 9] Necrotizing fasciitis is different from cellulitis in which there is absence of diffuse necrosis with localized abscess.[9] Necrotizing fasciitis usually occur on the extremities, abdomen, and perineum but it can occur on any part of the body as in the patient presented.[9]

The most common organism involved in type II necrotizing fasciitis is Streptococcus pyogenes (group A) and Staphylococcus aureus. Type II NF is found in normal individuals with no underlying immunocompromised state. Type I necrotizing fasciitis is polymicrobial caused by non-group A streptococcus, aerobic and anaerobic organisms, which is what was found in our patient. Type I is the one most common among those who are immunocompromised.[10,11]

Necrotizing fasciitis starts commonly at trauma site which can be a small puncture wound, surgical scar or blunt trauma.[9] In our patient, the initial lesion was observed at the site of intra muscular injection which is in concert with previous reports by other authors [12.] Patients who develop NF after intramuscular injections were reported to have worse prognosis than patients with infections from other routes of entry.[12]

Necrotizing fasciitis has been reported to develop after injection with non-steroidal anti-inflammatory drugs (as in our patient), corticosteroids, and mepivacaine injection.[13] The NSAIDS injected may have played a role in initiating the onset of the NF as they inhibit neutrophil chemotaxis and phagocytosis through blockage of lipoxygenase pathway. Non-steroidal anti-inflammatory drugs also reduce the production of leukotriene by leucocytes preventing its pro-inflammatory action. They also mask fever, pain and disease progression by preventing prostaglandin synthesis.[14] The patient reported here had moderate malnutrition which prior to the onset of the NF and which may have resulted in the polymicrobial infection (the type I infection). Malnutrition was noted to be the most common predisposing factor for NF in Northern Nigerian children.[4]

The anatomical sites involved in this patient also confirmed the diagnosis (Figure I). The classical early appearance of bullae and the rapid development of gangrenous lesions were all present in our patient. The patient presented to the hospital late mainly because of the financial constraints and ignorance of the parents which contributed to the predisposition to the tetanus infection and the poor outcome. Management of NF is early debridement, use of broad-spectrum antibiotics, and supportive management and aggressive nutritional support.[15, 16]

In conclusion, early diagnosis and quick treatment of NF improves the condition's outcome. Immunization against dangerous superimposed diseases like tetanus should be given priority, especially among people from low socioeconomic backgrounds.

**Figure 1:** Widespread necrosis of the gluteal region, thighs and upper limbs

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