

## Necrotizing soft tissue infection in a patient following cosmetic pedicure: a case report

*Infecção necrosante de tecidos moles em um paciente após pedicure cosmética: relato de caso*

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### ABSTRACT

Necrotizing soft tissue infections (NSTIs) are severe infections affecting the skin, subcutaneous tissue, superficial fascia, deep fascia, and musculature, often leading to extensive and permanent tissue loss. Such infections may originate in the skin and subsequently spread to deeper tissues. Cosmetic procedures, such as manicures and pedicures, are becoming increasingly popular. However, they involve disruption of soft tissue integrity, which can increase the risk of localized infections. We present the case of a 41-year-old woman who developed NSTI following a nonsterile pedicure. She was successfully treated with broad-spectrum antibiotics, surgical intervention, and vacuum-assisted closure (VAC) therapy.

**Keywords:** Soft tissue infections; Fasciitis, Necrotizing; Cosmetics.

### RESUMO

*As infecções necrosantes de tecidos moles são infecções graves no tecido subcutâneo, fáscia superficial, fáscia profunda e musculatura, e podem resultar em perda extensa e permanente de tecido. A infecção pode começar na pele e se espalhar para tecidos mais profundos. Procedimentos cosméticos, como manicure e pedicure, estão ganhando popularidade. Porém, envolvem a ruptura da continuidade dos tecidos moles, o que pode levar à infecção. Apresentamos o caso de uma mulher de 41 anos que sofreu de infecção necrosante de tecidos moles após pedicure não estéril. Ela foi tratada com antibióticos de amplo espectro, cirurgia e terapia de fechamento assistido por vácuo.*

**Palavras-chave:** Infecção necrosante de tecidos moles; Cosméticos; Fasciíte.

## Case Report

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## INTRODUCTION

Necrotizing soft tissue infections (NSTIs) are severe infections that can rapidly spread across the skin, subcutaneous tissue, superficial fascia, deep fascia, and musculature, often leading to extensive and permanent tissue loss.<sup>1</sup> Fortunately, such infections are rare.<sup>2</sup> Cosmetic nail procedures have become increasingly popular.<sup>3</sup> A cosmetic pedicure involves trimming, filing, and removing thickened skin from the toenails, often followed by nail polish application. The removal of thickened epidermis can disrupt soft tissue integrity, potentially increasing the risk of infection.<sup>3,4</sup> We present the case of a 41-year-old woman who developed NSTI following a non-sterile pedicure. She was successfully treated with broad-spectrum antibiotics, surgical intervention, and vacuum-assisted closure (VAC) therapy.

## CASE REPORT

A 41-year-old previously healthy woman, who was not taking any medications, visited a beauty parlor for a pedicure before Easter. The procedure was performed in the beautician's apartment under unsanitary conditions. Several days later, she developed swelling in her right foot along with a low-grade fever (Figure 1A) and severe pain in her right leg.

She was taken to the emergency department, where she was prescribed oral clindamycin (300 mg, three times a day) and a topical antibiotic. However, the swelling remained unchanged. The following day, petechiae, bruising, and worsening swelling appeared on the right foot (Figure 1B), along with the emergence of distinct necrosis on the hallux. A few hours later, blisters and erosions with oozing serous fluid developed.

The patient was referred to the dermatology department due to progressive swelling, now extending from the right foot to the lower leg, along with visible necrosis, blisters, and significant warmth in the affected limb (Figure 1C).

Initial laboratory tests revealed elevated inflammatory markers, with a C-reactive protein (CRP) level of 318 mg/L and procalcitonin at 5.12 ng/mL. The white blood cell count was 15,000/ $\mu$ L, indicating an immune response. Red blood cell parameters showed anemia, with  $3.7 \times 10^6$ / $\mu$ L erythrocytes, hemoglobin at 9.2 g/dL, and hematocrit at 27%. Additionally, platelet count was reduced to 95,000/ $\mu$ L, consistent with thrombocytopenia. Given the severity of the condition, she was immediately started on broad-spectrum intravenous antibiotic therapy with ceftriaxone and metronidazole. An urgent ultrasound examination of the lower limb veins was performed, and an emergency surgical consultation was scheduled.

The patient underwent urgent surgical intervention, including fasciotomy, decompression, and debridement of necrotic tissue. Filters were placed, and purulent contents were drained. Additionally, the nail plate of the right hallux was removed (Figure 1D).

During the procedure, multiple thrombosed vessels were observed in the subcutaneous tissue, and wound samples were collected for microbiological analysis. The diagnosis of NSTI was confirmed. Intravenous broad-spectrum antibiotic therapy

with ceftriaxone and metronidazole was continued.

Microbiological test results identified penicillin-sensitive *Streptococcus pyogenes* as the causative agent. Based on culture results, antibiotic therapy was switched to intravenous amoxicillin-clavulanic acid. However, the swelling and necrosis continued to progress, leading to a further change in treatment. The antibiotic regimen was escalated to intravenous piperacillin-tazobactam, and the patient underwent a second surgical procedure to remove additional necrotic tissue from the right foot.

During this second intervention, purulent material was drained from the forefoot and the big toe, and new incisions were made to further debride the affected tissues. Additional drains were placed, and VAC therapy was initiated.

VAC therapy proved to be highly effective, leading to a reduction in inflammatory markers and halting the progression of necrosis (Figure 1E). After 14 days of VAC therapy, the patient was in good overall condition (Figure 1F). Due to the significant tissue loss in the subcutaneous and skin layers of the right leg, the patient was referred to a plastic surgery clinic for further reconstructive treatment.

## DISCUSSION

If left untreated, NSTIs are life-threatening, with mortality rates reaching 20–30% even with appropriate treatment.<sup>5</sup> Amputation is often required,<sup>6</sup> and in nearly all cases, NSTIs result in skin defects, scarring, and limb deformities, significantly reducing patients' quality of life.<sup>7</sup>

In this case, the infection caused visible, disfiguring lesions on the patient's right lower limb. However, her general condition was stabilized, and she did not develop sepsis or other organ complications. The most crucial aspect of treatment was that amputation of the lower limb was successfully avoided.

Managing NSTIs requires a multimodal approach, where early antibiotic administration is critical for survival. Once necrotic tissue is identified, delaying surgical debridement is futile. Prompt surgical intervention is essential to remove necrotic tissue and prevent further spread of the infection. Additionally, collecting samples for microbiological testing is imperative to guide targeted antimicrobial therapy.<sup>3,8</sup>

Despite being a well-recognized condition, NSTIs are often misdiagnosed in the early stages. As previously mentioned, immediate antibiotic therapy is crucial for both patient survival and long-term outcomes. Exploratory surgery plays a key role in confirming the diagnosis, allowing for the detection of skin, subcutaneous tissue, fascia, and muscle necrosis, as well as vascular thrombosis, swelling, and exudate.<sup>9</sup>

This case shows that even minor cosmetic procedures can lead to NSTIs.

## CONCLUSIONS

Preventing NSTI requires careful selection of sterile environments for cosmetic procedures that breach soft tissue



**FIGURE 1A, 1B:** Necrotizing soft tissue infection following a cosmetic pedicure. Clinical presentation during the initial days of symptoms, as observed upon admission to the clinic.

**FIGURE 1C:** The day of the surgical procedure.

**FIGURE 1D:** Condition of the right lower limb after removal of surgical dressings.

**FIGURE 1E:** Clinical appearance after 10 days of VAC therapy.

**FIGURE 1F:** Clinical appearance after 14 days of VAC therapy

integrity. Proper hygiene and infection control measures significantly reduce the risk of complications. When assessing a patient with suspected necrotizing soft tissue infection, obtaining

a detailed history of pain, systemic symptoms, swelling, and local erythema is essential. Immediate initiation of broad-spectrum antibiotic therapy is crucial, along with early surgical interven-

tion when necessary to control the infection and prevent further tissue damage. The primary goal is to preserve the affected limb and minimize complications. If standard treatments fail to promote healing, VAC therapy can be a valuable option. Patients with severe NSTI should be referred for long-term follow-up at a surgical or wound care clinic to ensure appropriate management and recovery.

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**Authors contributions**

R.N., I.S., and I.W. designed the article, reviewed literature, and wrote the manuscript. R.N. and I.S. had primary responsibility for the final content. All authors read and approved the final manuscript.

**Ethics approval and consent to participate**

Not applicable.

**Consent for publication**

Photographs were published with the patient's informed consent. ●

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Intellectual contribution to the diagnostic and/or therapeutic management of studied cases.