

NECROTIZING SOFT TISSUE INFECTIONS: AN UNPREDICTIBLE, LIFE-THREATENING INFECTIONS

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Necrotizing soft tissue infections (NSTIs) are serious and potentially fatal rapidly progressive and aggressive infections of subcutaneous tissue, fascia, and sometimes muscles (manifesting as necrotizing pyomyositis). They are characterized by rapid spread and are associated with significant morbidity and mortality (1,2). Published studies report various incidence data for NSTIs. Chen LL reported an incidence of NSTIs of 0.3 to 15 cases per 100,000 population (3), and several other studies reported an annual incidence rate ranging from 0.72 to 9.2 per 100,000 person-years (4). NSTIs occur less frequently in children than in adults, with an incidence of 0.08 to 0.13 per 100,000 per year (5). Based on previous research and data available in the literature, they occur more often in men, accounting for up to 2/3 of all cases (6).

Regarding treatment outcomes, an important predictive factor is the patient's age, even though there is no age predilection for NSTIs. Those over 50 years of age are mostly affected and have a worse prognosis (2,7,8,9). The frequency of these infections has increased in recent years, so healthcare personnel are increasingly encountering this dangerous disease.

According to earlier data from the literature, this infection is caused by polymicrobial agents, both anaerobic and aerobic bacteria. However, some studies report the prevalence of monomicrobial NSTIs to be up to 60-80%, with the causative agents most often originating from the genitourinary and digestive tracts and the skin (2).

Streptococcus pyogenes, a Gram-positive beta-hemolytic streptococcus of serological group A, is one of the most common organisms isolated in cases of NSTIs (1). If the infection is caused by Gram-negative microorganisms, the infections can take on more rapid and fulminant forms (7). According to literature data, *Staphylococcus aureus* plays a significant role in the development of

these infections in the USA, and methicillin-resistant *Staphylococcus aureus* (MRSA) was isolated in 14.6% of complicated soft tissue and skin infections in a substantial number of European countries (8). An increase in Gram-negative species, predominantly *Klebsiella* and *E. coli* as the causes of these infections, is recorded in England (8). In the study by Jabbour et al, among those who did not survive, the most frequently isolated microorganisms as contributors to this infection were *Pseudomonas* and *Proteus* (9). Fungal infections are rare and mostly published as case reports (1).

The most common sites of infection are the perineal region, scrotum, and anterior abdominal wall, but it can also occur on any part of the body. The usual symptoms related to this infection are local pain, general weakness, fever, and hypotension. Additionally, tissue swelling, odor, skin necrosis, erythema, crepitations, and bullous changes can occur. Visible changes on the skin are smaller than an infection of the tissues beneath the skin, so it is vital to recognize NSTIs before the present changes on the skin affect a larger area (2,8,9,10). The presence of comorbidities can significantly complicate the clinical picture and make treatment more difficult. The most common comorbidity in NSTIs is diabetes mellitus, and alongside it, there are also alcoholism, arterial hypertension, chronic renal and liver failure, cirrhosis, obesity, and immunosuppression. Immunosuppressed patients are more susceptible to NSTIs, and clinical findings on physical examination may be less pronounced, with nonspecific laboratory findings, making diagnosis even more challenging (1).

For the successful treatment of this infection, one of the most important factors is early recognition or suspicion of the disease. Additionally, aggressive resuscitation of the patient, the use of broad-spectrum antibiotics until the causative agent is isolated, and subsequently administering antibiotics according to the antibiogram, as well as early and extensive surgical intervention, are necessary. Diagnosis of NSTI is typically based on clinical presentation. Radiological imaging and laboratory tests play a crucial role in predicting infection severity and treatment outcomes. This led to the development of the LRINEC (Laboratory Risk Indicator for Necrotizing Fasciitis) scoring system. The increasing misuse of antibiotics contributes to greater resistance of microorganisms, which will likely become an even more significant problem in the future (2,11,12). Urgent surgical treatment involving the radical removal of necrotic and devitalized tissue stands as a major determinant of favorable treatment outcomes. If the initial surgical intervention is not performed within the first 24 hours of symptom onset, the mortality rate increases significantly. Literature data indicate that up to 10 surgical debridements are conducted during treatment, with an average of 2.5. The necessity of Hyperbaric Oxygen Therapy (HBOT) in the treatment of these infections has not been definitively proven (1-10).

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ZE: Writing – original draft, Conceptualization, Supervision, Validation, editing; **AK:** Investigation, Writing, Validation; **TD:** data collection, writing; **NA:** Investigation, Validation, Visualization, writing

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