NECROTIZING SOFT TISSUE INFECTIONS FOLLOWING A SCALD BURN OF THE LOWER LIMB: A CASE REPORT

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SUMMARY. Necrotizing soft tissue infection (NSTI) is a rare but potentially fatal infection. It usually complicates skin traumas, such as lacerations, scratches, insect bites, burns and recent surgeries. Rapid diagnosis is crucial for a favourable prognosis. NSTI is an emergency surgical condition and every delay in the operative treatment has a proven negative effect. Recently, a rare case presented to us with a late diagnosis of NSTI complicating a scald burn of the lower limb. The patient’s injury was initially treated as a burn case but unfortunately ended in an above knee amputation. We report our management experience in this case, with a review of the literature.

Keywords: burns, necrotizing, soft tissue, infection

Introduction

Though first described in the 5th century by Hippocrates,¹ NSTI still poses a great challenge to modern medicine due to its fulminant presentation and high mortality rates (6% - 76%).² Skin trauma, burns or recent surgeries are considered precipitating factors, as well as the existence of immunosuppressive co-morbid states (cancer, diabetes mellitus, vascular insufficiencies, organ transplantation or alcohol abuse).¹² Nevertheless, in 2-38% of cases NSTI is idiopathic.³ Often the initial symptoms are not quite specific and so demand a high index of suspicion with a broad differential diagnosis, usually guided only by the extent of local and general aggravation.³ The infection is characterized by diffuse spreading of soft tissue necrosis caused by obliterative endarteritis and thrombosis of local microcirculation, and by rapid progression to sepsis and poly-organ failure.³ It therefore requires prompt recognition, adequate antibiotic therapy, poly organ resuscitation and, above all, aggressive surgical treatment. It is a known fact that complications and mortality rates are proportional to the delay in surgery. We present a rare case of NSTI diagnosed late following a scald burn to the lower limb, initially treated as a burn case. We propose to analyse the difficulties encountered in diagnosis of NSTI in burn patients. Any surgeon mislead by routine daily practice could initially fail to identify this ailment and thus prescribe inadequate therapeutic strategies.

Case report

A 64-year-old female patient was referred to our burn centre by her general practitioner 6 days after a scald burn of the left leg (hot water). She presented with signs of local inflammation, complaints of general weakness and fever. Co-morbidities included obesity, with a body mass index (BMI) of 51, hypertension, hypothyroidism, chronic venous insufficiency and insulin resistance.

The patient was managed initially in the emergency unit with a simple dressing and was discharged home. On admission to our unit, her anti-tetanus vaccination status was verified by QUICKTEST and was not found to be adequate. She received a booster vaccine combined with 250 IU of gamma globulin. The burn injury was second degree with an estimated TBSA of 10% on the posterior aspect of the left leg, and third degree with 1% TBSA on the lower third of the left thigh, with an area of necrosis in the medial aspect of the ankle (Fig. 1).

The physical examination demonstrated an oedematous leg with erythema extending from the ankle to the lower third of the thigh and an intact neurovascular system. Deepithelialization was present over some areas.

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Blood investigations revealed leukocytosis (WBC: 20, 7 g/l), erythrocytes sedimentation rate (ESR) of 292 mg/l, as well as prolonged partial thromboplastin time (PTT: 59 s) and prothrombin time within reference interval (PT: 86%). Three days before admission, the patient was put on oral cloxacillin (1 gram) three times per day.

During the early days of admission to our unit, treatment included frequent dressing changes (Povidone-iodine/paraffin gauze dressing (Jelonet)/Vaseline). Excision of necrotic tissue on day 4 of admission showed deep purulent lesions over the medial and lateral aspects of the left ankle and multiple tissue cultures were taken. Due to the appearance of the atypical lesions, there was a suspicion of an infectious pathology and a tissue biopsy and culture tests

Fig. 1 - The left leg on admission looks oedematous with erythema and areas of necrotic skin.

Fig. 2 - The first debridement showed severe skin inflammation with subcutaneous fat necrosis.

Fig. 3 - The intraoperative findings showed severe muscle necrosis that confirms the diagnosis of necrotizing myofascitis.

Fig. 4 - The first day after above knee amputation.

Fig. 5 - The stump post oxygen therapy looks clean.
were carried out (the histopathology result was nonspecific inflammation). Intravenous antibiotics were started with 12g/1.5g (pipercillin/tazobactam) per day and amikacin (aminoglycoside) 2.5g/day based on the suspicion of infection. Due to aggravation of local symptoms and in view of polymicrobial organisms, including Streptococcus pyogenes, Proteus mirabilis and Enterococcus faecalis detected by tissue culture, the patient underwent emergency surgical debridement of the necrotic tissues. Signs of severe skin inflammation were present involving the non burned part of the leg, with subcutaneous fat necrosis extending superiorly. Muscular fascia in the debrided area was intact (Fig. 2). Linezolid (Zyvoxid) 1200mg was added to the antibiotic therapy. Due to further aggravation of local and general symptoms, the patient was returned to the operating room the following day. The infection was found to have extended to the muscles causing, severe necrosis (Fig. 3), and thus confirming the diagnosis of necrotizing myofasciitis. Above knee amputation was performed (Fig. 4). Postoperatively, the patient developed active bleeding and a stump hematoma, which were treated surgically.

The patient was given hyperbaric oxygen (HBO) therapy and antibiotic therapy was continued for about five weeks. The HBO therapy was stopped after one month when the stump became clinically clean and the wound was managed with regular dressing until healing by secondary intention (Fig. 5). After 45 days of hospitalization, the patient was discharged in a good condition and transferred to a rehabilitation centre.

Discussion

The term NSTI defines a group of relatively rare, usually polymicrobial infections involving skin, subcutaneous tissue and muscles. Though known for centuries, its incidence is low (1:100 000 per year), and it is still relatively difficult to diagnose and treat. NSTIs are idiopathic in 2-38% of cases and cause non-specific subjective complaints, usually mimicking other more common infections. However, rapid diagnosis is crucial as NSTI is an emergency surgical condition and every delay in the operative treatment has a proven negative effect. The above case is a true example of the difficulties faced in recognizing and managing this condition. It represents a necrotizing soft tissue infection developing after a scald burn to the lower extremity. Late diagnosis and treatment led to serious complications and above knee amputation. NSTI is most commonly associated with mixed bacterial infection; Group A streptococcal species, called the “flesh-eating bacteria” in the media, are solely responsible in 10-15% of cases.

In retrospect, comparing our case to what is described in the literature, it could be concluded that the patient had both an etiological factor (burn) and precipitating co-morbid conditions for the development of NSTI. However, her clinical presentation was not pathognomonic but suspicious of NSTI. She had extensive oedema and erythema of the leg and deep epithelialization over some areas where they would not be expected 6 days after injury, if the healing process had progressed normally. Nevertheless, the scald burn was accepted as the primary diagnosis and the aggravation of local and general status was related to the inadequacy of the initial treatment. This NSTI was referred to us with 10% TBSA, second and third degree burn, and had been operated late. Diagnosis was made only after confirming the presence of typical NSTI microorganisms such as Streptococcus pyogenes, Proteus mirabilis and Enterococcus faecalis. The subsequent unfavourable course of the disease in our case was due to the less aggressive manner of the surgical treatment, which ultimately led to an above knee amputation.

The experience of the aforementioned complications and the need for repeated surgical procedures with the use of extensive antibiotic and organ-specific management and supportive therapies, confirms even more the fact that prompt and aggressive surgical debridement is the cornerstone of successful therapy.

Conclusion

A typical NSTI following a burn injury is relatively rare, usually missed to begin with and diagnosed only in a rather advanced and aggravated course of the disease. However, due to their fulminant nature they should be suspected in any burn case with a non-typical progression.

RÉSUMÉ. L’infection nécrosante des tissus mous (INTM) est une infection rare mais potentiellement mortelle. Elle complique habituellement les traumatismes de la peau, comme des lacérations, des éraflures, des piqûres d’insectes, des brûlures et des chirurgies récentes. Un diagnostic rapide est essentiel pour un pronostic favorable. L’INTM nécessite un traitement chirurgical urgent et tout retard dans le traitement chirurgical a un effet négatif éprouvé. Récemment, un cas rare a été présenté à nous avec un diagnostic tardif de l’INTM, compliquant une brûlure du membre inférieur. La blessure du patient a été initialement traitée comme un cas de brûlure causé par l’eau chaude, mais malheureusement est terminé à une amputation au-dessus du genou. Nous rapportons notre expérience de gestion dans ce cas, avec une revue de la littérature.

Mots-clés: brûlures, nécrosante, tissus mous, infection
BIBLIOGRAPHY


Conflict of interest. The authors of this paper hereby declare that they have no conflict of interest.

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