

# Fulminant necrotizing fasciitis of the thigh, following an infection of the sacro-iliac joint in an immunosuppressed, young woman

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## Abstract

Necrotizing soft tissue infection of an extremity is a rare but life-threatening disease. The disease is an infection that involves the soft tissue layer and is characterized by rapidly spreading inflammation (especially of the fascial planes and the surrounding tissues) with a high mortality. Early diagnosis is essential for the outcome of the patients. Radical surgical debridement is the treatment of choice. The predisposing factors are immunosuppression, diabetes mellitus and drug abuse. This report presents a case of necrotizing fasciitis in the thigh, following an abscess of the sacro-iliac joint, as a rare complication in a young, immunosuppressed woman. The patient's history revealed intravenous drug abuse and hepatitis C. After immediate diagnosis by magnetic resonance imaging, radical surgical debridement was required and performed. Prior to soft tissue coverage with a split skin graft, five additional sequential debridements were necessary. During her hospital stay, the patient experienced further cerebral and pulmonary septic embolisms and an infection of the elbow. Six months after admission, the patient was discharged in good condition to a rehabilitation center. Necrotizing fasciitis is a life-threatening complication following an abscess of the sacro-iliac joint. Physicians must be vigilant to inflammatory signs and pain in immunosuppressed patients. An abscess of the sacro-iliac joint is rare, but complications of an untreated abscess can be fatal in these patients.

## Introduction

Necrotizing soft tissue infection of the extremity is a rare but life-threatening disease. It is an infection that involves the soft tissue layer and is characterized by rapidly spreading inflammation, especially of the fas-

cial planes and the surrounding tissues.<sup>1,2</sup> The mortality rate in the literature ranges from 6% to 76%.<sup>1,2</sup>

Necrotizing fasciitis typically follows injury, trauma, surgical incisions or minor lesions.<sup>1,3</sup> Many risk factors can promote necrotizing fasciitis, such as obesity, immune compromised conditions (HIV, intravenous drug abuse), corticosteroid therapy and peripheral vascular disease exist.<sup>1,3,5</sup> Diabetes mellitus is present in 21% to 64% of patients with necrotizing fasciitis.<sup>4</sup> Necrotizing fasciitis normally begins with local inflammation of the soft tissue and suddenly progresses to the fascia, leading to systemic sepsis.<sup>2</sup> The primary efflorescence is often identified as a cellulitis, which is part of the differential diagnosis during the early stages.<sup>6</sup> Clinical signs of necrotizing fasciitis develop as the disease progresses. Blisters and bullae with serosanguineous and hemorrhagic fluid drainage are observed.<sup>1</sup> The triad of swelling, inflammation and pain are suspicious symptoms of necrotizing fasciitis and further diagnostics should be performed.<sup>2</sup> Sometimes, an ultrasound can be helpful to identify a fluid mass above the fascia.<sup>1</sup> Computed tomography of the suspicious area can reveal increased attenuation of the subcutaneous fat and may show gas in the soft tissues and edema.<sup>1</sup> Magnetic resonance imaging is highly sensitive (93%) for the detection of necrotizing fasciitis. Tissue necrosis and inflammatory edema may also be revealed.<sup>1,3</sup> Drug abuse is related to many medical complications, which depend on the dose injected, drug type and the delivery method. Various locations of abscesses arising after the injection of heroin and other drugs have been described. Sometimes, i.v drug users attempt to cannulate the femoral vein with their needles. When contaminated needles are used, the risk of HIV or hepatitis C infection increases. However, the risk of developing an abscess with fatal complications is high. In patients with chronic drug abuse, attention should be directed to the unusual places for drug injections (and possible abscess locations). This report presents an interesting case of a young woman with sepsis and fulminant necrotizing fasciitis of the thigh following an abscess in the sacro-iliac joint.

## Case Report

We describe the clinical course of a 34-year-old young Caucasian woman who was admitted to the hospital with septicemia and superficial inflammation of the left thigh.

Two days prior, she was admitted to another hospital with swelling of the left thigh and chronic pain in the sacro-iliac joint (two week duration). Oral antibiotic therapy was initiated

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(cefuroxime) without further diagnostics. Over the next two days, the patient developed a temperature as high as 39.4°C and then returned to the hospital. On the day of admission, she presented with increased inflammation parameters, leukocytes of 16.000/μL (8000-12.000/μL) and c-reactive protein (CRP) 35 mg/dL (<0.1 mg/dL). The left thigh demonstrated spreading inflammation of the soft tissue. Her medical history revealed i.v. drug abuse (heroin), and hepatitis C was present. Upon admission, a computed tomography scan of the abdomen and left thigh was performed, and an abscess of the sacro-iliac joint and an abscess of the psoas muscle up to the second vertebral body were observed (Figure 1). Magnetic resonance imaging (MRI) revealed necrotising fasciitis of the left thigh, following an abscess of the sacro-iliac-joint (Figure 2). Immediately, radical surgical debridement and fasciectomy of the left thigh was performed in the operating theatre. The abscess of the sacro-iliac joint was opened and drained using a surgical approach by Olerud. The pelvic ring was stable, and stabilization of the SI-Joint was not necessary. After the operation, the patient was transferred to the intensive care unit. Antibiotic therapy was administered, including tobramycin, ceftriaxone and metronidazole. Microbiological testing indicated an infection with multi-resistant *Pseudomonas aeruginosa* and Vancomycin-resistant

*Enterococcus faecalis*. A planned second revision with surgical debridement was performed two days later and revealed a clean wound with no fasciitis progression. During her stay in the intensive care unit, the patient also presented with an infection in the elbow, and open surgical debridement was required and performed. Cerebral and pulmonary septic complications also occurred and were treated non-operatively (Figure 3). Finally, five further sequential operations, including continuous vacuum therapy, were performed on the left thigh until the wounds could be covered with a split skin graft.

During her stay, intermittent hemodiafiltration was necessary due to septic, acute renal failure. *Pseudomonas aeruginosa* pneumonia was treated with antibiotics (ceftazidime). Seven days after admission, a tracheotomy was performed, and the patient was subsequent returned to spontaneous breathing. During her intensive care unit (ICU) stay, the patient required 16 units of erythrocyte concentrates, 3 units of thrombocyte concentrates, 6 units of fresh frozen plasma and 3000 international units of prothrombin concentrate. After two months in the ICU, the patient was transferred to an intermediate care unit (IMC) for another 4 months. During the stay, the patient presented with critical-illness polyneuropathy; she was discharged in good condition after intensive physiotherapy and was referred to a speciality rehabilitation center for weaning.

## Discussion

Necrotizing fasciitis is a rapidly spreading inflammation of the soft tissue involving the fascia and the subcutaneous tissue.<sup>7</sup> It is a life-threatening disease that can affect all body parts. The lower extremities are the most common infection sites.<sup>7</sup> Predisposing conditions are immunosuppression, drug abuse, diabetes mellitus, alcoholism, chronic renal insufficiency and malignancy.<sup>7</sup> Early diagnosis of this disease is essential for good patient outcomes. Necrotizing fasciitis has a high mortality rate ranging from 6% to 76%.<sup>1,2</sup> For diagnosis, magnetic resonance imaging is the gold standard, (followed by computed tomography).<sup>1,3</sup> Sonography of the extremity can be helpful to detect fluids around the fascia, which is an indirect sign of necrotizing fasciitis.<sup>6</sup> After early diagnosis, the treatment involves radical surgical debridement of the soft tissue and involved fascia as an effective way to reduce the bacterial load.<sup>8</sup> The antimicrobiological therapy requires broad-spectrum antibiotics or a combination of antibiotics to treat the aerobic, anaerobic, gram-positive and gram-negative organisms that are often involved.<sup>1</sup> Further treatment involves observation in the intensive care unit, adequate fluid resuscita-

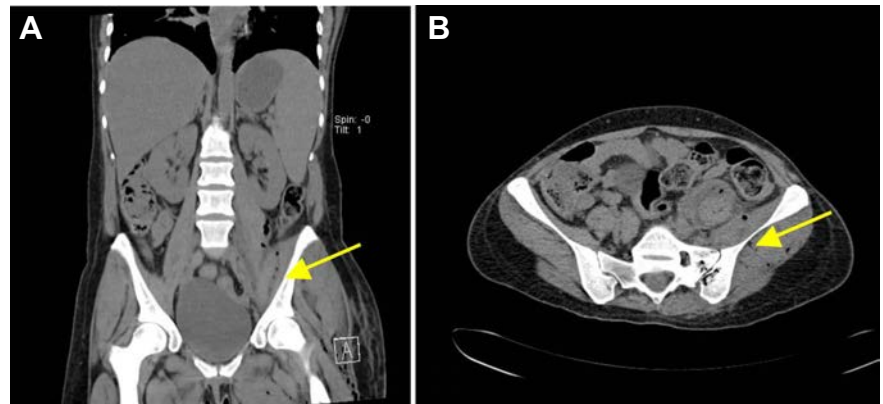


Figure 1. Abscess of the M. psoas on the left side up to lumbar vertebrae two: MRI T1, frontal (A) and MRI, T1, coronar (B).

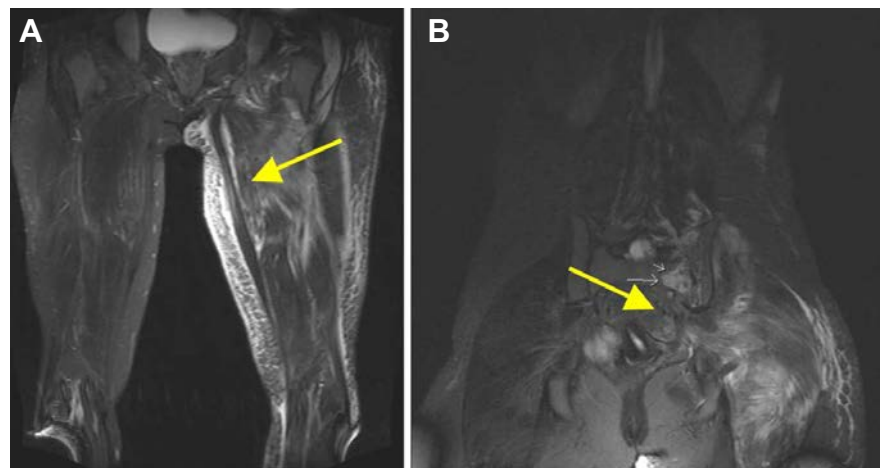


Figure 2. A) Necrotising fasciitis of the left thigh with enhancement of the tissue (MRI, T2, frontal); B) Abscess of the left sacro-iliac joint (MRI, T2, frontal).

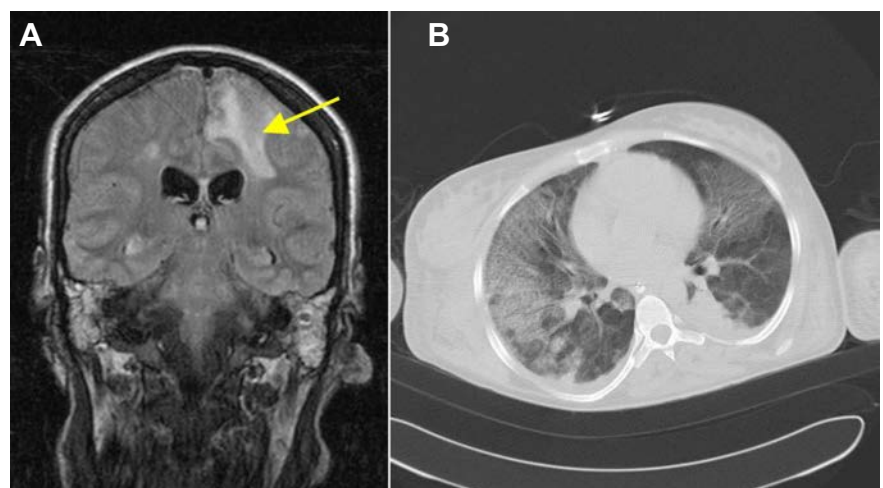


Figure 3. A) Cerebral septic embolism (MRI T2, frontal); B) Pulmonary septic embolism (CT scan, coronal).

tion and blood pressure support. After the first radical surgical debridement, careful management of the wounds is necessary to avoid complications such as a secondary infection. A second look after two days should be performed; often, the patients require repeated debridement. In case of clean wounds and controlled infection, intermittent vacuum therapy may be performed before employing special wound coverage using targeted reconstructive surgery or a split skin graft.<sup>8</sup>

The infection can be classified into three types: Type 1, constituting 80-90% of all cases, is a polymicrobial infection involving non-group Type A streptococci with anaerobic and/or facultative anaerobes. Type 2 necrotizing fasciitis is defined by the presence of group A hemolytic streptococci or *Staphylococcus aureus*.

Type 3 is caused by gram-negative rods, such as Vibrions. However, even methicillin-resistant *Staphylococcus aureus* (MRSA) or *Escherchia coli* have been reported as causative agents.<sup>1,3</sup> In this case, the causative agents were not typical for the presented types. Therefore, an initial antibiotic therapy with broad spectrum antibiotics is essential for these patients.

Septic embolism is common, and in cases of persistent septicemia, further diagnostics should be performed to detect other abscess formations. To avoid long-term ICU stays, an early diagnosis is essential. Most likely, early diagnosis of the sacro-iliac abscess based on the history of chronic pain in combination with drug abuse could have shortened the patient's hospital stay and avoided all complications. However, the clinical diagnosis of necrotizing fasciitis is sometimes not easy for emergency room physicians, and this disease may be primarily treated as superficial erysipelas. The use of the LRINEC (Laboratory Risk Indicator for Necrotizing Fasciitis) score, which was described by Wong *et al.* in 2004, may be helpful to detect necrotizing fasciitis.<sup>9</sup> This score is based on the white blood cell count and the levels of C-reactive protein, hemoglobin, serum sodium, serum creatinine and serum glucose upon admission. In their 2013 review article, Wang *et al.* described that

the most common symptoms are local swelling, erythema, fever and pain (in 82% of cases). The most common comorbidities are liver cirrhosis (47%) and diabetes mellitus II (39%). The mortality ranged up to 20% in a study group of 115 patients with necrotizing fasciitis. The researchers stated that a high index of suspicion is important in patients with existing co-morbidities and cutaneous findings, such as swelling or erythema. These results were also described in the study by Goh *et al.*<sup>6,7</sup>

Drug abuse is related to many medical complications, which depend on the dose injected, drug type and delivery method. Various locations of abscesses arising after the injection of heroin and other drugs have been described.<sup>10,11</sup> Sometimes i.v. drug users attempt to cannulate the femoral vein with their needles.<sup>11</sup> When contaminated needles are used, the risk of an infection with HIV or hepatitis C increases, but even the risk of developing an abscess with fatal complications is high.

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## Conclusions

This report presents an interesting case of a young woman with sepsis and fulminant necrotizing fasciitis of the thigh following an abscess of the sacro-iliac joint. Particularly in patients with chronic drug abuse, attention should be paid because of the unusually sites for drug injection and the possible abscess locations. Use of the LRINEC- score upon admission and immediate diagnostics (MRI, CT or ultrasound) are necessary to detect necrotizing fasciitis, and radical surgical debridement should be performed. Septic embolism in immunosuppressed patients is common and should be diagnosed in cases of complications.

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