

Necrotising Fasciitis in the Elderly: A Double Delay

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ABSTRACT

Necrotising fasciitis is an uncommon and rapidly progressive infection of the subcutaneous tissues and fascia which results in necrosis. Without prompt and aggressive surgical intervention, it inevitably leads to severe sepsis and multiorgan failure with a high mortality rate. In general, the diagnosis of infection in the elderly is often difficult, regardless of the type of infection. We report a case of necrotising fasciitis in a 95-year-old lady. The patient presented with bowel and urinary symptoms as well as left leg pain suggestive of sciatica. There was no sign of cellulitis and intravenous antibiotic was started for a presumed urinary tract infection. The diagnosis of necrotising fasciitis was made only much later when crepitus was noted in her leg and radiological studies confirmed gas in the soft tissues. The patient and her family declined surgery and she subsequently died from septicaemia. This condition posed a diagnostic dilemma in the absence of fever, sudden onset of severe pain, and cutaneous findings. In order to reduce morbidity and mortality a high degree of suspicion is required to reach an early diagnosis for prompt surgical intervention.

Keywords: diagnostic delay, necrotising soft tissue infection, subcutaneous fat

INTRODUCTION

Necrotising fasciitis (NF) is an uncommon but rapidly invasive soft tissue infection involving the fascia and the subcutaneous fat. It is potentially fatal with a high mortality rate due to overwhelming sepsis and multisystem organ failure. Time to surgery often determines the final outcome. In the elderly the presentation may be atypical resulting in delayed diagnosis and adverse outcome.

CASE REPORT

A 95-year-old lady with underlying Type 2 diabetes mellitus, well-controlled on diet, was admitted for chills, abdominal discomfort with occasional diarrhoea and dysuria with urinary frequency of a week's duration. She did not have fever or cough. She noted some loss of appetite but no vomiting. Her other complaints included breathlessness on exertion, and back pain with radiation to the left leg for a few weeks. There was no chest pain or palpitations. There were also no history of recent trauma or falls. Previously, she has been in reasonably good health and was fitted with

a vaginal pessary because of uterine prolapse. She was living independently by herself prior to the admission.

She was afebrile and not toxic-looking. She was alert and orientated. The blood pressure was 100/60 mm Hg, pulse rate 90/min and respiratory rate 16/min. Examinations of her heart, lungs, and abdomen were unremarkable. Straight-leg raising and hip movements were normal on both legs. There was no neurological deficit, no evidence of cellulitis and no tenderness of the muscles of the left leg. Her pedal pulses were poorly felt. She was found to have a leucocytosis of $35.1 \times 10^9/L$ with neutrophilia. The liver function tests were normal except for hypoalbuminaemia. Radiographs of the lumbar spine and hips were unremarkable except for some degenerative changes. Her chest radiograph was otherwise unremarkable. The urine showed some pyuria but no growth of organisms on culture. The initial clinical impression was a possible urinary tract infection. Intra-abdominal sepsis and pseudomembranous colitis were other

differential diagnoses. She was given a broad-spectrum intravenous antibiotic.

Over the next few days, she had no fever but her abdominal symptoms and her left leg pain persisted. There was no sudden exacerbation of pain. However, her left leg had become swollen and crepitus was elicited. No redness or any other skin changes was noted. A repeat radiograph of the hips and legs revealed extensive gas lucencies within the soft tissues extending from the left hip to the left ankle (Fig. 1). CT of the abdomen and pelvis performed later revealed extensive gas formation in the abdominal wall and the left iliopsoas muscles (Fig. 2). Blood cultures were negative and her serum creatine kinase level was normal.

A clinical diagnosis of NF was finally made. Both she and her family declined surgery after weighing the risks involved and possibly prolonged recuperation post-operatively. She subsequently succumbed to the illness.

DISCUSSION

Skin and soft tissue infections including NF are more common in the elderly¹ due to a combination of age-related changes (thinning of skin, poor wound healing, decreased barrier function, loss of elasticity) and environmental factors (photoaging) affecting the aged skin. Chronic skin disorders namely pruritis and xerosis, poor handling and care, immobility, maceration from incontinence, oedema from venous insufficiency, peripheral vascular disease, skin-breaching procedures, as well as medical devices and surgical implants further predispose the elderly to infections. In addition, general factors such as reduced cellular and humeral mediated immunity secondary to aging, malnutrition, multiple chronic diseases, and medications, all contribute to their susceptibility.

NF is an uncommon, severe and potentially life-threatening infection of the superficial and deep fascia including the subcutaneous fat. It has a mortality rate of 25% to 35% despite treatment². Classification of necrotising infections affecting the skin and soft tissues are confusing for there is much overlap in the depth of infection (skin, subcutaneous fat, fascia, muscle), anatomical sites (extremities, head and neck, perineum, trunk), infecting organisms (aerobes, anaerobes), and clinical manifestations (fever, systemic toxicity, with or without cutaneous findings), which are some

of the main criteria the classification is based on. Nevertheless, as a group, they all share a common pathology of infection, inflammation, thrombosis, and necrosis³. A simplistic way to classify them would be to determine which layer of the skin and soft tissue is primarily involved, though it becomes more complicated when secondary involvement of the other layers are already present, which is more the rule than the exception. NF by definition involves the fascia and subcutaneous fat with sparing of the skin and underlying muscles. NF has 2 subtypes based on clinical features. Type I NF which includes Ludwig's angina and Fournier's gangrene, tends to be polymicrobial and occurs in patients with underlying chronic illness usually in a healthcare facility setting; whereas in Type II NF monomicrobial gram-positive organisms predominate and occurs in relatively healthier individuals from the community. Both types involve a break in the integrity of the skin as a portal of entry. Other types of necrotising infections include necrotising cellulitis which have skin changes; and myositis which is another deep infection can resemble NF with presentation of pain out of proportion to the skin manifestations.

Our patient most likely had Type I NF which is also the more common of the two. Though still not universally accepted, Type III NF has been included as the third subtype with water-borne organisms being the causative agent⁴. Arguably, such subclassification may guide the initial choice of empirical antibiotics. However, regardless of their classification, and more importantly, treatment is essentially the same for all necrotising skin and soft tissue infections⁵. The diagnosis is not easy because of paucity of clinical signs during the early course of the disease (Table 1, overleaf)^{6,7}. The most important sign is the the presence of pain out of proportion to the overall clinical picture^{8,9}. Once the obvious signs of sepsis set in and crepitus appear, the diagnosis becomes clear but has already been delayed and usually results in poor outcomes. Crepitus is only present in the minority of cases⁸. In general, infections including skin and soft tissue infections are associated with increased morbidity and mortality in this age group¹⁰.

Blood test findings are generally non-specific though an elevated creatine kinase may give a clue to possible necrotising infections. The LRINEC (laboratory risk indicator for necrotising fasciitis) score can also be used to differentiate NF from other



Fig. 1. Radiograph of the left leg showing extensive gas formation in the tissues.

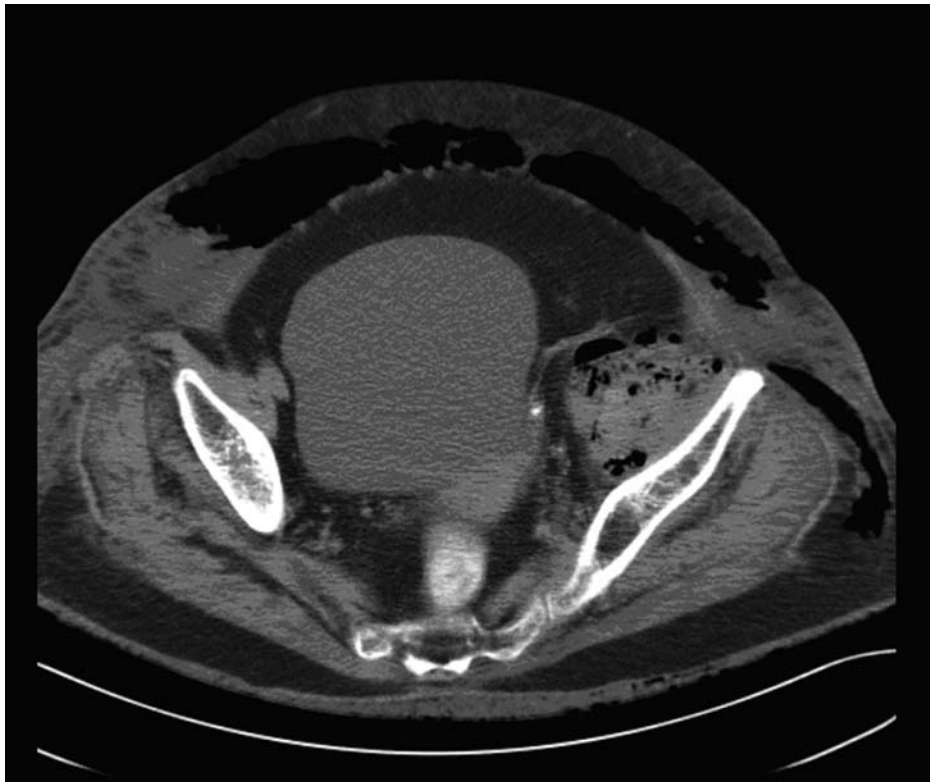


Fig. 2. Unenhanced CT of the abdomen and pelvis showing extensive gas formation in the anterior and the left lateral abdominal wall, and the left iliopsoas muscles.

Table 1. Clinical features in necrotising fasciitis.

| Early Features | Late Features |
|---|--------------------------------------|
| Sudden pain (disproportionate) | Severe pain |
| Tense swelling | Skin discoloration (purple or black) |
| Induration | Skin necrosis or gangrene |
| Skin anaesthesia | Blistering |
| Cellulitis | Haemorrhagic bullae |
| Systemic inflammatory response syndrome | Creptus |
| | Discharge of "dishwater" fluid |
| | Severe sepsis |
| | Multiorgan failure |

skin and soft tissue infections¹¹. Blood cultures are sometimes helpful. Plain radiograph showing gas in the soft tissues caused by anaerobic infections is specific but not sensitive². Other imaging modalities such as CT (computer tomography) and MRI (magnetic resonance imaging) are helpful but not confirmatory. Nevertheless, if NF is highly suspected, surgical exploration should not be delayed as it not only confirms the diagnosis but is life-saving. It has been shown that delayed surgical intervention as a consequence of delayed diagnosis leads to higher mortality¹². Early and complete surgical intervention includes exploration, drainage and debridement, appropriate intravenous broad-spectrum antibiotics, and close monitoring preferably in an intensive care setting, are the standard of care. Repeat surgical procedures may even be necessary in some cases. The use of hyperbaric chambers with increased oxygenation and intravenous immunoglobulin are still not well-established.

Our patient had no obvious skin changes and there was absence of gas on the first set of radiographs. The diagnosis was further delayed by the patient giving a myriad of symptoms. Though the patient experienced disproportionate pain, she did not manifest other specific symptoms and signs of NF, such as sudden onset of severe pain, fever and toxicity. It is well-known that elderly patients not uncommonly present with atypical signs and symptoms¹³. They can have multiple constitutional complaints e.g. malaise, lethargy/weakness, anorexia/dehydration/failure to thrive, nausea/vomiting; subtle to silent presentation from blunted physiological responses with aging e.g. reduced

pain perception, less febrile response and less leucocytosis in the setting of sepsis, and underlying cognitive impairment rendering inaccuracies in history-taking; classical geriatric syndromes e.g. confusion, falls, incontinence; general functional decline; and complications e.g. not delving in deep and further back enough to find the root cause. In the presence of a significant illness this special population group would be unwell earlier for they have less homeostatic reserve. However, their diagnosis and treatment are most often delayed or missed.

The presence of sepsis was noted and was attributed to a probable urinary tract infection; the diagnosis of NF was not initially entertained resulting in delay. Moreover, the differential diagnosis for unilateral leg pain is extensive which includes amongst others, spinal spondylosis or prolapsed intervertebral disc with sciatica, hip osteoarthritis, bone disorders, ischaemic limb, deep vein thrombosis, compartmental syndrome, rhabdomyolysis, and NF. Degenerative spine disease and peripheral vascular disease were also present in our patient. All of the above confounders illustrate how acute concurrent conditions as well as chronic pre-existing co-morbidities including drug-related illness which are more common in this age-group, may mask the current underlying problem. Most importantly, the attending physician should have a high index of suspicion of the condition in order to confirm it promptly and thereby offer definitive treatment in the form of surgical debridement. Finally, ageism which is endemic across all levels of society including doctors, caregivers and even patients themselves would give rise to

Table 2. Causes of diagnostic delay in the elderly.

| Atypical Presentation | Multiple Confounders |
|------------------------------|----------------------------------|
| Non-specific symptoms | Extensive differential diagnosis |
| Subtle to silent features | Concurrent acute illness |
| Geriatric syndromes | Pre-existing chronic illness |
| General functional decline | Drug-related effects |
| Complications | |
| Patient and Caregiver Factor | Doctor Factor |
| Cognitive impairment | Low index of suspicion |
| Ageism | Ageism |

the presentation of pathology being frequently dismissed as part of normal aging. All the above mentioned cumulative factors compound further the delay in diagnosis (Table 2).

CONCLUSION

The diagnosis of NF may be delayed especially when it occurs in the elderly. Since early surgery reduces mortality and morbidity, a high index of suspicion is necessary to make a prompt diagnosis thereby enabling early definitive surgical treatment. Further studies comparing various diagnostic modalities and trials for effective adjunctive therapies are needed for timely diagnosis and optimal treatment of this devastating disease⁴.

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