Acta Orthop. Belg., 2013, **79**, 104-106

ORIGINAL STUDY

Necrotising Fasciitis : A series of seven cases

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Necrotising fasciitis of the extremities is a rapidly progressive, potentially life threatening soft tissue infection. Early diagnosis, aggressive surgical and critical care management is vital in preventing mortality. This series reports the clinical presentation, behaviour of inflammatory markers, histological, microbiological and radiological findings in seven cases, which presented to our orthopaedic unit over the last one year. Seven patients (4 male and 3 female) were included. Usual presentation was spreading erythema and pain. Duration of symptoms varied from 3 to 14 days. All except one case affected the lower limbs. The average Laboratory risk indicator for necrotising fasciitis (LRINEC) score on the day of presentation was 5. Imaging demonstrated subcutaneous oedema, fluid and air pockets in muscular planes. Group A *beta haemolytic Streptococcus* was the most common organism isolated from culture. Treatment modalities included antibiotics, immunoglobulins and surgical debridement. Four of the patients showed full remission. However, three (one with pre-existing carcinoma) of them succumbed to the condition.

Keywords : necrotising fasciitis ; group A beta haemolytic Streptococcus ; LRINEC.

INTRODUCTION

Necrotising fasciitis is a rare condition characterised by a life-threatening soft tissue infection, where there is rapidly spreading inflammation resulting in necrosis of fascial planes, surrounding subcutaneous tissue and skin and subsequent skin ischaemia (*1,2,3*). This results in severe life-threatening sepsis (*4*). The term necrotising fasciitis represents the actual disease process of inflammation and necrosis of subcutaneous fat and deep fascia with sparing of muscle ; it can affect any body part, most commonly the upper and lower limbs (*2*).

Aetiology of necrotising fasciitis usually involves trauma with the skin as the most usual site of entry (*2*). It may develop where there is a breach in the skin, such as the site of a laceration, insect bite, needle puncture or skin abscess (*3*). Risk factors for necrotising fasciitis include diabetes mellitus, obesity, peripheral vascular disease, intravenous drug use, alcohol abuse, malnutrition, smoking, chronic cardiac disease, chronic corticosteroid therapy, chronic immune suppression, chronic liver and kidney disease, malignancy and age (*2,3,4*). Necrotising fasciitis in the early stages is often difficult to differentiate clinically from cellulitis, which can be a disaster as it requires rapid surgical debridement to prevent morbidity and mortality (*2*). Early

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No benefits or funds were received in support of this study. The authors report no conflict of interests.

aggressive surgical debridement and appropriate antimicrobial therapy are the mainstay of treatment in necrotising fasciitis (*5*).

There should be a high index of suspicion in patients who present with a triad of erythema, swelling and disproportionate pain. Progression to overt fasciitis leads to systemic toxicity. With disease progression, blisters and bullae form, followed by discolouration of the skin and necrosis. There is rapid progression of oedema and if there is soft-tissue gas, crepitus may be palpable (*2*). Tissue biopsy obtained during surgery is deemed to be the gold standard for definitive diagnosis of necrotising fasciitis (*3*), however these results provide a retrospective diagnosis.

Wong *et al* (*6*) devised a scoring system to help distinguish necrotising fasciitis from other soft tissue disease. This is the LRINEC (Laboratory Risk Indicator for Necrotizing Fasciitis) score. This utilises the laboratory parameters of C-reactive protein (CRP), total white cell count (WCC), haemoglobin, sodium, creatinine and glucose on admission to score patients with a suspected diagnosis of necrotising fasciitis. This was devised after a retrospective observational study of 145 patients with necrotising fasciitis and 309 patients with an abscess or cellulitis. The LRINEC score was shown to have a positive predictive value of 92% and negative predictive value of 96% in patients with a LRINEC score greater than 6. We performed a retrospective review of patients admitted to our unit with a diagnosis of necrotising fasciitis between June 2009 and July 2010.

PATIENTS AND METHODS

This was a retrospective review of patients with a diagnosis of necrotising fasciitis admitted to Royal Albert Edward Infirmary, Wigan between June 2009 and July 2010. Seven patients were identified during the period. Of the seven, six were adults (average age of 60.1 years) and one was a child aged 6 years. The patients averaged 1.7 relevant co morbidities.

RESULTS

There were 5 male patients and 2 female patients. They were between the ages of 6 and 77 years (6, 37, 66, 55, 77, 60, 66). The lower limbs were affected in six patients. One case affected the upper limb, spreading into the chest. The following pre-existing risk factors were identified : diabetes mellitus (2 cases), cancer (2 cases), alcohol abuse (2 cases), liver disease (1 case), obesity (1 case) and hypertension (1 case). Two of the patients had a history of trauma in the preceding week. Five of the patients complained of severe pain in the affected area. Other presenting signs included oedema, blisters, ecchymosis, tenderness and crepitus. The white cell count on presentation was raised in 3 out of 7 and C Reactive Protein (CRP) was raised in 4 out of 6 of the documented cases. CRP was raised over 150 mg/L in the 4 cases. Lactate levels were raised in 3 of the four cases in which it was measured. The average Laboratory risk indicator for necrotising fasciitis (LRINEC) score on the day of presentation was significantly raised in 3 of the six patients (Table I) (*6*). Five of the patients suffered systemic sepsis. Majority of the patients presented with features of cellulitis like erythema and swelling. Surgical treatment where offered took place on an average of 2.6 days following admission. Five patients underwent a second look, of which four underwent a reconstructive procedure during a third stage.

Table I. — LRINEC Scores

Patient	LRINEC score
1	1
2	9
3	3
4	7
5	9
6	N/A
7	2

Plain radiographs, Ultrasound and MRI

Investigations have a limited role in making a diagnosis of necrotising fasciitis. A plain radiograph may show gas in the soft tissue. All patients who

underwent ultrasound showed subcutaneous oedema, fluid and air pockets at the affected site. One patient underwent MRI showing involvement of the adductor compartment of the thigh.

Microbiology

Group A *beta haemolytic Streptococcus* was seen in four of the cultures. *Staphylococcus aureus*, *Bacteroides fragilis*, *Escherichia Coli* and *Staphylococcus epidermidis* were other organisms grown on culture.

Pathology

Histopathology of all cases showed severe inflammation of the dermis and subcutaneous tissue.

Treatment and Mortality

Benzyl Penicillin, Flucloxacillin, Clindamycin and Tazocin were the most commonly used antibiotics. Average time to surgery from time of admission was 2.6 days. Five of the operated patients were taken back to theatre for a second look in 48 hours. Four of them had a third look in theatre. Four patients were transferred to the Plastic Surgery unit for reconstructive procedures. Three patients succumbed to the condition.

DISCUSSION

Delay in recognition of necrotizing fasciitis can be fatal. Diagnosis of the condition is based entirely on clinical presentation. In our study the LRINEC scores did not prove useful. Radiographs and scans did confirm the clinical diagnosis. Delays in diagnosis are possible when these cases are treated as cellulitis by non surgical teams. A multidisciplinary approach would be essential in effective management of the condition. Patients are often critically ill and may deteriorate rapidly. They often need intensive care as seen in our study.

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