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Analysis of the increasing prevalence of necrotising fasciitis referrals to a regional plastic surgery unit: A retrospective case series

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Summary Necrotising Fasciitis is a destructive infection of the skin and subcutaneous tissues associated with significant mortality and morbidity. Survival from the condition often necessitates patient referral for appropriate reconstructive surgery and supportive medical management. The aim of our study was to identify emerging patterns, characteristics and outcomes of necrotising fasciitis in Northern Ireland. A retrospective analysis of all patients referred to the Regional Plastic Surgery Service in Belfast between 2007 and 2012 was performed. Forty-six patients were identified with clinical, intraoperative and histopathological confirmation of necrotising fasciitis. Mean patient age was 59.4 years (range 32—88) with a 25:21 male to female ratio. 13 patients died from the disease. Smoking, obesity, diabetes and immunocompromise were the most prevalent co-morbidities identified. 37 patients had no identifiable mechanism of infection initiation in the history. Painful cellulitis (44/46), skin necrosis (26/46), skin blistering (8/46) and subcutaneous emphysema (3/46) were the most common presenting features. The median LRINEC score at presentation was 7 (range 2—12). The mean serum lactate at presentation was 4.0 mmol/L (range 1.6—13.5). LRINEC scores and serum lactate at presentation exhibited diagnostic sensitivities of 65% and 90% respectively. The lower extremity was the most commonly affected anatomical site (16/46). Group A Streptococcus was the most frequently isolated causative bacterium from debrided tissue cultures (16/46). The

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prevalence of necrotising fasciitis in the population studied is increasing, particularly in relation to patient cases caused by Group A Streptococcal infection. Increasing bacterial virulence and levels of patient immunocompromise may explain this increasing trend. The LRINEC scoring system lacked diagnostic sensitivity. Elevated serum lactate was supported as both a diagnostic and prognostic indicator. The findings of our study are somewhat limited in their application to other regions and highlight the need for a national analysis of necrotising fasciitis in the UK.

Introduction

Necrotising fasciitis is a life-threatening infection of the skin and subcutaneous tissues which can rapidly spread through fascial planes to produce necrosis, systemic toxicity, shock, and, potentially, death. Incidence of the disease in the UK is estimated at approximately 500 cases per year, with mortality reaching 20–40% in some patient series despite recognised medical interventions.[1–3] Early surgical exploration and debridement, complemented by early antimicrobial therapy, remains the mainstay of treatment to improve survival, limit extensive resections, and reduce postoperative morbidity.[4,5] Survival from the disease often prompts referral to plastic surgery services to address the extensive reconstructive needs of the post-debrided patient.

Necrotising Fasciitis was first described in 1952 yet mortality from the disease remains consistently high.[6,7] A lack of specific clinical features in the early stages of the disease has been cited as the main reason for diagnostic difficulty.[8] This has prompted recent studies to focus on clinical assessment of necrotising fasciitis and the use of various diagnostic adjuncts and scoring systems to aid in early diagnosis.[9–13]

Table 1 The laboratory risk indicator for necrotising fasciitis (LRINEC).[10]

Serum Parameter	Range	Score
Hb (g/dl)	>13.5	0
	11–13.5	1
	<11	2
White cell count ($\times 10^9$/L)	<15	0
	15–25	1
	>25	2
Sodium (mmol/L)	<135	2
Creatinine (μmol/L)	>141	2
Glucose (mmol/L)	>10	1
CRP (mg/L)	>150	4
Total scores:	≤5 = low risk of necrotising fasciitis (<50% risk)	
	6–7 = intermediate risk of necrotising fasciitis	
	≥8 = high risk of necrotising fasciitis (>75% risk)	

The Laboratory Risk Indicator for Necrotising Fasciitis (LRINEC) has been suggested as a tool to facilitate early diagnosis based on various serum parameters at presentation (see Table 1).[10] The LRINEC scoring system remains a topic of ongoing debate with some studies questioning its sensitivity, specificity and its role as a prognostic indicator.[14–17] More recently raised serum lactate levels have been proposed as a means of differentiating necrotising fasciitis from other non-necrotising soft tissue infections.[18]

Whilst diagnostic adjuncts are an important aspect of improving disease recognition, there have been few recent papers that have made an analysis of causative bacterial trends over time in the UK. The aim of this study was to describe the clinical and epidemiological features of necrotising fasciitis in Northern Ireland. Its principal objective was to identify bacterial trends, disease characteristics and patient outcomes by performing a demographic, microbiological and reconstructive analysis of all patient cases in the region over the last 6-years.

Methods

We conducted a 6-year retrospective case series of all patients with a diagnosis of necrotising fasciitis referred to the Northern Ireland Plastic and Maxillofacial Surgery Service in Belfast between January 2007 and December 2012. In Northern Ireland post-debrided necrotising fasciitis patients are referred to the sole regional plastic surgery institution for reconstruction.

In January 2013, we used established clinical coding databases to identify all patients treated at our institution between January 2007 and December 2012. The ICD-10 code for necrotising fasciitis (M72.6) was used to perform this search, identifying 52 patients in the timescale specified.

Figure 1 provides a summary flow chart of our patient selection. All charts were scrutinised to check the accuracy of the coded diagnosis. 2 charts were excluded, as the clinical diagnosis recorded in the notes was that of a necrotising soft tissue infection and not necrotising fasciitis. The remaining charts were subjected to a series of inclusion and exclusion criteria to minimise selection bias, as depicted by Figure 1. This process excluded a further 4 patients resulting in a sample of 46 for final analysis.

We created a data proforma to collect all required clinical information. The first two authors completed data proformas by manually searching for the relevant clinical