The Brazilian Journal of
INFECTIOUS DISEASES
www.elsevier.com/locate/bjid

Original article

Necrotizing fasciitis: eight-year experience and literature review

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ARTICLE INFO

Article history:
Received 1 July 2013
Accepted 20 August 2013
Available online 22 November 2013

Keywords:
Necrotizing fasciitis
Comorbidity
Debridement
Antibiotics

ABSTRACT

Objectives: To describe clinical, laboratory, microbiological features, and outcomes of necrotizing fasciitis.
Methods: From January 1, 2004 to December 31, 2011, 115 patients (79 males, 36 females) diagnosed with necrotizing fasciitis were admitted to Mackay Memorial Hospital in Taitung. Demographic data, clinical features, location of infection, type of comorbidities, microbiology and laboratory results, and outcomes of patients were retrospectively analyzed.
Results: Among 115 cases, 91 survived (79.1%) and 24 died (20.9%). There were 67 males (73.6%) and 24 females (26.4%) with a median age of 54 years (inter-quartile ranges, 44.0–68.0 years) in the survival group; and 12 males (50%) and 12 females (50%) with a median age of 61 years (inter-quartile ranges, 55.5–71.5 years) in the non-surviving group. The most common symptoms were local swelling/erythema, fever, pain/tenderness in 92 (80%), 87 (76%) and 84 (73%) patients, respectively. The most common comorbidies were liver cirrhosis in 54 patients (47%) and diabetes mellitus in 45 patients (39%). A single organism was identified in 70 patients (61%), multiple pathogens were isolated in 20 patients (17%), and no microorganism was identified in 30 patients (26%). The significant risk factors were gender, hospital length of stay, and albumin level.
Discussion: Necrotizing fasciitis, although not common, can cause notable rates of morbidity and mortality. It is important to have a high index of suspicion and increase awareness in view of the paucity of specific cutaneous findings early in the course of the disease. Prompt diagnosis and early operative debridement with adequate antibiotics are vital.

Introduction

Necrotizing fasciitis is a rapidly progressive infectious disease that primarily involves the fascia and subcutaneous tissue. It is an uncommon but life threatening infection. It can affect all parts of body and the lower extremities are the most common sites of infection.[1–3] The predisposing conditions are diabetes mellitus, liver cirrhosis, alcoholism, hypertension, chronic renal insufficiency, and malignancy. Prompt diagnosis and early treatment with adequate antibiotic with or without surgical intervention are vital because of high mortality. We

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http://dx.doi.org/10.1016/j.bjid.2013.08.003

herein describe clinical, laboratory, microbiological features, and outcomes of 115 patients diagnosed with necrotizing fasciitis during a consecutive eight-year period and review the relevant literature.

Patients and methods

We retrospectively reviewed all necrotizing fasciitis cases at Mackay Memorial Hospital, Taitung from January 1, 2004 to December 31, 2011. Demographic data, clinical features, site of infection, type of comorbidities, microbiological and laboratory findings and outcomes were analyzed. The severity of liver cirrhosis was classified according to the Child–Pugh score. Diagnosis was made by operation and based on lack of resistance to blunt dissection of the normally adherent fascia, presence of necrotic fascia, and purulent discharge with a foul fish-water odor. Histopathological findings of surgical specimens typically show neutrophils and bacterial clumps infiltration between collagen bundles with focal necrosis were used to confirm the diagnosis when available. Blood and pus cultures were obtained at the time of first operative debridement. The number of operative debridement, the need for amputation, the duration of hospitalization, and in-hospital mortality rate were also documented.

The continuous variables, presented as medians and inter-quartile ranges (IQR, the range between the 25th and 75th percentile) due to the small sample size, were compared between surviving and non-surviving groups by the Mann–Whitney *U* test. Likewise the categorical variables were expressed by count and percentage and compared using the Yate's continuity correction or Fisher's exact test. To investigate the independent factors associated with death, simple and multiple logistic regression models were performed. All significant factors on univariate analyses were considered for the initial multivariate models. The final multiple logistic regression model was determined using the backward selection technique, wherein variables that did not improve model fit at $p < 0.1$ were discarded; however, the potential confounders such as age and gender were always forced in all multivariate models for adjustment. Moreover, multicollinearity was also evaluated by variance inflationary factor (VIF). Variables with VIF > 5 were then considered to have multicollinearity with other covariates and would be excluded from the multivariate analyses. The statistical analyses were performed with SAS software version 9.2 (SAS Institute Inc., Cary, NC). A two-sided p-value < 0.05 was considered as statistically significant.

Results

Clinical findings

Out of 115 cases of necrotizing fasciitis enrolled 91 survived (79.1%) and 24 died (20.9%). There were 67 males (73.6%) and 24 females (26.4%) with a median age of 54 years (IQR, 44.0–68.0 years) in the surviving group; and 12 males (50%) and 12 females (50%) with a median age of 61years (IQR, 55.5–71.5 years) in the non-surviving group, respectively. Table 1 summarizes the clinical features of patients. The most common comorbidity was liver cirrhosis in 54 patients (47%) and diabetes mellitus in 45 patients (39%). Among the 54 patients with liver cirrhosis, 33 patients were chronic alcohol abusers, nine had chronic hepatitis B and 16 had chronic hepatitis C. Eight patients had no comorbidity. Local swelling/erythema, fever, pain/tenderness were the most common clinical features at presentation in 92 (80%), 87 (76%) and 84 (73%), respectively.

Table 1 – Clinical features of the 115 necrotizing fasciitis patients.

Clinical features	No. of patients (% of total)
Local swelling/erythema	92 (80%)
Fever	87 (76%)
Pain/tenderness	84 (73%)
Tachycardia	43 (37%)
Shortness of breath	32 (28%)
Shock	30 (26%)
Bullous lesion	25 (22%)
Consciousness change	7 (6%)
Crepitus	7 (6%)

Site of infection

The infection involved the head and neck in four cases (3%), the upper limb in 15 cases (13%), the trunk in 15 cases (13%), the lower limb in 70 cases (61%), bilateral lower limb in four cases (3%) and the perineum and scrotum in 11 cases (10%), as shown in Table 2.

Laboratory findings

An initial blood count revealed leukocytosis (total white count $>12 \times 10^3/\mu L$) in 60 of the 115 patients (52%), leucopenia (total white count $<4 \times 10^3/\mu L$) in nine of 115 patients (8%) and thrombocytopenia (platelet count $>150 \times 10^3/\mu L$) in 46 of the 115 patients (40%). Hemoglobin <10 mg/dL is observed in 42 of the 115 patients (37%). Prothrombin and activated partial thromboplastin time (>12 s and >36 s, respectively) were prolonged in 64 (56%) and 44 (38%) of the 115 patients respectively. Acute renal failure was diagnosed in 26 (23%) of the 115 patients but serum sodium and potassium remained normal in most cases. In 74 cases (64%), serum albumin level was below 3 g/dL, of whom 18 (16%) were Child–Pugh class C.

Table 2 – Anatomical sites involved with necrotizing fasciitis.

Anatomical location	Number of cases (%)
Head and neck	4 (3%)
Upper limb	15 (13%)
Right	8 (7%)
Left	7 (6%)
Lower limb	70 (61%)
Right	28 (24%)
Left	38 (33%)
Bilateral	4 (3%)
Perineum and scrotum	11 (10%)
Trunk	15 (13%)