



## Necrotising fasciitis: clinical features in patients with liver cirrhosis

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Received 18 April 2004; accepted 11 January 2005

### KEYWORDS

Necrotising fasciitis;  
Liver cirrhosis;  
Diabetes mellitus

**Summary** Necrotising fasciitis is a fulminant and life-threatening infection. It is associated with a high mortality rate and is often seen in the aged and immunocompromised patients. Liver cirrhosis is regarded as a risk factor of necrotising fasciitis. From January 1995 to December 2003, 17 cirrhotic patients who had been admitted to our hospital for necrotising fasciitis were identified. The infection all developed in the lower extremities. Only six patients survived, and the overall case fatality rate was 64.7%. The cases were divided into two groups: survivors and nonsurvivors. Comparisons were made on age, gender, presenting symptoms, underlying medical diseases, laboratory data and clinical course. Underlying diabetes mellitus and grade C liver cirrhosis were the only statistically significant factors that led to poor prognosis ( $p < 0.05$ ).

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Necrotising fasciitis is a rare but fatal soft tissue infection, which is characterised by widespread necrosis of the superficial fascia and the subcutaneous fat. The causative organisms are usually toxin-producing, virulent bacteria, including *Streptococcus*, *Staphylococcus*, or a combination of Gram-negative bacilli and anaerobes. This condition is primarily found in the elderly and in the immunocompromised patients. Previous surgery, trauma,

diabetes and arterial insufficiency are common predisposing factors.<sup>1</sup> Liver cirrhosis was associated with necrotising fasciitis in several reports,<sup>2-4</sup> but the characteristics of this specific group of patient have not been elucidated. Therefore, we retrospectively analysed 17 cirrhotic patients who presented to our hospital with necrotising fasciitis from 1995 to 2003. The demographics, underlying diseases, clinical courses, and outcome were illustrated and analysed. The patients were divided into survivors and nonsurvivors. Several parameters were compared between the two groups to identify possible prognostic factors.

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## Patients and methods

We retrospectively reviewed the medical records of patients who were treated for necrotising fasciitis in National Taiwan University Hospital between January 1995 and December 2003. Patients were identified by a computer-generated search for patients who had been diagnosed with necrotising fasciitis in this 9-year period. Among the 136 identified patients, 17 who had been diagnosed with liver cirrhosis based on clinical, laboratory and echographic findings were included in the study. Definitive diagnosis of necrotising fasciitis depends on operative findings that include a lack of resistance of normally adherent fascia to blunt dissection, the presence of necrotic fascia and purulent discharge with foul 'dish-water' odour. Histopathological examination of surgical specimens was used to confirm the diagnosis when available. There were two cases that did not undergo surgery, but demonstrated rapid spreading topical skin changes and systemic toxicity. Computed tomography also revealed fascial plane dissection with fluid accumulation. So these two cases were also included for analysis.

These cases were divided into two groups. Those who survived were classified as group I ( $n=6$ ), and those who did not survive were classified as group II ( $n=11$ ). The demographic characteristics, clinical presentations, severity of liver cirrhosis, laboratory data and hospital courses were analysed. Statistical analysis was carried out using the software STATA (Stata Inc., College Station, TX, USA). Mann-Whitney  $U$ -test and Fisher's exact test were used to compare the statistically significant difference between the two groups. The difference was considered significant if  $p$  value  $<0.05$ .

## Results

Seventeen patients (15 men and two women) were enrolled with a mean age 58 years (range, 35-82 years). The age and gender distribution between group I and group II revealed no statistical difference. Demographic, clinical and laboratory details of the patients were summarised in Table 1. The aetiology of liver cirrhosis was hepatitis B infection in eight cases, hepatitis C infection in three, co-infection of hepatitis B and C in two, and alcoholism in four. Twelve patients had grade C cirrhosis according to Child-Turcotte's classification with Pugh's modification.<sup>5</sup> Another three patients had grade B cirrhosis, and the rest two had grade A. The distribution of severe cirrhosis (grade C) between

the two groups was significantly different by Fisher's exact test ( $p=0.028$ ).

All but one case in our study had comorbidities other than liver cirrhosis. Six patients had diabetes mellitus, five had malignancy, five had oesophageal varices, two suffered from chronic renal insufficiency and one had spinal cord injury with paraplegia. Pulmonary tuberculosis, hypertension, pneumonia and gouty arthritis were also sporadically noted (Table 1). Four patients in group II had underlying malignant diseases, including two with hepatocellular carcinoma, one with nonHodgkin lymphoma, and one with myelodysplastic syndrome. One in group I had hepatocellular carcinoma. The distribution of malignancy between the two groups was not significantly different ( $p=0.6$ ). All the six diabetic patients belonged to group II. There was a statistically significant difference between the two groups ( $p=0.043$ ).

The infection involved the lower extremities in every case. Twelve of them started in unilateral lower leg, three in bilateral lower legs and two in unilateral thigh. The majority of patients presented with exquisite pain (16 patients), and local swelling/erythema (17 patients). Fever was noted in only eight patients. The possible portal of entry of microorganisms could be identified in seven patients, including five minor trauma, one insect bite and one burn site. Crepitus was noted in only two patients. Seven patients presented with septic shock in the emergency department (Table 2). Leukocytosis (white blood cell count  $> 10\,000/\text{mm}^3$ ) was found in 10 of 17 patients. The mean white blood cell count was  $12\,500/\text{mm}^3$  (range,  $2400\text{-}25\,480/\text{mm}^3$ ). A trend of neutrophilia was noted with the mean proportion of segment from 87.1% (range, 63-96.2%). The mean level of serum albumin was 2.2 g/dl (range, 0.6-3.1 g/dl). For these continuous variables, there was no statistically significant difference between the two groups by Mann-Whitney  $U$ -test.

Blood were collected in the emergency department before the application of antibiotic, and the positive rate was 58.8% (10 in 17 patients). Cultures of tissue specimens were obtained at the time of the first operation. Excluding the two patients who did not undergo any operation, the total positive rate of tissue culture was 86.7% (13 in 15 patients). Organism isolated included *Escherichia coli* (three cases), *Aeromonas hydrophila* (two cases), *Klebsiella pneumoniae* (two cases), *Enterobacter cloacae* (two cases), *Pseudomonas aeruginosa* (two cases), *Viridans streptococcus* (one case), *Staphylococcus aureus* (one case), *Vibrio vulnificus* (one case), and *Vibrio cholerae* (one case) (Fig. 1). Eight patients visited our emergency department

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