Laboratory Risk Indicators for Necrotizing Fasciitis and Associations with Mortality

Nekrotizan Fasiitli Olgularda Laboratuvar Risk Belirteçleri ve Mortalite ile İlişkisi

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SUMMARY

Objectives

Necrotizing fasciitis (NF) is rare but life threatening soft tissue infection characterized by a necrotizing process of the subcutaneous tissues and fascial planes. The Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score has been verified as a useful diagnostic tool for detecting necrotizing fasciitis. A certain LRINEC score might also be associated with mortality. The aims of this study are to determine risk factors affecting the prognosis and to evaluate the prognostic value of the LRINEC score in NF.

Methods

Twenty-five patients with necrotizing fasciitis treated in Samsun Education and Research Hospital between January 2008 and April 2013 were enrolled in the study. Surviving and non-surviving patient groups were compared regarding demographic data, co-morbidity, predisposing factors, causative agents, number of debridements and LRINEC score.

Results

Mean age was 55.6±16.79 years (min: 17-max: 84), and the female/male ratio was 16/9. Mortality was observed in 6 (24%) patients. The most frequent comorbid diseases were diabetes mellitus (52) and peripheral circulatory disorders (24%), and the most frequent etiologies were cutaneous (32%) and perianal abscess (20%). Pseudomonas aeruginosa infection was higher in the non-surviving group (p=0.006). The mean number of debridements and LRINEC score were higher in the non-surviving group than in the surviving group (p=0.003 and p=0.003, respectively).

Conclusions

Pseudomans aeruginosa infection and multiple debridements are related with mortality. The LRINEC score might help predict mortality in NF.

Key words: Fasciitis; mortality; necrotizing; prognosis.

ÖZET

Amaç

Nekrotizan fasiit (NF) cilt altı dokular ve fasyal planlarda nekrozla karakterize nadir görülen ama hayatı tehdit eden bir yumuşak doku enfeksiyonudur. Nekrotizan fasiit için laboratuvar risk indikatör (LRINEC) skor, NF teşhisinde kullanılan yararlı bir tanısal yöntemdir. Belirli bir LRINEC skor mortalite ile de ilişkili olabilir. Bu çalışmanın amacı NF için LRINEC skorun prognostik değerini ortaya koymak ve prognozu etkileyen risk faktörlerini belirlemektir.

Gereç ve Yöntem

Ocak 2008-Nisan 2013 tarihleri arasında Samsun Eğitim ve Araştırma Hastanesi'nde tedavi edilen nekrotizan fasiit tanılı 25 hasta çalışmaya dahil edildi. Yaşayan ve ölen hastalar; demografik özellikler, yandaş hastalıklar, presidpozan faktörler, enfeksiyon etkeni, debridman sayısı ve LRINEC skorlar açısından karşılaştırıldı.

Bulgular

Ortalama yaş 55.6±16.70 yıl (min: 17-maks: 84), kadın/erkek oranı 16/9 idi. Altı (%24) hasta kaybedildi. En sık eşlik eden hastalıklar diabetes mellitus (%52) ve periferik vasküler hastalıklar (%24) idi. En sık etiyoloji ise kutanöz apseler (%32) ve perianal abse (%20) idi. Pseudomanas aeruginosa enfeksiyonu ölen hastalarda daha fazlaydı (p=0.006). Debridman sayısı ortancası ve LRINEC skor ölen hastalarda yaşayan hastalardan anlamlı olarak daha yüksek idi (sırasıyla p=0.003, p=0.003).

Sonuç

Pseudomanas aeruginosa enfeksiyonu ve çoklu debridmanlar mortalite ile ilişkilidir. LRINEC skror NF için mortaliteyi tahmin etmede kullanılabilir.

Anahtar sözcükler: *Fasiit; mortalite; nekrotizan; prognoz.*

Submitted: 21.09.2013 **Accepted:** 17.12.2013 **Published online:** 15.01.2014

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Introduction

Necrotizing fasciitis (NF), which is characterized by progressive necrosis of the fascia, subcutaneous tissue and skin, is a life-threatening soft tissue infection. The disease was defined with its contemporary meaning in 1950 by Wilson, who observed that skin necrosis is a rare occurrence, but fascial necrosis is much more common.[1] Urogenital-anorectal infection and trauma plays an important role etiologically.[2-4] However, NF may be caused by minor injuries such as tissue abrasions and lacerations, insect bites, and intramuscular injection; it also should be considered that there may not always be a detectable cause.[5-8] Despite immediate surgical intervention and antibiotic therapy, the mortality rate is about 20-30%.[3,4,9]

Diagnosis is made by physical examination, but may be difficult since it is frequently confused with the other skin and soft tissue infections. For this reason, the scoring system called Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) was developed in 2004 by Wong and colleagues, and was shown to be helpful for distinguishing NF from other soft tissue infections.[10] It was reported in further studies that this scoring system can be used for early diagnosis of NF.[11-15] To calculate the LRINEC score, C-reactive protein, hemoglobin, blood leukocyte count, serum glucose, serum creatinine, and serum sodium values of patients were measured at admission and scored as shown in Table 1. Then a certain score value is obtained for each patient. Values of six or higher indicate the most likely diagnosis of NF.[10-15]

The aim of this study is the clinical evaluation of patients diagnosed with NF, for whom early diagnosis and intervention are vital, and to investigate the relationship between LRINEC score and mortality rate.

Materials and Methods

The study was approved by the ethics committee of our hospital. The files of 31 patients, who were diagnosed with necrotizing fasciitis (M72.5) and were operated for Fournier gangrene with debridement (621470) code from January 2008 to April 2013, were examined retrospectively on automation system. Four patients who were initially debrided in another hospital and then sent to our hospital for follow-up or intensive care support and two patients whose data were inaccessible were excluded from the study. It was found that patients with skin redness, swelling, tenderness, skin necrosis, and subcutaneous crepitus had been diagnosed with NF. All the patients received antibiotic therapy just after the diagnosis and underwent debridement within the first 24 hours. Antibiotic treatment, which caused patients to be responsive to the factors reproduced in the deep tissue culture taken during debridement, was continued. Repeated debridement was implemented for the necessary patients.

Table 1. LRINEC (Laboratory risk indicator for necrotising fasciitis) score

Parameters	Score
C-reactive protein (mg/dl)	
<150	0
>150	4
Leukocyte count (mm^3)	
<15	0
15-25	1
>25	2
Hemoglobin (gr/dl)	
>13.5	0
11-13.5	1
<11	2
Serum sodium (mmol/l)	
>135	0
<135	2
Serum creatinine (mmol/l)	
<141	0
>141	2
Serum glucose (mmol/L)	
<10	0
>10	1

Patient age, gender, co-morbidities, predisposing factors, number of debridement, and factors isolated in deep tissue culture were detected. The measured C-reactive protein, hemoglobin, blood leukocyte count, serum glucose, serum creatinine, and serum sodium values of patients were recorded to calculate LRINEC score for each patient.

Patients were divided into two groups, alive (Group 1, n=19) and deceased (Group 2, n=6). Both groups were compared in terms of age, gender, co-morbidities, predisposing factors, number of debridement, and factors isolated in deep tissue culture. The LRINEC score difference between the groups was investigated.

Statistical analysis

Data was recorded in the pre-prepared forms and was uploaded to SPSS (Version 16, SPSS Inc. Chicago, IL) software. Student's t-test and Mann-Whitney U-test were conducted for comparison of continuous variables, and chi-square test was used for categorical variables. Statistical significance was considered to be $p<0.05$.

Results

The distribution of the evaluation parameters included in this study is shown in Table 2. The average age is 55.6±16.79