



Necrotizing fasciitis following venomous snakebites in a tertiary hospital of southwest Taiwan



Yao-Hung Tsai^{a,b,*}, Wei-Hsiu Hsu^{a,b}, Kuo-Chin Huang^{a,b}, Pei-An Yu^a, Chi-Lung Chen^{a,b}, Liang Tseng Kuo^{a,b}

^a Department of Orthopaedic Surgery, Chia-Yi Chang Gung Memorial Hospital, Taiwan, Republic of China

^b College of Medicine, Chang Gung University at Taoyuan, Taiwan, Republic of China

ARTICLE INFO

Article history:

Received 3 June 2017

Received in revised form 4 August 2017

Accepted 8 August 2017

Corresponding Editor: Eskild Petersen, Aarhus, Denmark

Keywords:

Necrotizing fasciitis
Snakebites
Venomous

ABSTRACT

Background: Necrotizing fasciitis following venomous snakebites is uncommon. The purpose of this study was to describe the initial clinical features of necrotizing fasciitis after snakebites, and to identify the risk factors for patients with cellulitis who later developed necrotizing fasciitis.

Methods: Sixteen patients with surgically confirmed necrotizing fasciitis and 25 patients diagnosed with cellulitis following snakebites were retrospectively reviewed over a 6-year period. Differences in patient characteristics, clinical presentations, snake species and laboratory data were compared between the necrotizing fasciitis and the cellulitis groups.

Results: None of the 41 patients died after being bitten by a snake. Twenty-nine patients (70.7%) were bitten by a cobra. Enterococcus species and *Morganella morganii* were the most common pathogens identified in wound cultures. Relative to the cellulitis group, the necrotizing fasciitis group had significantly higher rates of hemorrhagic bullae ($p=0.000$), patients with underlying chronic disease ($p=0.019$), white blood cell counts ($p=0.035$), segmented white cell counts ($p=0.02$), and days of hospitalization ($p=0.001$).

Conclusions: Victims of venomous snakebites should be admitted for close monitoring of secondary wound infections. The risk factors of developing necrotizing fasciitis from cellulitis following snakebites were associated with chronic underlying diseases and leukocytosis (total white blood-cell counts ≥ 10000 cells/mm³ and $\geq 80\%$ of segmented leukocyte forms). Physicians should be alert to a worsening wound condition after a snakebite, and surgical interventions should be performed for established necrotizing fasciitis with the empirical use of third-generation cephalosporins plus other regimens.

© 2017 The Author(s). Published by Elsevier Ltd on behalf of International Society for Infectious Diseases. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

Taiwan is situated on the boundary of tropic and subtropic regions with a warm and humid climate. Various kinds of snakes are found in Taiwan, and therefore, venomous and nonvenomous snakebites are often seen in the emergency room (Shih et al., 2006; Chen et al., 2011; Chang et al., 2007). The six most common venomous snakes with recorded bites on humans include the Taiwan cobra (*Naja atra*), Taiwan habu (*Trimeresurus mucrosquamatus*, *Protobothrops mucrosquamatus*), *Trimeresurus stejnegeri*, *Bungarus multicinctus*, *Deinagkistrodon acutus*, and *Daboia*

russelii siamensis (Shih et al., 2006; Chen et al., 2011; Chang et al., 2007). The standard therapy of antivenom administration can decrease the toxic hemorrhagic or neurotoxic effects of venom (Shih et al., 2006; Chen et al., 2011; Chang et al., 2007; Warrell, 2007; Huang et al., 2012). However, the development of compartment syndrome and soft tissue bacterial infections can not be prevented by antivenom treatment (Shih et al., 2006; Hsu et al., 2005).

Wound infections following venomous snakebites, such as cellulitis and necrotizing fasciitis, are not common; however, they have been reported in up to 30.8% of patients after a snakebite and they require aggressive treatment (Nadiyah et al., 2015; Liu et al., 2012; Otero et al., 2002; Otero-Patino, 2009). Necrotizing fasciitis secondary to snakebites can cause extensive local tissue destruction and progressive sepsis complicated with acute renal failure, thrombocytopenia, and coagulopathy, which is a true surgical emergency requiring fasciotomy or amputation, broad-spectrum

* Corresponding author at: Department of Orthopaedic Surgery, Chia-Yi Chang Gung Memorial Hospital, No. 6, West Sec, Chia-Pu Road, Putz City, Cha-I, 613, Taiwan, Republic of China. Tel.: +886 5 3621000x2855; fax: +886 5 3623005.

E-mail address: orma2244@adm.cgmh.org.tw (Y.-H. Tsai).

antibiotics, and intensive unit care (Chen et al., 2011; Nadiyah et al., 2015; Cumpston, 2011; Wang et al., 2010).

The purpose of this study was to describe the initial clinical features of necrotizing fasciitis after snakebites, and to identify the risk factors for patients with cellulitis who later develop necrotizing fasciitis.

Methods

Study design and setting

We reviewed the medical records of 83 patients with snakebites who were admitted to the emergency department of Chia-Yi Chang Gung Memorial Hospital in Taiwan from June 2010 to July 2016.

Of these patients, 42 (50.6%) were discharged from the emergency room after antivenom therapy, and 41 patients were admitted for intravenous antibiotics or surgery and were enrolled in this study. Sixteen patients (19.3%) with surgically confirmed necrotizing fasciitis were categorized into the necrotizing fasciitis group, and 25 patients (30.1%) who did not receive surgery were categorized into the cellulitis group. The snake species involved was confirmed primarily by witnesses or identification through a venomous snake chart by the patient or family. If the snake species could not be identified, it was categorized as an unknown species. Intravenous antivenom was initially administered to all patients, and broad-spectrum antibiotics were given at the emergency room or after admission to a ward.

The emergent operations of fasciotomy and excisional debridement were immediately performed in cases where necrotizing fasciitis was suspected and diagnosed at the time of admission to the emergency room or at the time of consultation in the ward. Cultures of purulent fluid and tissue specimens were obtained during the operations. Histopathological tissue specimen diagnoses were confirmed by the pathologist. The definite diagnoses of necrotizing fasciitis were based on clinical, surgical or histopathologic findings.

Microbiology laboratory procedures

The cultured specimens, obtained from the wounds or the blood, were confirmed by microbiologic evaluation. Identification of these microorganisms was based on standard phenotypic tests used in clinical microbiology laboratories. Antimicrobial susceptibility was determined by the hospital microbiology laboratory via the standard disk diffusion technique. The susceptibility interpretative criteria for these microorganisms in our microbiological lab was performed as recommended by the Clinical and Laboratory Standards Institute.

Clinical assessment

Data collected from the medical records of the 41 patients including age, gender, comorbidities, the involved limbs, clinical presentation of hemorrhagic bullae, doses of antivenom used, the snake species, laboratory data, the duration of hospitalization, and the clinical outcomes, were compared between the necrotizing fasciitis group and cellulitis group. We also analyzed the 16 patients with necrotizing fasciitis for the time from the snakebite to the presentation at the emergency room, the time interval between the diagnosis and first surgery, and the microbiological results.

Statistical analysis

Statistical analyses were performed using SPSS version 12.0 (SPSS, Chicago, Illinois). We used the two-tailed *t*-test for continuous variables (age, hospital stay, leukocyte count, band

forms, segmented forms, platelet count, creatinine, activated partial thromboplastin time (aPTT), prothrombin time and international normalized ratio (INR); and Fisher's exact test for categorical variables (gender, wound location, presentation of hemorrhagic bullae, underlying chronic disease, total white blood cell counts $\geq 10,000$ cells/mm³, segmented forms $\geq 80\%$) to identify significant relationships between the risk factors and outcomes in the two groups. To identify risk actual factors of progression from cellulitis to necrotizing fasciitis following a snakebite, we used binary logistic regression analysis to examine parameters that showed a difference ($p < 0.05$) in a univariate analysis. A *p* value of less than 0.05 was considered to be statistically significant.

Results

There were 83 patients with snakebites who were admitted to the emergency room, and we enrolled 41 patients that were admitted for intravenous antibiotics or surgery (Figure 1). The most common complaints of the enrolled patients were pain and swelling of the involved limbs with edematous, ecchymosis, and erythematous skin lesions at the time of admission to the emergency room. None of the 41 patients died after being bitten by a snake, and no bacterial growth was noted in the blood culture of any of the patients. Culture findings of the specimens obtained from the wounds of the necrotizing fasciitis group confirmed the bacterial species a few days after surgery. No significant changes in platelet counts or thrombocytopenia below 50 000 cells/mm³ was noted in any of the patients, and no abnormalities in creatinine level or abnormal values of prothrombin time INR and aPTT were found.

Patient characteristics in the necrotizing fasciitis group

The necrotizing fasciitis group included ten men and six women with a mean age of 64.7 years (range, 48 to 80 years). Twelve patients were bitten by a cobra, one by *Protobothrops mucrosquamatus*, and three by unknown species. The mean dose of antivenom administered before surgical intervention was 5.28 vials (range, 1 to 14 vials). The treatments administered and patient outcomes are summarized in Table 1.

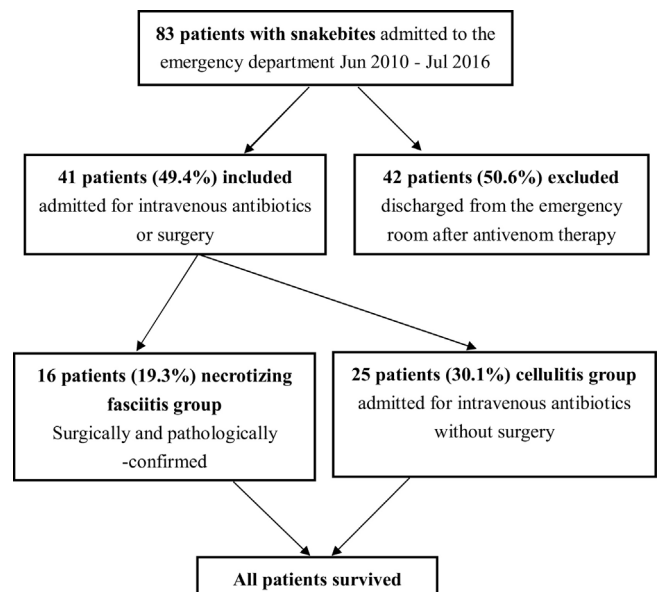


Figure 1. Flow chart of patient inclusion.

Download English Version:

<https://daneshyari.com/en/article/5667289>

Download Persian Version:

<https://daneshyari.com/article/5667289>

[Daneshyari.com](https://daneshyari.com)