Necrotizing Soft-Tissue Infection of the Trunk Resulting From Wound Caused by a Centipede: A Case Report

Yasutaka Tanaka
Takashi Mato
Shoma Fujiya
Tomotaka Takanosu
Nobutaka Watanabe
Takafumi Shinjo
Tomohiro Matsumura
Yoshimitu Izawa
Chikara Yonekawa
Hirotomo Kato

Corresponding Author: Yasutaka Tanaka, e-mail: r1632ty@jichi.ac.jp

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Patient: Male, 78-year-old
Final Diagnosis: Necrotizing soft-tissue infection
Symptoms: Erythema • tenderness
Medication: —
Clinical Procedure: —
Specialty: Infectious Diseases

Objective: Unusual clinical course

Background: Centipede envenomation is usually mild, but a review of the existing literature revealed a more serious course in a small proportion of patients. In fact, necrotizing soft-tissue infections have been reported following centipede stings in a small number of cases and require early diagnosis and treatment because of a high mortality rate.

Case Report: A 78-year-old man was stung by a centipede on the left abdomen. Treatment with antimicrobial agents was started due to cellulitis, but extensive erythema developed from the left chest to the left buttock. Six days after being stung, he visited our hospital. Necrotizing soft-tissue infection was diagnosed and treated immediately with antibiotics and debridement on the left side of the abdomen and chest. Group A Streptococcus was detected in the fascia. The wound was left partially open and washed daily, resulting in gradual improvement of the wound condition. On hospitalization day 8, the open wound was able to be closed. Antimicrobial therapy was completed on hospitalization day 16. The patient showed good progress.

Conclusions: Centipede stings are not rare in tropical and subtropical regions, and most occurrences of centipede envenomation cause only local symptoms. However, we believe that even wounds caused by centipedes should be monitored, given the possibility of subsequent severe infection, as in the present case. In addition, the causative organisms identified in the present patient with necrotizing soft-tissue infection following a centipede sting were commensal bacteria of the skin. Future research is thus needed to clarify the relationship between these causative organisms and centipedes.

Keywords: Cellulitis • Emergency Medicine • Multiple Organ Failure • Streptococcal Infections

Full-text PDF: https://www.amjcaserep.com/abstract/index/idArt/937869
Background

Centipede stings are not rare in tropical and subtropical regions. Many patients do not seek medical attention after such events because most occurrences of centipede envenomation are mild and cause only local symptoms. Many kinds of envenomation have been reported, and anaphylaxis caused by some types of envenomation has also been described [1,2]. However, in some reports, secondary infection following centipede stings has proven more problematic than symptoms arising from the centipede venom [3]. A small number of wounds caused by centipedes develop into severe skin infections, such as necrotizing soft-tissue infections, which have a high mortality rate and require early diagnosis and treatment [4]. We describe a case of necrotizing soft-tissue infection of the trunk, secondary to a wound caused by a centipede.

Case Report

A 78-year-old man was stung on the left abdomen by a centipede in rural Japan 6 days before presentation to our hospital. The centipede was about 5 cm long, and the patient identified the arthropod as a member of the genus *Scolopendra*. The patient was a teacher and researcher in forest ecology and was proficient in the classification and identification of local species, including insects. Soon after the injury, redness and a burning sensation appeared at the same site. On the third day after injury, widespread redness was apparent around the wound. Swelling and drainage of pus from the wound site were observed, and the patient reported substantial pain. He went to see his local doctor, who diagnosed cellulitis and gave him cefotiam intravenously. He continued this treatment for 2 days, but redness continued to increase, and on the sixth day after the injury, he was transferred to our Emergency Department as a case of severe infection.

The patient's medical history included angina pectoris, for which he was taking an antiplatelet medication. He had no history of diabetes mellitus or use of immunosuppressive agents or corticosteroids.

On presentation, the patient had a heart rate of 92 beats/min, blood pressure of 88/45 mmHg, respiratory rate of 18 breaths/min, and temperature of 37.6°C. He was clearly aware. On physical examination, extensive erythema and tenderness were observed on the left side from the chest to the buttocks (Figure 1). A painful ulcer and necrosis were observed on the left side of the abdomen (Figure 2). A small amount of pus was drained from the ulcer. Blood tests revealed an increased inflammatory response and renal dysfunction (Table 1). Computed tomography showed no gas production or abscess formation apparent in the abdominal wall.

### Table 1. Results of blood tests on presentation to our hospital.

| Variable                        | Result |
|---------------------------------|--------|
| White blood cells (thousands/μL)| 29.2   |
| Hemoglobin (g/dL)               | 11.7   |
| Platelets (thousands/μL)        | 85     |
| Fibrinogen degradation products (μg/dL) | 47.3 |
| C-reactive protein (mg/dL)      | 61.2   |
| Blood urea nitrogen (mg/dL)     | 97     |
| Creatinine (mg/dL)              | 3.76   |
| Creatine kinase (U/L)           | 72     |
| Sodium (mmol/L)                 | 122    |
| Potassium (mmol/L)              | 4.0    |
| Chlorine (mmol/L)               | 88     |
| Lactic acid (mmol/L)            | 2.3    |
| Glucose (mg/dL)                 | 94     |
More than 3500 species of centipedes have been identified worldwide, and they are divided into 5 orders: Scutigeromorpha, Lithobiomorpha, Craterostigmomorpha, Geophilomorpha, and Scolopendromorpha [3]. Centipedes are found mostly in warmer climates around the world and like moist and dark places [5].

The treatment course was as follows. At the time of hospitalization, circulatory and respiratory failure were observed. Renal dysfunction was also observed. The sequential organ failure assessment score was 11 on the day of admission. We diagnosed septic shock. Systemic management was initiated with ventilation and antihypotensive agents. After submitting blood cultures, antimicrobial therapy was started with meropenem, vancomycin, and clindamycin. A tetanus vaccination was also administered. On the day of admission, debridement was performed from the left side of the chest to the lateral abdomen. A skin incision was made from the left axilla to the buttock, revealing cloudy exudate. The external oblique fascia was sampled and submitted for pathological examination and bacterial culture examination. Parts of the external oblique fascia, latissimus dorsi fascia, and pectoralis major fascia were excised, and all darkened adipose tissue was removed. The wound was left partially open and cleaned daily. On hospitalization day 2, the antimicrobial agents were changed to ampicillin and clindamycin. Pathological examination revealed extensive necrosis of the fascia and neutrophilic infiltration (Figure 3). Fascia culture tests revealed group A Streptococcus (GAS) on hospitalization day 3. Blood culture tests were negative. Starting on hospitalization day 4, cefotaxime was used. The wound condition gradually improved with daily washing. On hospitalization day 8, the open wound could be closed. Antimicrobial therapy was terminated on hospitalization day 16. The patient showed good progress and was transferred to another hospital for rehabilitation on hospitalization day 31.

Discussion

Necrotizing soft-tissue infection is well known to occur after skin and mucous membrane injuries due to events including burns, trauma, and insect bites [11]. Both MSSA and GAS are commensal bacteria of the skin. Although the patient did not remember scratching the wound, indigenous bacteria are likely to have invaded from the damaged region following the event that likely caused the infection.

Figure 3. The left external oblique fascia. Hematoxylin and eosin staining reveals mostly necrosis, with some infiltration of neutrophils.

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One of the more serious symptoms of centipede envenomation is anaphylaxis. Centipede and bee venoms reportedly share some antigens, suggesting the potential for cross-reactivity [2,7]. If a patient is allergic to bees, clinicians should also be wary of anaphylaxis following centipede envenomation. In the present case, the patient had been working as a forest ecologist for many years and had possibly experienced bee and centipede stings in the past. Although redness and hypotension can also be seen in anaphylactic shock, the course in this case was hardly typical of an allergic reaction or anaphylactic symptoms. Erythema spread rapidly from the localized area in our patient, and symptoms worsened over time. There was little concern that he had anaphylactic symptoms. The main cause of the severe symptoms in the present case appeared to be infection. Necrotizing soft-tissue infections or similarly severe soft-tissue infections have been reported following centipede stings (Table 2) [8-10]. In most cases, patients present with symptoms such as pain and redness. Patients often take several days to visit the hospital, and some patients may die without antimicrobial therapy and debridement. All centipedes in the reported fatal cases were Scolopendra, and the causative organisms identified in those cases were all methicillin-sensitive Staphylococcus aureus (MSSA) [9,10]. This is the first report of necrotizing soft-tissue infection following centipede stings caused by GAS.

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centipede sting. On the other hand, as with some animal bites, the possibility of invasion and infection by bacteria living on the centipede’s jaws and limbs cannot be ruled out. However, in our literature search, we could not find any literature regarding commensal bacteria on the centipede; future studies are expected. For our patient, whether streptococci were present on the centipede’s jaws and limbs remains unclear.

Conclusions

Although many cases of centipede envenomation and stings are mild, a small number of wounds caused by centipede stings develop necrotizing soft-tissue infection. The wound should therefore be examined carefully and the possibility of severe infection kept in mind. The causative organisms identified in patients with necrotizing soft-tissue infection following centipede stings have been MSSA and GAS. Additional research is necessary to clarify the relationships between causative organisms and centipedes.

Declaration of Figures’ Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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Table 2. Past reports of necrotizing soft-tissue infections or similar severe soft-tissue infections caused by a centipede sting.

| Author       | Year of publication | Age (years) | Sex | Medical history | From time of sting to arrival at hospital | Location of sting | Centipede species | Causative organisms | Course of treatment |
|--------------|---------------------|-------------|-----|-----------------|-----------------------------------------|------------------|------------------|-------------------|---------------------|
| Puzzo A      | 2020                | 63          | Male| Nothing         | 1 week                                  | Forearm          | Scolopendra subspinipes | MSSA              | Patient treated with antimicrobials and debridement. Recovery took 2 months |
| Serinken M   | 2005                | 46          | Male| Obesity, hypertension | Last night                           | Neck             | Scolopendra moritans | Unknown             | Patient treated with antihistamine. Four days later, he returned and died 2 hours later |
| Uzel AP      | 2009                | 16          | Male| Unknown         | 3 days                                  | Forearm          | Scolopendra     | MSSA               | Patient treated with antimicrobials and debridement, leading to good outcome |
| Uzel AP      | 2009                | 84          | Female| Unknown         | 3 days                                  | Hand             | Scolopendra     | MSSA               | Patient treated with antimicrobials and debridement, leading to good outcome |

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