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Washio, Ken ; Masaki, Taro ; Fujii, Shotaro ; Hatakeyama, Mayumi ; Oda, Yoshiko ; Fukunaga, Atsushi ; Natsuaki, Masaru

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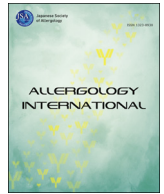
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Letter to the Editor

Anaphylaxis caused by a centipede bite: A “true” type-I allergic reaction

Dear Editor,

Centipedes (*Scolopendra subspinipes*; Fig. 1a) are arthropods belonging to the class Chilopoda.¹ Centipede bites can cause severe pain, and local skin manifestations (e.g., erythema, hemorrhagic vesicles, blisters, pustules, necrosis) usually appear¹ (though anaphylaxis is a rare complication).² Centipede venom contains several polypeptides and chemical mediators like histamine.³ However, whether anaphylaxis as a result of a centipede bite is an immunoglobulin (Ig)E-mediated “true” type-I allergic reaction or a histamine-based “pseudo allergic reaction” is not known. Further, although there are a few case reports for anaphylaxis by centipede bite in Japanese-language literature,^{2,4} such risk by centipede bite does not have worldwide recognition. Here, we report a case of anaphylaxis caused by a centipede bite in the English-language literature and show that it was a true type-I allergic reaction.

A 63-year-old female was bitten by a centipede at 3 o'clock at night. Previously, she had been bitten by centipedes many times.

She visited the Emergency Department at 7 a.m. by walk owing to swelling of the left hand and generalized wheals (Fig. 1b). At 8 a.m., she suddenly suffered nausea and her blood pressure fell to 52/32 mmHg. Saturation of arterial blood dropped to 93%. Immediately, we administered adrenaline (i.m.) and blood pressure increased to 106/70 mmHg. She was discharged after spending 1 day in hospital.

Later, we carried out a skin-prick test (SPT) using extracted centipede venom. A venomous extract (approximately 20 μ L) obtained from the fang of an adult centipede, *S. subspinipes mutilans*, was mixed with 180 μ L of phosphate-buffered saline (PBS).^{2,4} This venom preparation was defined to have a concentration of “ 1×10^{-1} ”. An SPT using 1×10^{-3} diluted venom showed a positive (++) reaction (wheal of 11×9 mm; erythema of 21×20 mm) 15 min later, whereas 1×10^{-4} dilution showed a negative result (2×2 ; 2×2) (Fig. 1c) compared with histamine (15×11 ; 40×30) and physiologic (0.9%) saline (1×1 ; 1×1). SPTs using bee venoms (ALK, Hørsholm, Denmark) showed negative result

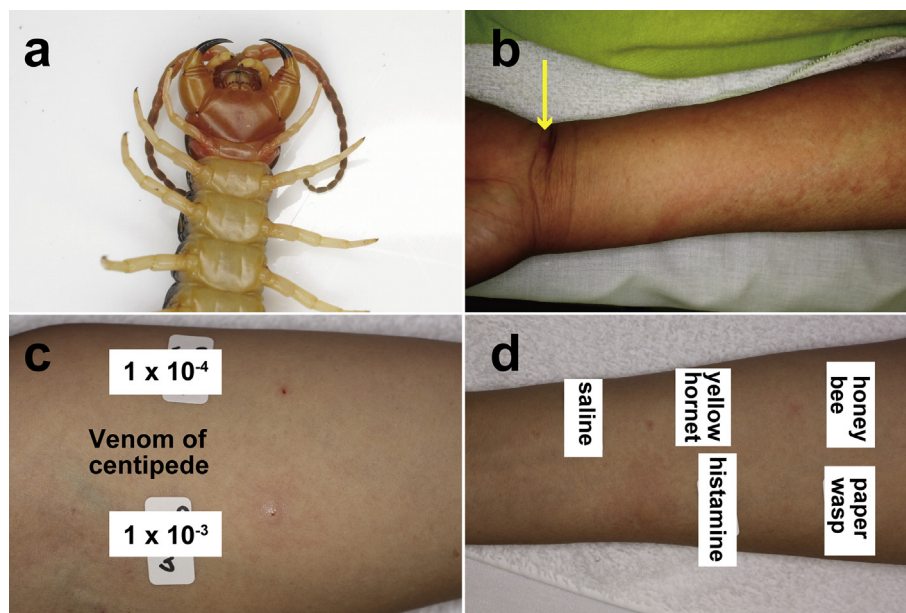


Fig. 1. (a) Venomous centipede fang. (b) Wheals on the arm after a centipede bite (yellow arrow denotes the bite wound). (c) Skin-prick test: 1×10^{-4} (upper) and 1×10^{-3} (lower) dilutions of centipede venom in 0.9% (physiologic) saline were tested. Pictures and measurements were taken after 15 min. (d) Skin-prick test showing positive result (histamine) and negative result (honey bee, paper wasp, yellow hornet, and saline).

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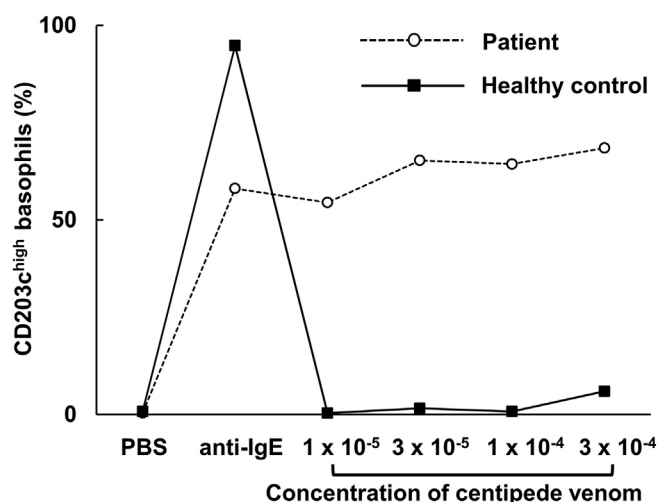


Fig. 2. Basophil-activation test showing a concentration-dependent increase in the number of CD203c^{high} basophils in the patient's blood when mixed with venom. Blood collection tubes containing ethylenediaminetetraacetic acid were used and tests were performed after 3 h of blood collection.

(Fig. 1d). SPTs for five healthy controls showed negative result up to 1×10^{-2} diluted venom (data not shown). To confirm that anaphylaxis had been caused by IgE, we undertook a basophil-activation test (BAT).^{5–7} For the BAT, a mixture of blood from the patient (white circle) and healthy control (black square) with PBS, anti-IgE, and different concentrations of the venom from a centipede (1×10^{-5} , 3×10^{-5} , 1×10^{-4} , 3×10^{-4}) were incubated with fluorescent-labeled antibodies according to manufacturer instructions (Beckman Coulter, Brea, CA, USA) and analyzed using a FACS-Verse™ flow cytometer (BD Biosciences, San Diego, CA, USA). As expected, a concentration-dependent increase in the number of CD203c^{high} basophils was observed from a mixture of her blood sample and the centipede venom, but no reaction was noted from a healthy control (Fig. 2). A report by Harada and colleagues suggested cross-reactivity between bees and centipedes.² Hence, we undertook the ImmunoCAP® (Thermo Fisher Scientific, Waltham, MA, USA) test with bee allergens, which suggested no specific IgE for bee allergens. Also, SPT with bee venoms also elicited negative results. We prescribed an adrenaline auto-injector and urged her to use a vermicide to prevent her from being bitten again.

Anaphylaxis as a result of a centipede bite is of similar seriousness to that elicited by a bee sting. We used the BAT and demonstrated that this allergic reaction was mediated by IgE. A previous report indicated the cross-reactivity with bees and centipedes,² whereas another one suggested no cross-reactivity between them.⁴ Our patient showed positive results only with centipede venoms, and not with bee allergens. Thus, centipede venom might include multiple allergens, some of which cross-react with bees but others do not. Our patient's history of repeated centipede bites, but no bees, may have induced sensitization to centipede bites. Our patient developed anaphylaxis after 5 h of sting by centipede. Although the reason of this late-phase reaction is not clear, we hypothesized that either 1) the anaphylactic shock occurred as a second phase reaction, or 2) exercising (visiting to our hospital)

exacerbated her symptom. This fact teaches us a lesson because it is generally recognized that late-phase reaction can be occurred 6 h or more after the sting by centipede.⁸ There is an expert opinion that victims of centipede bites should be monitored for 4 h for development of symptomatic reaction.⁹ As with bee stings, repeated bites by centipedes should be avoided. Patients who are bitten repeatedly by centipedes leading to an immediate allergic reaction (e.g., wheals) might be potential candidates for adrenaline auto-injectors, although our study has limitation of the case report. Physicians should be aware of anaphylaxis caused by centipede bites.

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Conflict of interest

The authors have no conflict of interest to declare.

Ken Washio^{a,b,*}, Taro Masaki^{a,b}, Shotaro Fujii^a, Mayumi Hatakeyama^b, Yoshiko Oda^b, Atsushi Fukunaga^b, Masaru Natsuaki^c

^a Department of Dermatology, Kobe-City Nishi Kobe Medical Center, Hyogo, Japan

^b Division of Dermatology, Department of Internal Related, Kobe University Graduate School of Medicine, Hyogo, Japan

^c Department of Dermatology, Hyogo College of Medicine, Hyogo, Japan

* Corresponding author. Department of Dermatology, Kobe-City Nishi Kobe Medical Center, 5-7-1, Koji-Dai, Nishi-ku, Kobe, Hyogo 651-2273, Japan.

E-mail address: washio@med.kobe-u.ac.jp (K. Washio).

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