A Case of Delayed Flare-up Allergic Dermatitis Caused by Jellyfish Sting

Yasuaki MANABE[*1], Tomotaka MABUCHI[*1], Mayu KAWAI[*1], Tami OTA[*1], Norihiro IKOMA[*1], Akira OZAWA[*1] and Takushi HORITA[*2]

[*1]*Department of Dermatology, Tokai University School of Medecine*
[*2]*Tokai University School of Marine Science and Technology*

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A 7-year-old boy, taking lessons at a yacht school at Enoshima in Kanagawa prefecture in Japan, recognized a linear eruption on his left lower leg during practice in August 2012. As it gradually enlarged, he visited a local medical clinic. The eruption initially improved with topical treatment but exacerbated in October of the same year. Although topical treatment was started again, there was minimal improvement, so the patient visited our hospital in December. At his first visit, he had a hard linear nodule on his left lower leg, and papules with excoriation were scattered over the lower limbs. Considering eczema, topical steroid treatment and occlusive dressing technique were started but the nodule remained. Based on the clinical course, clinical features, and laboratory findings, the lesion was considered to be delayed flare-up allergic dermatitis caused by a jellyfish sting [1].

Key words: jellyfish envenomation, Portuguese man-o'-war, delayed flare-up, allergic dermatitis

INTRODUCTION

Jellyfish envenomation is a common occurrence in daily life as Japan is surrounded by the ocean. The number of people using first-aid stations at beaches for jellyfish stings was approximately 7,000 to 15,000 every year just in Kanagawa prefecture in Japan. In many cases, eruptions appear only locally; with the rash developing locally at the sting site and then disappearing over a few days. Herein, we report a case with eruptions not only at the jellyfish sting site but extending to other areas, which persisted even 16 months later.

CASE REPORT

A 7-year-old boy visited our hospital on December 6, 2012 with eruptions on his lower legs. He had taken lessons at a yacht school at Enoshima in Kanagawa prefectures and recognized stinging pain that he never had experienced before in the left lower leg during practice in the sea in August 2012. The onset of a linear eruption was apparent when he emerged from the sea and he thus visited a local medical clinic. The eruption showed an improvement with topical treatment but had not been cured completely. Despite of continuing topical treatment, the eruption exacerbated in October of the same year. Topical treatment was started again, which, however, resulted in little improvement, and the eruptions extended over both lower limbs. At his first visit to our hospital, he had a slightly red protuberant eruption with strong infiltration in a horizontal linear form on the left lower inner leg. It was 4 × 1 cm in size and showed erosion at the center and pigmentation at the margin of the eruption. Papules up to 3 mm in size with excoriation were scattered around the protuberant eruption (Fig. 1). Irregular shaped dark-red erythema and papules were scattered over the left thigh and partially aggregated. Similar eruptions were seen on the right lower leg. The left inguinal lymph node was swelling. As it was considered to be a skin disorder caused by a marine organism, topical steroid treatment and an anti-allergic medicine intake were started. Although the linear protuberance on the left lower leg was slightly flattened at 1 month after the first visit, two nodules had newly developed on the left thigh (Fig. 2). At the medical interview in detail, the patient stated that when he emerged from the sea he had a linear eruption at the site of newly-developed two nodules on the left thigh which was similar to one on the left lower leg. Skin biopsy was performed at the site of the protuberant eruption on the left lower leg for the purpose of excluding granulomatous disease caused by infection. As histopathological findings, irregular acanthosis and cell infiltration around small vessels in dermis were observed (Fig. 3a). Infiltrating cells were lymphohistiocytic cells, plasmacytes, and eosinophils. No foreign bodies were detected, nor were any granulomas or atypical cells found (Fig. 3b). Tissue culture was negative for acid-fast bacilli including *Mycobacterium tuberculosis*, fungi, bacteria. Blood tests revealed no abnormalities; WBC 9400/μl (Neut. 62.1%, Lympho. 29.1%, Eosino. 4.6%, Atypic 0.0%), Hb 13.5 g/dl, Plt 28.1 × 10^4/μl, CRP＜0.09 mg/dl, IgE 77 IU/ml. Accordingly, as the histopathological findings and laboratory data were nonspecific, the lesion was considered to be prurigo nodularis and the patient continued to receive treatment. Steroid-occlusive therapy was performed for the nodules starting in January 2013, achieving gradual flattening of the nodules. Although no new eruption development was seen thereafter, the

Yasuaki MANABE, Department of Dermatology, Tokai University School of Medecine, 143 Shimokasuya, Isehara, Kanagawa 259-1193, Japan
Tel: +81-463-93-1121 Fax: +81-463-93-9387 E-mail: manabe-717@umin.ac.jp

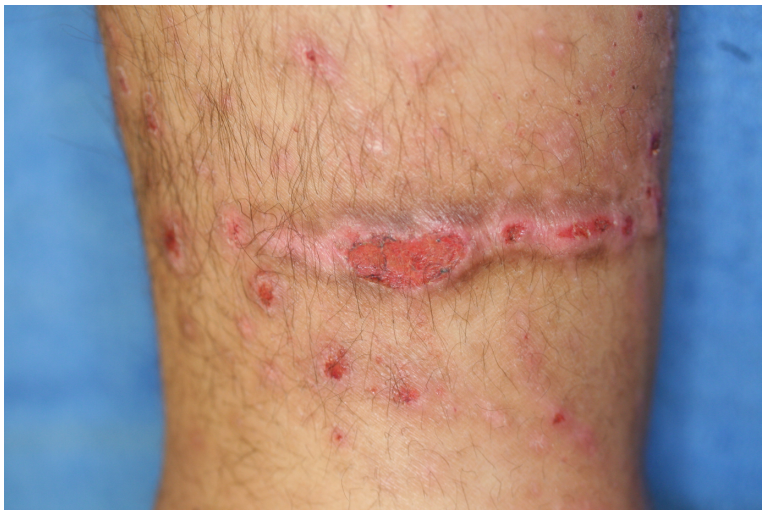

Fig. 1 A protuberant eruption in a horizontal linear form on the left lower inner leg. Papules with excoriation were scattered around the protuberant eruption.

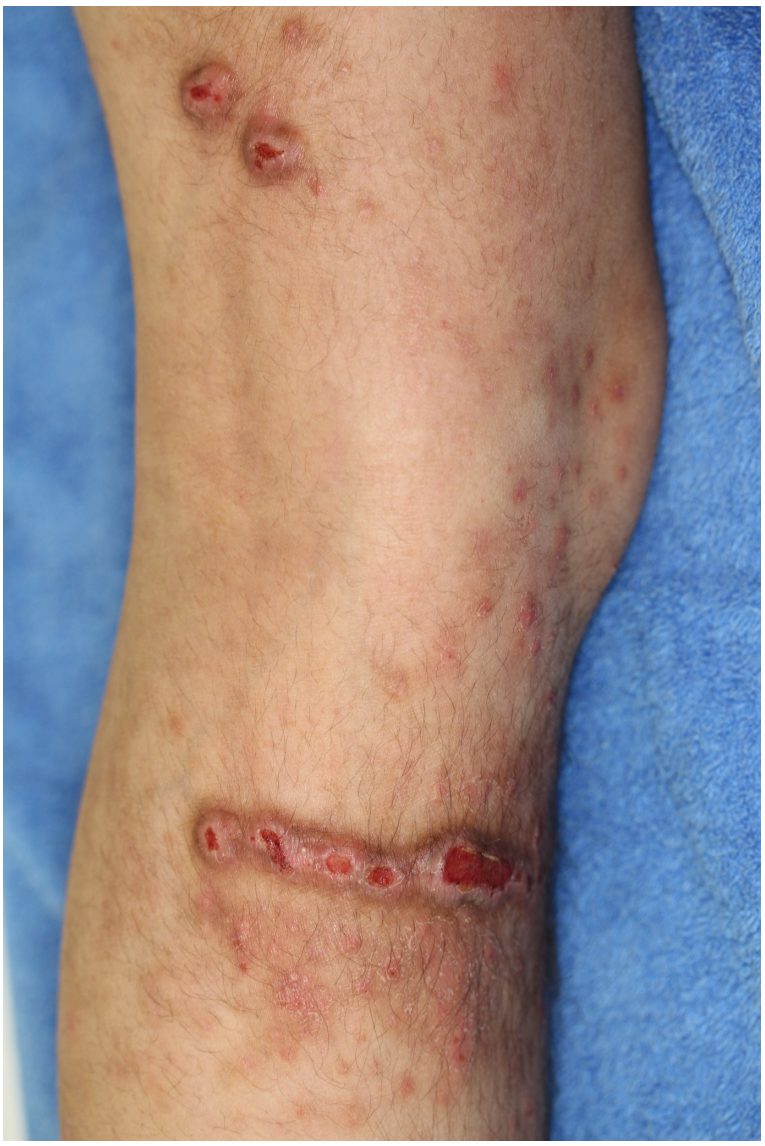

Fig. 2 Two nodules had newly developed on the left thigh at 1 month after the first visit.

patient continued to receive this treatment as nodules were still present 16 months after the first visit. The clinical course was showed on Table 1.

DISCUSSION

Jellyfish envenomation which commonly occurs every year in the summer months was considered to be the most likely cause of the eruption in our case.

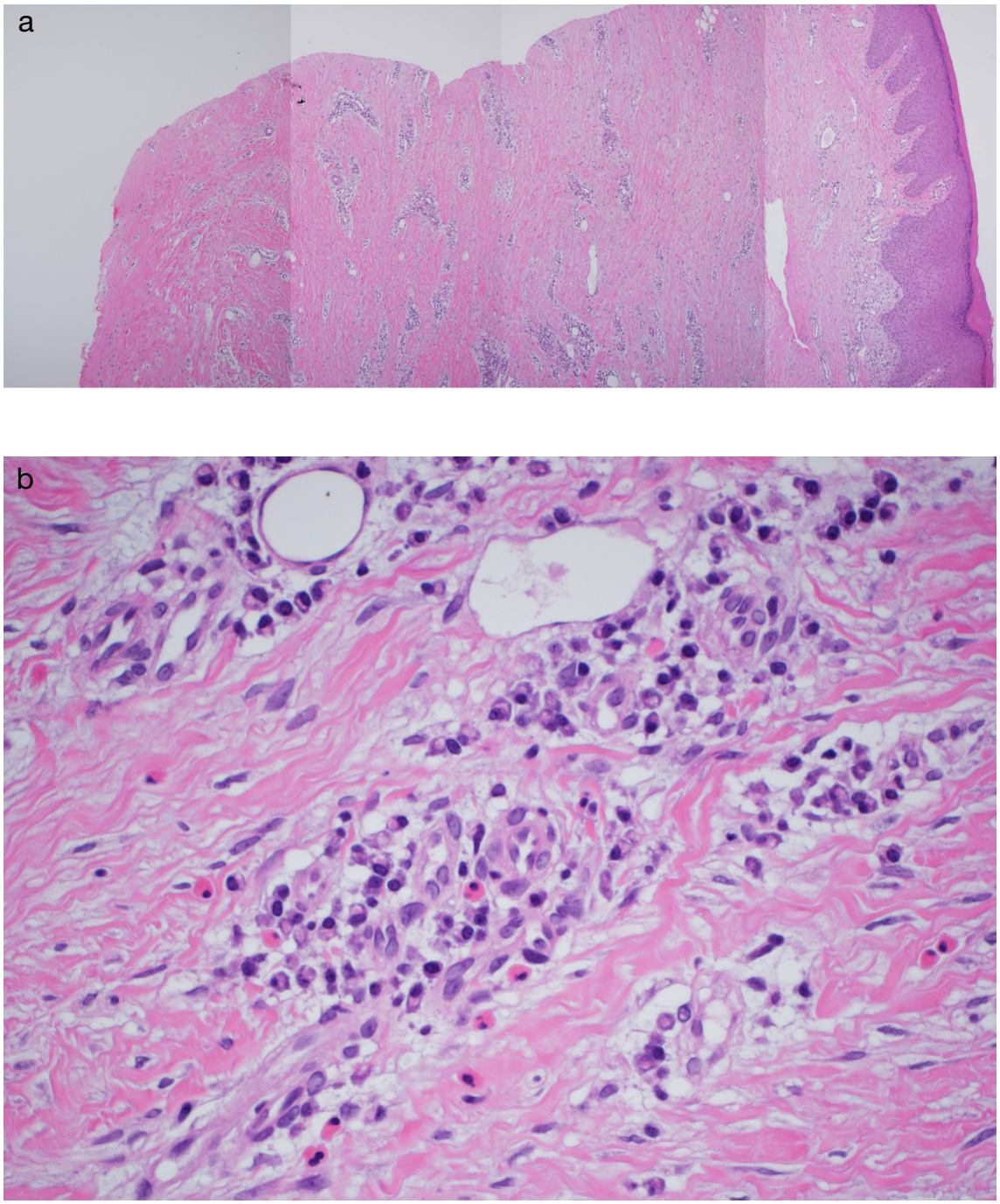

Fig. 3 a) Irregular acanthosis and cell infiltration around small vessels in dermis were observed.
b) Infiltrating cells were lymphohistiocytic cells, plasmacytes, and eosinophils. No foreign bodies were detected, nor were any granulomas or atypical cells found.

As the eruption which appeared immediately after the sting was linear, it was presumed that the delayed eruption also took a linear form. Due to this linear form, skin disorder from a ray sting was initially considered. However, ray sting was excluded as it causes acute severe symptoms, resulting in serious outcomes such as local necrosis and ulceration. As the eruption was linear, contact dermatitis from a rope or seaweed encountered during yacht practice was also considered. However, these were both considered to be unlikely because there was no history of rope contact based on the medical interview and the eruption was accompanied by pain and enlargement at the initial examination. When we consulted the Department of Marine Biology, School of Marine Science and Technology of our university, Carybdea rastoni, Physalia physalis, and Gonionema vertens were suspected as the marine organism causing the eruption in our case, considering the area (Enoshima) and the season. However, due to the small distance between the tentacles in Carybdea rastoni, the clinical features of sting sites often appear linear with the continuation of very small papulae and is unlikely to result in large widely-spaced coalescing nodules, as in our case. We were told that Physalia physalis, in which the distance between the tentacles is large, was highly likely to be the cause of the eruption

Table 1 Clinical course

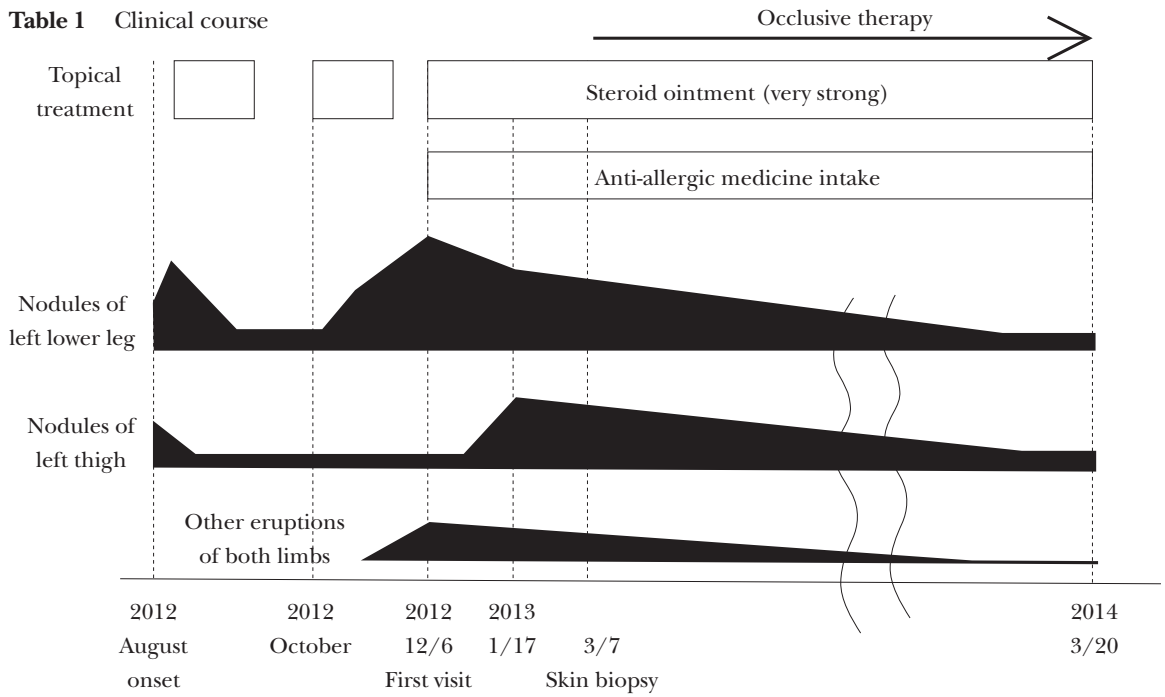

Table 2 Classification of jellyfish envenomation syndromes [3]

Local reaction
Toxin induced
Exaggerated local reaction (angioedema)
Recurrent reactions
Delayed persistent reactions
Distant site reactions
Contact dermatitis
Papular urticaria
Long-term reactions
Keloids
Pigmentation
Fat atrophy
Contractions
Gangrene
Reactions from jellyfish ingestion
Gastrointestinal symptoms
Papular urticarial
Systemic reactions
Toxin-induced
Irukanji reaction
Fatal reaction
Toxin-induced
Immediate cardiac arrest
Rapid respiratory arrest
Delayed renal failure
Anaphylaxis

in this case [2].

With regard to symptoms caused by jellyfish envenomation, Burnett *et al.* gave detailed descriptions in 1986 by classifying them into five categories, i.e. local reaction, long term reaction, jellyfish ingestion, systemic reaction, and fatal reaction (Table 2) [3]. In our case, the linear protuberance flared up and showed a protracted course lasting for approximately 16 months and the eruption spread to areas other than the jellyfish sting site. Thus, based on the classification, we considered our case's findings to correspond to delayed persistent reactions and distant site reactions of a local reaction. Meanwhile, in Japan, it was considered to correspond to delayed flare-up allergic dermatitis caused by jellyfish sting, which is described in the previous report summarized by Uezato *et al.* of the University of the Ryukyus in 2012. Delayed flare-up allergic dermatitis caused by jellyfish sting is a flare-up, chronic, or persistent local skin reaction occurring within 1 to 4 weeks of the sting in addition to acute symptoms immediately after the sting, Topical steroid is the main treatment and reportedly takes a long time in some cases [1]. Although it is inferred to be a type IV allergic reaction to the insertion of a stinging filament [1, 5], the detail of its mechanism has not been proved.

Next, we searched for reports of delayed skin disorders which flared up after jellyfish stings in Japan. Searching the database of the Japan Medical Abstracts Society, we identified 13 cases including our patient [1, 4–7]. Table 3 summarizes these 13 cases. The clinical features included erythematous papule, erythematous linear vesicles, and edematous erythema in cases that had early flare-ups, i.e., within 5 to 8 days, and the treatment period was short at only 2 to 3 weeks. Meanwhile, prurigo nodularis in our case and keloid with another case that had late flare-ups occurred 1 month later after the sting necessitated prolonged treatment periods of 16 months or more and 19 months, respectively.

According to the survey conducted by Public

Table 3 Summary of delayed flare-up eruptions after jellyfish sting in 13 patients reported in Japan [1, 4–7]

Mean age	19.9 years (2–40 years)
Sex	2 men, 11 women
Location	Lower limbs 9 cases, Upper limbs 5 cases, Face 1 case
Clinical feature	Erythematous papule 5 cases, Erythematous linear vesicles 3 cases, Edematous erythema 2 cases, Reddish swelling and fever 2 cases, Keloid 1 case, Linear prurigo nodularis 1 case
Timing of flare-up after the sting	5 to 8 days later 11 cases, 1 month later 2 cases
Treatment period	A few days 6 cases, 2 to 3 weeks 5 cases, 10 months or more 1 case, 19 months 1 case

Health and Welfare Bureau of Kanagawa Prefecture, first-aid stations at beaches in Kanagawa are used by approximately 7,000 to 15,000 people every year, and by 79.9 to 170.3 people daily on average for jellyfish stings. These patients will presumably visit medical institutions later. Our case was the only one presenting with delayed skin symptoms in Kanagawa Prefecture over the last 5 years. However, when we examine patients with eruptions caused by jellyfish stings, it is considered necessary to examine them in not only the acute phase but also to perform adequate follow-up.

The summary of this report was presented at the 37th Annual Meeting of The Japanese Society of Pediatric Dermatology in July 2013.

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