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蚊咬過敏症：一病例報告

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HYPERSENSITIVITY TO MOSQUITO BITE: A CASE REPORT

Ping-Chin Fan and Hsiao-Ning Chang*

Severe hypersensitivity to mosquito bites is very rare. A 18-year-old girl student has had multiple hemorrhagic bullae with atrophic scars on both limbs and left side of the face due to mosquito bites for 16 years. When she was seven years old, she noticed a severe local reaction with bloody bullae formation, chills, and fever several hours after the mosquito bite. The bullae developed into ulcers which finally became scars. This patient was confirmed to be hypersensitive to mosquito bites by the mosquito bite test. This case is the first record of mosquito allergy in Taiwan.

Key words: hypersensitivity, mosquito bite

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It is very rare for the mosquito bite to cause severe systemic and local hypersensitivity reactions. These reactions include pyrexia, cramps, erythematous swelling, blister formation, skin necrosis, ulcers, and scarring. Brown *et al.* reported a fatal case of hypersensitivity related to mosquitoes⁽¹⁾. Killby & Silverman conducted a study on 16 subjects bitten by *Aedes aegypti* and at least two species of anopheline mosquito⁽²⁾. According to their respective reactions to specific mosquito bites and their history of exposure, the subjects fell into three categories: nonsensitized, sensitized, and desensitized. Moreover, Hidano *et al.* suggested an association between mosquito allergy and malignancy⁽³⁾.

On September 16, 1983, one of the authors (H.N.C.) brought a patient with suspected mosquito allergy to our laboratory. We made a mosquito bite test to confirm the disease one week later. This is the first record of mosquito allergy in Taiwan. In this report, we present the clinical history and the course of the mosquito bite test.

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CASE REPORT

A 18-year-old girl student (native of Kuangtung) has had multiple hemorrhagic bullae with atrophic scars on both limbs and left side of face for 16 years. In 1967 at age one and a half, she was brought first to the O.P.D. of the Dermatologic Section, Veterans General Hospital (VGH) Taipei with severe "insect bite" skin lesions. Prednisolone ointment and antihistamine were given with temporary improvement.

In 1973, she was brought to the Dermatologic Section, National Taiwan University Hospital (NTUH). A mosquito extract sensitivity test was done, but no definite result was obtained. On November 11, 1974, the patient was admitted to the VGH during an acute attack of the multiple hemorrhagic bullae after mosquito bites. Blood, urine, biochemistry, skin biopsy, neurologic and bone marrow examinations were done and the diagnoses of panniculitis, vasculitis, leukopenia, and lymphocytosis were also made. Bleeding and clotting times were normal.

On September 16, 1983, the patient was admitted to the VGH again on account of reddish bullae formation over localized edematous skin with high fever (39.1°C), general malaise and fatigue following a mosquito bite. The fever subsided spontaneously one day later; other symptoms also disappeared except the reddish swelling bullae which had become dark-brown in color. Laboratory tests showed a WBC count of 3,700-4,300/cumm with relative lymphocyto-

sis, but no eosinophilia. This finding was confirmed by bone marrow aspiration and the other cellular elements were intact. A picture of panniculitis and vasculitis was revealed by skin biopsy of the ulcer area. Skin test with mosquito whole body extract indicated a slight immediate hypersensitivity reaction but no delayed reaction. Western blot of the patient's serum revealed many bands of IgG and IgE antibodies against whole body extract antigens from five species of mosquito. The delayed reaction to mosquito bite seemed to be due to Type III Arthus reaction. The reports from peripheral blood examinations are shown in Table 1. Several hyposensitizations with whole body and salivary gland extracts of mosquito were done in a period of 4 months without any clinical improvement.

On September 22, 1983, a mosquito bite test was performed in the Department of Parasitology, National Yangming Medical College (presently, National Yangming University). Five female *Ae. aegypti* mosquitoes from our laboratory developed colony were confined in a paper cup covered with a layer of nylon gauze. The paper cup was turned upside down on the left forearm of the patient allowing the mosquitoes to feed for about 30 seconds. Follow-

ing the mosquito bites, small reddish papules with itching were noted immediately at the bite sites. About 11 hours later these lesions became swollen with accumulating translucent fluid. A high fever (39°C) then occurred and subsided without treatment on the following day. Hemorrhagic necrotization and crust formation appeared two days later (Figs. 1-14).

DISCUSSION

After the discovery of the first case of mosquito allergy in the present study, four more cases of this disease were found in Taiwan. Two cases had severe local immediate reaction with large wheals and itching. One case had moderate local reaction and severe late reaction with a large area of local swelling and redness. The remaining case had mild local immediate reaction with severe late bullous reaction⁽⁴⁾. Shen *et al.* used the serum samples from these cases to determine the antigens recognized by antibodies involved in mosquito allergy⁽⁴⁾. They detected both IgE and IgG anti-mosquito antibodies in human. These antibodies can be used to characterize the corresponding antigens by immunoblot analysis. The occurrence of these antibodies may be related to the clinical ex-

Table 1. Summarized Reports of Peripheral Blood Examinations for the Patient with Mosquito Allergy

Date	RBC/cumm	Hgb gm%	WBC/cumm	WBC differential count (%)				
				N	L	E	M	B
Nov. 11, 1974	N.D.	12.5	4,700	15	74	11	0	0
Nov. 13, 1974	N.D.	11.4	4,350	16	58	11	4	11*
Nov. 17, 1974	Bleeding time: 2'10"			Coagulation time: 3'20"				
Nov. 19, 1974	N.D.	N.D.	4,750	25	75	0	0	0
Jul. 15, 1976	N.D.	N.D.	6,850	35	54	10	1	0
Sep. 16, 1983	5.19 M	14.7	2,300	28	72	0**	0	0
Sep. 20, 1983	N.D.	11.6	4,300	28	71	1	0	0
Sep. 22, 1983 #	4.53 M	12.5	3,700	50	50	0	0	0
Sep. 23, 1983	N.D.	12.1	3,900	66	34	0	0	0
Sep. 24, 1983	4.12 M	11.7	3,600	77	23	0	0	0
Apr. 6, 1984	N.D.	N.D.	3,600	69	31	0***	0	0

* Band form of WBC.

** Eosinophil count: 55/cumm.

*** Eosinophil count: 33/cumm.

Mosquito bite test was performed. Total eosinophil count: 33/cumm.



Figs. 1-4. The appearance of the patient, a 18 year-old girl student.

1. Face of the patient.
2. A few recently cured lesions and scars on both arms.
3. Some recently cured lesions and old scars on both legs (left lateral view).
4. Dorsal view of Fig. 3.

Figs. 5-14. Experimental mosquito bite and immediate hypersensitive reactions.

5. Before mosquito bite: a paper cup containing five female *Aedes aegypti* set beside the left arm.
6. Feeding five female *Aedes aegypti* on the left forearm of the patient for 30 seconds.
7. Two minutes after biting: formation of small papules on forearm.
8. Five minutes after biting: the papules little enlarged on forearm with itching and redness.
9. Twelve hours after biting: formation of six translucent vesicles on forearm with itching, swelling, and slight redness. The patient had fever and headache 5 hours after biting.
10. Sixteen hours after biting: reddish vesicles on forearm. The patient still had fever and headache.
11. Twenty hours after biting: the contents of vesicles became reddish-brown. The higher fever (39°C) occurred 33 hours after biting and subsided spontaneously to normal one day later.
12. Seven days after biting: the vesicles ruptured.
13. Nine days after biting: formation of crust without systemic symptoms and signs.
14. Ten days after biting: same as Fig. 13.

pression and the pathogenesis of human reactions to mosquito bites. In the serum of the present case, there was a very strong IgG binding activity towards antigens with molecular weights of 78, 62, 55, 42, 34 to 31, 29 to 28, and 23 to 21 K in the extracts prepared from the whole mosquito body and from the salivary gland, respectively.

In 1938, Brown et al. reported a case of hypersensitivity to mosquitoes with a fatal outcome⁽¹⁾. They described a 15-year-old white girl with a typical allergy caused by *Ae. aegypti*. This case was proved by an experimental bite. Later, this patient presented an abdominal swelling, jaundice, and prostration continuing until her death at the age of 18 years. The autopsy revealed hypertrophic liver cirrhosis, fatty liver, splenomegaly, ascites, anemia, and intestinal hemorrhage, which were interpreted as Hanot's cirrhosis.

Although mosquito allergy is a severe disease, it may recover spontaneously. However, this disease may have a strong association with malignant histiocytosis or related histiocytic proliferation involving various organs. Hidano et al. studied the follow-up data from 21 cases in Japan⁽³⁾. These cases had severe local and systemic hypersensitivity to mosquito bite (mosquito allergy). Three cases were cured and no longer show hypersensitivity. Nine cases were alive with persisting hypersensitivity. Among the nine fatal cases, the death of seven were attributed to malignant histiocytosis or related conditions. In another case a systemic malignant neoplasm was suspected but was not confirmed as malignant histiocytosis. These authors postulated that repeated Arthus reactions due

to mosquito allergen may provoke an immunological consumption as suggested by the negativity of tuberculin reaction and dinitrochlorobenzene (DNCB) sensitization. The infection by a virus such as EB virus might cause proliferation of histiocytes and enhancement of phagocytosis. However, the mechanism of these pathologic changes needs further investigation.

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