

[ CASE REPORT ]

## Severe Anaphylactic Shock Following a Slow Loris Bite in a Patient with Cat Allergy

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### Abstract:

The slow loris monkey is one of the few venomous mammals. Its venom repels predators and can cause anaphylactic shock and even death in humans. The venom protein has been evaluated and has high sequence similarity to cat allergen; however, no studies involving subjects with cat allergy and who have been exposed to slow loris venom have been reported. We herein report the first case of severe anaphylactic shock following a slow loris bite in a patient with cat allergy.

**Key words:** monkey bite, slow loris, anaphylaxis, cat allergy

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### Introduction

The slow loris monkey is one of the few venomous mammals. Its venom repels the predators and can cause anaphylactic shock and even death in humans (1, 2). Their venom delivery system is unique. The brachial gland is located in a relatively hair-free, slightly raised area in the flexor region of the upper arm. When threatened, the slow loris raises its arms over the head to combine its brachial gland exudate with saliva and bites to deliver the venom (3).

The brachial gland exudate protein has been studied and has high sequence similarity to the cat allergen (4). However, there have been no reports of patients with cat allergy experiencing anaphylactic shock due to a slow loris bite.

We herein report what is, to our knowledge, the first case of anaphylactic shock due to a slow loris bite in a patient with cat allergy.

### Case Report

A 37-year-old Japanese woman with 3 slow lorises as pets was attempting to separate 2 of the animals that were fighting (1 female and 1 male) when she was bitten on her right hand by the male (2 years old, weighing approximately

1 kg). Before biting, the slow loris was excited and emitting a strong odor. The patient had taken a bath just before the bite. Within 2-3 minutes after the bite, systemic pruritus, dyspnea, and swelling around her lips occurred. She called an ambulance and was brought to our hospital. She had never had a pet other than the slow lorises; however, she had had allergic symptoms (coughing, itching) to cats since childhood. She had been bitten by slow lorises several times before, but this was the first time that she had developed anaphylactic symptoms. Although we could not perform a multiple allergen specific IgE antibody measurement, she had no other allergic history, including food or drug allergy. She did not have asthma, atopic dermatitis, or nonsteroidal anti-inflammatory drug hypersensitivity. She was a non-smoker, and there was no remarkable family or work history.

On admission, she presented with dyspnea, hypoxia (SpO<sub>2</sub>, 92%; O<sub>2</sub>, 10 L/min), hypotension (blood pressure, 60/35 mmHg), and generalized rash, so she was diagnosed with anaphylactic shock. For immediate treatment, adrenaline (0.3 mg) was intramuscularly administered, followed by methylprednisolone (125 mg), famotidine (20 mg), and chlorpheniramine (5 mg) administered intravenously. Since the dyspnea and hypotension did not improve, adrenaline (0.3 mg) was readministered 5 minutes following the first

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**Table. Cases of Anaphylaxis by Slow Loris Bite.**

References	Age	Sex	Allergy	Location of the bite	Biting time	Situation	Time to anaphylaxis	Severe hypotension	Management	Discharge
2	43	Male	None	Right wrist	Several seconds	Fighting a 2-year-old male slow loris	4–5 min	Yes	Diphenhydramine 50 mg iv neperidine 75 mg iv adrenaline 1 mg im	day 1
6	N/A	Male	N/A	Right middle finger	30 s	A slow loris in a defensive posture	33 min	No	Cetirizine 20 mg iv hydrocortisone 200 mg iv adrenaline 0.5 mg im	day 1
7	22	Male	None	Right ring finger	10 s	Unprovoked attack by a slow loris	55 min	Yes	Hydrocortisone 200 mg iv chlorpheniramine 4 mg iv adrenaline 0.5 mg im	day 1
This case	37	Female	Cat allergy	Right hand	A few seconds	Fighting a 2-year-old male slow loris	2–3 min	Yes	Chlorpheniramine 5 mg iv famotidine 20 mg iv methylprednisolone 125 mg iv adrenaline 0.6 mg im	day 4

iv: intravenous, im: intramuscular, N/A: Not Available

administration. Her symptoms improved after the second adrenaline injection, and she was admitted to the intensive-care unit. Tetanus toxoid, tetanus immunoglobulin, and ampicillin-sulbactam (3 g every 12 hours) were administered as antimicrobial prophylaxis for a monkey bite. After admission, the patient was found to have a cat allergy, and serum-specific allergen (IgE antibody levels) for cat dandruff was examined and found to be positive (3.38 UA/mL, normal < 0.35 UA/mL). We were unable to measure the total serum IgE levels.

No recurrence of anaphylaxis or local signs of infection were observed, and she was discharged on day 4. We prescribed adrenaline self-injection as prophylaxis.

## Discussion

In the present case, anaphylactic shock occurred in a patient with cat allergy due to a slow loris bite. Slow loris is a venomous monkey, but only three cases of anaphylaxis due to slow loris bite have been reported (Table). An association has been previously demonstrated between slow loris allergy and cat allergy (4). The slow loris combines its brachial gland exudate with saliva and bites to deliver the venom. There are 8 types of cat allergens (Fel-d1-8), of which Fel-d 1 is recognized in >90% of cat allergic patients (5). Previous studies have shown that the brachial gland exudate protein has high sequence similarity to the cat allergen Fel-d1. In addition, it was suggested that this allergen similarity might explain the variable reactions to the slow loris bites in humans (4). This is the first case to support this mechanism, and to our knowledge, no other cases involving subjects with cat allergy who have been exposed to slow loris venom have been reported.

From an early age, the present patient had allergic symptoms (coughing and itching) whenever she approached cats. It is therefore thought that she was not sensitized to cat allergen by being bitten by a slow loris but originally had a

cat allergy. Although crude antigens were used in the measurement of IgE antibody for cat dandruff in this case, the possibility of false positives due to cross-reactivity cannot be ruled out. We desired but could not perform component resolved diagnostics of Fel-d1-8, Western blotting for the accurate diagnosis of cat allergy, or sensitization tests using slow loris venom to rule out the possibility of slow loris allergy.

Anaphylaxis in the present case was severe and occurred soon after the bite. While anaphylaxis occurred 33-55 minutes after the bite in the previous two cases (6, 7), the present patient and that from Wilde's study (2) had severe anaphylaxis after 2-5 minutes (Table). While the relationship between severity/acuteness of anaphylaxis and cat allergy remains unknown, several other factors should be considered. For example, our patient and the case from Wilde's study were bitten by fighting young slow lorises. Slow lorises produce more venom when in proximity to conspecifics for competitive success (8), and as another study reported, young slow lorises are more aggressive than adults (9). Another explanation may be the smell from the slow lorises. Slow lorises use venom both directly and indirectly via smell. The odor warns conspecifics of increased brachial gland exudate secretion and deters predators with olfactory cues in the slow loris' gland exudates (1, 10). This patient sensed a strong odor while separating the fighting slow lorises. This patient had been bitten several times before; however, the local reaction of the wound was stronger this time, and the occurrence of severe anaphylaxis was unusual. Odor from fighting slow lorises may indicate greater danger in such cases.

In the present case, severe and acute anaphylaxis to slow loris venom occurred in a patient with cat allergy. In addition to cat allergy, several other factors may have been associated with the severity/acuteness of anaphylaxis. Hence, patients with cat allergy should be particularly careful around slow lorises in order to prevent the occurrence of anaphy-

laxis.

### Conclusion

To our knowledge, this report is the first case of severe anaphylactic shock immediately following a slow loris bite in a patient with cat allergy. Although the relationship between severity/acuteness of anaphylaxis and cat allergy remains unclear, patients with cat allergy should be especially careful around slow lorises. Further studies are needed to clarify the relationship between severity/acuteness of anaphylaxis and cat allergy.

### The authors state that they have no Conflict of Interest (COI).

Drs. Fumiya Inoue and Akihiko Inoue contributed equally to this work.

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