

Massive cerebral infarct following multiple honeybee stings

Namal Rathnayaka^{1,2,3}, Anusha Nishanthi Ranathunga², Bandusiri Rathnayaka², S A M Kularatne⁴

Introduction

Bees belong to the class insects, to the order *Hymenoptera* and to the family Apidae. The order *Hymenoptera* includes the bees, wasps and ants. According to the type of nest that bees build and what are stored there, they are classified in to two major groups; the honeybees and the pollen bees. There are four species of honeybees in Sri Lanka naming Asian honeybee (*Apis cerana* – ‘Meemessa’), Rock honeybee or feral giant honeybee (*Apis dorsata* – ‘Bambara’), feral dwarf honeybee (*Apis florea* – ‘Danduwel meemessa’) and stingless bee (*Trigona iridipennis* – ‘Kaneyiya messa’) [1]. The bees are medically important because their stings cause multiple clinical manifestations including simple allergic reaction [2, 3, 4] and severe complications such as acute kidney injury [5], acute myocardial infarction [6], pulmonary haemorrhage [7], intracerebral haemorrhage [8] and ischemic infarcts [9]. We report a 63-year-old healthy male presenting with right side hemiplegia due to a cerebral ischemic infarct in the left side following multiple bee stings. Extensive literature search found no similar reported cases in Sri Lanka.

Case report

A 63-year-old previously healthy male tea estate worker was admitted to medical ward following multiple honeybee stings (> 30) in the whole-body including face, chest, abdomen and limbs while he was working in a tea estate at about 2.30 PM. He had education up to the grade 5 and was an occasional smoker and alcoholic. On admission, he had difficulty in breathing, nausea and vomiting with generalized body swelling more prominent on the face with periorbital swelling. Multiple stingers

were found embedded to the skin and were removed. His blood pressure was 160/90 mmHg and pulse rate was 82 beats per min. Respiratory rate was 20 cycles per min and on-air, oxygen saturation was 98%. On neurological examination, his Glasgow coma scale was 11 (Eye-4, Motor-6, Verbal-1), bilateral pupils were equally reactive to light with 3 mm in size and mouth deviated to left side. Right upper and lower limb weakness with a power of 2/5 were observed and upward plantar reflex was observed in right side. He was treated with intravenous hydrocortisone 200 mg 4 times per day, desloratadine 5 mg twice a day and paracetamol 1g 4 times per day with intravenous fluid. The initial laboratory findings were WBC- $14 \times 10^3/\mu\text{L}$, neutrophils-95%, lymphocytes-2%, eosinophils-1%, platelets $245 \times 10^3/\mu\text{L}$, Hb-14.6 g/dL, blood urea-3.2 mmol/L, serum creatinine-93 $\mu\text{mol/L}$, SGOT-48 U/I, SGPT-37 U/I, Na⁺ -143 mmol/L, K⁺ -3.7 mmol/L, random blood sugar-147 mg/dl and troponin I- 0.083 ng/ml (normal <0.034). 2D echocardiogram showed hypertensive heart disease with 60% of ejection fraction. The initial non-contrast computed tomography of brain done at 10 hours after the stings showed ischemic infarct of left cerebral hemisphere and repeat scan done at 44 hours due to deterioration of neurological signs revealed spreading of the infarction involving the left middle cerebral arterial territory (Figure 1). Then, he was started aspirin 300 mg and clopidogrel 75 mg per night with atorvastatin 40 mg and losartan potassium 25 mg twice daily.

The patient was transferred to the neurology unit on day 4 for the rehabilitation and he was discharged on day 43 of the bee attack with the disabling of the right side of the body and was referred for further rehabilitation to a dedicated centre at Ragama, Sri Lanka.

Ceylon Medical Journal 2021; **66**: 151-153

DOI: <http://doi.org/10.4038/cmj.v66i3.9494>

¹Department of Pharmacology, Faculty of Medicine, Sabaragamuwa University of Sri Lanka, Hidellana, Ratnapura, Sri Lanka, ²Teaching Hospital, Ratnapura, Sri Lanka, ³Department of Veterinary Pathobiology, Faculty of Veterinary Medicine and Animal Science, University of Peradeniya, Sri Lanka. ⁴Department of Medicine, Faculty of Medicine, University of Peradeniya, Sri Lanka.

Correspondence: NR, e-mail: <namal@med.sab.ac.lk>. Received 16 December 2020 and revised 20 July 2021 accepted 02 September 2021.



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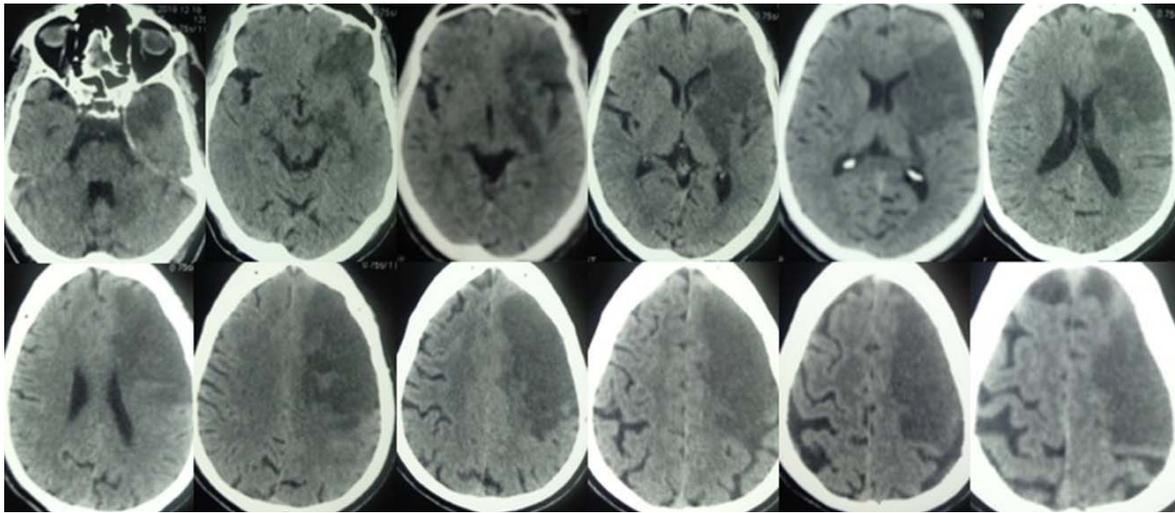


Figure 1. Non-contrast computed tomography at 44 hours following the bee stings showing spreading of the infarction in left cerebrum.

Discussion

In Sri Lanka, most of the *Hymenoptera* stings are caused by bees and wasps [2,3,4]. Local effects such as pain, swelling and facial puffiness are the prominent clinical features of bee stings. However, anaphylaxis and other systemic manifestations are very rare accounting for 4.4% [3,4]. The venom of honeybees contains mainly biological active amines (histamine, serotonin), enzymes (phospholipase A₂) and polypeptide toxins (mellitin). The allergic reactions are mediated by active amines whereas direct toxin effects are caused by mellitin [10]. Even though, the pathophysiology of cerebral infarction following bee stings is unclear, it was suggested five mechanisms naming cerebral embolism, vascular thrombosis, hypotension, hypertensive haemorrhage and hypoxia [9]. It has also been suggested that vasoconstriction secondary to mediators released after the sting, immune response and sympathetic mechanism of endothelial permeability involving the cerebral vasculature contribute to cerebral ischemia [11]. In our patient, he did not developed anaphylaxis but he had local envenoming effects initially and then developed right side weakness of the body. This may be due to cerebral vasoconstriction or prothrombotic state with subsequent ischemia leading to the stroke. Allergic reactions are unlikely as our patient had low levels of eosinophil counts in peripheral blood. On the other hand, he persistently had hypertension for which an angiotensin receptor blocker (losartan) was started. Also, his troponin levels were elevated without having ECG changes which might be due to the effect on coronary vessels caused by bee venom. Allergic coronary artery spasm (Kounis syndrome) may rarely occur following *Hymenoptera* stings [12] and fatal case of anaphylaxis with myocardial infarction following giant honeybee sting has previously been reported in Sri Lanka [6].

Hemiplegia, dysarthria, aphasia, apraxia, ataxia, seizures and coma are the other reported neurological manifestations of honeybee stings [8,9]. Our patient developed right side hemiplegia on admission to the medical facility around 1 hour following the multiple bee stings. It is suggestive that this patient might have severe envenomation because some of stingers have been removed at his house. This is because the stinging apparatus of Hymenopterans is associated with venom gland and is located at the tip of the abdomen of female insects. Therefore, these stingers should be carefully removed from the body. Otherwise, remaining venom in the venom gland may be reinjected and cause severe effects. Our patient is a previously healthy working person. But due to the bee stings, he got disabled and is unable to do the daily activities on his own. Colonies of honeybee are mostly found in rural Sri Lanka, particularly in estates and sometimes, people are rearing these colonies in order to get honey. Hymenopterans are aggressive in nature when they are disturbed and attack anybody in the vicinity as a defensive behavior. Therefore, people should understand their behavior and respect them for their place in the ecology particularly pollination.

Conclusion

Multiple bee stings may cause severe systemic envenoming and complications like cerebral infarction.

Authors' contributions

BR, NR and ANR were involved in the clinical management of the patient and the drafting of the manuscript. SAMK critically evaluated and revised the draft. All authors approved the final submission.

Disclosure statement

We have no conflict of interest to declare. This research received no specific grant from any source.

Acknowledgment

We are grateful to the staff of medical ward and Neurology Unit, Teaching Hospital Ratnapura.

Patient consent

As we were unable to contact or communicate with the patient or his family members in order to obtain the consent, all the information regarding the patient was completely anonymised.

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