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Death Came as a Sting: A Case Report

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Abstract:

Various species possess stings that can induce pain and are generally avoided by people. The sting of a bee, in particular, can result in not only a painful experience but also pose a potential threat to life for many individuals. It can trigger severe allergic reactions, leading to a life-threatening condition known as anaphylaxis. Instances of fatalities attributed to anaphylaxis following bee stings have been documented in the literature. Occasionally, complications arising from bee stings can contribute to the demise of the victims.

Presented here is a case involving a 64-year-old adult male who was brought to the hospital already deceased. Upon examination, multiple bee stings were observed across the body, with the stingers still intact in some areas. Additionally, two deceased honeybees were found on the victim's body. During the autopsy, congested internal organs were identified, and postmortem blood biochemical analysis revealed elevated levels of Immunoglobulin E and serum creatinine.

Keywords: Anaphylaxis, Bee sting, IgE, Stinger.

1. Introduction:

Honeybees, classified in the Hymenoptera family, share this family with other species like wasps, ants, and hornets. ⁽¹⁾ The potential danger of a bee sting lies in its capacity to induce anaphylactic reactions, leading to a range of symptoms and allergic responses, spanning from localized skin reactions to complications affecting the cardiovascular and renal systems. Within the vast Hymenoptera family, comprising over 100,000 species of bees and ants, a majority possess a poison gland and a stinger. ⁽²⁾ Hymenoptera encounters are common, primarily due to the nesting behaviors of bees. Among these, bumblebees (*Bombus* species) and honeybees (*Apis mellifera*) are frequently encountered species. Notably, honeybees succumb immediately after stinging, as the act results in their evisceration, leaving the stinger and venom sac intact in the skin. ⁽²⁾

We present a case involving a 64-year-old male who was brought to the hospital in a deceased state, bearing multiple intact bee stingers and three deceased honeybees. The cause of death was determined to be anaphylaxis triggered by the bee stings. This presentation will delve into the mechanism of sudden death, autopsy findings, and the postmortem diagnosis.

History:

The individual, who had gone to irrigate plants on a farm, was attacked by honeybees upon his return from the field. Upon hearing his screams, the victim's relatives rushed to the scene and found him lying on the ground. They promptly transported him to the hospital, where he was pronounced brought dead. Following legal protocols in India, the body was transferred to the mortuary and subsequently postmortem examination was carried out to determine the cause of death.

Postmortem examination:

During the external examination, two deceased honeybees were discovered on the front of the victim's abdomen (Figure 1). Multiple bee stings, characterized by intact stingers in their original positions, were observed across the head, neck, trunk, both upper limbs, and outer aspect of the upper thighs, surrounded by reddish-brown patches as illustrated in Figure

2. All other external body orifices were unremarkable and no external injuries were present over the body.



Figure 1 shows dead honeybees over the abdomen



Figure 2 shows presence of intact stingers over the body

Upon internal examination, the laryngeal region exhibited normalcy. The cut sections of both the lungs, liver, spleen, and kidneys revealed congestion. Multiple petechial haemorrhages were identified on the cut section of the white matter of the brain. Histopathological analysis confirmed the congestion observed in the organs. However, the histopathological examination of the brain, heart, epiglottis, and skin from the sting site yielded normal findings.

Investigations:

The Postmortem blood was sent for biochemical analysis, which revealed:

1. Immunoglobulin E (IgE) - 461.2 IU/mL (Reference value 0.1 - 200 IU/mL)
2. Serum Creatinine - 2.1 mg/dl (Reference value 0.6 - 1.4 mg/dl)

Opinion as to cause of death:

The deceased died due to complications (Anaphylaxis and acute kidney injury) secondary to bee sting envenomation

2. Discussion:

Reactions to bee stings can be categorized into four types: local, systemic, toxic, and unusual. In non-allergic individuals, a local reaction typically occurs following a bee sting, which usually subsides within a few hours. ⁽³⁾ Instances of massive honeybee attacks, involving more than 50 stings, have been reported with systemic manifestations such as rhabdomyolysis, hemolysis, arterial hypotension, hepatic disturbance, and coagulation abnormalities. ⁽⁴⁻⁷⁾ The prompt removal of bee stingers (Figure 3) after an attack is crucial, as it has been observed that even after detachment from the bee's body, inoculation continues. Early removal of the bee sting appears to result in fewer adverse effects compared to delayed removal, and the method of removal does not seem to influence the amount of venom injected into the body. ⁽⁸⁾ Mellitin, the active component of honeybee venom, is associated with phospholipase A2 (PLA2) and possesses vasoactive and hemolytic properties. ⁽⁹⁾



Figure 3 showing isolated stinger removed from the body

The specific venom component responsible for liver damage remains unidentified; however, hornet venom has a direct hepatotoxic effect. ⁽¹⁰⁾ Liver damage resulting from bee stings is evident in findings such as peri-cholangitis and centrilobular necrosis. ⁽¹¹⁾ In many cases, the cause of death remains unknown, but in a subset of patients, death is attributed to respiratory failure. ⁽¹²⁾ Mortality rates vary among species, estimated to range from 15 to 25%. ^(5,7,12) Bee sting-induced renal failure is primarily a consequence of the venom's vasoactive toxic effects, leading to arterial hypotension. Studies indicate that bee venom directly affects kidney tubules, inducing features of acute tubular necrosis. ^(7,13) The pathogenesis of acute tubular necrosis is believed to involve the precipitation of myoglobin and haemoglobin casts in renal tubules. ⁽⁷⁾

In our case, the patient suffered a honeybee attack with over 50 intact stingers present on the body. Postmortem blood analysis revealed nearly double the normal level of immunoglobulin (IgE) and elevated serum creatinine, indicating established renal failure. The heightened IgE levels signify anaphylaxis, triggered by the bee stings. Consequently, the onset of massive anaphylaxis and acute renal impairment/failure following the bee stings initiated the terminal events leading to the deceased's complications and, ultimately, his demise.

3. Conclusion:

Though fatalities from bee stings are not rare, implementing adequate precautionary measures in high-risk areas and administering prompt first aid or necessary lifesaving treatment can substantially decrease mortality. Bee stings have the potential to trigger anaphylactic shock and sudden death. Hence, it is crucial for individuals experiencing bee envenomation to be quickly referred to medical centres, ensuring they receive timely and appropriate treatments to prevent undesirable complications.

Conflicts of interest: Nil

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