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Editorial Note

Emergency Management and Life-Saving Interventions in an Allergic Reaction Following a Bee Sting to the Nose: A Case Report

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Abstract

Bee stings may cause clinical presentations ranging from mild local reactions to life-threatening anaphylaxis. Stings involving the face and upper airway region are particularly important because of the risk of laryngeal edema and airway obstruction. In this case report, we present the emergency department evaluation and management of a 40-year-old male patient who developed progressive facial swelling after being stung by a bee on the nose. On admission, the patient's vital signs were stable except for an oxygen saturation of 92%, and progressive facial edema was observed. Due to the risk of laryngeal edema and airway compromise, intramuscular epinephrine was considered, and the patient was treated with intravenous methylprednisolone and antihistamines under hospital conditions with close observation. Early recognition and prompt intervention prevented further airway complications. This case highlights the importance of close monitoring, airway assessment, and timely pharmacological treatment in Hymenoptera stings involving the facial region.

Keywords: Bee sting, Allergic reaction, Anaphylaxis, Laryngeal edema, Emergency medicine

1. Introduction

Bee stings are among the common causes of emergency department admissions worldwide. Reactions caused by Hymenoptera stings may vary from local inflammatory responses to systemic anaphylaxis. Stings involving the head and neck region are particularly concerning because of their anatomical proximity to the upper airway and the potential risk of airway edema and laryngeal obstruction [1].

Early diagnosis and rapid intervention are essential in reducing morbidity and mortality associated with allergic reactions and anaphylaxis. Initial emergency management includes airway assessment, oxygenation support, monitoring of vital signs, and initiation of appropriate pharmacological therapy. Intramuscular epinephrine is the first-line treatment in anaphylaxis, whereas corticosteroids and antihistamines are considered adjunctive therapies [2].

In this report, we describe the evaluation and management of a patient who presented to the emergency department with progressive facial swelling following a bee sting to the nose.

Hymenoptera envenomation is a frequently encountered medical condition caused by insects belonging to the Hymenoptera order, including honeybees (Apis species), wasps (Vespids), and ants. Bee venom contains multiple biologically active enzymes, amines, and peptides responsible for local and systemic toxic and allergic reactions. Although honeybee and wasp venoms share several minor components, they differ in their major toxic constituents.

Melittin, an amine-derived peptide constituting nearly 50% of honeybee venom, is responsible for pain induction and disruption of cellular membrane integrity. In contrast, wasp venom contains mastoparan instead of melittin. Mastoparan similarly disrupts membrane integrity and stimulates the release of histamine from mast cells, serotonin from platelets, and catecholamines from chromaffin cells. Furthermore, mastoparan may induce calcium-mediated apoptosis and necrosis through G protein-coupled receptor activation.

Phospholipase A2 is considered the major allergenic component of bee venom and contributes to membrane lipid degradation. Hyaluronidase facilitates venom dissemination by degrading extracellular matrix components, while mast cell degranulating protein promotes histamine release through mast cell activation. Additional minor venom components include acid phosphatase, lysophospholipase, and apamin.

Bee venom may trigger the release of multiple inflammatory mediators, leading to allergic and systemic reactions. Local reactions are the most common clinical manifestation

following bee stings, whereas anaphylaxis represents the most frequent systemic complication. Neurological complications are relatively rare but have been reported in the literature, including ischemic stroke, epileptic seizures, optic neuritis, facial paralysis, Guillain–Barré syndrome, encephalopathy, acute disseminated encephalomyelitis, plexopathy, and parkinsonism.

The exact pathophysiological mechanisms underlying neurological involvement after Hymenoptera stings remain unclear. Experimental studies have suggested that phospholipase A2 may induce electroencephalographic abnormalities and seizure activity. Increased excitatory neurotransmitter release mediated by mastoparan-induced calcium influx has also been proposed as a possible mechanism contributing to neurological manifestations.

2. Case Presentation

A 40-year-old male patient presented to the emergency department with progressive facial swelling after being stung by a bee on the nose. The patient had no known chronic illnesses, regular medication use, or previous history of allergic reactions [3,4].

On admission, the patient's vital signs were as follows:

- Blood pressure: 140/90 mmHg
- Oxygen saturation: 92%
- Heart rate: within normal limits
- Respiratory rate: within normal limits
- Body temperature: within normal limits

Physical examination revealed progressive facial edema. The patient did not exhibit wheezing, hypotension, altered mental status, or severe respiratory distress. However, due to the anatomical proximity of the sting site to the upper airway and the decreasing oxygen saturation, the patient was considered at high risk for impending laryngeal edema and airway obstruction.

Primary assessment was performed according to the airway, breathing, and circulation (ABC) approach. Oxygen support and close airway monitoring were initiated. Intramuscular epinephrine administration was considered because of the risk of upper airway involvement. The patient was subsequently treated with intravenous methylprednisolone and antihistamine therapy under continuous cardiac and oxygen saturation monitoring.

Serial physical examinations were performed during a 4–6 hour observation period in the emergency department. No progression to stridor, bronchospasm, hypotension, or respiratory failure was observed. Facial edema gradually regressed and oxygen saturation improved during follow-up.

After clinical stabilization, the patient was discharged with recommendations for outpatient allergy and immunology evaluation for possible Hymenoptera venom hypersensitivity. The patient was informed about warning signs of anaphylaxis and advised to seek immediate medical attention if similar symptoms recurred.

3. Discussion

Allergic reactions secondary to bee stings are frequently encountered in emergency medicine practice. Clinical manifestations may range from mild local reactions to severe life-threatening anaphylaxis. Stings involving the head and neck region require careful evaluation because of the increased risk of upper airway compromise [5].

In the present case, despite relatively stable hemodynamic parameters, progressive facial edema and reduced oxygen saturation raised concern for possible airway involvement. Edema may rapidly progress in stings involving the nasal and facial region; therefore, close observation is essential.

Intramuscular epinephrine remains the first-line treatment for anaphylaxis and should not be delayed in patients with suspected airway compromise. Although this patient did not fulfill all classic diagnostic criteria for systemic anaphylaxis, the possibility of impending laryngeal edema warranted close monitoring and consideration of early epinephrine administration.

Corticosteroids may reduce late-phase inflammatory responses and help prevent symptom progression, while antihistamines are effective in controlling histamine-mediated symptoms. However, these agents should be considered adjunctive therapies and not substitutes for epinephrine in severe allergic reactions.

This case demonstrates that even clinically stable patients with bee stings involving the face and upper airway region may rapidly deteriorate and therefore require careful observation, airway preparedness, and timely intervention. Referral to an allergy and immunology clinic is also important for long-term evaluation and prevention of future severe reactions.

4. Conclusion

Bee stings involving the head and neck region may initially present with mild symptoms but can rapidly progress to severe airway complications. Early airway assessment, close monitoring of vital signs, and timely pharmacological intervention in the emergency department are critical in reducing morbidity and mortality. Prompt recognition of patients at risk for laryngeal edema and consideration of early intramuscular epinephrine may be life-saving.

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