CASE REPORT

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Fatal case of Wasp Envenomation in a Non-Morbid Individual

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ABSTRACT

Anaphylaxis to animal bites and stings poses a significant medical risk that vary according to the patient's response and nature of the insult. Hymenoptera sting mostly cause local toxic reaction and sometimes anaphylactic manifestations especially in individuals with pre-existing comorbidities likes hypertension, chronic diabetes, etc. Among the Hymenoptera insects, wasp possess a significantly higher risk of IgE mediated hypersensitivity` reactions than bees. Usually, death is not an outcome in healthy individuals unless associated with comorbidities. However, we are reporting a case of fatal wasp envenomation in an apparently healthy 47-year-old man stung by a swarm of wasps. He presented with complaints of facial swelling, dyspnoea, and stridor. He succumbed to the anaphylactic shock after days of hospitalisation. Post-mortem histopathology and immunological studies revealed raised venom specific IgE levels and reduced Complement C3a levels. Fatal outcome in such cases can be prevented by early diagnosis and specific management by analysing serum levels of wasp sting venom specific IgE levels and complement C3a levels.

INTRODUCTION

Insect stings results more than 50 deaths per year in the United State. Usually, wasp or bee envenomation are not fatal unless pre-existing morbidity is there.[1] But there is significant increased burden of morbidity & mortality from bee and wasp sting as depicted in Fig.1. Hymenoptera insects include apidae (bees), vespidae (wasps and hornets) and formicidae (ants) which are frequently incriminated in insect bites in forested areas.[3]

The most common stinging insects are bees and wasps. Wasps build honeycomb nests in shrubs and under heaves of houses or barns. Wasps have a narrow "wasp waist" and dangling legs when in flight. They can sting repeatedly without losing sting apparatus and they inject around 2 to 15 micrograms. The most common immune reactions are due to wasp stings than bees. The sensitization reaction to wasp venom can occur after a single sting. [1, 4] Parasitic wasps prey mostly on pest and

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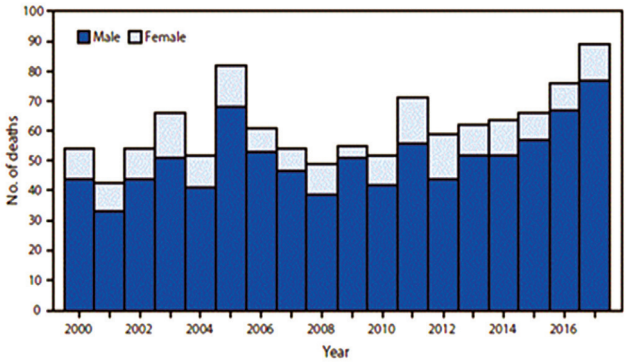
they are increasingly used as an agricultural pest control. [2] Bee and wasp venoms are different, each containing distinct major allergens. Wasp venom specifically contains antigen 5, while phospholipase A2 present in bee venom. Both venoms associated with a variety of local to systemic reactions. Patient may present early to the emergency department due to pain, itching, dyspnea and other complications. Sometime late due to swelling, redness and itching etc. The face presenting with edema and indurations are signs of delayed hypersensitive reactions. These symptoms are mainly due to allergic reactions not due to venom per se. The common symptoms are nausea, diarrhea, vomiting, abdominal cramps etc. Wasp venoms have direct and indirect cytotoxic (hepatic, renal and myocyte membrane), hemolytic, neurotoxic and vasoactive properties, which can cause intravascular haemolysis and rhabdomyolysis.[8,9] Wasp sting causes severe anaphylactic reactions associated with swollen face, lips, tongue etc.[4] We are reporting a rare case of anaphylaxis due to multiple wasp envenomations.

Fig.1: showing gender based mortality trend due to sting envenomation.[5]



CASE REPORT

A forty-seven-year-old male engaged in his agricultural work. Suddenly a swarm of wasps attacked and stung him mostly on exposed part of the body. He was wearing the vest and loincloth over the body. He was shifted to our hospital within an hour of the incidence; and, admitted to the emergency department (ED) with the complaints of swelling of face, dyspnoea, and stridor. On examination pulse was weak and rapid, blood pressure not recordable, respiratory rate 30 permin accompanied with wheezes and stridor, and Glasgow coma scale (GCS) was 03/15. On examination of wounds, there was no evidence of stingers; and no

Fig.2: showing blood - tinged oedema fluid in air-way and congestion of lungs.

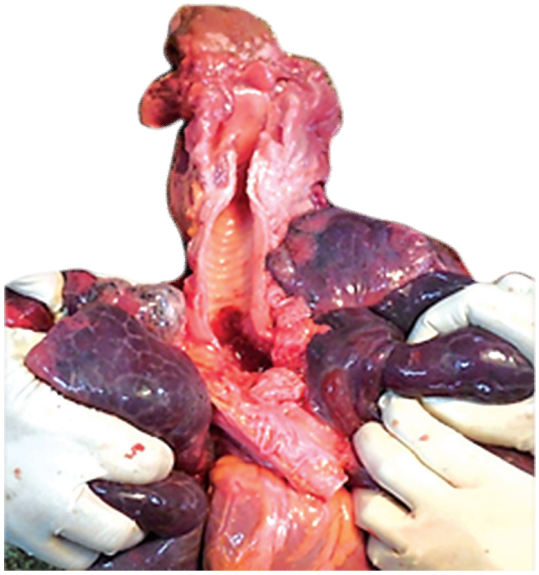


Fig.3 : showing focal confluant areas of sub-endocardial haemorrhages in both ventricles.

previous history of diabetes, hypertension, ischemic heart disease, kidney-related disease, and any history of prior sensitization. He was treated with injection hydrocortisone, noradrenaline, calcium gluconate, and dobutamine. Despite all supportive measures, he was succumbed to the complications of wasp-stinging after four hours of admission to ED. A medico-legal case (MLC) was registered and the body was sent for autopsy thereof.

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Postmortem Examination

External examination showed swelling and congestion of eyelids, face, mouth and tongue. Serosanguinous fluid was oozing from nostrils and mouth. Multiple puncture marks without stingers were noted over face, upper chest and both upper limbs of around 0.1 cm diameter with associated swelling, congestion and haemorrhage. On incision over the neck and upper part of chest, extravasation of blood in the soft tissue and muscles is seen.

There was mild to moderate oedema and congestion of larynx, vocal cord and trachea. (Fig. 2) Pleural cavities contained 300 ml of serosanguinous fluid. Heart showed focal endocardial haemorrhages of anterior wall of both ventricles. (Fig.3) Lungs and brain showed congestion and edema. The abdominal organs were intact and unremarkable. Chemical analysis was negative for any toxic substances including alcohol. Histopathological examination showed sub epithelial oedema of larynx and skin tissues from stung sites showed edema of papillary dermis, with mild perivascular lympho -mononuclear infiltrate. Heart showed focal subendocardial haemorrhages in both ventricles and other organs congested. Immunological study revealed increase in venom specific serum Ig E levels and decreased complement C3 level (0.197 g/L). On perusal of hospital records, autopsy findings, histopathological findings, venom specific Ig E and C3a levels. Tryptase levels are not estimated because of the unavailability in our hospital. The cause of death was concluded to be an anaphylactic shock from multiple wasp envenomations.

DISCUSSION

The allergic reactions to Hymenoptera group are common among men and particularly among those of over 30 years.[6] Chemically wasp venom contains mixture of complex chemicals that break down cell membranes, as well as neurotransmitters like acetylcholine and serotonin. They also have substances that trigger the release of histamine, producing an intense allergy-like reaction. IgE antibodies to Hymenoptera venom are present in 20-30% of adults who had an insect sting in the previous 2-3 years.[1] Most deaths related to ***hymenoptera*** stings are result of immediate hypersensitivity reactions causing anaphylaxis.[13] Immediate hypersensitivity reactions will lead to urticaria, dyspnoea, angioedema and hypotension with generalized anaphylactic episode. Anaphylaxis is an extreme form of allergic reaction which causes swelling of the lips and tongue, breathing problems, collapse and loss of consciousness. Anaphylaxis can cause death. [10]

The role of complement C3a activation could be the first in-vitro variable which correlates with the severity of wasp-sting anaphylactic reactions.[11] Richard and Roberts studied post mortem findings in all anaphylactic reactions and examined 56 cases of which 19 were due to wasp or bee venom and concluded that most common reported finding is nonspecific pulmonary edema and congestion. Features suggesting anaphylaxis were noted in 100 % of cases in food allergies followed by 67% in wasp and bee-venom.[12]

Pratish, et al. reported a case of wasp sting with unusual fatal outcome (Disseminated intravascular coagulation, rhabdomyolysis with acute renal failure secondary to wasp envenomation).[14] Siddahartha das et al reported a case of fatal wasp sting with pre-existing undiagnosed diabetes and hypertension.[15] Rabindranath das et al reported wasp envenomation with acute renal failuree. [16] Cihong et al out of 1091 cases admitted forty eight died due to organ injury following toxic reactions to stings and six died due to anaphylactic shock.[17]

CONCLUSION

- Death occurs in healthy individuals with raised venom specific IgE level and decreased complement C3a levels.
- Early diagnosis using the above said blood investigation may be of great help to start early & specific treatment. Venom specific IgE levels are recommended for the confirmation of wasp sting.
- Hence, all such cases should be watched early despite the presence or absence of comorbidities.

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