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A Fatal Cardiac Tamponade in a Honey Bee Sting Victim

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Abstract: *Honey Bee stings are common in India.Common Clinical presentation includes minor localized reactions in form of swelling and redness, sometimes anaphylactic reaction. Apart from local cutaneous manifestations or generalized anaphylaxis, stings can cause a variety of systemic complications. The most frequent clinical events are hypotension, dyspnea, anaphylactic shock and angioedema.Infrequently major complications like rhabdomyolysis, acute renal failure, acute pulmonary edema are reported from different studies. There have been few reports dealing with cardiac toxicities such as rhythm abnormalities and myocardial infarction after hymenoptera stings. Cardiac tamponade with epicardial vessel rupture following honeybee sting is a rare phenomenon,not much reported in literature. Here we report a case of 75year old male withmultiple honey bee sting brought for medico legal autopsy revealed cardiac tamponade and epicardial vessel tortuosity and rupture of epicardial vessel near the apex of heart.*

Key words: *Honey Bee Sting, Cardiac Tamponade, Anaphylaxis*

I. Introduction

Honey bees belong to the order hymenoptera and family Apidae. Adult worker bees have a barbed stinging apparatus attached to its abdomen. They sting defensively, when a human intrudes into its colony. Alarm pheromones are released by the stinging bee, which attracts other bees to the location. Honey bees die after a single sting because the sting and the venom apparatus get avulsed from its abdomen. Bees inject approximately 50mcg of venom which is the total capacity of the venom sac, and leave behind the stings embedded in the skin.[1]

Venom is a mixture of biogenic amines(histamine, 5-hydroxytryptamine and acetylcholine), enzymes (phospholipase A and hyaluronidase), and toxic peptides (apamin, melittin, minimine and mast cell degranulating peptides).[2] The spectrum of allergic reactions to bee venom ranges from normal (mild) local reactions to large local reactions to systemic anaphylactic reaction (mild, moderate and severe). Systemic toxic reactions are seen in cases of mass envenomation by large number of bees.[3]

Systemic allergic reactions are IgE mediated Type 1 hypersensitivity reaction. Toxic reactions in mass bee envenomation are not allergic, but are due to the direct action of large amount of venom.

The heart is both a source and a target of chemical mediators released during allergic reactions. Mast cells are abundant in the human heart, where they are located predominantly around the adventitia of large coronary arteries and in close contact with the small intramural vessels. Cardiac mast cells can be activated by a variety of stimuli including allergens, complement factors, general anesthetics and muscle relaxants. Mediators released from immunologically activated human heart mast cells strongly influence ventricular function, cardiac rhythm and coronary artery tone.[5]

Bee venom induces an endogenous amine release similar to the mediators released from the mast cells during allergic reactions, which normally produces vasodilatation. However paradoxical coronary vasoconstriction is a possibility especially in the presence of endothelial damage that may result in acute coronary syndrome.[6]

Multiple case reports have demonstrated the occurrence of acute coronary syndrome and myocardial infarction following bee sting. But here in this particular case report I present a case where there was a rupture of epicardial vessel leading to cardiac tamponade.

II. Case Report

An elderly deceased male aged 75 years was subjected to medico-legal autopsy atMcGann district hospital Shimoga, with history of bee sting. According to police inquest papers, the victim sustained multiple bee stings over his body at his farm when he went to fetch fodder for his cattle, he was shifted to McGann Hospital where he expired the next day morning. The body was subjected to medicolegal autopsy. on external examination during autopsy multiple punctured wounds measuring less than 0.1cm were present over face, head, neck and both the shoulder blades. Sting were scraped out of few of the wounds and visualized under magnification which were to be of barbed stings of honey bee. On internal examination on opening of

pericardium there was 250ml of blood and blood clots, the heart showed congestion with apical region intensely congested with visible tortuous epicardial vessels. On serial sectioning of coronary arteries they were patent all through their course. One of the branches of epicardial vessel at the apex of the heart was torn. The lungs were congested, and other major organs did not show any significant changes. The cause of death was given as CARDIAC TAMPONADE as a result of rupture of Epicardial vessel consequent upon multiple Beestings.

III. Discussion

Bee venom is a complex mixture of substances, such as melittin, apamin, adrenaline, noradrenaline, histamine, serotonin etc., Endogenous adrenaline and noradrenaline secretion may be stimulated by the mellitin, phospholipase A2, histamine and serotonin present in venom. These substances may provoke ischemia in the myocardium, as well as intense hypotension. The heart is both a source and a target of chemical mediators released during allergic reactions. Mast cells are abundant in the human heart, Mast cells in the human heart are located mainly between myocardial fibres, around blood vessels and in the arterial intima. In particular, mast cells are often detected in close contact with small intramural coronary arteries as well as in the wall of large epicardial vessels.[7] Cardiac mast cells have a full capacity to respond to IgE mediated stimuli releasing large quantities of mediators.

Vigoritoet al.[8] first showed that intracoronary injection of low doses of histamine in humans induced a rapid decrease in the mean aortic pressure and an increase in coronary blood flow. These effects are due mainly to the activation of H1 receptors expressed on vascular smooth muscle. Furthermore, in healthy individuals, histamine may induce arrhythmias and atrioventricular conduction blocks.

Katarina et al.[9] elucidated some mechanisms of contractions or relaxations of isolated porcine left anterior descending coronary artery (LAD) induced by two peptides from the honeybee venom, melittin and apamin.Melittin at lower concentrations (0.1–10 μg/ml) induced transient relaxation, and contraction at higher concentrations (≥7 μg/ml). Their data showed that melittin could affect contractility of porcine LAD at concentrations similar to those encountered in multiple honeybee stings in humans.

Thus Bee venom would have caused the rupture of epicardial vessel in this particular case leading to cardiac tamponade. There are cases reported previously with myocardial infractions in bee venom cases, but rupture of epicardial vessel and cardiac tamponade was not reported till date.

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