



## A STUDY OF CLINICAL PROFILE, COMPLICATIONS AND OUTCOME OF BEE STING PATIENTS AT TERTIARY CARE CENTRE, KARWAR.

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### ABSTRACT

**Introduction:** Bee stings are common public health hazards worldwide. Clinical spectrum of venom allergy varies from local reaction to life-threatening and unusual delayed reaction which may be fatal.

**Material and Methods:** This study is a retrospective, single-center study involving patients diagnosed with bee sting injury at KRIMS Teaching Hospital, Karwar during the year July 2020 to June 2021. Demographic patient information and data regarding type of bee, injury site, presence of retained bee stingers, all relevant investigations & ECG reports were collected from medical records. **Results:** 76 patient's data were collected, out of which 56 patients were male and 22 were females. Patient's age ranged widely from 30 to 80 years. 25% of the patients were aged 51-60. Local reactions were seen in 85.50% of the individuals, 6.50% had no reactions, 5.50% patients had both local & systemic reactions and 2.50% patients had systemic reactions. **Conclusion:** Various manifestations after bee sting have been noted. Local reactions, such as pain, vomiting, myalgia, edema and swelling are common and generally self-limiting. The chest pain abated over a few hours, and serial ECGs showed the changes of a developing myocardial ischemia. Wasp and bee stings result in mild reactions to life-threatening complications, which may be delayed in onset. Therefore, early anticipation of these complications by the treating physician is needed for the management of the patient.

**KEYWORDS :** Hymenoptera Sting, Hepatotoxicity, Acute Kidney Injury, myocardial ischemia.

### INTRODUCTION

Hymenopteras are common worldwide, especially in countries with a predominantly moderate climate. In this environment, these stinging insects are present for larger part of the year and around 56% to 94% of the population is stung at least once in their lifetime.<sup>1</sup> All the stinging insects belong to the order Hymenoptera of the class Insecta. Medically important hymenopterans are Apidea (Honey bee and bumble bee), Vespidae (Wasp, hornets and yellow jackets) and Formicidae (Ants). The venomous stinger of hymenoptera evolves from their ovipositor that has lost egg-laying function and modified for stinging and delivering the venom to their victims. Bee loses its barbed stinger after the sting, whereas a single wasp is able to sting multiple times because the stinger is not detached from the body after the sting.<sup>2</sup>

These stinging events occur when a single insect is disturbed while searching for food or in large swarm when insects respond to a human intruder as a threat to their colony, usually in late summer or early fall.<sup>3</sup> These insects preferentially sting in the head and neck area. The amount of venom released during a wasp sting is up to 3  $\mu$ gm as compared to 140  $\mu$ gm released per bee sting. The components of venom include enzymes such as phospholipase A1 and A2 and hyaluronidase, peptides such as melittin, amines such as histamine, serotonin and catecholamines and others such as mastoparan, apamine, acetylcholine and antigen.<sup>4,5</sup> These components have inflammatory, direct and indirect cytotoxic (Renal, hepatic and membrane), haemolytic, vasoactive, neurotoxic and cellular anti-membrane properties resulting in local as well as systemic manifestations.<sup>6</sup> Reactions to hymenoptera envenomation are classified into normal local reaction, large local reaction, systemic anaphylactic reactions and delayed unusual reactions.

After the sting patient may develop minor local reaction of erythema, oedema and pain at the site of sting which is self-limiting and resolves spontaneously within 24 hours. Large local reaction is defined as an area of induration exceeding a diameter of 10 cm which lasts longer than 24 hours and then subsides. Prevalence of systemic anaphylactic reaction is 0.3% - 7.5%. These reactions are usually apparent within 15 minutes of sting and vary in intensity from mild (Urticaria, pruritis, angioedema, vomiting and diarrhoea) to life threatening reactions (Wheeze, cough, dyspnoea and bronchoconstriction). The unusual delayed reactions are the

rare clinical presentations of hymenoptera sting and include serum sickness, vasculitis, thrombocytopenic purpura, renal, neurological, cardiovascular and skin manifestations. Incidence of mortality in wasp and bee sting is low and ranges from 0.03 to 0.48 per 1000000 inhabitants per year.

### MATERIALS AND METHODS

This study is a retrospective, single-center study involving 76 patients diagnosed with bee sting injury at KRIMS Teaching Hospital, Karwar during July 2020 to June 2021.

#### Inclusion Criteria

(1) All patients with Bee sting of > 18 years of age.

#### Exclusion Criteria

- (1) Patients with < 18 years of age
- (2) Refusal to give informed consent.

Demographic patient information and data regarding type of bee, injury site, presence of retained bee stingers, history, clinical examination & all relevant investigation reports including ECG and treatment were collected from medical records. Bee type was based on patient self-report and/or family members. Furthermore, the outcomes of patients stung were reported. The study was approved by the Institutional ethics committee, krims, karwar.

### RESULTS

76 patient's data were collected out of which 56 patients were male and 22 were female. Patients' age ranged widely, from 30 to 80 years. 25% of the patients were aged 51-60 (Table 1). Local reactions were seen in 85.50% of the individuals, 6.50% had no reactions (Table 3). Hypotension caused by anaphylaxis may certainly induce myocardial ischaemia; An electrocardiogram (ECG) revealed myocardial ischemia in 3% patients. The symptoms of local reactions were seen in 85.50%. 6.50% showed no symptomatic reaction (Table 3). Both local and systemic response were seen in 5.50% of the individuals. 2.50% showed systemic response (Table 3). ECG was normal in 96% individuals. ECG changes with sinus tachycardia were seen in 2% of the individuals. Less than <2% showed some ECG abnormalities such as sinus bradycardia, LVH ventricular ectopics, T-wave inversion and ST Depression. Statistical analysis were done using SPSS version 21.0, ANOVA was used to compare means between three or more groups.

**Table 1. Age Distribution of Patients.**

Age	N	%
<30	8	10
31-40	11	15
41-50	19	25
51-60	13	18
61-70	16	21
71-80	9	11
>80	0	

**Table 2. Clinical Features**

Symptoms	N	%
No reaction	11	14
Local reaction	60	79
Vomiting	7	9
Breathlessness	2	3
Chest pain	2	3
Abdominal pain	3	4.5
Fever	2	3
Myalgia	3	4
Covulsions	1	1.5
others	15	20

**Table 3. Local & Systemic Reaction**

Response	Count	%
Nil	11	14
Local	60	79
Systemic	3	4
Systemic	2	3

**DISCUSSION**

Bee sting are commonly encountered worldwide. Bee stings can cause severe reactions and have caused many victims in previous years.<sup>6</sup> Local reactions are more common, generally are self-limiting and vanish within a few hours. Allergic reactions to the venom of some stinging insects, such as bees, yellow jackets, hornets, wasps or fire ants can be life threatening also.<sup>7</sup> The clinical manifestations of bee sting can be divided into three groups: local reactions, immunological reactions usually leading to anaphylaxis and systemic toxic reactions caused by large doses of venom.<sup>8</sup> Multiple stings may lead to various clinical manifestations like vomiting, diarrhea, dyspnea, generalized edema, hypotension, syncope, acute renal failure, and even death. Rarely, they can cause vasculitis, serum sickness, neuritis, and encephalitis. However, only a few numbers of individuals with bee sting allergies suffer fatal reactions. Anaphylaxis is the most severe and prevalent insect sting reaction. There are also rare cases of unusual systemic reactions to insect stings. Local and systemic reactions after bee stings are common, but there are few reports of severe complications, such as acute coronary syndrome, acute renal failure and stroke.<sup>9</sup> Our study also showed symptoms of local reactions in 85.50%. 6.50% showed no symptomatic reaction Myocardial infarctions after insect stings are very rarely reported in the literature. Most of acute coronary syndromes occur with ST segment elevation. Rapid development of symptoms is assigned either to myocardial ischemia or anaphylaxis especially without cutaneous symptoms. Hemodynamic events in the course of anaphylaxis may reduce coronary blood flow, but it should be also remembered that histamine, serotonin, nor adrenaline, dopamine released during the allergic reaction is a potent coronary vasoconstrictor and has direct inotropic and chronotropic effects increasing myocardial oxygen demand. Deep hypotension during anaphylaxis might be responsible for myocardial ischemia. Mediators discharged by activated mast cells as a cause of coronary symptoms were defined by Kounis as allergic angina or allergic myocardial infarction.<sup>10,11</sup> In summary some patients with bee stings have delayed cardiovascular events with acute coronary syndrome and/ or stroke. These probably reflect direct toxic reactions and not allergic reactions. These patients are potentially candidates for short term anticoagulant therapy at the time of the stings.

**CONCLUSION**

Bee stings are common causes of medical problems. Various manifestations after bee sting have been described. Local reactions, such as pain, flare, wheal, edema and swelling are very common and generally self-limiting. Unusually manifestations like diarrhea, vomiting, dyspnea, myalgia, generalized edema, giddeness, anaphylactic shock, acute renal failure, myocardial infarction, hypotension, collapse, pulmonary hemorrhage, acute hemorrhagic pancreatitis, and atrial fibrillation may occur. The therapeutic approach of a patient victim of bee stings constitutes a medical emergency condition. Bee stings should be removed from the victim's body as quickly as possible, aiming at decreasing the exposure time to the venom. Anaphylaxis should always be suspected and treated after bee stings.

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**REFERENCES**

- 1) Antonicelli L, Bilo MB, Bonifazi F. Epidemiology of hymenoptera allergy. *Curr Opin Allergy Clin Immunol* 2002;2(4):341-6.
- 2) Fitzgerald KT, Flood AA. Hymenoptera stings. *Clin Tech Small Anim Pract* 2006;21(4):194-204.
- 3) Edwards R. Social Wasps. Their biology and control. East Grinstead, United Kingdom: Rentokil Ltd., 1980.
- 4) Bilo BM, Rueff F, Mosbech H, et al. Diagnosis of Hymenoptera venom allergy. *Allergy* 2005;60(11):1339-49.
- 5) Przybilla B, Rueff F. Insect stings: clinical features and management. *Dtsch Arztebl Int* 2012;109(13):238-48. [6] Singh Y, Joshi SC, Saxen
- 6) Temizoz O, Celik Y, Asil T, Balci K, Unlu E, Yilmaz A. Stroke due to bee sting. *Neurologist* 2009;15:42-3.
- 7) Geraldo Bezerra da Silva Junior. Acute kidney injury complicating bee stings – a review. *Rev Inst Med Trop São Paulo.* 2017;59:e25
- 8) Weeranun Dechyapirom. Concurrent acute coronary syndrome and ischemic stroke following multiple bee stings. *International Journal of Cardiology* 2011;151:e47-e52.
- 9) Nandi M, Sarkar S. Acute kidney injury following multiple wasp stings. *Pediatr Nephrol.* 2012;27:2315-17.
- 10) Murat Guze et al. Turkish Journal of Emergency Medicine. September 2016;16:126-128.
- 11) Chen DM, Lee PT, Chou KJ, Fang HC, Chung HM, Chen DM, et al. Descending aortic thrombosis and cerebral infarction after massive wasp stings. *Am J Med* 2004;116:567-9.