

The Bee Sting Related Wolff-Parkinson-White Syndrome

SHANMUGA RAVI SANTHOSH M., STALIN VISWANATHAN, SHANTHI KUMAR

ABSTRACT

Hymenoptera stings are common reasons for emergency visits. The admissions for the hymenoptera stings occur for systemic or unusual reactions. We are reporting a man with multiple bee stings, who presented with dizziness and palpitations and

was found to have ECG findings of the Wolff-Parkinson-White syndrome. He had no worsening of symptoms or new ECG changes during his hospitalization. The hymenoptera related cardiac effects have also been reviewed and summarized.

Key Words: Hymenoptera stings, Coronary syndrome, Arrhythmia, Kounis syndrome

INTRODUCTION

Bees, hornets, wasps and ants are grouped under the order of hymenoptera. All these hymenopteran insects commonly cause local reactions. Unusual reactions which affect the cardiac, renal, pancreatic and the neurological systems have been rarely reported. We have described an electrocardiographic complication which arose from multiple bee stings, that has not been previously reported.

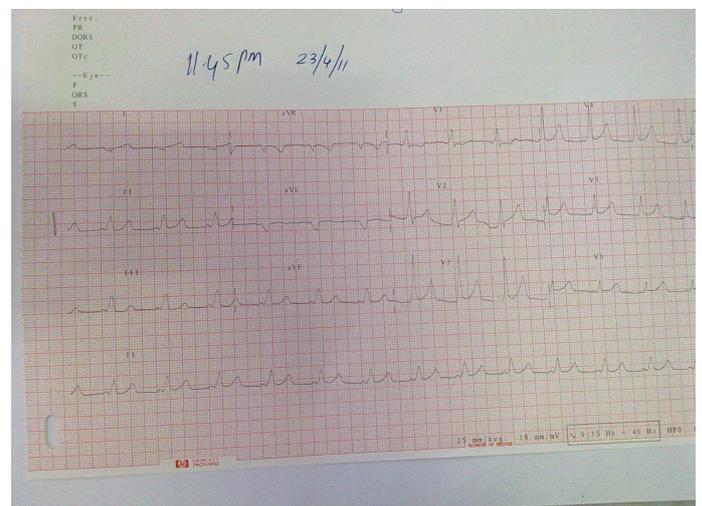
CASE

A 32-year old clerk who worked in a factory came with a history of multiple bee stings [~five] to his lips, right eye-lid and right ear lobe. There was no history of retained stingers. He was taken to the company's hospital with a history of palpitations and dizziness. He had only lip and ear lobe swellings, with an otherwise normal examination. He had been administered intravenous methyl prednisolone 125 mg and chlorpheniramine along with intramuscular diclofenac 50mg. He was referred to our institution in view of the electrocardiographic changes which were noted in that hospital. There were no other cardiorespiratory symptoms or signs. He had never smoked and was a teetotaler. He had no family history of heart disease. At admission, his pulse was 96/min, his blood pressure was 110/80mm Hg and his respiratory rate was 18/min, with a normal systemic examination. His upper lip and his right ear lobe had minimal swelling and redness. There were no other visible skin changes. His investigations revealed haemoglobin -13.4g/dL, total counts -9.0x10⁹/L, with 92% neutrophilia, blood sugar -8.96mmol/L, urea- 8.93mmol/L, creatinine-80µmol/L, creatine kinase- [CK-MB] 16U/L, troponin I- negative and total IgE levels of 126U/L[<150]. His electrocardiogram revealed a short PR-interval and a delta wave which were suggestive of the Wolff-Parkinson-White syndrome (WPWS) [Table/Fig-1]. His echocardiography report was normal. The patient was observed in the hospital for 3 days and no new symptoms or new changes in the ECG were found. He was given injectable chlorpheniramine and hydrocortisone 100mg at the time of his admission. In view of his age, his non-smoking status and the absence of new symptoms, a coronary angiography was deferred after consultation with the

cardiologist. The ECG findings subsided spontaneously on a follow up visit a week later.

DISCUSSION

The hymenoptera stings typically cause type IV hypersensitivity (IgG) mediated focal and large local skin reactions (>10cm), which our patient had. He also suffered a severe allergic reaction in the form of WPWS. The hymenoptera venom contains both allergenic [mainly phospholipase A₂] and thrombogenic substances along with vasoactive mediators. These substances can cause either hypotension or hypertension. Hypertension and an increased myocardial oxygen demand can predispose to ischaemia just as hypotension can [1]. Mellitin, the major component of the bee venom induces catecholamine release [2]. Metalloproteinases like tryptases and leukotrienes, both of which mediate hypersensitivity reactions, have a multitude of cardiac effects that include the destabilization of plaques and coronary vasospasm. Intravenous injections of Africanized Bee Venom [ABV] into Wistar rats had caused elevations of cardiac noradrenaline and acute myocardial infarction lesions [3]. The ABV injection temporarily



[Table/Fig-1]: ECG at admission revealing WPW syndrome

causes reduction in the heart rate and the mean arterial pressure, which is similar to the picture in the Bezold-Jarisch reflex. ABV consists of vasoconstrictors like adrenaline and noradrenaline and vasodilators like histamine. Histamine modulates inflammatory cells, activates platelets and can cause coronary vasoconstriction [4]. Hypertension and subsequent ischaemia [which are partly contributed by the direct myocardial toxicity] can lead to infarction and ECG changes. These effects on the heart may be reduced by atropine [5].

Coronary events are very rare in the hymenoptera stings. Bee sting fatalities are generally associated with the preexisting coronary lesions. Coronary events and electrocardiographic changes have been described in three hymenoptera families-namely the bees, wasps, and the hornets. Twenty four odd cases of Myocardial

1	2011	Wasp	Myocardial infarction [MI]	Valla et al.
2	2011	Bees	Kounis syndrome	Karasu et al.
3	2010	Bees	ECG changes of MI-2 children	Biteker et al.
4	2009	Bees	Acute coronary syndrome	Murat et al.
5	2009	Wasps	Stent thrombosis, MI	Greif et al.
6	2009	Hornets	MI	Cvetkovic-Matic D. et al.
7	2009	Bees	MI	Mytas et al.
8	2009	Bees	MI	Taqqar et al.
9	2008	Bees	Ventricular fibrillation	Quercia et al.
10	2008	Bees	MI, ST segment elevation, RBBB	Erbilen et al.
11	2008	Bees, wasp	1 case each; MI, normal coronaries	Bitekar et al.
12	2006	Hornet	MI with Atrioventricular block	Korantzopoulos et al.
13	2005	Wasp	Acute MI	Bongo et al.
14	2003	Wasp	Silent MI	Lombardi et al.
15	2003	Wasp	Atrial flutter	Fisher et al.
16	2002	Wasp	Acute MI	Calveri et al.
17	2001	Bees	MI	Quercia et al.
18	2001	Bees	MI	Ceyhan et al.
19	2000	Bees	MI	Magadle et al.
20	1997	Bees	Atrial flutter and fibrillation	Law et al.
21	1994	Bees	posterior wall MI	Engrav et al.
22	1994	Wasp	Acute MI	Wagdi et al.
23	1988	Bees	Ischemic ECG changes	Nagaratnam et al.
24	1988	Wasp	Acute MI	Jones et al.
25	1979	Yellow jacket	Electrographic changes	Rowe et al.
26	1997	Bees	MI	Massing et al.
27	1976	Wasps	Acute MI	Levine et al.
28	1974	Wasps	Reversible electrographic changes	Brasher et al
29	1972	Hornet	Ventricular ectopics	Shilkin et al.
30	1970	Hornet	Ventricular ectopics	Durie et al.

[Table/Fig-2]: Coronary syndromes and electrocardiographic changes in hymenoptera stings

Infarction (MI) in hymenoptera stings have been reported [Table/Fig-2]. Wasp and bee stings have similarly caused 9 and 13 cases of MI respectively [Table/Fig-2]. Two acute coronary syndromes 1 with and 1 without an ST elevation MI] have been described following hornet stings [3]. Other electrocardiographic changes have been described in hymenoptera stings. These changes include ischaemia, atrial flutter and fibrillation, a right bundle branch block, ventricular fibrillation (VF), ventricular ectopics, and a wandering pacemaker [6 -10]. The patient with VF briefly became comatose following hypoxia. Atrial arrhythmias occur in patients with preexisting atrial diseases like the left atrial enlargement.

The electrocardiographic changes in hymenoptera envenomation have been postulated to be caused by the use of epinephrine, myocardial ischaemia which is caused by bronchoconstriction related hypoxia [5,7], an anaphylaxis related coronary vasospasm or a preexisting heart disease. The coronary syndrome which is related to allergic reactions [venom, drugs] is called the Kounis syndrome [4].The patients with this syndrome generally have ECG changes of infarction and elevated cardiac enzymes. But our patient never had angina nor did he have elevated cardiac enzymes (troponin I and CK-MB). Intradermal venom skin tests and increased histamine/ tryptase levels are generally observed in these patients. We did not have the facilities for conducting such tests. Only tachyarrhythmias had been previously reported with bee stings [8,9].

In conclusion, bee stings can rarely cause electrocardiographic changes which may or may not be life threatening; sometimes they are associated with coronary events. An ECG may be required for all the victims of hymenoptera stings, even in the absence of systemic symptoms, during emergency visits. Due to the rare coronary events, their observation periods will have to be extended as well.

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