

Multiple Wasp Stings Induced Acute Kidney Injury: A Case Report

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Abstract

Case Report

The clinical manifestations of wasp stings are often mild and localized to the sting site, vulnerable people may exhibit multisystemic and potentially lethal consequences such as anaphylactic reaction, intravascular hemolysis, rhabdomyolysis, acute renal failure and shock. Acute kidney injury (AKI) can result from wasp stings through different mechanisms. Here, we describe a case of 28-year-old lady who experienced acute renal injury (AKI) following fifteen days of multiple wasp stings. After three sessions of hemodialysis (HD) along with steroid and supportive care, her renal function was returned to normal. This case study emphasizes that managing multiple wasp stings specially in complicated cases with AKI should be consulted with specialized clinics which have dialysis facility. The management of wasp stings induced AKI should start as early as possible. The majority of survivors experience a satisfactory renal recovery after receiving comprehensive dialysis assistance when progressive renal failure develops.

Keywords: Acute Renal Injury (AKI), Hemodialysis (HD), Lethal Consequences, Wasp Stings.

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INTRODUCTION

Wasp stings are not uncommon in the tropical countries. The wasp venom is a complex protein-based material that have an impact on different organ and tissues [1]. Wasp stings are very painful that can locally induce itching, swelling, and redness. The majority of these allergic reactions are mild to moderate, but some individuals may have severe allergic reactions such as breathing difficulties or anaphylaxis, which require emergency medical attention. Multiple wasp stings may result in potentially lethal life-threatening consequences include rhabdomyolysis, intravascular hemolysis, anaphylactic reactions, acute kidney injury (AKI), shock or even death [2].

Wasp stings-induced AKI is a rare but serious consequence; it is typically brought on by toxic-ischemic mechanisms such as hypovolemia, myoglobinuria, intravascular hemolysis, acute tubular necrosis, and direct toxicity [3]. Here, we have documented a case that was effectively treated after presenting with oliguria and generalized edema that was diagnosed as AKI following multiple wasp stings. This case report illustrates the diverse presentation of wasp stings that might help to raise awareness among the clinicians.

CASE REPORT

A 28-year-old healthy woman presented with burning pain all over the body along reduced urine output following multiple wasp sting. She was stung by wasps at multiple sites while doing her regular household

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chores 15 days back. Then she took some paracetamol and oral antihistamine medications by herself. But as her pain did not subside and she developed generalized weakness she visited a local hospital, where after initial evaluation she was admitted and treated with some injectable saline and medications the name of which she couldn't mention. Her pain subsided with this treatment. She also noticed gradual reduction of urine output for the last 13 days to about 100-200 ml per day which was associated with high colored urine. But there was no history of burning sensation during micturition, hesitancy or urgency. At that time, she was experiencing generalized swelling, extreme weakness, anorexia, shortness of breath and occasional vomiting for same duration. With this complains she was then referred to National Institute of Kidney Diseases and Urology

(NIKDU), Dhaka, Bangladesh for better management. The patient had never used any nephrotoxic drugs or had any other serious medical conditions, such as hypertension, diabetes mellitus or any acute/chronic disease.

General physical examination revealed that; she was ill-looking, mildly anemic and moderately edematous; multiple wasp stings marks were present over the skin of her back and upper extremities (Figure- 1). Her blood pressure was 140/95 mm Hg and pulse rate was 88 beats per minute. Respiratory rate was 24 breaths/minute. Systemic examination of respiratory system revealed features of bilateral pleural effusion. Clinically, the other systemic evaluation was normal.



Figure 1: Wasp bite marks over the skin of [A] Back of the trunk and [B] Arm

The results of the investigations showed that she had significant anemia, neutrophilic leucocytosis, with a high C- reactive protein (CRP) level, her creatinine phosphokinase (CPK) level was 585 (U/L), lactate dehydrogenase (LDH) level was 448 U/L, blood urea was 314 mg/dl, serum creatinine level was 22.1 mg/dl, having hyperkalemia in serum electrolytes analysis [Table- 1]. Her coagulation profile and liver function tests were within normal limit, but urine R/M/E report showed moderate proteinuria without any form of hematuria. Her FDP dimer was negative, and circulating eosinophil count was raised. Metabolic acidosis was observed in arterial blood gas analysis. The ultrasonogram (USG) of kidney, ureter and bladder (KUB) region showed that both kidneys were normal in size with increased cortical echogenicity and moderately maintained corticomedullary differentiation, the

electrocardiogram (ECG) revealed feature of hyperkalemia, but echocardiography and chest X-ray findings were normal. She was labelled as a case of acute kidney injury (AKI) with hyperkalemia due to multiple wasp stings. Emergency hemodialysis (HD) was done with blood transfusions following resuscitation. All necessary general supportive measures were taken accordingly. She was treated by inj. Methylprednisolone 1 gm IV daily for 3 days followed by oral steroid (1 mg/kg body weight) for 14 days then gradually tapered over a period of 4 weeks. Total 3 session HD was done along with one-unit packed cell was transfused in each session. Initially urine output was 100 ml/day then urine output was gradually increased from 4th day of starting inj. Methylprednisolone, which was almost 3 L/day during discharge. Serum creatinine was reduced spontaneously. At follow-up (after four weeks), her KUB

ultrasonogram revealed that both kidneys were normal in size with normal echogenicity in the kidneys and corticomedullary differentiation was well-maintained in

both kidneys. All the follow-up renal function tests were normal [Table- 1].

Table 1: Different parameters of the patients at different time interval

| Parameters | On admission | During discharge | At follow up |
|---|---|--|--|
| Hemoglobin (Hb) (gm/dl) | 7.6 | 11.1 | 12.7 |
| Total WBC count/cu mm | 14,750 | 10,230 | 7,000 |
| Total circulating eosinophil/cu mm | 825 | 480 | 175 |
| C- reactive protein (CRP) (mg/L) | 65 | | |
| CPK (U/L) (<145 U/L) | 585 | 184 | 88 |
| LDH (U/L) (135-225 U/L) | 448 | 213 | 146 |
| Urine R/M/E | Protein:++ RBC: nil Pus cell: 6-8/hpf pH- 4.6 | Protein: trace RBC: nil Pus cell: 0-2/hpf pH- 5.8 | Protein: nil RBC: nil Pus cell: 0-2/hpf pH- 6.2 |
| Blood Urea (mg/dl) | 314 | 41 | 18 |
| Serum creatinine (mg/dl) | 22.1 | 1.3 | 0.8 |
| Na (mmol/l) | 135 mmol/l | 136 | 138 |
| K (mmol/l) | 6.5 mmol/l | 4.5 | 4.6 |
| Cl (mmol/l) | 92 mmol/l | 96 | 94 |
| Serum albumin (mg/dl) | 3.6 | | |
| Serum calcium (mg/dl) | 8.6 | | |
| Serum phosphate (mg/dl) | 7.6 | | |
| Serum uric acid (mg/dl) | 8.4 | | |
| USG of kidney ureter and bladder (KUB) region | Both kidneys were normal in size with increased cortical echogenicity and moderately maintained corticomedullary differentiation. | | Both kidneys were normal in size with normal cortical echoes and well-maintained corticomedullary differentiation. |
| ECG | Hyperkalemia | | |
| Echocardiography | Normal | | |
| Chest X- Ray | Normal | | |

DISCUSSION

Wasp toxin consists of different bio-active substances such as histamines, serotonin, phospholipids, hyaluronidase, and antigen; that produce various clinical symptoms in human after sting [4]. Among these; phospholipase A₂ starts inflammation, hyaluronidase enhances to spread venom, melittin possess- hemolytic, vasoactive, contractile, and cellular anti-membrane properties, histamine increases vascular permeability and apamin is a neurotoxic [5]. The clinical symptoms due to wasp stings usually depends upon- number of wasp bites, potency of the venom and immunity of the patient. Local symptoms to a wasp bite include pain and swelling, whereas systemic allergic reactions can range from mild or moderate (angioedema, breathlessness, abdominal pain) to severe (laryngeal edema, hypotension, unconsciousness or even death) [6]. A terrible consequence that might happen in the initial hours following wasp stings is anaphylaxis. Which then followed by liver damage, coagulation abnormalities, hemolysis or rhabdomyolysis within first three days. In susceptible patients, this may be further followed by renal injury that peaks in four to nine days [7].

Mortality or morbidity typically follows 20–200 wasp stings in an individual [8]. However, according to Watana D, 500 stings may be lethal to an adult due to direct toxicity, while only 30 to 50 stings can lead to fatalities in children, and even a single sting might cause anaphylactic shock in a previously sensitized individual [9]. Our patient had almost 60 sting marks over the skin on different parts of her body including- her back of the trunk, arms and neck. In our case, an anaphylaxis reaction (hypersensitivity) to wasp venom was not suspected as per clinical history from the patient.

Although the exact incidence of acute kidney injury (AKI) after wasp sting is unknown, a retrospective study conducted in Thailand found that seven out of 45 patients (15.5%) experienced AKI following wasp stings [4]. In different case series, renal biopsy revealed that acute interstitial nephritis was the cause of acute kidney injury without signs of shock, hemolysis, or rhabdomyolysis [10-12]. Acute kidney injury (AKI) has also been reported to result from a combination of acute tubulointerstitial nephritis and acute tubular nephropathy [12].

We have found the evidence of hemolysis and rhabdomyolysis in this instance. However, the level of myoglobin in urine was not checked. Clinically patient had anemia with low hemoglobin level (7.6 gm/dl). Despite the absence of RBC in the urine routine examination, the color of the urine was red. Continuous hemolysis was also indicated by a rise in CPK and LDH levels.

Additionally, our patient had reduced urine output. It was documented that, acute kidney injury (AKI) brought on by wasp stings might manifest as hypotension, microscopic or macroscopic hematuria, oliguria, and anuria [13]. It has also been reported that several wasp stings can cause delayed onset immune-mediated interstitial nephritis, with minimum clinical manifestation at the time of the sting and a gradual reduction in urine production one week after wasp stings [14]. Since the exact long-term renal morbidity of wasp stings is still unknown, prompt detection and treatment of AKI due to wasp stings are crucial to preventing further renal damage.

To identify accurate renal lesion, renal biopsy is recommended when renal function is declining or not improving, which also dictates the appropriate treatment strategy [12]. Steroids can be used to treat acute interstitial nephritis [10-12]. Steroids promote early renal healing and ultimately avoid irreversible kidney damage by reducing interstitial fibrosis in acute interstitial nephritis. We couldn't perform renal biopsy in our case because of patient's refusal.

The prognosis of wasp stings related complications is depends upon the time interval between the sting and hospitalization. There is no special therapy for wasp stings, and there is no specific antidote against wasp venom. Removal of the stingers and early detection of toxin-related complications are the first steps in immediate management. The main objectives of treatment should be to prevent volume depletion tubular obstruction and aciduria, all of which can result in AKI.

In the current case, we first administered intravenous calcium gluconate to treat hyperkalemia, intravenous NaHCO₃ to treat acidotic breathing and urine alkalization along with hemodialysis. Our patient received three sessions of hemodialysis (HD) followed by steroid and supportive treatments. Following a 15-day hospital stay, the youngster was released with instruction to return after four weeks with urine R/M/E, complete blood count (CBC), serum creatinine and ultrasonogram of KUB region reports. The findings of all follow up reports were normal. These outcomes were comparable to other research where 86% of patients received dialysis and hospital stays ranged from one to 39 days [5]. Multiple wasp stings can cause acute kidney injury (AKI), which is typically reversible. Recovery times range from a few days to weeks, and most patients recover in a month [11]. Since the exact long-term renal

morbidity following wasp stings is unknown, early detection and treatment are crucial to prevent renal damage.

CONCLUSION

Wasp stings are not uncommon, particularly in rural regions. Multiple wasp sting is a serious condition that puts victims at high risk for suffering acute renal failure along with multi-system involvement. Treatment for wasp stings induced AKI should begin as soon as feasible. When progressive renal failure develops, extensive dialysis support leads to a satisfactory renal recovery, with the majority of survivors experiencing a return to normal renal functions. The current case highlights that physician should be aware of the phenomenon of delayed onset hypersensitivity reaction following wasp stings.

Consent of the Patient

This article did not discuss any non-traditional therapeutic methods; only the disease course was reported in this article. Therefore, patient consent was not an ethical issue.

Conflicts of Interest: The authors have stated that there are no conflicting interests.

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