Acute Kidney Injury Following Wasp Stings - A Case Report and Literature Review

SAYEEDA ANWAR¹, NASIR HOSSAIN², FARZANA KABIR ROZANA³, SULTAN MAHAMUD SUMON⁴.

Abstract

The manifestations of wasp stings are usually benign and localized at the site of stings but susceptible individuals may present with multisystem and potentially fatal complications like hemolytic anaemia, acute renal failure and shock. We report here a child who developed acute kidney injury seven days after multiple wasp stings. The renal functions recovered with supportive management including two sessions of peritoneal dialysis. This case report highlights that management of some of the wasp stings should be done in consultation with centre which has facilities for dialysis. The management of wasp sting should be started as early as possible and when progressive renal failure ensues, intensive dialysis support results in good renal recovery in majority of survivors.

Key Words: Acute kidney injury, Wasp stings, Venom.

Introduction

Wasp stings are not uncommon in Bangladesh. The manifestations are usually benign and localized at the site of stings. However, susceptible individuals may present with multisystem and potentially fatal complications like hemolytic anaemia, acute renal failure and shock. Acute renal failure is due to hypovolemia, anaphylactic shock, myoglobinuria, hemolysis, acute tubular necrosis and from direct toxicity.

Hymenoptera are social creatures that typically sting following provocation. These include apids (honeybees and bumble bees), vespids (wasps, hornets and yellow jackets) and ants. Though the worker bees and bumblebees sting in defense; attacks are commonly carried out by swarm of bees or wasps¹. Wasp stings are a well known form of envenomation in the tropics². The manifestations range from pain, erythema and edema at the site of sting to anaphylaxis, generalized urticaria, angioedema and dyspnoea which usually occur within 10 minutes of sting³ or it may prolong more than 24 hours.

Intravascular hemolysis, myocardial infarction, pulmonary haemorrhage, thrombocytopenia, rhabdomyolysis and acute kidney injury are atypical multisystem reactions to stings⁴.

Here in we report a two year three months old boy who presented with acute kidney injury due to intravascular hemolysis following multiple wasp stings. This case report highlights the diverse manifestations of wasp stings to increase awareness of pediatricians.

Case Report

A 2 year 3 months old boy, second issue of nonconsanguinous parents admitted in the department of Nephrology, Dhaka Medical College Hospital, Dhaka, with painful itching on different parts of the body for seven days following accidentally bitten by a swarm of wasps while playing in the playground. Immediately the child developed severe pain and intense itching on different parts of the body. After two days of wasp bite he developed gradual swelling of whole body starting from face. He developed oliguria followed by anuria and dyspnoea for one day without any history of offending drugs or familial nephropathy.

The boy was irritable, puffy, edematous, and moderately anemic. There were multiple bite marks
(about 40 in number) was present over scalp, face, shoulder and forearm, variable in size and shape-
largest one being measured 5x5 mm with each lesion having central necrosis surrounded by itchy red
edematous zone and tender on palpation. His vital parameters showed that he was febrile, tachypnoic &
hypertensive but other systemic examinations were normal.

Investigation reports revealed he was moderately anemic with neutrophilic leucocytosis, CRP positive,
blood urea-156 mg/dl, S.creatinine-8.18 mg/dl and S. electrolyte showed hyperkalaemia. His circulating
eosinophil count was raised, FDP dimer negative, Urine R/M/E, coagulation profile & liver function tests
were normal. Arterial blood gas showed metabolic acidosis. Echocardiography and chest X-ray-normal,
Ultrasonogram of KUB-Both kidneys are echogenic with moderately maintained corticomedullary
differentiation.

The child was admitted with a diagnosis of acute kidney injury (stage III) following multiple wasp stings.
After resuscitation emergency peritoneal dialysis was done for uremic encephalopathy and blood
transfusion for anemia along with general supportive care. Intrapерitoneal dialysis was continued for 96
hours(08/08/2014-11/08/2014) and post dialysis investigation revealed S. creatinine 3.8 mg/dl, blood
urea-96 mg/dl and S.potassium-4.5 mmol/l. At 48 hours interval peritoneal dialysis was repeated and
kept for another 96 hours from 14/08/2014 to 17/08/2014. Before and after second peritoneal dialysis S.
creatinine, blood urea and S. potassium were 5.2 to 2.5 mg/dl,70 to 40 mg/dl and 5.5 to 3.5 respectively.
His urine and blood culture revealed no growth.

Patient’s condition improved and urine output was gradually increasing to >1ml/kg/day by 7th day of
admission and after 1st dialysis. His blood urea and S. creatinine levels also declined steadily over
following days with blood urea and serum creatinine levels coming down to 3.6mg/dl and 1.2 mg/dl
respectively at discharge on 16th day on 23/08/2014. Renal biopsy was not considered as his renal
functions improved. The follow up renal function tests were normal and after 4 weeks his DTPA and DMSA
showed normal cortical tissue and normal functioning both kidneys with normal GFR (left kidney-52.7 ml/
min and right kidney-53.8 ml/min).

Discussion
A wasp when threatened or attacked, stings in self
defiance while mass envenomation occurs when their
colony is disturbed. Wasp toxins include histamines,
serotonin, phospholipids, hyaluronidase and antigen
which cause different clinical manifestations following
wasp stings7, 6. Children of all age and sex are
vulnerable to wasp sting8, 9,10.

Phospholipase A2 initiates inflammation, hyaluronidase causes spread of venom, melitin has
hemolytic, vasoactive, contractile and cellular antimembrane properties, histamine increases
vascular permeability and apamine is a neurotoxin11,12. The local reactions following wasp
bite include pain and swelling, while systemic allergic reactions may be mild, moderate (angioedema,
asthma, abdominal pain) or severe (laryngeal edema, hypotension, loss of consciousness)14,13,15.

Anaphylaxis is a dreaded complication occurring
within first few hours after the stings. It may be
followed by liver injury, coagulation derangements,
rhabdomyolysis or haemolysis which peak in one to
three days. This may further be followed by kidney
injury that peaks in four to nine days in susceptible
patients16.

The incidence of acute kidney injury following wasp
sting in children is not precisely known although
seven out of 45 (15.5%) patients had developed acute
kidney injury in a retrospective study in Thailand6.
Causes of acute kidney injury were rhabdomyolysis
and intravascular haemolysis which were found to be acute
interstitial nephritis on renal biopsy17.

There were many case series of acute kidney injury
without evidence of shock, haemolysis or
rhabdomyolysis which were found to be due to acute
interstitial nephritis on renal biopsy18,19.

Similarly a combination of acute tubulointerstitial
nephritis and acute tubular nephropathy has also
been described causing acute kidney injury20.
Recently delayed onset immune mediated interstitial
nephritis following multiple wasp stings has also been
described where there were minimal clinical
manifestation at time of sting followed by gradual
reduction in urine output after one week21.

In our patient Acute tubular necrosis following
intravascular haemolysis was suspected due to
anaemia, high CPK level and no prior history of
exposure to any nephrotoxic drugs or preexisting
renal disease. The exact cause of acute kidney injury
could not be established as renal biopsy was not performed. Interstitial nephritis, direct nephrons toxicity or combinations of these factors as cause of acute renal failure could be a possibility.

Our patient also presented with decreased urine output and uraemia. Acute kidney injury secondary to Hymenoptera stings might present as oliguria, anuria, microscopic or macroscopic haematuria and hypotension. Our patient underwent two sessions of peritoneal dialysis, which is similar to previous studies where hospital stay ranged from one to 39 days and 86% of patients underwent dialysis. After 16 days of hospital stay the boy was discharged with advise to come after 4 weeks with DTPA & DMSA reports which were also came normal.

This highlights that these patients should be managed in consultation with centre with facilities for peritoneal dialysis or haemodialysis.

Renal biopsy is recommended when renal function is deteriorating or not improving to detect renal lesion as that determines specific drug treatment. Acute interstitial nephritis can be treated with steroid. Steroid reduces interstitial fibrosis in acute interstitial nephritis helping early renal recovery and ultimately preventing irreversible kidney damage.

Prompt recognition and treatment is very important to prevent renal damage as the long term renal morbidity of wasp stings are not known precisely.

Conclusion:
Wasp sting is a common phenomena mostly in rural areas. The management of wasp sting should be started as early as possible and when progressive renal failure ensues, intensive dialysis support results in good renal recovery with return of renal functions to normal in majority of survivors.

References


