

Case Reports

Acute renal failure following multiple wasp bites

W D V N Gunasekara¹, N V I Ratnatunga², A S Abeygunawardena³

Sri Lanka Journal of Child Health, 2007; **36**: 67-8

(Key words: wasp bites, acute renal failure)

Introduction

Wasps and bees descend from order Hymenoptera. All social wasps belong to family Vespidae and *Vespa affinis affinis* (Hornet or “Debara”) is the species found in Sri Lanka. Other stinging hymenopterans in Sri Lanka are Hive honeybee or “Mee massa” (*Apis cerana*), Giant honeybee or “Bambara” (*Apis dorsata*) and Little honeybee or “Danduvel massa” (*Apis florea*) and they belong to family Apidae. Acute renal failure is a rare clinical manifestation of hymenopteran bites.

Case report

A 65 year old woman and her 1 year 2 month old grand daughter were attacked by a swarm of wasps while inside a small jungle in Jayanthipura, Polonnaruwa. About 10 bite marks were identified over the head, face and upper trunk of the baby, on admission to Base Hospital Polonnaruwa. She developed a mild urticarial rash, and during the second day became progressively drowsy and had a short lasting convulsion.

Baby had been anuric for 24 hours, when transferred to Teaching Hospital Peradeniya (THP). She was drowsy, ill, pale and had generalized oedema. The blood pressure was 130/80 mmHg. She remained markedly oliguric. Blood urea and serum creatinine increased to 34mmol/l and 300µmol/l respectively. Peritoneal dialysis was started on the 4th day following bites and continued for further three days with intense supportive care. She went into a diuretic phase on day 9 and renal functions normalized after 1 month.

Previously she had been quite healthy and active without any significant ailments. During the present illness she did not have anaphylaxis or hypotension and there were no bleeding manifestations, jaundice, red coloured urine or features of rhabdomyolysis such as limb immobility, muscle pain or tenderness. Urinalysis

did not reveal albumin, red blood cells or casts. Urine cultures were sterile. Her haemoglobin was 90g/l, but blood picture did not reveal evidence of haemolysis and leucocyte and platelet counts were within normal ranges. Serum potassium did not increase beyond 5mmol/l. Liver enzymes were not elevated. Ultrasound scan of the abdomen showed evidence of renal parenchymal disease, but no structural abnormalities were noted. Renal biopsy performed on day 7 following the bites (figure 1 A-C) showed features of acute tubular necrosis (ATN). In the absence of any other aetiologies, a diagnosis of acute renal failure with ATN, due to multiple wasp bites was made.

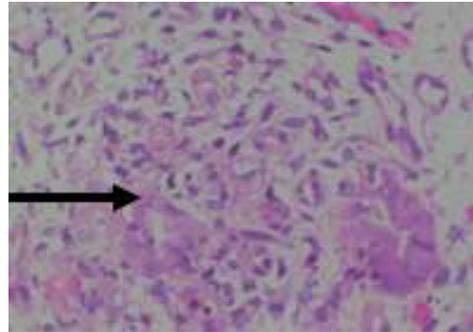


Figure 1A - A granuloma has formed following a ruptured distal tubule. (H and E stain)

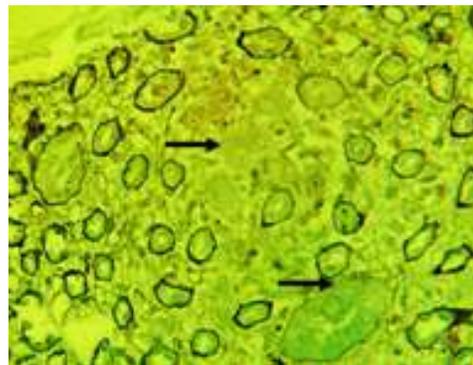


Figure 1B - Missing black colour outline indicates total loss of tubular epithelium (top arrow) and the gap in the basement membrane of the tubule (down arrow) indicates a ruptured tubule (Silver stain)

¹Senior Registrar in Paediatric Nephrology, Teaching Hospital, Peradeniya. ²Professor of Pathology, ³Senior Lecturer in Paediatrics, Faculty of Medicine, University of Peradeniya

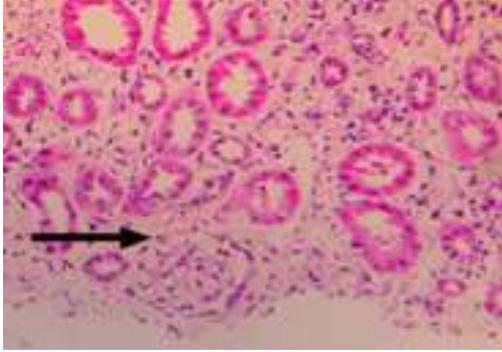


Figure 1 C – Histologically normal glomeruli excluded a glomerular pathology (H and E stain)

Discussion

A spectrum of clinical manifestations ranging from nonspecific skin lesions to anaphylactic shock can occur, in a previously sensitized person, following even a single hymenopteran bite¹. An unexposed person can get cellular damage due to systemic envenomation following multiple bites. Toxins like histamine, serotonin, wasp kinin, phospholipase A₂, mellitin and hyaluronidase are responsible for the latter^{1,3}. Toxaemia can lead to intravascular haemolysis, thrombolysis, disseminated intravascular coagulation (DIC), rhabdomyolysis, centrilobular necrosis of liver, ATN of kidney and sub endocardial necrosis^{1,2,3}. Although toxins of 500 stings are estimated to be capable of killing an adult, as few as 30 stings can cause fatal envenomation in children^{1,3}.

ARF can result from direct toxicity or following haemolysis, rhabdomyolysis or DIC. Circulatory compromise due to anaphylaxis or dehydration can cause pre renal type of ARF. ATN is the histological end result of these pathologies and acute tubular-interstitial nephritis (ATIN) also can occur in combination^{1,3,5}. Thiruventhiran and et al had analyzed 24 cases of ARF due to hymenopteran bites and all have had evidence of haemolysis and/or rhabdomyolysis. Pigment casts in tubules also had been noted, in addition to ATN, of the biopsied patients of this series, supporting pigment nephropathy secondary to haemoglobinuria or myoglobinuria, to be the likely patho-mechanism of renal damage¹. The mechanism of injury may be related to dissociation of haemoglobin/myoglobin to ferrihaemate-tubular toxin, precipitation of pigments in tubular lumen and vasoconstriction.

The most probable cause of ATN of our patient is direct kidney damage by circulatory toxins. A few

cases had been reported previously having same pathomechanism³. Our patient benefited by early institution of peritoneal dialysis and the intense supportive care. Some cases with ATN treated with steroids have had a good outcome⁵. Steroids may hasten renal recovery by preventing interstitial fibrosis. Early recovery had been noted in some other patients with ARF with haemolysis and/or rhabdomyolysis who had been treated with forced alkaline diuresis, early in the course^{1,2}. Alkaline diuresis might inhibit dissociation and precipitation of pigments.

In conclusion, it is important, not only to provide medical care as soon as possible to patients with multiple hymenopteran bites, but also to anticipate major clinical problems due to systemic envenomation in the days to come. Peritoneal dialysis and intense supportive care are the mainstay of treatment for ARF. Steroids and alkaline diuresis might be effective in cases with interstitial nephritis and pigment nephropathy respectively.

Acknowledgements

We thank Dr A.W.M. Wazeel (check spelling) (Consultant Nephrologist GH Kandy) and Mr L. Weerathunga (Dpt of Entomology, Sri Lanka National Museum).

References

1. Thiruventhiran T, Goh BL, Leong CL, Cheah PL, Looi LM, Tan SY. Acute renal failure following multiple sting. *Nephrol Dial Transplant*. 1999; **14**:214-7.
2. Kim YO, Yoom SA, Kim KJ, Lee BO, Kim BS, Chang YS, Bang BK. Severe rhabdomyolysis and acute renal failure due to multiple wasp stings. *Nephrol Dial Transplant* 2003; **18**:1235.
3. Bhatta N, Singh R, Sharma S, Sinha A, Raja S. Acute renal failure following multiple wasp stings. *Pediatr Nephrol* 2005; **20**(12):1809-10.
4. Zhang R, Meleg-Smith S, Bhatuman V. Acute tubulointerstitial nephritis after wasp stings. *Am J Kidney Dis*. 2001; **38**(6):33
5. Mathew MH, Steven RA, William EH. Intensive Care. In: Barratt T M, Avner E D, Harmon W, editors, *Paediatric Nephrology*. 4th ed. Lippincott: Williams & Wilkins, 1996; 1135-50.