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Case Report

Bilateral Orchitis following Hump-Nosed Viper Bite: A Rare Complication with Multi-organ Involvement

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Abstract

Hump nosed viper (*Hypnale* species) envenomation is an important common cause of systemic envenomation in Sri Lanka and Indian polyvalent antivenom in use does not cover this species. We present a rare case of a 45-year-old previously healthy male who developed severe multiorgan related complications following a hump nosed viper bite to the left foot. Initially presented with localized pain with swelling and clinical course rapidly progressed to acute kidney injury requiring hemodialysis, myocarditis confirmed by ECG and echocardiography and bilateral orchitis with hydrocele.

Laboratory investigations revealed rising serum creatinine, elevated liver transaminases, high troponin I levels and hematologic findings consistent with thrombotic microangiopathy. Despite the lack of effective antivenom, the patient was successfully managed through a multidisciplinary approach. Treatment included antibiotics, blood and blood products transfusions and hemodialysis.

He showed full recovery with normalization of renal function, cardiac parameters and resolution of testicular swelling on follow up. This case underscores the potential rare and severe systemic complications following hump nosed viper envenomation and highlights the urgent need for species and region specific antivenom in Sri Lanka.

Keywords: hump-nosed viper, orchitis, acute kidney injury, thrombotic microangiopathy, microangiopathic haemolytic anaemia

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Introduction

Snakebite envenomation is a common medical emergency in the tropics and remains a serious public health burden in many parts of the world, particularly in South Asia. In Sri Lanka, snake bites are common in rural and agricultural communities, with thousands of cases reported annually. Among venomous species, the hump-nosed viper (*Hypnale* species) is increasingly recognised as a medically significant snake and is responsible for a substantial proportion of hospital admissions due to envenomation. Traditionally underestimated in clinical severity, but recent studies have shown that bites from this species can lead to serious systemic effects, including acute kidney injury, coagulopathy, microangiopathic hemolytic anaemia and rarely neurological or cardiac complications [1].

Despite the clinical importance of *Hypnale* species, no effective antivenom is currently available in Sri Lanka.

The country continues to rely on indian polyvalent antivenom, which is formulated to target venom from four major indian venomous snakes, such as *Naja naja*, *Bungarus caeruleus*, *Daboia russelii*, and *Echis carinatus,* but does not provide coverage for Hypnale envenomation [2]. This creates significant challenges in clinical management, especially in severe or atypical cases where treatment relies entirely on supportive and symptomatic care.

The case presented here describes a 45-year-old previously healthy male who developed a rare and complex pattern of multiorgan involvement following a hump-nosed viper bite, including bilateral orchitis, acute kidney injury requiring hemodialysis, myocarditis and thrombotic microangiopathy. Bilateral orchitis is an exceptionally rare complication of snakebite and has not been widely reported in the literature in Sri Lanka. This case highlights the potential severity and unusual presentations of Hypnale envenomation and emphasises the urgent need for species-specific or region-specific antivenom, and increases the clinical awareness among healthcare providers in endemic regions.

Case description

A 45-year-old previously healthy male presented to the emergency department of a tertiary care hospital in Sri Lanka with a history of a snake bite to the left lateral dorsum of the foot. The incident occurred at approximately 6:30 p.m. while the patient was working in his garden. Snake identified with brown colour, head covered with large scales and a hump at the tip of the snout by the medical officer. Immediately after the bite, he developed severe localised pain, progressive swelling of the left foot extending up to the knee and mild bleeding at the site of envenomation.

On admission at 9.45 p.m., the patient appeared alert and oriented. Examination revealed significant swelling, warmth and tenderness of the left lower limb extending up to the knee. Left-lateral dorsum of foot with fang marks but no necrosis, blistering or active bleeding at the time of examination (Figure 1).

Other systemic examination was unremarkable except scrotal examination showed bilateral tender testicular swelling without signs of fluctuation or abscess formation. Throughout his hospital stay, the patient exhibited evolving signs of multisystem involvement, including acute kidney injury, testicular inflammation and features of cardiac involvement.

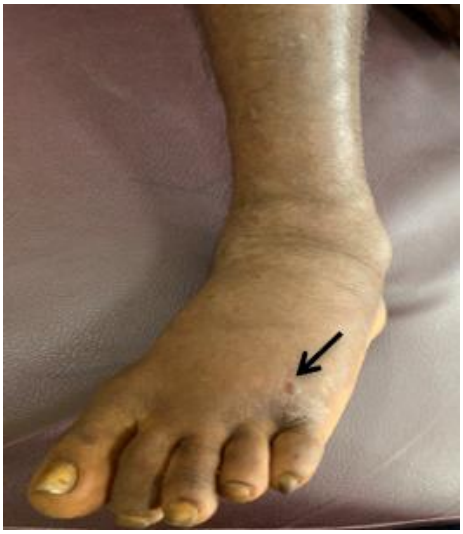

Figure 1: Site of bite, left lateral dorsum of foot with fang mark

Initial laboratory investigations revealed a normal white blood cell count ($10.7 \times 10^3/\mu L$) and haemoglobin level (12.3 g/dL) on admission. Still, within 48–72 hours, the patient developed thrombocytopenia (platelet count dropped to $35 \times 10^3/\mu L$) and a progressive rise in serum creatinine, peaking at 744 µmol/L by day 7, consistent with acute kidney injury. Inflammatory markers were significantly elevated, with C-reactive protein rising from 1.1 to 118 mg/dL (Table 1).

Coagulation studies revealed mildly prolonged prothrombin time/international normalised ratio (1.35) and activated partial thromboplastin time (40.2 sec), although the 20-minute whole-blood clotting test remained negative, suggesting no frank coagulopathy.

Liver function tests showed a transaminitis pattern with aspartate aminotransferase (AST) peaking at 348 U/L and alanine aminotransferase (ALT) at 209 U/L with indirect hyperbilirubinemia (total bilirubin 52.8 µmol/L, indirect 45.3 µmol/L). These findings suggested hepatic involvement was likely secondary to systemic envenomation and thrombotic microangiopathy.

Cardiac markers showed a significant elevation in Troponin I with a peak of 771 ng/L, and electrocardiogram showed diffuse T wave inversions in V1-V6,I, aVL, prompting further cardiac evaluation (Figure 2). Two-dimensional echocardiography confirmed myocarditis with a preserved ejection fraction (>60%) and without regional wall motion abnormalities or pericardial effusion.

Table 1: Laboratory investigations of the patient

Investigation results (reference range)	Day 1	Day 3	Day 7	Day 14	Day 25
White cell count (4-10×10³/uL)	10.7	12.1	13.9	10.2	21
Haemoglobin (11-17 g/dL)	12.3	10.1	6	9	10.6
Platelets (150-400×10³/uL)	243	35	62	260	334
Serum creatinine (60-120 Umol/L)	111	560	744	580	560
Aspartate aminotransferase (10-35 U/L)	59	348		15	
Alanine aminotransferase (10-40 U/L)	76	209		28	
Alkaline phosphatase (30-120 U/L)		46			
Serum albumin (35-52 g/L)		35.1			
Total bilirubin (5-21umol/L)		52.8			
Direct bilirubin (<3.5 umol/L)		7.4			
Indirect bilirubin (5-17 umol/L)		45.3			
Serum globulin(g/L)		21.3			
C- Reactive protein (0-5 mg/dL)	1.1	118	86	29	15
Serum sodium (135-148 mmol/L)	143	133	140	135	136
Serum pottasium(3.6-5 mmol/L)	3.3	3.97	4.1	3.4	4.9
Serum phosphate (0.8-1.5 mmol/L)				1.1	
Total calcium (2.15-2.65 mmol/L)				2.31	
Prothrombin time/ international normalised ratio	1.1	1.2	1.35	0.95	
Activated partial thromboplastin time (20 -35 S)		33		40.2	
Lactate dehydrogenase (150-225 U/L)		787			
20-minute whole blood clotting test			All negative		
Troponin I (10-53 ng/L)	221	771		356	285
Random blood sugar (100- 160 mg/dL)	158	136		287	
Urine full report		Normal			
Blood culture		No growth			
Urine culture		No growth			
Electrocardiogram (Day 4)	Sinus rhythm with diffuse T inversion in anterolateral leads				
Two-dimensional echocardiography (Day 6)	EF> 60% with evidence of myocarditis. No pericardial effusion, no regional wall motion defects				
Ultrasound abdomen (Day 4)	Bilateral evidence of acute kidney injury changes. No evidence of obstructive features. On discharge- ultrasonically normal kidney with mild hepatomegaly				
Ultrasound scrotum (Day 6)	Evidence of bilateral orchitis with mild hydrocele. No abscess collections				
Blood picture (Day 2)	Findings favour microangiopathic haemolytic anaemia as the more likely venom-induced thrombotic microangiopathy.				

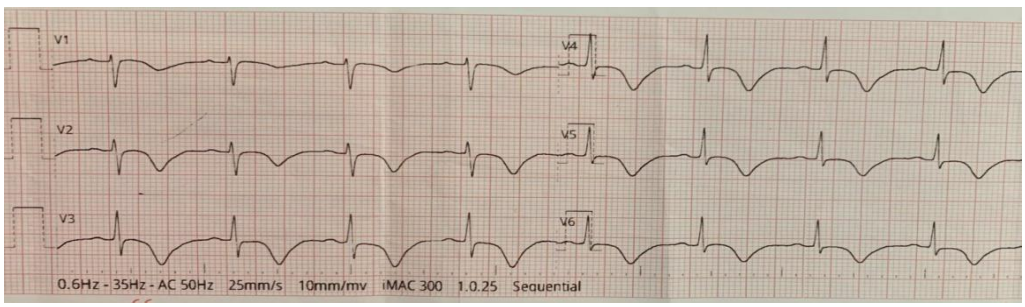

Figure 2: Electrocardiogram showed diffuse T wave inversions in V1-V6, I, aVL

Peripheral blood smear revealed features consistent with microangiopathic haemolytic anaemia, with schistocytes>1%, likely venom-induced thrombotic microangiopathy (Figure 3).

Ultrasound scan of the kidneys showed features of bilateral AKI without evidence of obstruction. Scrotal ultrasound revealed bilateral orchitis with mild hydrocele without abscesses. It is a rare finding in the context of snake envenomation. Urine and blood cultures remained sterile, ruling out bacterial sepsis. The urine full report was within normal limits despite reduced urine output during the early phase.

The patient was managed by a multidisciplinary team including physicians, nephrologists, haematologists, and a transfusion specialist. In the absence of a specific antivenom for hump-nosed viper envenomation in Sri Lanka, the treatment was entirely supportive. Initial care included fluid resuscitation, analgesics and empirical antibiotics for local cellulitis. As renal failure progressed, the patient required 10 sessions of hemodialysis, from the fifth session onward, with 5 units of fresh frozen plasma to replace depleted clotting factors and three blood pack blood transfusions were done.

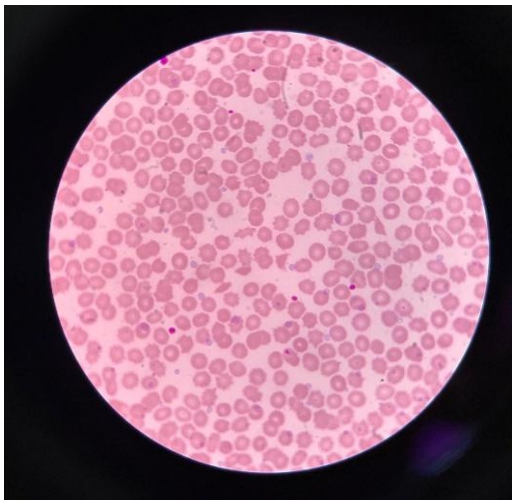

Figure 3: Blood picture after 96 hours from bite showed schistocytes, acanthocytes, burr cells, spherocytes and polychromatic cells, favouring microangiopathic hemolytic anaemia. Giemsa stain, (×40)

The patient remained hospitalised for 28 days and showed progressive, complete recovery from multiorgan involvement. By the second week, his urine output and serum creatinine normalised, indicating renal recovery, while inflammatory markers, liver enzymes, and platelets returned to normal with ongoing supportive care and hemodialysis. The bilateral orchitis with hydrocele resolved completely without surgery, confirmed by repeat ultrasonography. Troponin I levels decreased steadily, and ECG abnormalities resolved. At discharge, he was clinically stable, pain-free, and ambulant. During follow-up, renal and cardiac functions remained normal, echocardiography confirmed full recovery, and there were no residual or long-term complications, allowing him to resume normal daily activities.

Discussion

This case represents a rare, clinically significant presentation of hump-nosed viper envenomation with multiorgan involvement, including acute kidney injury, myocarditis, thrombotic microangiopathy, and bilateral orchitis. The latter is extremely rare and rarely documented in the medical literature. It underscores the diverse systemic effects of *Hypnale species* venom and provides valuable insight into its pathophysiological complexity, particularly the role of microvascular and endothelial injury in organ dysfunction. The complete recovery achieved through timely supportive care with multidisciplinary collaboration in the absence of specific antivenom further highlights the importance of early recognition and supportive management. Reporting this case contributes to the growing body of knowledge on underrecognised complications of hump-nosed viper bites in Sri Lanka and emphasises the need for species-specific antivenom. By detailing this unique constellation of findings and outcomes, the case not only expands clinical understanding but also serves as a reference for managing complex snake envenomation cases in resource-limited settings. Envenoming by *Hypnale hypnale, Hypnale nepa, and Hypnale zara* remains a significant public health challenge in Sri Lanka [2]. Although traditionally thought to cause only mild local effects, more recent clinical evidence has demonstrated the potential for severe systemic complications, including local effects, acute kidney injury, haematological abnormalities, coagulopathy, cardiac and rarely reproductive organ involvement [3]. The case described here represents a rare and severe systemic reaction to *Hypnale* envenomation in a previously healthy adult [4]. The patient developed multiorgan dysfunction, including acute kidney injury requiring hemodialysis, thrombotic microangiopathy, myocarditis and bilateral orchitis. This case reinforces the need for heightened awareness of the wide spectrum of clinical manifestations associated with

hump-nosed viper bites, especially in regions where specific antivenom is not available.

One of the most recognised systemic complications of hump-nosed viper envenomation is acute kidney injury (AKI). Factors may contribute to the pathogenesis of acute kidney injury, venom-induced haemodynamic instability, intravascular haemolysis, rhabdomyolysis, and thrombotic microangiopathy [5]. In this patient, the progressive rise in serum creatinine, reduction of urine output and ultrasound findings confirmed the diagnosis of AKI. The presence of thrombocytopenia, elevated lactate dehydrogenase, indirect hyperbilirubinemia and fragmented red cells on the blood picture suggested a thrombotic microangiopathy, likely microangiopathic haemolytic anaemia (MAHA). This further contributed to renal impairment(6). Cardiac involvement in this patient, evidenced by elevated troponin I, electrocardiogram changes, and echocardiographic myocarditis, represents a rare but increasingly recognised manifestation of hump-nosed viper envenomation. Such venom-induced myocarditis likely results from direct myocardial toxicity, cytokine-mediated inflammation, or microvascular injury due to thrombotic microangiopathy, and in this case, was self-limiting with supportive care.

The bilateral orchitis and hydrocele observed are extremely rare and may reflect a localised manifestation of systemic vascular and inflammatory injury. *Hypnale* venom contains procoagulant enzymes, phospholipase A_2, and metalloproteinases that cause endothelial damage, platelet activation, and microthrombi formation, leading to TMA. These mechanisms explain the renal, hematologic, and local tissue effects as well as testicular involvement [7].

The testes, with their rich vascular supply and rigid tunica albuginea, are susceptible to venous congestion and ischemia when microthrombi or oedema occur, resulting in secondary orchitis and hydrocele. Resolution of orchitis with supportive care supports an immune- or microvascular-inflammatory pathogenesis rather than infection, as confirmed by sterile cultures and normal imaging. Other reported complications of *Hypnale* bites include hemolytic anaemia, local necrosis, sepsis, and shock [3]. In Sri Lanka, where specific antivenom is unavailable, management remains supportive, including antibiotics, analgesics, hemodialysis, blood product transfusion, and conservative management of myocarditis and orchitis. Though therapies like steroids, plasmapheresis, and IV immunoglobulin have been explored for immune-mediated injury, evidence remains limited. This case underscores that early supportive care and multidisciplinary management can lead to full recovery, while emphasising the urgent need for species-specific antivenom to reduce multiorgan damage and hospital stay in future cases.

Conclusion

This case highlights the severe and unusual systemic complications following hump-nosed viper envenomation, including the rare occurrence of bilateral orchitis with hydrocele. It has not been widely reported in the Sri Lankan literature. The absence of a specific antivenom for hump-nosed viper bite in Sri Lanka continues to pose a major clinical challenge, particularly in managing patients with multiorgan involvement. Despite these limitations, this case highlights the potential severity and unusual presentations of Hypnale envenomation. It demonstrates that early recognition, intensive supportive care, and multidisciplinary management can lead to full recovery even in life-threatening scenarios. In clinical practice, suspicion of atypical complications of snakebite, especially in endemic regions, and preparedness to manage systemic effects beyond the commonly recognised renal and hematologic manifestations are crucial for successful management of snake bites. This case also reinforces the need to develop species-specific or region-specific antivenom, increases clinical awareness among healthcare providers in endemic regions, and supports snakebite management protocols tailored to local epidemiology.

Informed consent

Informed verbal consent was taken from the patient and the next of kin for the publication of this case report. No personal data has been displayed.

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