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Case Report

Thrombotic Microangiopathy Induced by Saw-Scaled Viper Envenomation: A Case Report

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Abstract

The saw-scaled viper (*Echis carinatus*) is one of the most venomous snakes in Sri Lanka, primarily found in dry, sandy coastal region. Bites typically cause local swelling, pain, and occasionally necrosis. Although systemic complications are less common, serious conditions such as coagulopathy and thrombotic microangiopathy (TMA) can occur, underscoring the importance of early detection and timely treatment. This case report presents a rare instance of venom-induced TMA following a saw-scaled viper bite, which led to acute kidney injury (AKI) and was successfully treated with therapeutic plasma exchange

Key words

Saw-scaled viper, Thrombotic microangiopathy (TMA), Venom-induced consumption coagulopathy (VICC), Acute kidney injury (AKI), Therapeutic plasma exchange (TPE)

Introduction

The saw-scaled viper (*Echis carinatus*) is one of the venomous snakes found in Sri Lanka, primarily inhabiting dry, sandy coastal areas (1). Bites typically occur on the feet or hands, and although dry bites are rare (about 8%), envenomation can cause significant local and systemic effects. Local symptoms include swelling, pain, and occasionally blistering and necrosis. The most commonly reported systemic manifestation is coagulopathy, often diagnosed using the 20-minute whole blood clotting test (WBCT). In rare cases, patients may develop spontaneous bleeding, thrombotic microangiopathy (TMA), renal impairment, or myocardial ischemia thrombocytopenia, and renal failure that was consistent with thrombotic microangiopathy. Thrombotic Microangiopathy Following Arabian Saw-Scaled Viper (Echis coloratus. TMA is characterized by thrombocytopenia, hemolytic anemia, and acute kidney injury, sometimes overlapping with venom-induced consumption coagulopathy (VICC). (2)

Case report

A 52-year-old previously healthy male was transferred to the Teaching Hospital Jaffna following a saw-scaled viper bite three days earlier. He was bitten on the right foot and presented initially to District General Hospital Mannar with local swelling and pain but no overt systemic bleeding. His WBCT was positive, prompting administration of 10 vials of Indian polyvalent antivenom (PAV), with another 10 vials administered after a persistently abnormal WBCT. He remained hemodynamically stable and was treated supportively.

Initial labs showed WBC 11.5 $\times 10^9$/L, Hb 16.8 g/dL, platelets 238 $\times 10^9$/L, and creatinine 83 µmol/L. Over the next three days, serum creatinine rose to 581 µmol/L, prompting his transfer for nephrology evaluation. At the Teaching hospital Jaffna he was hemodynamically stable and his urine output was preserved. Supportive management continued with hydration and monitoring of urine output and serum creatinine level.

Further investigations revealed anemia (Hb dropped to 6.6 g/dL), thrombocytopenia (platelets 22 $\times 10^9$/L), and elevated LDH (1281 U/L). A blood picture confirmed microangiopathic hemolytic anemia, and TMA was diagnosed. Despite increasing creatinine levels (up to 707 µmol/L), dialysis was not immediately indicated but later small lag and raise in creatinine level noted. Decision to start therapeutic plasma exchange (TPE)

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as treatment was taken with expert opinion. The patient underwent two cycles of TPE, resulting in improved renal function and blood counts. He was discharged on day 10 with no complications. One week later, his creatinine normalized to 94 µmol/L, and hemoglobin rose to 10.4 g/dL.

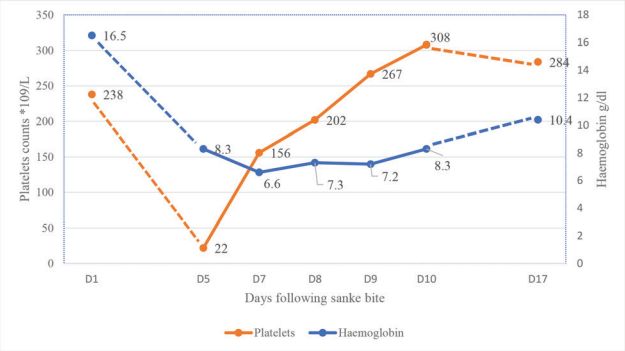

Figure 1- Blood counts distribution following snake bite

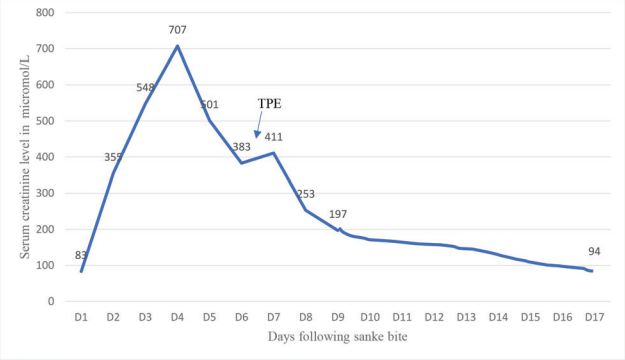

Figure 2- Serum creatinine level following snake bite

Discussion

Echis carinatus is widely distributed across the Indian subcontinent and parts of Africa and Asia. In Sri Lanka, it is primarily found in the northern and eastern coastal regions (3). Although envenomation can be fatal elsewhere, most Sri Lankan cases are relatively mild. A 2007–2008 case series in Northern Sri Lanka reported 48 SSV bites, with 65% experiencing local symptoms and 29% showing coagulopathy. Importantly, there were no fatalities.

SSV venom contains toxic enzymes that can disrupt coagulation and cause hemotoxic effects, including VICC and TMA (4). VICC occurs when venom enzymes activate the clotting cascade, consuming clotting factors and leading to hypofibrinogenemia and sometimes disseminated intravascular coagulation (DIC). The underlying mechanism of TMA is less clear but likely involves endothelial injury from the venom, leading to microthrombi and multiorgan dysfunction.

TMA is characterized by thrombocytopenia, acute kidney injury, and microangiopathic hemolytic anemia. It may develop after VICC has resolved or overlap with it[2]thrombocytopenia, and renal failure that was consistent with thrombotic microangiopathy. The patient was treated by plasma exchange and hemodialysis. He made a full recovery and was discharged after 4 weeks. This case report supports plasmapheresis as an option for management of a patient who develops thrombotic microangiopathy secondary to snake bite, especially those who do not improve with antivenom and supportive therapy.Thrombotic Microangiopathy Following Arabian Saw-Scaled Viper (Echis coloratus. Misclassification as DIC is common due to overlapping features. Rare complications like TMA require high clinical suspicion and timely intervention. Some patients with TMA require dialysis, although many recover with supportive care[5]microangiopathic haemolytic anaemia (MAHA. There is no evidence that antivenom prevents TMA specifically, but early antivenom remains the mainstay of treatment for snake envenoming. Recent studies suggest that therapeutic plasma exchange may be beneficial in severe or persistent cases. As in this case, early identification, combination of antivenom and timely used TPE led to clinical improvement, supporting its potential utility.

Conclusion

Saw-scaled viper bites in Sri Lanka generally present with mild symptoms and low fatality. However, rare complications such as thrombotic microangiopathy can occur, as demonstrated in this case from Mannar. Continued research is essential to refine treatment protocols and improve outcomes for snakebite victims in Sri Lanka.

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