

Severe acute kidney injury following Sri Lankan *Hypnale* spp. envenoming is associated with thrombotic microangiopathy

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Abstract

Context: Acute kidney injury (AKI) is the most serious clinical manifestation of the Sri Lankan hump-nosed pit viper (*Hypnale* spp.) bites. Thrombotic microangiopathy (TMA) is increasingly recognized in association with AKI in cases of *Hypnale* spp envenomation. We investigated AKI in a cohort of cases of *Hypnale* envenomation, its association with TMA and the early diagnostic value of common biomarkers for AKI occurring.

Materials and methods: We conducted a prospective observational study of suspected viper bites and included 103 confirmed cases of *Hypnale* envenomation, based on venom specific enzyme immunoassay of blood. AKI was defined using the Kidney Disease: Improving Global Outcomes (KDIGO) criteria. Thrombotic microangiopathy was diagnosed based on thrombocytopenia (platelet count $< 150,000 \times 10^3/\mu\text{L}$) and microangiopathic haemolytic anaemia (MAHA). We investigated the diagnostic performance of creatinine, platelet count and INR for AKI within 4 h and 8 h post-bite by area under the receiver operator characteristic curve (AUC-ROC).

Results: Ten patients developed AKI: seven AKI stage 1 and three AKI stage 3. Ten patients (10%) developed thrombocytopenia while 11 (11%) had MAHA. All three AKI stage 3 had thrombocytopenia and MAHA fulfilling the criteria for TMA. Two of them presented with oliguria/anuria and all three required haemodialysis. Serum creatinine within 4 h post-bite was the best predictor of AKI with AUC-ROC of 0.83 (95% CI: 0.67-0.99) and was no better within 8 h of the bite.

Conclusions: We found that AKI is uncommon in *Hypnale* spp. envenomation, but an important serious complication. Severe AKI was associated with TMA. A creatinine within 4 h post-bite was the best predictor of AKI.

Keywords: Hump-nosed pit viper; *Hypnale* species; Sri Lanka; acute kidney injury; thrombotic microangiopathy.