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Descriptive Analysis of Development of Severe Outcomes in Russell's Viper (*Daboia Russelii*) Envenoming in Rural Sri Lanka

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Background: Russell's viper is the medically most important snake in Sri Lanka due to the high incidence of bites, development of local and systemic envenoming.

Objective: To describe the pattern of severe outcomes in Russell's viper envenoming of a large cohort.

Methods: Data of the Cohort database, in which prospectively recruits all snakebite patients admitted to Teaching hospital, Anuradhapura (THA) were descriptively analyzed. Data from August 2013 to March 2025 with confirmed Russell's viper envenoming and received first-dose of antivenom at THA were extracted. Development of anaphylaxis to antivenom and five severe outcomes, intubation, dialysis, thrombotic-microangiopathy (TMA), hospital stay ≥ 7 days and death, were assessed.

Results: Out of 6983 patients admitted during the study period 895 (12.8%) Russell's viper envenomed patients have received first-dose of antivenom at THA. The median age was 44 years (IQR 33-53), and the majority (n=700; 78.2%) were males. Anaphylaxis for antivenom was reported in 222 (24.8%) patients. Total of 100 (11.1%) patients have developed one or more severe outcomes which includes 36 patients who have also developed anaphylaxis to antivenom. Hence incidence of severe outcomes attributed directly to envenoming is 7.15%. The reported incidence of each severe outcome is 13 (1.5%), 29 (3.2%), 24 (2.7%), 56 (6.3%), and 9 (1.0%) for intubation, dialysis, development of TMA, requiring long stay in the hospital and death respectively. The 36 patients who have developed both anaphylaxis to antivenom and one or more severe outcomes reported 22 (2.4%), 7 (0.8%), 21 (2.3%), 15 (1.7%) and 12 (1.3%) incidences for intubation, dialysis, requiring long stay in hospital, development of TMA and death respectively.

Conclusion: Any form of severe outcome following Russell's viper bite occurred in approximately 10% of patients, where dialysis and long stay in the hospital were the most common events. Development of anaphylaxis to antivenom in a quarter of patients indicates the severity of that issue compared to venom effects only.

Keywords: Anaphylaxis, Russell's viper envenoming, Severe Outcomes