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EFFICACY OF TWO INDIAN POLYVALENT SNAKE ANTIVENOMS AGAINST SRI LANKAN RUSSELL'S VIPER (DABOIA RUSSELII) AND SAW-SCALED VIPER (ECHIS CARINATUS) VENOMS

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Objective: There are concerns about the effectiveness of Indian polyvalent snake antivenom for snake envenoming in Sri Lankan. The objective of this study was to test the in vitro efficacy of two Indian Polyvalent snake antivenoms against two viper venoms.

Methods: Indian polyvalent snake antivenoms were obtained from VINS Bioproducts Limited and from BHARAT Serum and Vaccines Limited. Individual antivenom vials from 16 batches (15 VINS and 1 BHARAT) were tested, and 10 vials from one batch from each manufacturer. Protein quantification of antivenom was done by the Bradford method. In vitro studies were done at venom concentrations consistent with human envenoming - 1.7 ∝g/mL for

D. russelii and 0.5 ∝g/mL for *Echis carinatus* venom.

D. russelii venom binding studies were done by mixing

D. russelii venom with increasing concentrations of antivenom, and then detecting unbound *D. russelii* venom by enzyme immunoassay. The ability of antivenoms to neutralise the procoagulant activity of *D. russelii* venom and

E. carinatus venom were measured using the turbidometric method.

Results: VINS antivenoms had a higher protein concentration than BHARAT antivenoms. The median protein content of 10 vials of one batch of VINS antivenom, 200 mg (157-238 mg) was significantly higher than the median protein content of 10 vials of one batch of BHARAT antivenom, 109 mg (39-125 mg; $p<0.0001$). Antivenom concentrations binding 100% of free *D. russelii* venom varied was 1.5-4.3 mg/mL for VINS antivenom and 17 mg/mL for BHARAT antivenom. Antivenom concentrations that neutralised the procoagulant activity of *D. russelii* venom was 0.10-0.12 mg/mL for VINS antivenom compared to 0.44-0.64 mg/mL for BHARAT antivenoms, and 1.0-3.6 mg/mL compared to 1.8-29 mg/mL for *E. carinatus* venom.

Conclusions: The protein content, binding and ability to neutralise the procoagulant activity of the two viper venoms was superior for all VINS antivenoms compared to BHARAT antivenoms at concentrations consistent with the administration of 10 vials of antivenom (2.9 mg/ml).