
ABSTRACT

Unlike *Naja naja*, *Bungarus caeruleus*, *Echis carinatus*, and *Daboia/Vipera russellii* venoms, *Ophiophagus hannah* venom is medically ignored in the Indian subcontinent. Being the biggest poisonous snake, *O. hannah* has been presumed to inject several lethal doses of venom in a single bite. Lack of therapeutic antivenom to *O. hannah* bite in India makes any attempt to save the victim a difficult exercise. This study was initiated to compare *O. hannah* venom with the above said venoms for possible interference in hemostasis, enzymatic, pharmacological properties, its cross-reactivity with commercial antivenoms and neutralization properties. *Ophiophagus hannah* venom was found to actively interfere in hemostatic stages such as fibrin clot formation, platelet activation/aggregation, and fibrin clot dissolution. It decreased partial thromboplastin time (aPTT), prothrombin time (PT), and thrombin clotting time (TCT). These activities are similar to that shown by *E. carinatus* and *D. russellii* venoms, and thus *O. hannah* venom was found to exert procoagulant activity through the common pathway of blood coagulation, while *N. naja* venom increased aPTT and TCT but not PT, and hence it was found to exert anticoagulant activity through the intrinsic pathway. Venoms of *O. hannah*, *E. carinatus*, and *D. russellii* lack plasminogen activation property as they did not hydrolyze azocasein, while they all showed plasmin like activity by degrading the fibrin clot. Although *N. naja* venom did not degrade azocasein, unlike other venoms, it showed feeble plasmin like activity on fibrin clot. Venom of *E. carinatus* induced clotting of human platelet rich plasma (PRP), while the other three venoms interfered in agonist induced platelet aggregation in PRP. Venom of *O. hannah* least inhibited the ADP induced platelet aggregation as compared to *D. russellii* and *N. naja* venoms. All these three venoms showed complete inhibition of epinephrine-induced aggregation at varied doses. However, *O. hannah* venom was unique in inhibiting thrombin-induced aggregation.

The king cobra venom was comparatively studied for the cross-reactivity/reactivity and toxicity neutralization by the locally available equine therapeutic polyvalent BSV and VB antivenoms (commercial), and monovalent

antivenom (OH-IgG) prepared in rabbit against king cobra venom. None of the two therapeutic commercial antivenoms procured from two different firms showed any signs of cross-reactivity in terms of antigen–antibody precipitin lines in immuno-double diffusion assay; however, a weak and an insignificant cross-reactivity pattern was observed in ELISA and Western blot studies. Further, both BSV and VB antivenoms failed to neutralize proteolytic, hyaluronidase and phospholipase activities as well as toxic properties such as edema, myotoxicity and lethality of the venom. As expected, OH-IgG showed strong reactivity in immunodouble diffusion, ELISA, Western blot analysis and neutralized both enzyme activities as well as the toxic properties of the venom. Thus, the study provides insight into the likely measures that needs to be taken in cases of accidental king cobra bites for which the Indian subcontinent is still not prepared for.