EFFECT OF PRO-COAGULANT SNAKE VENOMS ON DIFFERENT ANIMAL PLASMA

Maduwage K.[1,2], Scorgie F.[3], Lincz L.[3], O'Leary M.[1], Isbister G.K.[1,2]

[1]*School of Medicine and Public Health, University of Newcastle, Newcastle, Australia.*

[2]*South Asian Clinical Toxicology Research Collaboration, University of Peradeniya, Peradeniya, Sri Lanka.*

[3]*Hunter Haematology Research Group, Calvary Mater Newcastle, Newcastle, NSW, Australia.*

Procoagulant coagulopathy is a major systemic snake envenoming syndrome. Animal models have been used to test to efficacy of antivenom against procoagulant snake venoms, but there is little information on coagulopathy in animals and the effect of different snake venom procoagulants.

Objectives: This study aimed to compare the *in-vitro* procoagulant effect of four snake venoms - *Pseudonaja textilis* (brown snake; prothrombin activator toxin), *Daboia russelli* (Russell's viper; factor X activator toxin), *Echis carinatus* (Carpet viper; prothrombin activator toxin)and *Calloselasma rhodostoma* (Malayan pit viper; thrombin-like enzyme toxin)venoms on seven different animal plasmas - human, rabbit, cat, guinea pig, pig, cow and rat.

Methods: Clotting tests (prothrombin time) and factor levels (fibrinogen, factor V, X, D-dimer) were done on each animal plasma. Clotting tests were similar to human for rat, rabbit and pig, while the prothrombin time was about double for cat, cow and guinea pig. Fibrinogen levels were similar for all and other factor levels varied between species. Procoagulant effect was assessed by measuring clotting times for serial dilutions of snake venom with animal plasma and then calculating effective concentration of venom (EC_{50}).

Results: Human and rabbit plasmas had the lowest EC_{50} values for *P. textilis* (0.13 and 0.42µg/ml), *D. russelli* (0.42 and 0.10µg/ml), *E.carinatus* (0.6 and 0.1µg/ml)venoms, while cat plasma had the lowest EC_{50} value for *C. rhodostoma* (11.4µg/ml) venom. Cow plasma was resistant to all 4 procoagulant venoms with high EC_{50} of 13.1 to 646µg/ml. Rat, pig and guinea pig were also resistant to procoagulant toxins with EC_{50} values 10-fold that of human and rabbit for all venoms.

Conclusion: This study shows that different animal plasmas have varying susceptibility to procoagulant venoms. The differing EC_{50} values of animal plasmas compared to human plasma suggests that excepting rabbits, animal models are not appropriate to test procoagulant activity.