EVALUATION OF THE LETHAL POTENCY OF SCORPION AND SNAKE VENOMS AND COMPARISON BETWEEN INTRAPERITONEAL AND INTRAVENOUS INJECTION ROUTES.

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Abstract

Scorpion stings and snake bites are major health hazards that lead to suffering of victims and high mortality. Thousands of injuries associated with such stings and bites of venomous animals occur every year worldwide. In North Africa, more than 100,000 scorpion stings and snake bites are reported annually. An appropriate determination of the 50% lethal doses (LD_{50}) of scorpion and snake venoms appears to be an important step to assess (and compare) venom toxic activity. Such LD_{50} values are also commonly used to evaluate the neutralizing capacity of specific anti-venom batches. In the present work, we determined experimentally the LD_{50} values of reference scorpion and snake venoms in Swiss mice, and evaluated the influence of two main venom injection routes (i.e., intraperitoneal (IP) versus intravenous (IV)). The analysis of experimental LD_{50} values obtained with three collected scorpion venoms indicates that Androctonus mauretanicus (Am) is intrinsically more toxic than Androctonus australis hector (Aah) species, whereas the latter is more toxic than Buthus occitanus (Bo). Similar analysis of three representative snake venoms of the Viperidae family shows that Cerastes cerastes (Cc) is more toxic than either Bitis arietans (Ba) or Macrovipera lebetina (Ml) species. Interestingly, the venom of Elapidae cobra snake Naja haje (Nh) is far more toxic than viper venoms Cc, Ml and Ba, in agreement with the known severity of cobra-related envenomation. Also, our data showed that viper venoms are about three-times less toxic when injected IP as compared to IV, distinct from cobra venom Nh which exhibited a similar toxicity when injected IP or IV. Overall, this study clearly highlights the usefulness of procedure standardization, especially regarding the administration route, for evaluating the relative toxicity of individual animal venoms. It also evidenced a marked difference in lethal activity between venoms of cobra and vipers, which, apart from the nature of toxins, might be attributed to the rich composition of high molecular weight enzymes in the case of viper venoms.