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Biochemical study on cardiotoxic effects of *Mesobuthus eupeus* scorpion venom and the role of antivenom and carvedilol in rats

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Abstract

Mesobuthus eupeus is an indigenous scorpion species in Southwest Iran which is responsible for the majority of scorpion sting cases in Khuzestan province. To conduct this research a total of 75 Wistar male rats were divided into 5 equal groups randomly. Group 1 (control); Group 2: *M. eupeus* venom was administered with a dose of 1 mg/kg IP. Group 3: Venom + 0.5 ml of polyvalent antivenom intramuscularly, 30 minutes after envenomation. Group 4: Venom + 5 mg/kg of carvedilol 30 minutes after envenomation IP. Group 5: Venom + 0.5 ml of polyvalent antivenom + 5 mg/kg of carvedilol 30 minutes after envenomation IP. Blood samples were collected by cardiac puncture at 8, 24, and 48 hours after saline/venom injection from anesthetized rats. Heparinized plasma was isolated to measure cardio-related biochemical parameters, including the activity of CPK, LDH, and AST and troponin-I levels were measured by routine methods. The results showed that the activity of the enzymes of CPK-MB, LDH, AST, and also troponin-I as a specific index of heart damage elevated at different times following venom injection compared with the control group. Even though the administration of anti-venom following venom injection at different times significantly reduced the activity of these enzymes and also troponin-I levels, but the level of these indicators was still higher than the control group. Carvedilol administration had no significant effect on reducing the activity of the above-mentioned factors. Meanwhile, the combined administration of carvedilol and anti-venom following venom injection had similar results with the antivenom group. This result may relate to the dose and its frequency of carvedilol use.

Keywords: Cardiotoxicity, *S*corpion, *Mesobuthus eupeus*, Antivenom, Carvedilol

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