Background: The treatment of cocaine toxicity is an important subject for emergency physicians. We investigated the effects of dexmedetomidine, moxonidine and alpha-methyldopa on acute cocaine toxicity in mice.

Objectives: The aim of this study was to evaluate the effects of dexmedetomidine, moxonidine and alpha-methyldopa in a mouse model of acute cocaine toxicity.

Materials and Methods: We performed an experiment consisting of four groups (n = 25 each). The first group received normal saline solution, the second group received 40 μg/kg of dexmedetomidine, the third group received 0.1 mg/kg of moxonidine and the fourth group received 200 mg/kg of alpha-methyldopa, all of which were intraperitoneally administered 10 minutes before cocaine hydrochloride (105 mg/kg). All animals were observed for seizures (popcorn jumping, tonic-clonic activity, or a loss of the righting reflex) and lethality over the 30 minutes following cocaine treatment.

Results: The ratio of animals with convulsions was lower in all treated groups when compared to the control (P < 0.001). Furthermore, 68% (n = 17) of animals in the dexmedetomidine group, 84% (n = 21) of the alpha-methyldopa group, 92% (n = 23) of the moxonidine group and 100% (n = 25) of the control group showed evidence of seizure activity (P = 0.009). Cocaine-induced lethality was observed in 12% (n = 3) of the dexmedetomidine group, 48% (n = 12) of the alpha-methyldopa group, 52% (n = 13) of the moxonidine group, and 72% (n = 18) of the control group (P < 0.001). All treatments prolonged the time to seizure, which was longest in the dexmedetomidine group (P > 0.05). In addition, the time to lethality was also longer in the same group (P < 0.001).

Conclusions: The present study provides the first experimental evidence in support of dexmedetomidine treatment for cocaine-induced seizures. Premedication with dexmedetomidine reduces seizure activity in a mouse model of acute cocaine toxicity. In addition, while dexmedetomidine may be effective, moxonidine and alpha-methyldopa did not effectively prevent cocaine-induced lethality.

Keywords: Cocaine; Intoxication; Dexmedetomidine; Moxonidine; Alpha-Methyldopa