Long-term cardiovascular autonomic responses to aqueous ethanolic extract of Boophone disticha bulb in early maternally separated BALB/c mice

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William Pote , Dexter Tagwireyi , Herbert M. Chinyanga, Colin Musara, Davies M. Pfukenyi, Pilani Nkomozepi, Louis L. Gadaga, George Nyandoro, Jephat Chifamba

Abstract

Background: Boophone disticha is commonly used in southern Africa for the management of mental-related illnesses. Recently, it was shown to reduce blood pressure (BP) in maternally separated mice immediately after withdrawal of treatment. However, the long-term cardiovascular effects and the underlying mechanisms are still illusive. Based on the reputed traditional use of the plant for anxiety and stress-related disorders, the aqueous-ethanolic extract of B. disticha was screened for its long-term effects on the cardiovascular and autonomic responses to repeated acute stressors in adult early maternally separated BALB/c mice.

Methods: Five groups (n = 6 each) of adult BALB/c mice subjected to early maternal separation (MS) were given six daily oral doses of vehicle (normal saline); low, medium and high doses of B. disticha (10, 25 and 40 mg/kg body weight, respectively); and 1 mg/kg body weight diazepam during adulthood. The control (un-separated) group (n = 6) received vehicle treatment. Cardiovascular parameters (BP and heart rate (HR)) were recorded using non-invasive tail-cuff methods on post-treatment days (PTDs) 9 and 30 to compare short-term and long-term effects of the plant extract, respectively. Autonomic responses were measured by estimating BP variability (BPV) and HR variability (HRV).

Results: Early maternal separation significantly increased systolic BP (SBP), and decreased HR on PTD9 while raising BPV on PTD30 when compared to control un-separated mice ($p < 0.05$). B. disticha at low dose significantly reduced short-term SBP and mean arterial pressure (MAP), while medium dose reduced long-term diastolic BP (DBP) and MAP in maternally separated mice when compared to vehicle and diazepam ($p < 0.05$). High dose significantly decreased SBP and MAP at both occasions ($p < 0.05$).

Conclusions: The current results have led to the identification of long-term antihypertensive-like activity of the aqueous ethanolic extract of B. disticha which was found to last for several weeks after withdrawal of treatment