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The effect of intraperitoneal injection of Beta vulgaris root aqueous extract on thermal and mechanical hyperalgesia in the neuropathic pain (CCI) model in male rat

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Background and Aim : Neuropathic pain is a chronic pain caused by damage to neuronal cells and impaired function of the central or peripheral nervous system. Nevertheless of all the treatments provided so far (non-steroidal analgesics, opioids, anti-depressants and anticonvulsants), any one had not been fully effective in treatment or prevention of neuropathic pain development and also exerts some side effects. Beta vulgaris contains betanin and strong antioxidant effect so it could be assumed that it is able to prevent both the mechanical and thermal neuropathic hyperalgesia.

Methods : This experimental study was performed using 42 male rats weighing 200-250 g. Neuropathic allodynia was created with the Sciatic Nerve chronic constriction injury Model (CCI). Animals were randomly divided into 6 groups (n=7) composed of positive control group, CCI surgical control group, intra-peritoneal recipients of Beta vulgaris root aqueous extract with 50, 100,150 mg/kg doses per day for 14 constitutive days after surgery and sham group received distilled water as extract vehicle within 14 days after surgery. Mechanical (pin prick test) and thermal (hot plate test) hyperalgesia were measured on day zero (before surgery) and days 3, 7, 14, 21, and 28 followed by surgery.

Results : Intraperitoneal injection of Beta vulgaris root aqueous extract with 50, 100, 150 mg/kg doses resulted in a significant reduction in mechanical and thermal hyperalgesia ($p < 0.05$). The most effective dose for reduction of mechanical and thermal hyperalgesia was 150 mg/kg ($p < 0.01$).

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Conclusion : It has been suggested that betanin, within the Beta vulgaris aqueous extract as an antioxidant, is able to inhibit the NF-b, iNOS, and NO production as well as MPO reduction. Perhaps the same mechanisms also in the present study have led to reduce mechanical and thermal hyperalgesia which should be investigated more.

Keywords : Aqueous extract, Beta vulgaris, Hyperalgesia, Neuropathic pain, Rat