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Phenytoin intraperitoneal administration effects on neuropathic pain induced by chronic constriction injury in male rats

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Background and Aim : Abnormal expression and function of voltage-gate sodium channels occurs in neuropathic pain conditions. Phenytoin is an anticonvulsant drug and blocks these channels. Present study checked out the effects of Phenytoin in neuropathic pain in rats.

Methods : 21 male rats in the weight range of 200 to 250 g were used in this experiment study. Neuropathic pain was created with Sciatic nerve ligation (CCI) model. Animals were randomly divided into 3 groups each whit 7 animal. The sham CCI group with nerve ligation, a group receiving phenytoin at a dose of 50 mg per kg chronically during the 14 days after surgery, a group receiving 20% DMSO (as solvent) Phenytoin. Mechanical (Von Frey, Pin Prick) and thermal (Acetone, Hot Plate) pain testing performed on zero (before surgery) and 3rd, 7th, 14th, 21st and 28th days after surgery. The statistical analysis were performed using Graph pad software.

Results : Phenytoin significantly reduced mechanical and thermal neuropathic allodynia and hyperalgesia on days 3, 7, 14, 21 and 28. ($p < 0.001$).

Conclusion : Chronic administration of Phenytoin as voltage-sensitive sodium channels blocker, probably prevents the alterations which leads to neuropathic pain after nerve injury, so it could be infer that during the physio-pathologic events that leads to neuropathic pain the chronic activity of voltage-sensitive sodium channels is important after nerve injury, at least in part, so may be, Phenytoin could be considered as a drug suggestion to prevent possible neuropathic pain.

Keywords : Chronic constriction injury ; Neuropathic pain; Allodynia; Hyperalgesia; Phenytoin.