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Electrophysiological effects of Haplophillum Robustum hydroalcoholic extract as a proconvulsant plant model and comparison with PTZ model in wistar rat

Submission Author: Ali Moghimi

Elham Farmanesh¹, Ali Moghimi², Sahar Moghimi³, Masoud Fereidoni⁴

1. Rayan Center for Neuroscience and Behavior, Dept. of Biology, Faculty of Science, Ferdowsi University of Mashhad, Iran
2. Rayan Center for Neuroscience and Behavior, Dept. of Biology, Faculty of Science, Ferdowsi University of Mashhad, Iran
3. Department of Electrical Engineering, Faculty of Engineering, Ferdowsi University of Mashhad, Iran
4. Rayan Center for Neuroscience and Behavior, Dept. of Biology, Faculty of Science, Ferdowsi University of Mashhad, Iran

Background and Aim : The incidence of epilepsy is over 1% of the total population. The exact mechanism of epilepsy is unknown. It is obvious that brain shifts into the activity of a seizure with excessive electrical synchronizations. In most studies PTZ is used for induction of epileptiform convulsions. Developing new models for epileptiform seizures has a great value. Haplophillum robustum injections show convulsive seizures that behaviorally is similar to PTZ induced seizures and induced convulsive stages are according to Racine criterion. In this study electrophysiological changes resulting from the injection of this plant hydroalcoholic extract studied and compared with PTZ.

Methods : The Haplophillum Robustum plant was collected from Ferdows (south Khorasan province, Iran). Leaves were dried and the hydroalcoholic extract was prepared to administer in two experimental groups of male Wistar rats, (in two doses: 250 and 500 mg/kg BW, N=7 for each group). For control were used two groups) PTZ, 50 mg/kg and diazepam, 5 mg/kg, both via IP injections, N=7 for each group). For EEG recordings, bipolar concentric stainless steel electrodes were implanted and fixed on the frontal and temporal areas of skull using stereotaxic surgical procedure under deep anaesthesia. After recovery period, extracts and control substances were injected and EEG was recorded during preictal, ictal and post ictal periods of seizures. For EEG analysis were used the LAB VIEW and MATLAB software to characterize the frequency and amplitude of recorded signals.

Results : Generalized tonic-clonic seizures, the same as PTZ but with more severity. At different periods (preictal, ictal and postictal) epileptiform spikes with significantly higher frequencies and amplitudes were

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observed. Injection of 500mg/kg of the extract strongly increased brain electrical activities and lead to death. Diazepam injection could diminish the induced electrical activities and behavioral features of evoked convulsions in both experimental groups.

Conclusion : The results showed that Haplophillum Robustum (sodabi) extract injection can provoke epileptiform convulsions similar to PTZ with more severe symptoms than PTZ. So, we introduce this plant extract as a good model and substitute of PTZ for experimental epilepsy studies. Different doses of the plant extract may be recommended for partial and generalized seizures. According to these investigation findings, the extract may induce its effects through GABAergic systems. Identification of plant chemical components and their in-vivo effects are necessary for future and detailed studies.

Keywords : Haplophillum Robustum, sodabi, epilepsy induction model, PTZ