Effect of pentylenetetrazole and sound stimulation induced single and repeated convulsive seizures on the MDA, GSH and NO levels, and SOD activities in rat liver and kidney tissues.


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Abstract

OBJECTIVES: the aim of our study was to evaluate the activity of superoxide dismutase (SOD) and the levels of glutathione (GSH), malondialdehyde (MDA), and nitric oxide (NO) in liver and kidney tissues in a rat model of convulsive seizure induced by single and repeated doses of pentylenetetrazole (PTZ) and sound stimulation with key ringing.

MATERIALS AND METHODS: male Wistar adult rats (n=48), were used in the experiment. The animals were divided into six groups: (1) Single Seizure Control Group (SS-Control; n=8), (2) Repeated Seizures Control Group (RS-Control; n=8), (3) PTZ induced Single Seizure Group (SS-PTZ Group; n=8), (4) PTZ induced Repeated Seizures Group (RS-PTZ Group; n=8), (5) Key-Ringing Induced Single Seizure Group (SS-KEY Group; n=8), (6) Key-Ringing Induced Repeated Seizures Group (RS-KEY Group; n=8). Following injections rats were observed for seizure activity for 30 min. Animals were sacrificed 24h after induced seizure (single or last seizure) or saline administration. MDA, NO, GSH levels and SOD activities were determined in liver and kidney tissues.

RESULTS: there was no significant difference between SS-Control and RS-Control groups, SS-PTZ and SS-KEY groups, and RS-PTZ and RS-KEY groups (p>0.05) in none of the examined 4 parameters in liver and kidney tissues. The liver and kidney levels of MDA and NO in SS-PTZ group were found to be significantly higher than the SS-Control group (p<0.05). In SS-KEY group, the liver and kidney levels of MDA and NO were found to be significantly higher and GSH levels were significantly lower than the SS-Control group (p<0.05). While liver and kidney levels of MDA in RS-PTZ group and RS-KEY group were found to be significantly higher than the RS-Control group (p<0.05), liver and kidney GSH levels were significantly lower (p<0.05). The liver levels of NO in RS-PTZ group and RS-KEY group were found to be significantly higher than the RS-Control group (p<0.05). Kidney SOD activities in RS-PTZ group and RS-KEY group were found to be significantly lower than the RS-Control group (p<0.05). When RS-PTZ group is compared with the SS-PTZ group, the liver SOD activity and kidney NO level were found to be significantly lower in the RS-PTZ group (p<0.05). While the liver NO level and GSH level in RS-KEY group were significantly higher than the SS-KEY group, SOD activity was significantly lower in the RS-KEY group (p<0.05). When RS-KEY group was compared with SS-KEY group, the kidney NO level and SOD activity were found to be significantly lower in the RS-KEY group (p<0.05).

CONCLUSION: in conclusion, key-ringing or PTZ induced single and repeated seizures result in...
increased oxidative damage and lipid peroxidation, and decreased antioxidant defense mechanisms.

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MeSH Terms, Substances

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