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The Effect of Ebselen on Motor Performance, Balance Skills and Analgesia in A Rat Model of Parkinson's Disease

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AIM: Parkinson's disease (PD) is a neurodegenerative disorder characterized by the loss of dopaminergic neurons in the substantia nigra, although there are many underlying mechanisms, which are associated with oxidative stress, neuroinflammation and apoptosis. Ebselen (EBS) is a non-toxic seleno-organic drug with antioxidant, antiinflammatory, and cytoprotective properties. We aimed to investigate the protective and therapeutic effects of EBS on rotenone (ROT)-induced rat model of PD.

METHODS: Sprague Dawley female rats were basic randomly divided into 4 groups (n:8). Control group rats were given only vehicle solution. ROT group: 3 mg/kg, once a day s.c. injection of ROT was applied for 7 days. EBS+ROT group: 10 mg/kg, once a day i.p. injection of EBS was applied for 7 days+3 mg/kg, once a day s.c. injection of ROT was applied for 7 days. ROT+EBS group: 3 mg/kg ROT (s.c.) and 10 mg/kg EBS (i.p.) were injected for 7 days. All rats were tested for rotarod and accelerod balance-to-motor coordination performance measurements, hot plate and tail-flick analgesimetry tests, and the effects of EBS on the nervous system and functions.

RESULTS:

Tests	Rotarod Test (300 sec)					Accelerod Test (0-79 rpm)	
Groups	5 rpm	10 rpm	20 rpm	30 rpm	40 rpm	240 (sec)	600 (sec)
Control	300±0	300±0*	170±94*	135±64*	88±33*	75±26	160±57*
ROT	300±0	263±35	55±32	28±22	32±23	49±21	103±28
EBS+ROT	300±0	300±0*	161±98	117±81*	85±55*	77±17	167±38*
ROT+EBS	300±0	300±0*	144±84	101±54	70±30	69±27	155±20

*Statistically significant increase when compared with ROT group ($p<0.05$).

RESULTS:

Analgesia Tests	Hot plate (55^{0}C) (sec)	Tail flick (intensity 25) (sec)
Control	5.53±1.78	4.71±2.20
ROT	4.56±1.33	4.38±1.26
EBS+ROT	5.38±2.13	4.73±1.27
ROT+EBS	5.23±1.71	4.78±1.15

There was no statistical significance between the groups ($p>0.05$)

CONCLUSION: These findings showed that the protective effect of EBS was much more potent than the therapeutic effects of EBS on motor performance and balance skills in a rat model of PD.

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