

ABSTRACT

Effect of Transient Global Ischemia on Exploratory Behavior of Wistar Rat Observed with Open Field Test and Y-Maze Test

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Background: According to Riskesdas 2013, the prevalence of heart failure and coronary heart disease in Indonesia are 0.13% and 0.5%, respectively. Both diseases lead to transient global ischemia, which may induce behavior impairment.

Objective: The goal of the present study is to observe the effects of transient global ischemia on the exploratory behavior of Wistar rats, using open field and Y-maze apparatuses.

Method: Subjects were divided into three groups. These were Sham, IR2, and IR9 groups. Sham group was treated with sham surgery whereas IR2 and IR9 groups were treated with twenty minutes *bilateral common carotid occlusion (BCCO)*. Sham and IR2 groups were tested with open field and Y-maze apparatuses two days after the treatment, whereas IR9 group was tested nine days after the treatment.

Result: No significant difference on locomotion frequency of open field test was observed between the three groups ($p>0.05$). Confounding factor of the behavior on open field is stress, which could be observed during grooming and freezing. Another confounding factor is spatial memory, which could be observed with percentage alternation of Y-maze test. There was no significant difference on the confounding factors ($p>0.05$). It was concluded that the same value of exploratory behavior was not confounded by stress and spatial memory.

Conclusion: There is no difference of exploratory behavior of Wistar rats with BCCO treatment compared to control. Time difference (second and ninth day after treatment) does not induce increasing of exploratory behavior.

Keywords: *transient global ischemia, exploratory behavior, open field test, y-maze test, brain injury, bilateral common carotid occlusion*

INTISARI

Pengaruh *Transient Global Ischemia* terhadap Perilaku Eksploratori Tikus Wistar Ditinjau dengan *Open Field Test* dan *Y-Maze Test*

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Latar Belakang: Menurut Riskesdas tahun 2013, berdasarkan kriteria pernah terdiagnosis oleh dokter, prevalensi gagal jantung dan penyakit jantung koroner secara berurutan di Indonesia adalah 0,13% dan 0,5%. Kedua penyakit tersebut pada akhirnya menciptakan kondisi *transient global ischemia* di otak yang menimbulkan gangguan perilaku.

Tujuan: Tujuan penelitian ialah mengamati pengaruh *transient global ischemia* terhadap perilaku eksploratori tikus Wistar ditinjau dengan *open field test* dan *Y-maze test*.

Metode: Subjek penelitian dibagi menjadi tiga kelompok, yaitu kelompok Sham, IR2, dan IR9. Kelompok Sham mendapat perlakuan pembedahan sham sedangkan kelompok IR2 dan IR9 mendapat perlakuan *bilateral common carotid occlusion (BCCO)* selama dua puluh menit. Kelompok Sham dan IR2 diuji *open field test* dan *Y-maze test* pada hari kedua setelah perlakuan sedangkan kelompok IR9 mendapatkan tes yang sama pada hari kesembilan setelah perlakuan. Hasil dikatakan bermakna jika nilai $p < 0,05$.

Hasil: Pada ketiga kelompok subjek, tidak ada perbedaan bermakna pada parameter utama perilaku eksploratori, yaitu *locomotion frequency* di *open field test* ($p > 0,05$). Faktor pengacau perilaku tikus di *open field test*, yaitu stres ditinjau dengan parameter *grooming* serta *freezing*. Faktor pengacau lain, yaitu memori spasial ditinjau dengan parameter *percentage alternation* di *Y-maze test*. Tidak ada perbedaan bermakna pada faktor pengacau ($p > 0,05$) sehingga disimpulkan bahwa kesamaan perilaku eksploratori pada ketiga kelompok subjek tidak dipengaruhi oleh stres dan memori spasial.

Kesimpulan: Tidak ada perbedaan perilaku eksploratori pada tikus Wistar dengan BCCO dibandingkan dengan pembedahan sham. Perbedaan waktu uji perilaku antara hari kedua dan kesembilan setelah perlakuan tidak meningkatkan perilaku eksploratori.

Kata kunci: *ischemia global, perilaku eksploratori, open field test, y-maze test, brain injury, bilateral common carotid occlusion*