

뇌신경재활

게시일시 및 장소 : 10 월 18 일(금) 13:15-18:00 Room G(3F)

질의응답 일시 및 장소 : 10 월 18 일(금) 15:49-15:53 Room G(3F)

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Effect of aerobic exercise intensity and timing on functional recovery in rat with stroke

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Objectives

Recent studies with stroke have shown that the timing and intensity of rehabilitation have influence on functional recovery. However, there is still a controversy as to the optimal timing and intensity of rehabilitation and its effect on motor functional recovery. Also, the effects of timing and intensity of rehabilitation on biochemical factors such as corticosterone levels and brain derived neurotrophic factor (BDNF) have not been studied yet. The aim of this study was to investigate the effect of exercise start timing and intensities on motor functional recovery, corticosteron level changes, and brain BDNF changes using a rat ischemic stroke model.

Methods

Male Wistar rats (8 weeks old) were used in this study. All rats in rehabilitation groups were randomly allocated into 2 different rehabilitation start groups, which were 3-day start group (early) and 7-day start group (delayed). And, each 3 or 7 days start group had different intensity groups (10min/day, 30min/day, 60min/day, treadmill training). Also, there were control group (no surgery) and stroke control group (stroke with no exercise). Each groups were comprised of 5 rats and total 50 rats were involved in this study. Infarcts were produced by photochemically induced thrombosis in the motor and sensorimotor cortex. Behavior tests such as stair case test, rotarod test, and serum blood collection were performed at 2, 7, 14, 21, 28, and 35 days post-stroke. Serum corticosterone level and brain BDNF concentrations were determined with commercial enzyme-linked immunosorbent assay (ELISA) kits.

Results

All 10min, 30min, 60min treadmill exercise group in both 3-day start and 7-day start groups showed a significant improvement in behavioral tests compared to rats without training in stroke control group. When comparing between exercise groups regarding exercise intensity and exercise start timing, in 3-day start group, the 10min exercise group showed

a significant improvement compared to the 30min or 60min groups (Fig. 1). In addition, in 7-day start group, there was a significant decrement in 60 min exercise group compared to the 10min or 30min exercise group (Fig. 2). The serum corticoster levels and BDNF levels were significantly increased in exercise groups compared to control or stroke control groups. However, there was no significant difference in hormone levels between each exercise groups. (Fig. 1 and 2)

Conclusions

Our data suggest that functional recovery by treadmill exercise after stroke may differ by timing of training or exercise intensities. Underlying mechanism of different functional recovery still need to be evaluated.

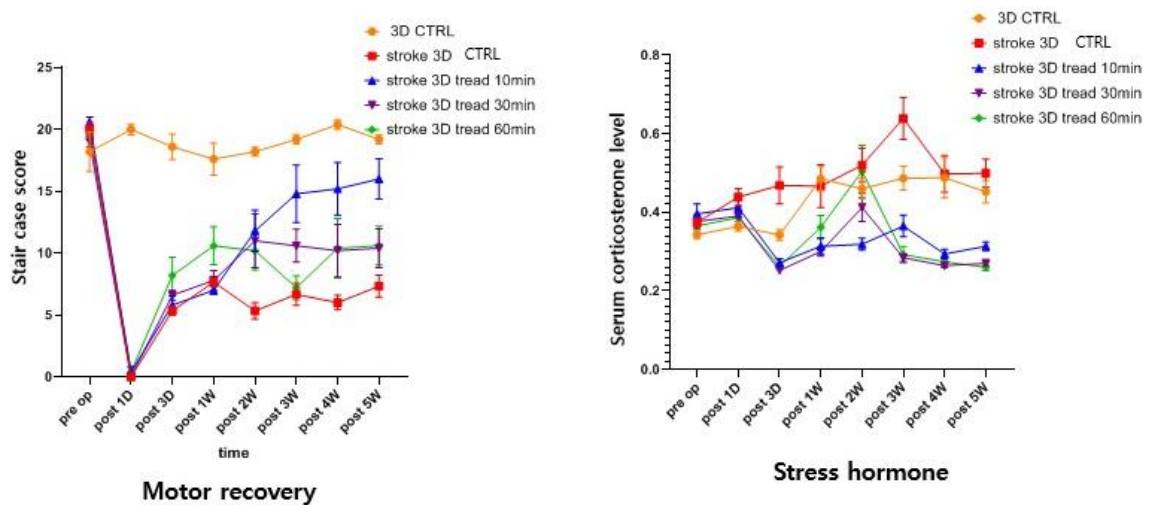


Figure 1. Motor recovery and stress hormone level in 3-day start group

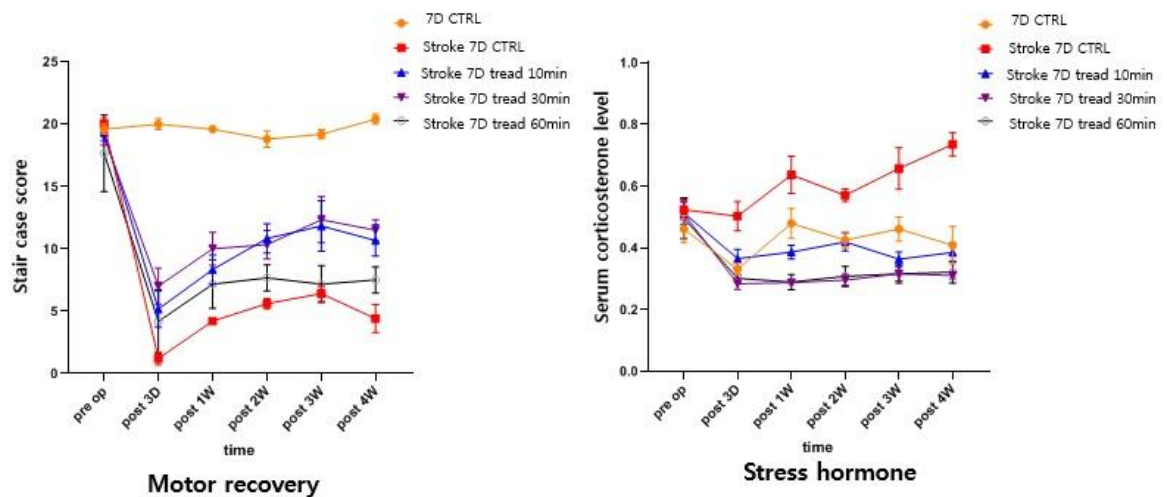


Figure 2. Motor recovery and stress hormone level in 7-day start group