ABSTRACT

THE INFLUENCE OF RESTRAINT TEST ON THE INCREASE OF SERUM CORTISOL LEVEL AND IL-1β IN MALE WISTAR STRAIN RATS

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During pain stimulation, the body activates its homeostatic mechanism to neutralize the pain. However, when the body is exposed to psychosocial stressor, the experienced pain is perceived even more severe. This study was aimed to find the influence of psychosocial stressor, presenting as restraint test, on the increase of cortisol and IL-1β to disclose the mechanism of the effect of psychosocial stressor of restraint test on pain signaling cell using psychoneuroimmunological approach. The body induces response to stressor by activating HPA-Axis to produce cortisol, whose function is to suppress immune system, particularly macrophage and lymphocyte, resulting in the decrease of endorphin production. Other response is the activation of dopaminergic neuron to produce dopamine. Elevated dopamine may block the descendent pathway from brain to spinal medulla for secretion of endorphin. Psychosocial stressor may also activate microglia and astrocyte, leading to the increase of IL-1β secretion. Pain stressor results in the damage of tissue cell and the release of IL-1β to incite pain impulse to spinal medulla. Thereby, during simultaneous exposure of pain and psychosocial stressor, the production of IL-1β is increasing.

In this study, restraint test was subjected to male Wistar strain *Rattus norvegicus* with 200 - 350 grams BW, serving as treatment group, for 30 minutes. Immediately thereafter, hot plate test was carried out to this group together with control group. After the treatment had been accomplished for less than 1 (one) hour, blood was taken for cortisol and serum IL-1β levels. Serum cortisol analysis was undertaken using RIA, and IL1-β using Indirect Sandwich ELISA.

Results of Manova (Sig < 0.05; F = 44.181) and Anava (Sig. < 0.05; F cortisol = 24.757, dan F IL-1β = 91.114) indicated that the level of cortisol and IL-1β in treatment group were significantly different from those in control group. IL-1β was the discriminant variable between both groups, as shown in discriminant analysis (Sig < 0.05; F = 91.114). The results of analysis proved that psychosocial stressor of restraint test was not only able to induce change in pain signaling cell by activating HPA Axis to produce cortisol, but also able to directly increase IL1-β secretion by immune cells.

In conclusion, the psychosocial stressor of restraint test increases the level of cortisol and IL-1β in the serum of male Wistar strain *Rattus norvegicus*.

***Keywords**: psychoneuroimmunology, pain, restraint test, cortisol, IL-1β*