

Thyroid Stimulating Hormone Is a Biomarker for Stress: A Prospective Longitudinal Study

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Abstract : Thyroid-stimulating hormone (TSH) is regulated by the negative feedback of T3 and T4 but is affected by cortisol and cytokines during allostasis. Hence, TSH levels can be influenced by stress through cortisol. In the present study, changes in TSH levels under stress and the potential of TSH as a stress marker were examined in patients lacking T3 or T4 feedback after thyroid surgery. The three stress questionnaires (Korean version of the Daily Stress Inventory, Social Readjustment Rating Scale, and Stress Overload Scale-Short [SOSS]), open-ended question (OQ), and thyroid function tests were performed twice in 106 patients enrolled from January 2019 to October 2020. Statistical analysis was performed using the generalized linear mixed effect model (GLMM) in R software version 4.1.0. In a multiple LMM involving 106 patients, T3, T4, SOSS (category), open-ended questions, the extent of thyroidectomy, and preoperative TSH were significantly correlated with lnTSH. T3 and T4 increased by 1 and lnTSH decreased by 0.03, 3.52, respectively. In case of a stressful event on OQ, lnTSH increased by 1.55. In the high-risk group, lnTSH increased by 0.79, compared with the low group ($p < 0.05$). TSH had a significant relationship with stress, together with T3, T4, and the extent of thyroidectomy. As such, it has the potential to be used as a stress marker, though it showed a low correlation with other stress questionnaires. To address this limitation, questionnaires on various social environments and research on copy strategies are necessary for future studies.

Keywords : stress, surgery, thyroid stimulating hormone, thyroidectomy

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