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Editorial

Maternal Thyroid Dysfunction and Inflammation: Non-Thyroidal Illness Syndrome

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Editorial

The relationship between the activities of maternal thyroid hormones (THs) and fetal THs is vital for the normal development [1-72]. In critically ill patients, a drop in the level of free 3,5,3'-triiodothyronine (T3) syndrome with normal thyroid-stimulating hormone (TSH) level and variations in the levels of free thyroxin (T4) and reverse T3 is common and represents the non-thyroidal illness syndrome (NTIS) or the euthyroid sick syndrome [73-81]. More interestingly, several authors undertook that the reduction in level of T3/rT3 and an increase in the level of rT3 are considered the highest profound factor for diagnosis of NTIS [78,83-86]. In addition, Docter et al. [86] reported that the pathophysiological alterations of NTIS might be attributed to the following: (1) disturbances in the hypothalamic-pituitary-thyroid axis (HPTA); and (2) acute changes in the peripheral thyroid hormone metabolism. This peripheral metabolism is evaluated by the activities of the three selenodeiodinases (D1, D2 and D3) [5,32]. In NTIS condition, the changes in the peripheral THs metabolism were as the following: (1) increased in the activity of D3 in acute myocardial infarction [87]; (2) increased in the activity of D2 in skeletal muscle [88]; and (3) decreased in the activity of D1 in skeletal muscle and liver [89]. The reduction in the activity of D1 (decrease the production of T3 fromT4) and an increase in the activity of D3 (increase the production of rT3) can be explained the elevation in the level of T4 [90]. In addition, the reduction in the level of thyroid binding globulin (TBG) is a possible cause for THs disorders in patients with NTIS [75,91]. Moreover, Fliers et al. [92] recorded the reduction in the level of thyrotropin release hormone (TRH) mRNA in NTIS. In parallel, the elevation in the levels of proinflammatory cytokines was observed in the critically ill [93] and chronic diseases [77,90]. These cytokines are probably associated with the inhibition of HPTA in NTIS [80,94].

From these data, the lower levels of maternal THs because of the disturbances in the HPTA or in the local THs metabolism may increase the risk of NTIS syndrome. These disorders may delay all developmental and functional biological systems. These sustained defects may be depending on the type of illness, organ/tissue, species, and sex type. Thus, well-maintained the regular activities of maternal THs during the development may be needed to avoid these defects. Nevertheless, changes the levels of THs metabolism due to the disturbances in the activities of deiodinases (Ds; I, II & III) in different organs during the critical illness should be examined in the near future.

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