

**Short Communication****Thyroid Hormone Replacement Therapy in Critically Ill Patients: Lack of Promising Evidence for Physiologically Sound Approaches**

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The sick euthyroid syndrome, also known as non-thyroidal illness syndrome, refers to changes seen in patient thyroid function tests administered in the medical intensive care unit during episodes of critical illness(1). Low serum  $T_3$  is the most common abnormality in euthyroid sick syndrome. Both low  $T_3$  and low  $T_4$  syndrome are reported in critically ill patients and low serum  $T_4$  is related with worst outcome. These features in laboratory findings of sick euthyroid patients have been explained by circulating thyroid binding hormone inhibitor (2). Thyroid hormone signalling regulates crucial biological functions, including energy expenditure, thermogenesis, development and growth. Fliers et al. (3), in their review “Thyroid function in critically ill patients”, concluded that routine thyroid hormone replacement therapy is not recommended in non-thyroid illness syndrome in critically ill patients. As we know, decreased plasma concentrations of thyroid hormones, especially  $T_3$ , in critically ill patients represent the severity of the disorder and are associated with poor outcomes. On the other hand, thyroid hormone administration has been reported to be associated with improved hemodynamics, increased cardiac output, decreased ICU length of stay, reduced need for inotropic agents and mechanical devices, decreased incidence of myocardial ischaemia and decreased incidence of atrial fibrillation and pacemaker therapy (4-6). There are some studies reported the link between low levels of thyroid hormone and sarcopenia which leads to critical ill weakness (7,8). So it may be a rational to use hormone replacement therapy in selected critically ill patients with sick euthyroid syndrome.

Not to implement physiologically sound approaches just because “evidence is lacking” might be disadvantageous for these patients over time as it might probably take years until clinical evidence become available. Subsequently, based on previous trials that have introduced effectiveness or at least no effects of hormone replacement therapy for non-thyroid illness syndrome, it seems that critically ill patients without limiting conditions such as advanced age or cardiac dysfunction (e.g. CHF or ACS) might benefit from thyroid replacement therapy and depriving these patients from what they might have benefited seems unethical.

As we mentioned sick euthyroid syndrome occurs with different faces in critically ill patients with some good and some bad characteristics. Tolerating the early onset hibernation response with its concomitant changes in thyroid hormone parameters seems to be beneficial and safe. But the other type of sick euthyroid syndrome which develops later during prolong ICU admission may have a different face and needs some interventions as it has impact on patients outcome.

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