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## Thyroid status and severity or mortality of COVID-19

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### Implication for health policy/practice/research/medical education

The non-thyroidal illness syndrome is characterized by low triiodothyronine in people with normal thyroid status, commonly occurring in seriously ill patients or individuals with malnutrition. Several studies showed people with severe COVID-19 had much lower free triiodothyronine levels than the patients who had less severe COVID-19. Therefore, free serum triiodothyronine may become a predictor of the severity of COVID-19 and an indicator for its management.

**Keywords:** COVID-19, Thyroid hormones, Non-thyroidal illness syndrome, Free triiodothyronine

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We read the recently published article entitled “Correlation of thyroid status with severity and mortality of COVID-19 patients” with great attention (1). Although we believe the authors of this study have made a considerable contribution to this effort, we would like to add some additional comments.

According to the result of this retrospective cohort study, thyroid status is not related to the severity of COVID-19 or its mortality. However, in contrast to this finding, a previous study showed the association between lower free triiodothyronine (FT3) with the severity of COVID-19 and mortality rate (1).

Some mechanisms explain the changes in thyroid hormone in COVID-19 patients. One is low T3 syndrome, also known as non-thyroidal illness syndrome. It is characterized by low T3 in people with normal thyroid status, commonly occurring in seriously ill patients or individuals with malnutrition. It has been detected in several critical illnesses, including acute and chronic types, such as cardiovascular diseases, infectious diseases, trauma, and cancer. As the severity of the illness progresses, serum T3 declines even more. The observed association between the decrease in serum T3 and the severity of myocardial infarction, the rise in serum creatinine in renal disease, and the severity of the trauma demonstrate this alteration (2).

According to a previous study, this syndrome's distinct immunological and genetic signatures were found

in COVID-19 patients, and they concluded that this condition served as a new indicator of the severity of the disease (3). Another prospective research discovered that low free T3 caused by nonthyroidal disease syndrome predicts increased mortality in severely ill mechanically ventilated patients and may be used to risk stratify these patients, even though they did not perform serial testing to determine if patients would eventually develop low triiodothyronine (T3), thyroxine (T4), or TSH (thyroid stimulating hormone) levels (2)

It has been demonstrated that nonthyroidal disease syndrome is a reliable indicator of prognosis in individuals with life-threatening diseases. The inflammatory response may have diverse roles in the etiology of nonthyroidal disease syndrome at various clinical stages in COVID-19 patients, since free T3 may develop into a practical tool for stratified therapy of patients with severe COVID-19 (4).

Finally, nonthyroidal disease syndrome is associated with a decrease in freeT3. Several studies showed people with severe COVID-19 had much lower free triiodothyronine levels than the patients who had less severe COVID-19. Therefore, free serum triiodothyronine may become a predictor of the severity of COVID-19 and an indicator for its management (4).

### Authors' contribution

Conceptualization, validation, investigation, writing—original draft preparation, writing—review and editing, visualization: Visualization: AHR & AFY; Supervision: AFY.

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### Conflicts of interest

The authors declare that they have no competing interests.

### Ethical issues

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the authors.

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