

Thyroglobulin is a useful biomarker of adequate iodine status in adults

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Because there is significant day-to-day variation in iodine intake, iodine status cannot be accurately determined in individuals and can only be assessed in aggregate at the population level, using median urinary iodine concentration (UIC). Thyroglobulin (Tg), secreted from the thyroid follicular cells, has been used as a validated biomarker of iodine status in children, inverse to the median UIC (1). A new study examined the efficacy of using serum Tg concentration as an inverse biomarker of iodine status in adults, as compared with the reference of median UIC.

Study method and results

This was a double-blind, randomized, placebo-controlled clinical trial of mildly iodine-deficient adults aged 18 to 40 years in New Zealand, where pockets of mild iodine deficiency persists despite national measures to mandate iodized salt in bread products starting in 2009 (4). Study participants (112 adults with a baseline median UIC of 65 µg/L, consistent with mild iodine insufficiency, and a median serum Tg of 16.6 µg/L) received either 150 µg of potassium iodate or placebo daily for 24 weeks. For paired analyses, they provided spot urine samples at baseline and at 24 weeks for the measurement of urine iodine, and blood serum throughout the study for the measurement of Tg. By the end of the study, the median UIC had increased to 79 µg/L in the placebo group and to 178 µg/L in the iodine-supplemented group. As compared with the placebo group, serum Tg levels among the supplemented group decreased by 12%, 20%, and 27% at 8, 16, and 24 weeks, respectively. These decreases resulted in a median serum Tg concentration of 13 µg/L at 24 weeks, and only 1.8% of the population with a serum Tg >40 µg/L.

Discussion

The study adds significantly to the current understanding of monitoring iodine status as an important global public health measure, given the challenges of urine collection, the inability to measure urinary iodine in some laboratories, and that UIC is a reflection of short-term (i.e. days or weeks) iodine status. The use of serum thyroglobulin, which can be obtained from a fingerprick and spotted onto filter paper, may be particularly attractive in overcoming the difficulties of the collection, storage, and the shipping of urine samples in the field. The findings of this study confirm those of two other studies in adults, which were limited by their short duration, use of too little iodine supplementation to improve iodine status, and a cohort of only iodine-sufficient subjects (5, 6). The study also confirmed that serum Tg is a more sensitive biomarker of iodine status than TSH and thyroid hormone. Further

studies are needed to expand on the findings among adults of other age ranges and to be adequately powered to assess potential sex-based differences that is common to many thyroid disorders.

References

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