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Editorial

Iodine: A Lot to Swallow

SEARCH

This editorial sparked an interesting debate. . .

Recently, a growing number of doctors have been using iodine supplements in fairly large doses in their practices. The treatment typically consists of 12 to 50 mg per day of a combination of iodine and iodide, which is 80 to 333 times the RDA of 150 mcg (0.15 mg) per day. Case reports[1,2] suggest that iodine therapy can improve energy levels, overall well-being, sleep, digestive problems, and headaches. People with hypothyroidism who experienced only partial improvement with thyroid hormone therapy are said to do better when they start taking iodine.[3] In addition, fibrocystic breast disease responds well to iodine therapy, an observation that has been documented previously.[4] The reported beneficial effects of iodine suggest that some people have a higher-than-normal requirement for this mineral, or that it favorably influences certain types of metabolic dysfunction.

While iodine therapy shows promise, I am concerned that two concepts being put forth could lead to overzealous prescribing of this potentially toxic mineral. First is the notion that the optimal dietary iodine intake for humans is around 13.8 mg per day, which is about 90 times the RDA and more than 13 times the "safe upper limit" of 1 mg per day established by the World Health Organization. Second is the claim that a newly developed iodine-load test can be used as a reliable tool to identify iodine deficiency.

Is the optimal human requirement 13.8 mg per day?

The argument, developed by one investigator,[5] that the optimal human iodine intake is around 90 times the RDA is based mainly on two points. The first point is that the average iodine intake of adults living in Japan is 13.8 mg per day, and the Japanese are among the healthiest people in the world, with low rates of cancer. The second point is in regard to the amount of oral iodine that it takes to saturate the thyroid tissues.

The idea that Japanese people consume 13.8 mg of iodine per day appears to have arisen from a misinterpretation of a 1967 paper.[6] In that paper, the average intake of seaweed in Japan was listed as 4.6 g (4,600 mg) per day, and seaweed was said to contain 0.3% iodine. The figure of 13.8 mg comes from multiplying 4,600 mg by 0.003. However, the 4.6 g of seaweed consumed per day was expressed as wet weight, whereas the 0.3%-iodine figure was based on dry weight. Since many vegetables contain at least 90% water, 13.8 mg per day is a significant overestimate of iodine intake. In studies that have specifically looked at iodine intake among Japanese people, the mean dietary intake (estimated from urinary iodine excretion) was in the range of 330 to 500 mcg per day,[7,8] which is at least 25-fold lower than 13.8 mg per day.

The other argument being proposed to support a high iodine requirement is that it takes somewhere between 6 and 14 mg of oral iodine per day to keep the thyroid gland fully saturated with iodine. Whether or not that is true, it is not clear that loading the thyroid gland or other tissues with all the iodine they can hold is necessarily a good thing. Since emerging from the iodine-rich oceans to become mammals, we have evolved in an iodine-poor environment. Our thyroid glands have developed a powerful mechanism to concentrate iodine, and some thyroid glands (or other tissues) might not function as well after a sudden 90-fold increase in the intake of this mineral. As I will explain later, relatively small increases in dietary iodine intake have been reported to cause hypothyroidism or other thyroid abnormalities in some people.

It has also been observed that iodine supplementation promotes the urinary excretion of potentially toxic halogens such as bromide and fluoride. While that effect might be beneficial for some people, it is not clear to what extent it would shift the risk-benefit ratio of megadose iodine therapy for the general population.

Is the iodine-load test valid?

For the iodine-load test, the patient ingests 50 mg of a combination of iodine and

iodide and the urine is collected for the next 24 hours. The patient is considered to be iodine-deficient if less than 90% of the administered dose is excreted in the urine, on the premise that a deficient person will retain iodine in the tissues, rather than excrete it in the urine. According to one doctor who uses the test and a laboratory that offers it, 92% to 98% of patients who have taken the iodine-load test were found to be deficient in iodine.

However, the validity of the test depends on the assumption that the average person can absorb at least 90% of a 50-mg dose. It may be that people are failing to excrete 90% of the iodine in the urine not because their tissues are soaking it up, but because a lot of the iodine is coming out in the feces. There is no reason to assume that a 50-mg dose of iodine, which is at least 250 times the typical daily intake, can be almost completely absorbed by the average person. While this issue has not apparently been studied in humans, cows fed supraphysiological doses of iodine (72 to 161 mg per day) excreted approximately 50% of the administered dose in the feces.[9]

Proponents of the iodine-load test argue that the less-than-90% urinary excretion seen in most patients is probably not due to incomplete intestinal absorption. They point out that the percent urinary excretion increases progressively (usually over a period of months) with continued high-dose iodine administration, and that this increase occurs because the body retains less of each successive dose as it becomes more saturated with iodine. However, an alternative explanation for the progressive increase in urinary iodine excretion is that repeated dosing leads to increases in the percent absorbed. That could conceivably occur in a number of different ways. As an antimicrobial agent, iodine might enhance overall nutrient absorption by killing certain pathogens in the gastrointestinal tract. Supplementing with large doses of iodine might also induce the proliferation of an intestinal iodine-transporter molecule, thereby increasing iodine absorption capacity. A third possibility is that an enterohepatic circulation exists for iodine. Repeated dosing with 50 mg of iodine might overload the enterohepatic circulation system, resulting in less iodine being dumped back into the intestine to be excreted in the feces, and more excreted in the urine. Before the iodine-load test can be considered a reliable indicator of tissue iodine levels, it needs to be demonstrated that only negligible amounts of iodine are excreted in the feces after an oral iodine load.

Potential side effects of iodine

Fairly modest increases in iodine intake have been reported to cause thyroid dysfunction, particularly hypothyroidism. In a study of 33 Japanese patients with

hypothyroidism, the median serum TSH level decreased from 21.9 mU/L to 5.3 mU/L (indicating an improvement in the hypothyroidism), and one-third became euthyroid, when the patients stopped eating seaweed and other high-iodine foods for 1–2 months.[10] In a survey of 3,300 children aged 6–12 years from 5 continents, thyroid glands were twice as large in children with high dietary iodine intake (about 750 mcg per day), compared with children with more normal iodine intake.[11] While the significance of that finding is not clear, it suggests the possibility of iodine-induced goiter. In addition, there is epidemiological evidence that populations with "sufficient" or "high normal" dietary iodine intake have a higher prevalence of autoimmune thyroiditis, compared with populations with deficient iodine intake.[12] In a study of children in a mountainous area of Greece with a high prevalence of goiter, public-health measures taken to eliminate iodine deficiency were followed by a three-fold increase in the prevalence of autoimmune thyroiditis.[13] In addition, modest increases in dietary iodine have been suspected to cause hyperthyroidism in some people,[14] an effect that is known to occur with larger doses of iodine.

Other well-known side effects of excessive iodine intake include acne, headaches, allergic reactions, metallic taste in the mouth, and parotid gland swelling. While the doses of iodine reported to causes those side effects have often been higher than those currently being recommended, some people appear to be especially sensitive to the adverse effects of iodine.

Practitioners who are using iodine therapy report that these side effects, including thyroid problems, are very uncommon. The relative absence of side effects may be due to the use of iodine as part of a comprehensive nutritional program. One might also speculate that the iodine/iodide combination causes fewer adverse effects on thyroid function than does iodide alone (which is the type of iodine present in iodized salt).

Conclusion

The possibility that high-dose iodine/iodide can relieve certain common conditions is intriguing. Considering the positive anecdotal reports, an empirical trial of iodine/iodide therapy, based on the clinical picture, seems reasonable. The case has not been made, however, that the average person should markedly increase his or her iodine intake in an attempt to saturate the tissues with iodine. Nor has the case been made that the iodine-load test can provide reliable guidance regarding the

need for iodine therapy. Thyroid function should be monitored in patients receiving more than 1 mg of iodine per day.

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References

1. Brownstein D. *Iodine: why you need it, why you can't live without it.* Medical Alternatives Press, West Bloomfield, MI, 2004.
2. Abraham GE, et al. Orthoiodosupplementation: Iodine sufficiency of the whole human body. http://www.optimox.com/pics/Iodine/IOD-02/IOD-02.htm#2. (Note: Several other articles on iodine by Abraham GE et al are posted at this website).
3. Brownstein D. op.cit.
4. Ghent WR, et al. Iodine replacement in fibrocystic disease of the breast. *Can J Surg* 1993;36:453–460.
5. Abraham GE, et al. op. cit.
6. Nagataki S, et al. Thyroid function in chronic excess iodide ingestion: comparison of thyroidal absolute iodine uptake and degradation of thyroxine in euthyroid Japanese subjects. *J Clin Endocrinol Metab* 1967;27:638–647.
7. Ishizuki Y, et al. [The variation of Japanese urinary excretion of iodine in different decades of age]. [Article in Japanese]. *Nippon Naibunpi Gakkai Zasshi* 1994;70:1093–1100.
8. Ishizuki Y, et al. [Urinary iodide excretion in Japanese people and thyroid dysfunction]. [Article in Japanese]. *Nippon Naibunpi Gakkai Zasshi* 1992;68:550–556.
9. Crout NM, Voigt G. Modeling the dynamics of radioiodine in dairy cows. *J Dairy Sci* 1996;79:254–9.
10. Kasagi K, et al. Effect of iodine restriction on thyroid function in patients with primary hypothyroidism. *Thyroid* 2003;13:561–567.
11. Zimmermann MB, et al. High thyroid volume in children with excess dietary iodine intakes. *Am J Clin Nutr* 2005;81:840–844.
12. Schumm-Draeger PM. [Iodine and thyroid autoimmunity] [Article in German]. *Z Arztl Fortbild Qualitatssich* 2004;98 Suppl 5:73–6.
13. Zois C, et al. High prevalence of autoimmune thyroiditis in schoolchildren after elimination of iodine deficiency in northwestern Greece. *Thyroid* 2003;13:485–9.
14. Stewart JC, Vidor GI. Thyrotoxicosis induced by iodine contamination of food: a common unrecognized condition? *Br Med J* 1976;1:372–375.

Iodine Debate Continues. . .

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