# SODIUM SELENITE IMPROVES MILD GRAVES' EYE DISEASE

Marcocci C, Kahaly GJ, Krassas GE, Bartalena L, Prummel M, Stahl M, Altea MA, Nardi M, Pitz S, Boboridis K, Sivelli P, von Arx G, Mourits MP, Baldeschi L, Bencivelli W, Wiersinga W; European Group on Graves' Orbitopathy. **Selenium and the course of mild Graves' orbitopathy.** N Engl J Med 2011;364:1920-31.

#### BACKGROUND

Mild Graves' orbitopathy (GO) reduces quality of life. The condition improves spontaneously in one fifth of patients, remains static in two thirds, and progresses in the remainder. Cytokines and oxygen free radicals in the orbit may be pathogenic for GO. When it is severe, GO is treated with corticosteroids or decompressive surgery. Selenium is thought to be beneficial for Hashimoto's thyroiditis. Pentoxifylline is a phosphodiesterase inhibitor that also has antiinflammatory and immunomodulatory effects. The purpose of this study was to evaluate these two agents in the treatment of mild GO.

## **METHODS**

This was a multicenter, randomized, double-blind, placebo-controlled trial that enrolled 159 patients. Patients were randomly assigned to receive placebo, selenium as sodium selenite (not "selenium selenite") 100  $\mu$ g twice daily, or pentoxifylline 600 mg twice daily in capsules that appeared identical, for a total of 6 months. Patients were evaluated at baseline, 3, 6, and 12 months by an ophthalmologist who determined a clinical activity score that evaluated seven items. They also were given a quality of life Graves' orbitopathy questionnaire (GO-QOL). The primary end points were the ophthalmologic assessment and GO-QOL

#### RESULTS

The mean age of the patients was 43 to 44 years. About two thirds of them were treated with antithyroid drugs during the study; the remainder were euthyroid while taking levothyroxine after thyroidectomy or radioiodine treatment. A total of 35% to 50% were current smokers. The GO-QOL score for visual function improved in 62% and the appearance improved in 75% of the selenium group; the magnitude of the improvement was much better than in the other groups. The overall ophthalmic outcome at 6 months was much better in the selenium group than in the other groups and the rate of worsening was less in the selenium group. The beneficial effect of selenium persisted for 6 months after therapy. The eyelid aperture improved in 37% of the selenium group but in only 12% of the placebo group and 15% of the pentoxifylline group. Drug-related adverse events occurred in seven patients taking pentoxifylline but did not occur in the other groups.

#### CONCLUSIONS

Treatment with selenium significantly improved quality of life and reduced ocular involvement and slowed its progression in patients with mild Graves' orbitopathy.

## COMMENTARY • • • • • • • • • • • • • • • • •

Management of hyperthyroidism is straightforward and successful in patients with Graves' disease, but management of the eye condition is problematic because there is no simple effective therapy. In my experience, the eye condition may cause considerable concern, especially in young women, and thus it poses a vexing problem. This multicenter study has produced a remarkable therapeutic result by showing that sodium selenite clearly improves Graves' eye disease in a majority of patients, with virtually no side effects. Although these patients did not have severe ophthalmopathy that may have required corticosteroids, radiation, or surgery, they were clearly troubled by their appearance. The mechanism of the effect is unclear; the authors speculated that selenium reduced reactive oxygen species.

To place the selenium dose in perspective, it should be noted that the National Institutes of Health Office *continued on next page* 

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of Dietary Supplements recommends a selenium intake of 55  $\mu$ g per day, presumably in food. The maximum safe selenium intake is estimated to be 600  $\mu$ g per day (1).

One concern about adoption of this therapy is that the study was relatively small. There were only 54 patients in the selenium group, but they did much better than the 50 in the placebo group or the 48 in the pentoxifylline group. Because this therapy is inexpensive and apparently harmless, I am tempted to use it in my treatment of patients with Graves' disease who have any degree of clinical eye involvement. A sodium selenite capsule containing 100 µg of selenium costs only 10 cents (Internet price). Let's hope that a drug company does not get an FDA approval for selenium for Graves' eye disease and then sell it for \$10 per capsule.

— Jerome M. Hershman, MD

## Reference

1. Yang GQ, Xia YM. Studies on human dietary requirements and safe range of dietary intakes of selenium in China and their application in the prevention of related endemic diseases. Biomed Environ Sci 1995;8:187-201.

