

Notes from the Field

Thyrotoxicosis After Consumption of Dietary Supplements Purchased Through the Internet — Staten Island, New York, 2015

Angela Regina, DO¹; Nima Majlesi, DO²

On June 18, 2015, a woman aged 30 years was brought to the Staten Island University Hospital Emergency Department (ED) in New York by her mother, who reported that the patient had become acutely confused at home, was repeating herself, and did not recognize her family members. She had a diagnosis of bipolar disorder for which she took lithium, and she had a history notable for polysubstance abuse (use of three or more addictive drugs in the past 12 months). Her other medications included risperidone (an antipsychotic), benztropine (an anticholinergic), and bupropion (an antidepressant). ED staff members learned from the patient's mother that the patient had started taking "diet pills" that contained a thyroid hormone, which the patient had purchased through the Internet 2 weeks earlier. The patient volunteered that she had doubled the dosage 1 week earlier, in an attempt to lose more weight.

In the ED, the patient was awake but was unaware of her location or the date. Her mother said that the patient had expressed no recent suicidal ideation. Her vital signs were within normal limits, with the exception of a heart rate of 130 beats per minute. She had a mild tremor at rest, but was not ataxic. While in the ED, her temperature increased to 101.5°F (38.6°C). Laboratory analyses indicated lithium concentration in the therapeutic range, and serum salicylates and acetaminophen concentrations were undetectable. A urine drug screen was negative for cocaine, tetrahydrocannabinol (the psychoactive component of cannabis), opioids, phencyclidine, and benzodiazepines.

Thyroid function studies indicated thyroid stimulating hormone <0.01 mIU/mL (normal range = 0.27–4.20 mIU/ml), triiodothyronine (T₃) >32.5 pg/mL (normal range = 1.80–4.60 pg/mL), and thyroxine (T₄) >7.8 ng/dL (normal range = 0.9–1.8 ng/dL). The active ingredient listed on the bottle of diet pills was "triiodothyronine hormone 25 mcg." The mother counted the pills and reported that 25 were missing from the bottle. The patient was admitted to the hospital with a diagnosis of acute thyrotoxicosis, secondary to exogenous thyroid hormone. She was initially treated with intravenous hydration and benzodiazepines. Her symptoms improved only minimally, and she remained delirious and tachycardic for >72 hours. On the third hospital day, the patient was evaluated by a toxicologist who recommended starting treatment with beta-blockers to ameliorate the symptoms of hyperthyroid-associated increased beta-adrenergic tone. Once treatment with propranolol was initiated, the patient's

vital signs and mental status stabilized. Her thyroid function tests normalized during her hospital stay after discontinuing the thyroid supplements, and she was discharged on the fourth day.

The patient had purchased the product, which contained triiodothyronine (a thyroid hormone), online. Although the company's website claims that the capsules are for research purposes only, the comments on the company's webpage indicate that consumers purchase the supplements for weight loss. Pharmaceutical thyroid supplementation for patients with hypothyroidism is available by prescription only. Patients who obtain thyroid supplementation on the internet or through other sources are at risk for thyrotoxicosis because of the unpredictability of dosing and contents.

Thyrotoxicosis has previously been reported related to use of dietary supplements (1,2). During 2013, dietary supplements were among the top 25 substances most frequently involved in human toxic exposures (3). Dietary supplements are easily obtained, especially through the Internet, but they are not subject to the same regulatory safeguards as are drugs. Manufacturers must register their facilities with the Food and Drug Administration (FDA), but they are not required to obtain FDA approval before the development of or sale of dietary supplements (4,5). Manufacturers and distributors also are required to make certain that all claims and information on the product label and in other labeling are truthful and not misleading. FDA's authority related to supplements, however, is generally limited to postmarketing surveillance, such as adverse event monitoring and facility inspections (6). This adverse reaction and product was reported to MedWatch, FDA's Safety Information and Adverse Event Reporting Program.

Commercially available thyroid supplements can contain clinically relevant amounts of triiodothyronine, and consumption has the potential to cause profound metabolic derangements (7). The fact that these products are readily available on the Internet market, often without online disclosure of the active ingredients, poses a substantial health risk. Health care providers evaluating patients with signs and symptoms of thyrotoxicosis should inquire about the use of dietary supplements and examine product labels to ascertain the contents. In addition to supportive therapy, the use of beta-blockers should be considered after consultation with a medical toxicologist. Consumers are encouraged to exercise caution when purchasing products labeled as containing thyroid hormones, and health care providers are strongly encouraged to report adverse events associated with the use of dietary supplement products to MedWatch (<http://www.fda.gov/medwatch>).

¹North Shore University Hospital, Manhasset, New York; ²Division of Medical Toxicology, Department of Emergency Medicine, Staten Island University Hospital, New York.

Corresponding author: Angela Regina, areginatox@gmail.com, 516-562-4125.

References

1. Daniels GH, Sluss P. Pure T₃-thyrotoxicosis from a Mexican weight loss supplement. *Endocr Pract* 2013;19:559–60.
2. Dimeski G, Lampe G, Brown NN. Chinese herbal supplements the cause of thyrotoxicosis. *Pathology* 2013;45:185–6. <http://dx.doi.org/10.1097/PAT.0b013e32835c879e>
3. Mowry JB, Spyker DA, Cantilena LR Jr, McMillan N, Ford M. 2013 annual report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 31st annual report. *Clin Toxicol (Phila)* 2014;52:1032–283. <http://dx.doi.org/10.3109/15563650.2014.987397>
4. Food and Drug Administration. Dietary supplements. College Park, MD: US Department of Health and Human Services, Food and Drug Administration; 2016. <http://www.fda.gov/Food/DietarySupplements/>
5. Food and Drug Administration. Dietary supplement products & ingredients. College Park, MD: US Department of Health and Human Services, Food and Drug Administration; 2016. <http://www.fda.gov/Food/DietarySupplements/ProductsIngredients/default.htm>
6. Bauer BA, Elkin PL, Erickson D, Klee GG, Brennan MD. Symptomatic hyperthyroidism in a patient taking the dietary supplement tiratricol. *Mayo Clin Proc* 2002;77:587–90. <http://dx.doi.org/10.4065/77.6.587>
7. Kang GY, Parks JR, Fileta B, et al. Thyroxine and triiodothyronine content in commercially available thyroid health supplements. *Thyroid* 2013;23:1233–7. <http://dx.doi.org/10.1089/thy.2013.0101>