A Case of Thyroid Storm Induced by Iodine-Containing Dietary Supplements and Homeopathic Remedies

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Abstract

Objective: We report the case of a patient who presented to the hospital in thyroid storm following the use of several iodine-containing dietary supplements (DS) and homeopathic remedies (HR). **Case Summary:** The patient was a 76-year-old woman with no personal or family history of thyroid or autoimmune disease. On laboratory assessment, a thyroid panel showed that her total T3 and T4 were elevated at 334 ng/dL and 14.6 µg/dL, respectively; thyroid stimulating hormone was undetectable; and thyroid stimulating immunoglobulin was positive at 7.4. The patient had been consuming 170 µg of iodine daily for the past 2 months via her DS and HR. An objective causality assessment using the Naranjo adverse drug reaction probability scale revealed that an adverse effect was probable. The patient likely suffered from iodine-induced thyrotoxicosis secondary to the consumption of numerous DS and HR. **Discussion:** Dietary supplements and homeopathic remedies can pose significant health risks. The safety of these products is not assured as they are incompletely monitored by the Food and Drug Administration. Individuals who take these compounds do so at their own risk and should pay close attention to product contents. **Conclusions:** The labeling of DS and HR products may be misleading. Pharmacists and clinicians are advised to inquire about the use of DS and HR products. When use is identified, the products should be subject to a thorough review.

Keywords

dietary supplement, homeopathic remedies, herbal preparation, thyroid storm, iodine

Introduction

The Jod-Basedow effect describes hyperthyroidism induced by the intake of excess iodine. This presentation of hyperthyroidism, also known as iodide-induced thyrotoxicosis (IIT), is a well-established condition that can occur in patients with or without preexisting thyroid disease.¹ Many cases in patients without a preexisting thyroid disorder are observed following consumption of iodinated compounds such as amiodarone or iodinated contrast dye rather than iodine itself.¹ Most Americans meet the recommended dietary allowance (RDA) for iodine of 150 µg via dietary consumption of iodized salt and other fortified foods. Thus, the use of iodine supplements in addition to typical dietary intake is not recommended.

Dietary supplements (DS) and homeopathic remedies (HR) are not as closely regulated by the Food and Drug Administration (FDA) as prescription products, and labeling may be unclear as to how much iodine the products contain. The Dietary Supplement Health and Education Act of 1994 requires that product labeling include a complete list of ingredients as well as quantities for each dietary ingredient.² This labeling falls under the regulation of the Federal Trade Commission. The FDA does not regulate DS

for efficacy or safety and may only remove a product from the market if it has poses a significant risk to the public when used according to the instructions on the label.² It is difficult for the FDA to review all DS and HR being marketed in retail stores and on the Internet. Thus, unsafe products may be available to consumers.

Using these products may place patients at risk for consuming excessive amounts of iodine with potentially serious consequences. Hyperthyroidism can result within days to years following excess iodine consumption and usually resolves spontaneously once the excess consumption ceases.¹ This case highlights the importance of not only inquiring about prescription and common over-the-counter medications when interacting with patients, but also investigating potential adverse events associated with the use of DS and HR.

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Case Report

The patient discussed in this report was a 76-year-old Caucasian woman who was a retired nurse and who lived independently with her husband. She had a general distrust of the health care system and did not have a primary care physician. As a result, her past medical history was limited to asthma exacerbated by environmental allergens and irritable bowel syndrome. She did not take prescription or typical over-the-counter medications, but she did use numerous DS and HR (see the appendix).

The patient initially presented to an outside hospital. Her chief complaints included increased fatigue over the past 2 weeks and increased shortness of breath and peripheral edema over the past 2 months. She had also experienced a reportedly intentional 30-pound weight loss over the past 1 to 2 months. On admission, the patient was 1.6 meters tall and weighed 56 kg.

Diagnostic testing at the outside hospital indicated that she was in atrial fibrillation with a rapid ventricular response up to 150 beats per minute. She was also found to have severe congestive heart failure with a left ventricular ejection fraction of 20% on echocardiogram. Her thyroid panel indicated that she had hyperthyroidism. During treatment at the outside hospital, the patient became unstable and was transferred to our facility for advanced care.

A repeat thyroid panel was obtained on admission to the intensive care unit. The results were as follows: total T3 and T4 were elevated at 334 ng/dL (reference = 80-200 ng/dL) and 14.6 µg/dL (reference = 4.5-12.5 ng/dL), respectively; thyroid stimulating hormone (TSH) was undetectable (reference = 0.3-3.04 mIU/L); and thyroid stimulating immunoglobulin (TSI) was positive at 7.4 (reference is a negative result). No goiter or nodules were identified on thyroid palpation. A radioiodine uptake test was not performed. The elevation of T3 and T4 combined with the absence of TSH is diagnostic for hyperthyroidism. The presence of TSI indicates an autoimmune component and is consistent with an underlying diagnosis of Graves' disease. However, the patient had no personal or family history of thyroid or autoimmune disease.

The patient's symptoms were severe enough to meet the Burch-Wartofsky criteria for thyroid storm.³ Thyroid storm is a severe presentation of hyperthyroidism. It is a life-threatening condition, and she was treated accordingly.⁴ The patient required hospitalization in the intensive care unit for 3 days. On stabilization, she was transferred to the medical floor for continued inpatient care. On hospital day 7, the patient suffered from a debilitating left-sided embolic stroke secondary to her thyroid storm-induced atrial fibrillation. Her symptoms included right-sided facial drop, right-sided weakness, and aphasia. When the patient was discharged on hospital day 16, her deficits following the stroke required her to be discharged to a skilled nursing facility for rehabilitation. After discharge, the patient was lost to follow-up.

A discussion with the patient and her husband revealed that she was using 70 DS and HR, which she had obtained from various retail stores, an apothecary, and the Internet (see the appendix). The patient reported that she used 15 of these products daily and that the others were used when needed. *Natural Medicines Comprehensive Database* was used to research each of the DS and HR. Other available resources include *The Review of Natural Products*, *Natural Standard*, and the National Center for Complementary and Alternative Medicine. Many of the patient's products contained iodine and animal glandular tissues. Although none of the products specifically stated that they contained thyroid tissue, it could not be ruled out as a possibility.

She had been taking one Every Woman's One Daily Multi (New Chapter Organics, Brattleboro, VT) tablet daily for the past 2 years. Each tablet contained 75 µg of iodine. She had also been taking one Cataplex F (Standard Process, Palmyra, WI) tablet daily for about 2 months. Each tablet contained 95 µg of iodine. She reported taking one of her as-needed remedies, Sinus homeopathic medication (Heel BHI, Albuquerque, NM), 2 weeks prior to coming to the hospital. This sinus medication contained an undocumented amount of diluted kali iodatum (potassium iodide).

Discussion

The patient had been taking the Every Woman's One Daily Multi for 2 years without noticeable adverse effects. Thus, it was determined that the addition of the Cataplex F and Sinus homeopathic tablet to her regimen was the most probable cause of her thyroid storm. The Every Woman's One Daily Multi combined with the Cataplex F provided 170 µg of iodine daily. This is well above the RDA of 150 µg and does not take into account dietary sources of iodine.

This event receives a score of 7 on the Naranjo adverse drug reaction probability scale.⁵ A score of 7 indicates that the event was a probable adverse drug event. However, in the development of this scale, Naranjo et al excluded intentional and accidental poisonings from their definition of an adverse drug event. Thus, the Naranjo scale may not be a reliable scale in this case.

Several other characteristics can be used to differentiate IIT from Graves' disease. These include age at onset, gender, presence of a goiter, presence of autoimmune involvement, and levels of radioiodine uptake.¹ Patients with Graves' disease typically present with an insidious onset of symptoms between the ages of 20 and 40 years. Patients are more commonly women and frequently have an autoimmune involvement. Patients usually present with a goiter and with elevated radioiodine uptake. Conversely, patients with IIT typically present with an acute onset between the ages of 40 and 70 years. Women and men are affected equally and there is usually not an autoimmune component to the disease. Patients with IIT usually do not develop a goiter and will have reduced or absent radioiodine uptake on exam.¹

Iodine consumption can induce thyrotoxicosis in euthyroid Graves' disease.^{1,4} A less well documented phenomenon is iodide-induced thyroid autoimmunity.⁶ Iodine given at doses of 500 µg daily for 6 months has been shown to induce reversible thyroid dysfunction and autoimmunity in euthyroid patients without a personal or family history of autoimmune disease. In these patients, thyroid function normalized and antibody titers returned to baseline without treatment on discontinuation of the excess iodine intake.⁶

The patient described in this case report presented atypically. Consistent with Graves' disease, she had autoimmune involvement as evidenced by a positive TSI. However, consistent with IIT, she presented with an acute onset at age 76 years following consumption of excessive amounts of iodine. She did not have a goiter or thyroid nodules. It is reasonable that this was a case of IIT and this event was reported to the FDA via the MedWatch adverse event reporting program. No samples of her medications were retained for analysis.

Conclusions

The use of dietary supplements and homeopathic remedies may be accompanied by significant health risks. Safety of these products is not assured as they are incompletely monitored by the FDA and the labeling may be incomplete or misleading. Thus, individuals who take these compounds do so at their own risk and should pay close attention to product contents. Pharmacists and clinicians are advised to inquire about the use of DS and HR products. When use is identified, the products should be subject to a thorough review to determine redundant product exposure and hidden toxic compounds.

Clinicians should be aware of the potential adverse effects of excess iodine consumption from dietary supplements and other sources. Many patients may not recognize that iodine is a component of *kali iodatum*. Furthermore, product labels may only state that dilute amounts are used without listing specific quantities. Pharmacists can play a key role in counseling patients on DS and HR and intervening to avoid potentially life-threatening cases of thyroid storm.

Appendix

Home Medication List

*Indicates products taken daily

Products known to contain iodine:

- 1) *Cataplex F (95 µg iodine)
- 2) *Every Woman's One Daily Multi (75 µg iodine)
- 3) Sinus homeopathic tablet (*Kali Iodatum* [potassium iodide] 8× dilutions)
- 4) *Vitamin O (trace amounts of iodine)

Products which may contain iodine due to glandular tissue content:

- 5) *Adrenergize
- 6) *Cardio-Plus
- 7) *Cataplex B
- 8) *Cataplex C
- 9) *Folic Acid B₁₂
- 10) *Vasculin

Products which likely do not contain iodine:

- 11) Allergy Relief homeopathic tablet
- 12) Apothecary Congestion Relief Oil
- 13) Arnica Montana (leopard's bane)
- 14) Ashwagandha Root Extract
- 15) Asthma (luyties #83)
- 16) Ayurvedic Toothpaste
- 17) Back homeopathic tablet
- 18) *Bioplasma
- 19) Bronchial Irritation (luyties #3)
- 20) *Bronchitis & Asthma Aide
- 21) Butcher's Broom Root
- 22) Calcarea Fluor (calcium fluoride)
- 23) Calcium Lactate
- 24) Calendula officinalis gel
- 25) Calming homeopathic tablet
- 26) Calms homeopathic tablet
- 27) *Co-Q 10
- 28) Crab Apple Flower Essence
- 29) EyeBright
- 30) Fermented Cod Liver Oil
- 31) *Ferrum Phos (iron phosphate)
- 32) Five Flower Formula
- 33) FluPlus homeopathic tablet
- 34) Ginsana (*Panax ginseng*)
- 35) Hawthorn Berries
- 36) Homeopathic Arthritis Pain Formula
- 37) Hypericum Perf (St. John's Wort)
- 38) Ignatia Amara (St. Ignatius' Bean)
- 39) Intestine homeopathic tablet
- 40) Lobelia Inflata (Indian tobacco)
- 41) L-Tryptophan
- 42) *Magnesia Phos (magnesium phosphate)
- 43) Melatonin
- 44) Natrum Mur (sodium chloride)
- 45) Natrum Sulph (sodium sulfate)
- 46) Neuralgia (luyties #9)
- 47) *Night Vision Advantage
- 48) Probiotic Advantage proprietary blend
- 49) Psyllium Husk capsules
- 50) Rescue cream
- 51) Rhus Tox (poison oak)
- 52) Ruta Grav (rue)
- 53) Silica (silicon dioxide)

- 54) Similasan eye drops—allergy eye relief
- 55) Similasan eye drops #1—for dry eye
- 56) Similasan eye drops #2—for itchy eyes
- 57) Similasan Irritated Eye Relief drops
- 58) Similasan sinus relief tablets
- 59) Sinus (luyties #203)
- 60) Sleep (luyties #173)
- 61) Slippery Elm Throat Lozenges
- 62) TendoFit proprietary blend
- 63) Theanine Serene with Relora
- 64) Topical Hair Thickening Serum
- 65) Traumeel
- 66) Uri-Control
- 67) Valerian Root
- 68) White Chestnut Flower Essence
- 69) Yerba Santa Flower Essence
- 70) Zeel homeopathic tablet

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