Case report

Recurrent hamburger thyrotoxicosis

Malvinder S. Parmar, Cecil Sturge

Abstract

RECURRENT EPISODES OF SPONTANEOUSLY RESOLVING HYPERTHYROIDISM may be caused by release of preformed hormone from the thyroid gland after it has been damaged by inflammation (recurrent silent thyroiditis) or by exogenous administration of thyroid hormone, which might be intentional or surreptitious (thyrotoxicosis factitia). Community-wide outbreaks of "hamburger thyrotoxicosis" resulting from inadvertent consumption of beef contaminated with bovine thyroid gland have been previously reported. Here we describe a single patient who experienced recurrent episodes of this phenomenon over an 11-year period and present an approach to systematically evaluating patients with recurrent hyperthyroidism.

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Case

A 61-year-old woman with a history of recurrent episodes of transient thyrotoxicosis presented in November 2001 with a 3-week history of weight loss of 4 kg, palpitations and increased sweating. She had mild tachycardia (112 beats/minute) and fine tremor of the hands. She had no thyroid enlargement, thyroid bruits, eye signs or pretibial myxedema. A clinical diagnosis of hyperthyroidism was confirmed by elevated free thyroxine (T_4) (46 [normally 9 to 23] pmol/L) and suppressed thyroid-stimulating hormone (TSH) (0.02 [normally 0.35 to 5.0] μIU/L). Her symptoms resolved spontaneously and her free T_4 returned to normal (12 pmol/L) within 8 weeks.

This was the patient's fifth episode of transient hyperthyroidism over an 11-year period (see Fig. 1), each episode lasting 2 to 3 months. Silent thyroiditis had been diagnosed in 1991 after investigations at a tertiary care centre, and subsequent episodes had been labelled silent thyroiditis because of similar presentations. Further investigations in November 2001 showed normal erythrocyte sedimentation rate (ESR), no antinuclear antibody or antithyroid antibodies, normal levels of thyrotropin binding inhibitor immunoglobulin (TBII) (less than 8.0 IU/L) and low serum thyroglobulin level (0.4 [normally 2.3 to 48.0] μg/L). A chart review revealed negative results for antithyroid antibodies in 1990, 1996 and 1998, low uptake of radioactive iodine in 1990, 1993 and 1996, and normal ESR and low serum thyroglobulin level in 1998.

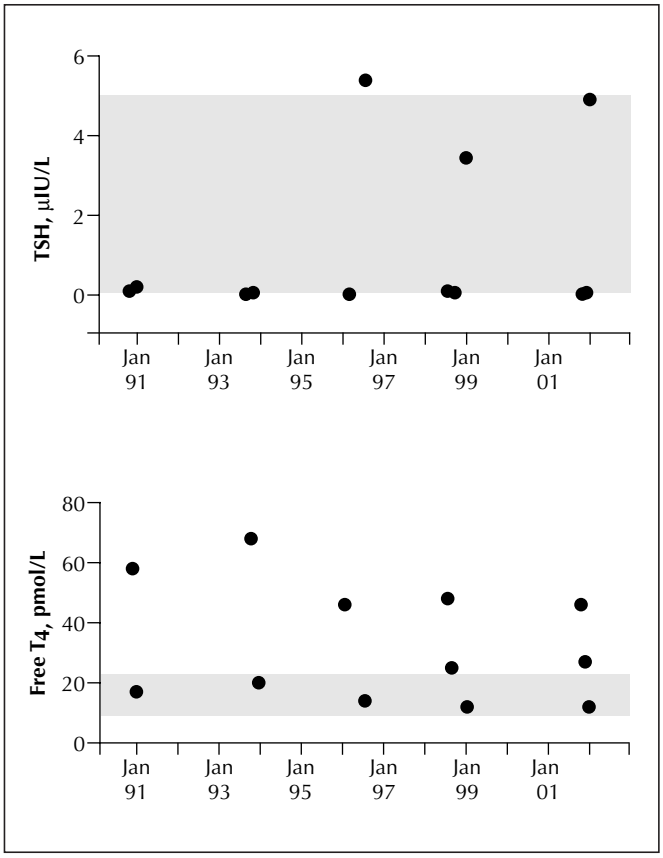

Fig. 1: Thyroid-stimulating hormone (TSH) and free thyroxine (T_4) levels for a 61-year-old woman show 5 documented episodes of transient hyperthyroidism over a period of 11 years, starting in November 1990. Normal levels, indicated by shaded horizontal bars: 0.35 to 5.0 μIU/L for TSH, 9 to 23 pmol/L for free T_4.

Low uptake of radioactive iodine, both at the current presentation and previously, suggested the possibility of silent (painless) thyroiditis,[1] iodide-induced thyrotoxicosis[2] or thyrotoxicosis factitia.[3] However, the combination of low uptake of radioactive iodine with low serum thyroglobulin level is strongly suggestive of an exogenous cause for the hyperthyroidism, such as surreptitious use of thyroid supplements. We therefore questioned the patient about exogenous thyroid intake in any form (including herbal supplements), but she denied use of any supplements other than glucosamine sulfate for osteoarthritis. She had no history of psychiatric treatment or access to thyroid medications.

Further questioning into the patient's dietary history revealed that she lived on a farm with her husband and that every couple of years they slaughtered a cow from their herd, which was their main source of meat. Inquiries to the couple's local butcher revealed that he was unaware of the prohibition against gullet trimming (a procedure whereby muscles from the bovine larynx are harvested) and had inadvertently been contaminating edible meat with thyroid tissue. He used meat from the neck of the patient's cows to make patties, which were usually consumed by the patient within a couple of months of butchering. Her husband, who was not affected by any thyroid problems, did not consume these patties, preferring other cuts of meat. The patties could not be tested, as the patient had finished the current batch a month before consumption of contaminated beef was suspected as the cause of her thyroid problems. However, the temporal association of episodes of transient hyperthyroidism with availability of meat from a slaughtered cow over the previous 11 years is highly supportive of hamburger thyrotoxicosis, rather than silent thyroiditis.

Comments

The most common cause of recurrent hyperthyroidism is a relapse of previously treated hyperthyroidism,[4–6] but other causes should also be considered (Box 1).

In patients with suspected recurrent hyperthyroidism, a history of thyroid disease, presence of goitre and review of medication lists may be helpful in the diagnosis. Eye signs, proptosis and goitre are usually absent in exogenous hyperthyroidism, but such a combination would not exclude Graves' disease, especially in elderly patients, who commonly present with atypical (apathetic) hyperthyroidism. Normal or high uptake of radioactive iodine suggests Graves' disease or toxic nodular goitre, whereas low uptake is seen in patients with thyroiditis or exogenous hyperthyroidism.

To differentiate endogenous from exogenous causes, it is helpful to determine serum thyroglobulin level. Elevation of thyroglobulin is a marker of endogenous hyperthyroidism, whereas low thyroglobulin in association with hyperthyroidism is a hallmark of exogenous thyroid intake or thyrotoxicosis factitia.[3] A practical approach to diagnosis for a patient with recurrent hyperthyroidism is shown in Fig. 2.

Community-wide outbreaks of thyrotoxicosis caused by the consumption of bovine thyroid gland in ground beef in Minnesota, South Dakota and Iowa[10,11] in 1984 and 1985 resulted in the prohibition of gullet trimming in all plants that slaughter cattle and pigs. This case emphasizes that sporadic cases of recurrent thyrotoxicosis caused by consumption of thyroid-contaminated beef may still occur and may be diagnosed as silent thyroiditis. For patients with features suggestive of silent thyroiditis, health care providers should consider this cause of hyperthyroidism, especially for anyone who may be slaughtering farm animals for their own use and for hunters who may be gullet trimming game.

Box 1: Causes of recurrent hyperthyroidism

Common

- Graves' disease (relapse)[4-6]
- Toxic nodular goitre (relapse)[7]
- Iatrogenic (excessive thyroxine replacement for hypothyroidism)
- Intentional suppression of TSH with exogenous thyroxine supplements, used for control of goitre or thyroid cancer

Rare

- Silent (subacute, painless) thyroiditis[8]
- Excess iodine
- Postpartum thyroiditis
- Drug-induced thyroiditis (amiodarone, interferon alpha, interleukin-2)
- Ectopic thyroid tissue (struma ovarii)
- Pregnancy[9]
- Functional metastatic follicular carcinoma
- TSH-secreting pituitary adenoma
- Thyrotoxicosis factitia (surreptitious)
- Hamburger thyrotoxicosis

Note: TSH = thyroid-stimulating hormone.

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From the Medical Program (Internal Medicine), Timmins and District Hospital, Timmins, Ont. (Parmar), and the Department of Family Practice, Anson General Hospital, Iroquois Falls, Ont. (Sturge)

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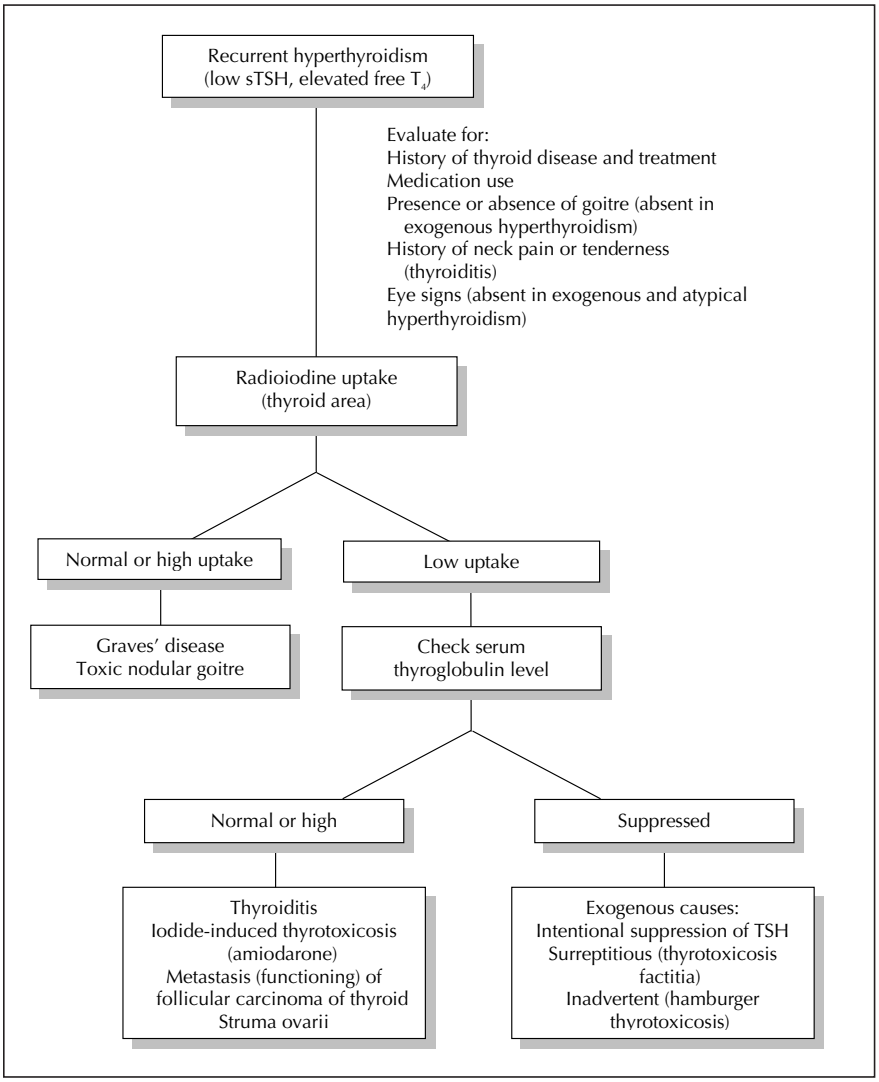

Fig. 2: Algorithm showing diagnostic approach to a patient with recurrent hyperthyroidism. sTSH = sensitive TSH.

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Correspondence to: *Dr. Malvinder S. Parmar, Medical Program (Internal Medicine), Timmins and District Hospital, Suite 107, 707 Ross Ave. E, Timmins ON P4N 8R1; fax 705 268-8066; atbeat@ntl.sympatico.ca*