HYPERTHYROIDISM IN THE ELDERLY

Dr Low Lian Leng, A/Prof Lee Kheng Hock

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INTRODUCTION

Hyperthyroidism in the elderly is not uncommon and often presents in an atypical manner. Signs and symptoms are often non-specific and may be easily attributed to aging or diseases in other organ systems, leading to delayed diagnosis and complications. Drugs such as beta-blockers may also mask the signs of hyperthyroidism. The diagnosis can be easily made and treatment leads to a euthyroid state. Atrial fibrillation and other cardiovascular complications can be avoided and prognosis is excellent. Family physicians are often the first point of contact for these patients and will be managing such cases in their practice. We therefore need to be familiar with the presentation, diagnosis and treatment.

We describe a case that illustrates the non-specificity of symptoms in hyperthyroidism in elderly patients.

CASE DESCRIPTION

An 85-year-old lady Chinese lady was admitted to Singapore General Hospital for giddiness of a few weeks' duration. This was associated with occasional dyspnoea, palpitations, and loss of weight of unquantifiable amount and duration.

Her past medical history included hypertension for which she was on atenolol 100 mg, enalapril 5 mg, and hydrochlorothiazide 12.5 mg to be taken every morning. There was no family history of autoimmune disorders.

On examination, she was noted to have a left thyroid nodule. Physical examination did not reveal signs of thoracic outlet obstruction. She was not tachycardic and her heart rate was regular. Thyroid eye signs were absent.

Table 1 shows the results of investigations done at time of admission. There were elevation of T3 and T4. Thyrotropin (TSH) was suppressed. Her thyroid auto-antibodies (thyroid receptor auto-antibodies, anti-thyroid peroxidase, anti-thyroglobulin) were negative.

Table 1. LABORATORY RESULTS OF PATIENT ON ADMISSION

Investigations	Results	Units	Normal Values
Free Thyroxine (T3)	10.1	PMOL/L	3.2-5.3
Free Thyroxine (T4)	31.6	PMOL/L	9.6-19.1
Thyrotropin (TSH)	0.023	MU/L	0.36-3.24
Hemoglobin	10.4	G/DL	12-16
WBC	7.2	109/L	4.0-10.0
Platelets	170	109/L	140-440
Troponin T	<0.01	UG/L	Less than 0.03
Total Cholesterol	2.99	MMOL/L	Less than 5.20
HDL Cholesterol	1.12	MMOL/L	More than 1.00
Triglycerides	0.56	MMOL/L	Less than 1.70
LDL Cholesterol	1.62	MMOL/L	Less than 2.60
Pro-BNP	1184	PG/L	Less than 150
Iron	13	UMOL/L	11-27
Total Iron Binding Capacity	46	UMOL/L	39-60
Serum Folate	>45.3	NMOL/L	4.8-37.4
Serum B12	313	PMOL/L	145-637
Electrocardiogram	Multiple atrial premature complexes		
Chest X-Ray	Normal		

A thyroid uptake scan was performed and showed an enlarged left thyroid lobe containing several hot nodules, the largest nodule measures 2.8 x 1.8 x 3.2 cm. The right thyroid lobe was barely discernible.

Oesophago-duodenoscopy and colonoscopy to investigate the loss of weight did not reveal any gastro-intestinal malignancy.

A diagnosis of toxic nodular goiter with hyperthyroidism was made. The patient was started on oral carbimazole 10mg twice a day. A referral was made to the cardiology department in view of the multiple premature atrial complexes on her electrocardiogram.

She was advised by the cardiologist to continue on beta-blockers and to observe for signs and symptoms of heart failure. A follow-up appointment with the endocrinologist was arranged for her to discuss the option of radioactive iodine ablation.

CASE DISCUSSION

Thyroid Function in Normal Aging

The thyroid gland produces thyroxine (T4) and triiodothyronine (T3). With age, the thyroid gland undergoes moderate atrophy and develops nonspecific histopathologic abnormalities: fibrosis, increasing numbers of colloid nodules, and some lymphocytic infiltration. Production of T4 decreases by about 30% between young adulthood and advanced age.[1] The decrease in T4 is

LOW LIAN LENG. Resident, Department of Family Medicine and Continuing Care, Singapore General Hospital

LEE KHENG HOCK, Head and Senior Consultant, Department of Family Medicine and Continuing Care, Singapore General Hospital

considered to be physiologic compensation for decreased use of the hormone by tissue and not a manifestation of primary thyroid failure.

The body's decrease in use of T4 correlates with the age-related decline in lean body mass, suggesting that the mass of metabolically active, protein-rich tissue (i.e., muscle, skin, bone, and viscera) decreases, which may lead to reduced use and catabolism of thyroid hormones. Thyroid hormone levels rise subtly, and thyrotropin (TSH) output decreases. T3 and T4 output decreases, and serum T4 levels return to normal. When stimulated by increased TSH, the healthy aged thyroid gland can increase its hormone production normally.

Serum T3 and free T3 levels decrease moderately with age. This decline is thought to be due to a combination of decreased monodeiodination of the outer ring of T4 and decreased pituitary secretion of TSH.

Prevalence of hyperthyroidism in the elderly

In elderly patients, the prevalence of overt hyperthyroidism is 2%[2] and 10 to 15% of patients are older than 60 years.[1]

Etiology and Pathophysiology

Unlike in younger adults where Graves' Disease is more common, in elderly patients, hyperthyroidism is more often due to multinodular goitre[3]. Adenomas autonomously produce and secrete excessive thyroid hormone even though TSH production is fully suppressed. Another common cause of hyperthyroidism among elderly patients is iodine-induced hyperthyroidism, often from the use of amiodarone, a cardiac drug containing iodine that deposits in tissue and delivers iodine to the circulation over very long periods of time. The thyroid gland has the unique function to concentrate iodine to thousand times that of blood and hence is affected. Transient hyperthyroidism from subacute thyroiditis is less common and rarely clinically significant as it resolves within weeks.

Atypical presentation

Atypical presentation is common in elderly patients with hyperthyroidism. Only about 25% of hyperthyroid patients aged 65 years of age present with typical symptoms and signs[3]. These age-related differences in symptoms are the result of the aging process and of concomitant disease and medications that modifies the effects of excessive thyroid hormone. For example, cardiac disease and heart failure is common in elderly persons, so the possibility of underlying hyperthyroidism may not be suspected. Gastrointestinal (GI) symptoms may be confused with GI malignancy. A decreased number or affinity of catecholamines receptors results in a decreased response to catecholamines in the elderly.

The classical triad of hyperthyroidism in older patients is tachycardia, weight loss, and fatigue. Constipation is present in more than 20% of elderly patients, while diarrhoea is uncommon. Sweating, hyper-reactive reflexes, nervousness and anxiety are also far less common in elderly hyperthyroid patients. Table 2 shows the clinical features of hyperthyroidism in elderly patients. Note then seven signs of hyperthyroidism which are seen commonly in younger patients but are seen less often in older patients: hyperactive reflexes, increased sweating, heat intolerance, tremor, nervousness, polydipsia, and increased appetite[4]. The thyroid gland is normal in size or impalpable in about 40% of cases, enlarged and nodular in 35%, and enlarged and diffuse in 25%.

Table 2. CLINICAL FEATURES OF HYPERTHYROIDISM IN ELDERLY PATIENTS

More Common	Less Common
Tachycardia	Diarrhoea
Fatigue & weakness	Nervousness and Anxiety
Atrial Fibrillation	Hyperkinesis
Arrhythmias	Sweating
Angina, Heart Failure	Hyperreflexia
Constipation	Ocular Signs i.e. Exophthalmos
Changes in Appetite	
Neuropsychiatric Symptoms i.e. Apathy,	
Weight loss	
Smaller Thyroid Gland	
Multinodular Gland	

Complications

The most common complication in elderly patients is atrial fibrillation, which occurs in 27% of elderly hyperthyroid patients at presentation. There is a statistically significant association between atrial fibrillation and hyperthyroidism.5 Risks for heart failure and early death are increased if atrial fibrillation does not convert to normal sinus rhythm when euthyroidism is restored. Atrial fibrillation also carries a high risk of embolic stroke. Other important complications are depression (called apathetic thyroidism), myopathy, and osteoporosis.

Diagnosis

Laboratory diagnosis of hyperthyroidism is usually straightforward if there is a high index of suspicion. Most elderly hyperthyroid patients have increased serum concentrations of unbound thyroxine (T4) and tri-iodothyronine (T3), and reduced concentration of thyrotropin (TSH).[6]

Serum TSH measurement is the best single test for the diagnosis of hyperthyroidism. However it is important to remember that TSH level may be low in some normal elderly individuals as well as patients receiving glucocorticoid therapy and patients with non-thyroidal illness eg. sick euthyroid state. About 1% of patients have normal amounts of free T4 in serum and raised values of T3; this is called T3 toxicosis. Serum T4, T3, and thyroglobulin levels are on the average lower in older

patients with hyperthyroidism than in younger patients.

Drugs in particular amiodarone should be considered when interpreting an abnormal thyroid function test and can be associated with both hyper and hypothyroidism.

To determine the etiology of hyperthyroidism, investigations such as a thyroid uptake scan, thyroid ultrasound, or Fine Needle Aspiration Cytology (FNAC), thyroid antibodies can be considered.

Prognosis and Treatment

The prognosis for hyperthyroidism in the elderly is excellent. Treatment usually leads to a euthyroid state. If hypothyroidism results, it is treated easily with levothyroxine sodium. The three treatment strategies for hyperthyroidism namely, medication to suppress the gland, surgery to remove the hyper functioning tissue, and radioactive iodine (RAI) to destroy the gland are still applicable to the elderly although the preferred choice depends on the etiology.

In multinodular toxic goitre, surgery[8] may be preferred as the response to 131I therapy is often delayed and incomplete.

When hyperthyroidism is due to subacute thyroiditis, Hashimoto's disease, or acute radiation damage, the only effective treatment is to give beta-blockers and to closely observe the patient for complications. Antithyroid drugs and 131I are not helpful because they do not decrease the uncontrolled output of hormone from damaged thyroid follicles.

The usual treatment of iodine-induced hyperthyroidism is high doses of antithyroid drugs and a beta-blocker. Treatment may be difficult because the large store of thyroid hormone in the gland blunts the effect of antithyroid drugs, and the large pool of iodine throughout the body markedly decreases the uptake of 131I.

Treatment of choice for most elderly patients with Graves' disease or a single autonomous nodule is radioactive sodium iodide (131I). It is preferred because it is easy to administer and it avoids any age-related postoperative complications of surgery. Antithyroid drugs (e.g., propylthiouracil, carbimazole) are effective in the treatment of Graves' disease if the patient's adherence with the regimen is good. However, in patients with uninodular toxic goitre, antithyroid drugs are slow to take effect and rarely lead to permanent remission. Unlike in Graves' disease, post-ablative hypothyroidism does not arise routinely, since the isotope is not concentrated in the contra lateral suppressed thyroid tissue.[7] Long-term antithyroid drug treatment for Graves' Disease usually lasts 1 to 2 years. Antithyroid drug therapy is usually successful if the patient is compliant. As mild hyperthyroidism and a small thyroid gland are characteristic in elderly patients, the chance of permanent remission is enhanced. If hyperthyroidism recurs after antithyroid drug treatment, 131I should be considered.

Antithyroid drugs as primary therapy in elderly persons are administered in the same way as in younger persons. Propylthiouracil may be initiated at 150 to 300 mg/day orally in divided doses every 8 hourly. The dosage can be adjusted based on serum TSH levels. Carbimazole can be started at 15 to 40 mg/day and given as a single daily dose. Propranolol and other beta-blockers can be added on to manage sympathetic symptoms of hyperthyroidism. Beta-blocker related bradycardia may occur once the patient returns to a euthyroid state and needs to be observed for. In patients with atrial fibrillation and high thyroid hormone levels, cardioversion should not be attempted until a euthyroid state is achieved. Once it is, the atrial rhythm spontaneously reverts to normal in about two thirds of patients. Psychiatric symptoms usually resolve when the patient becomes euthyroid but should be treated if necessary. Standard measures to prevent osteoporosis are indicated, particularly in elderly women.

Subclincal hyperthyroidism

This merits discussion here. Subclinical hyperthyroidism is defined as a below-normal TSH concentration concurrent with normal triiodothyronine and T4 levels. Patients are usually euthyroid without the specific signs or symptoms associated with overt hyperthyroidism. Causes of subclinical hyperthyroidism include endogenous overproduction (Graves disease and nodular thyroid disease), excessive levothyroxine administration, and adverse effects of medications such as amiodarone. Progression to overt disease occurs at a rate of 1-2% per year when TSH is less than 0.1 mU/L and up to 5% per year in patients with multinodular goitre.[9,10] Current recommendations suggest to repeat the thyroid function tests within 2 to 3 months, or as early as 2 weeks later if the patient has atrial fibrillation or established cardiac disease.[8] Evidence supports treatment in patients with a TSH less than 0.1mU/L, multinodular goitre, or symptoms (including known cardiac and skeletal complications)[11]. General treatment options include antithyroid medications, radioactive iodine and partial thyroidectomy.

CONCLUSION

Hyperthyroidism in this elderly patient presents with weight loss as the cardinal complaint, and on examination there was a left thyroid nodule. There was no tachycardia and the pulse was regular. Laboratory investigations confirmed hyperthyroidism and thyroid scan showed multiple hot nodules.

REFERENCES

1. Kennedy JW, Caro JF. The ABC of managing hyperthyroidism in the older patient. Geriatrics 1996; 51:22-32.

2. Maugeri D, Russo MS, Carnazzo G, et al. Altered laboratory thyroid parameters indicating hyperthyroidism in elderly subjects. Arch Gerontol Geriatr 1996; 22:145-53.

3. Juan J. Díez. Hyperthyroidism in patients older than 55 years: an analysis of the etiology and management. Gerontology 2003; 49:316-23.
4. Trivalle C, Doucet J, Chassagne P, et al. Differences in the Signs and Symptoms of Hyperthyroidism in Older and Younger Patients. J Am Geriatr Soc 1996; 44: 50-3.
5. Cobler JL, Williams ME, Greenland P. Thyrotoxicosis in institutionalized elderly patients with atrial fibrillation. Arch Intern Med 1984; 144: 1758-60.
6. Thorkild Friis et al. Thyrotoxicosis in the elderly Scandinavian Journal of Primary Health Care, Volume 3, Issue 1 February 1985, pp 7-8.
7. Szabolc I, Podoba J, Feldkamp, et al. Comparative screening for thyroid diseases in old age in areas of iodine deficiency, long term iodine prophylaxis and abundant iodine intake. J Clin Endocrinol (oxf) 1997 Jul; 47(1): 87-92.
8. Todd CH. Management of thyroid disorders in primary care: challenges and controversies. Postgrad Med J 2009;85:655-9.
9. Surks MI, Ortiz E, Daniels GH et al. Subclinical thyroid disease: scientific review and guidelines for diagnosis and management. JAMA 2004;291:228-38.
10. Toft AD. Subclinical hyperthyroidism. N Engl J Med. 2001;345:512-6.
11. GharibH, Tuttle RM, Baskin HJ, et al. Consensus statement: subclinical thyroid dysfunction: a joint statement on management from the American Association of Clinical Endocrinologists, the American Thyroid Association, and The Endocrine Society. J Clin Endocrinol Metab.2005;90:581-5.