

APPROACH TO COMMON THYROID DISORDERS
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SUMMARY

Thyroid disease is common, affecting 1 to 3 percent of the adult population. The approach to the evaluation and treatment of thyroid disorders is fortunately simple and the treatment usually effective. Three questions need to be answered in the assessment of every thyroid patient.

1. What is the function of the gland?
2. What is the anatomy of the gland?
3. What is underlying etiological diagnosis?

Knowing the answers to these three questions is all that is required to formulate a management plan.

1. Determination of the function of the gland

Assessment of the functional status of the thyroid is achieved by routine history, physical examination and measurement of TSH (or free T4 if hypothalamic/pituitary disease suspected). If one or other of these tests is in the normal range there is a greater than 99 percent chance that the patient is truly euthyroid.

2. Determination of the anatomy of the gland

The thyroid fortunately is situated in the anterior neck just inferior to the thyroid cartilage and is easily visible in the majority of lean patients. Have the patient expose the anterior neck and with the head extended slightly and have the patient swallow and observe the contours of the neck. You will get an idea of the size, symmetry or nodularity of the gland. This impression is then confirmed by palpation. Have the patient slightly flex the head and run the right thumb under the right sternomastoid over the right lobe of the thyroid and then examine the left lobe of the thyroid with the left thumb. Asking the patient to swallow, particularly if the gland is low-lying in the neck may be advantageous. Give the patient a glass of water if necessary. You will need to observe the size, contour, symmetry and texture of the gland. If nodularity is found, also check regional lymph nodes.

The thyroid gland may also be palpated from behind using fingers rather than thumbs.

3. Determination of etiology of underlying condition

Etiology will often be apparent after determination of thyroid function and anatomy. Otherwise further laboratory investigation may be necessary. Common investigations include thyroid radioactive iodine uptake (RAIU), anti-thyroid antibodies and fine needle aspiration biopsy.

COMMON CLINICAL DISORDERS

A. Hyperthyroidism

i) Diffuse goitre

The commonest scenario is the hyperthyroid patient with a diffuse goitre. The differential diagnosis is between Graves' disease and silent (painless, post-partum) thyroiditis. Patients with Graves' disease may have pathognomonic eye or skin findings but are often indistinguishable from those with thyroiditis. Radioactive iodine uptake is high in patients with Graves' disease and close to zero in those with thyroiditis. (Thyroid scans are not indicated in the patient with diffuse goitre and are reserved for patients with a solitary nodule or multinodular goitre who are thyrotoxic, see below). The titre of anti TSH receptor antibody may also be helpful but is more of a research tool. In Graves' disease it is usually >20 and in thyroiditis <10 .

The natural history of silent thyroiditis is of a short-lived period of hyperthyroidism (weeks only) followed by spontaneous resolution often with a phase of hypothyroidism following hyperthyroidism. The hyperthyroid phase may be managed with beta blockade (propranolol 10-20 mg TID-QID) and the hypothyroid phase with short term (6-12 months) thyroxine replacement if indicated.

Graves' disease does not spontaneously remit and needs to be treated either with antithyroid drugs or radioactive iodine. Methimazole (Tapazole) is the antithyroid drug of choice and has also been used extensively in pregnancy without an increase in teratogenesis (PTU may be used as an alternative). A dose of 10-20 mg OD will render most patients euthyroid within six weeks. The higher the dose used, the greater the risk of hypothyroidism. Time to euthyroidism is shorter the higher the dose used. The dose should then be titrated against the free T4 aiming to keep the free T4 between the mid-normal and high normal (ie between 15 and 20 in most labs). Treatment should be continued for 6-18 month then stopped. If the patient then relapses, the patient should be offered radioactive iodine treatment though a further course of anti-thyroid medication (for an indefinite period if necessary) is an acceptable option. Factors which favour a remission with antithyroid drugs include; age under 25, small goitre, and short duration and a modest degree of thyrotoxicosis.

I 131 is the treatment of choice for the elderly, for those patients whose likelihood of remission with anti-thyroid drugs is low and for those who have had a relapse after cessation of anti-thyroid medication. The dose of I 131 is determined by estimating the size of the gland and the percentage uptake of radioactive iodine.

This is administered by nuclear medicine physicians and is beyond the control of most referring physicians. Within two years of receiving I 131 therapy half of all patients will have become hypothyroid and within a decade ninety per cent or more will have become hypothyroid. Therefore all patients should be warned of this likelihood and should be monitored with a free T4 every three months for the first year and annually thereafter with a TSH. When the TSH rises above the normal range they should be replaced with usual doses of l-thyroxine (see below).

ii) Thyrotoxicosis with solitary nodule

A thyroid nodule occurring in a hyperthyroid patient suggests autonomous functioning of that nodule. This can be confirmed with a high RAIU and scan showing activity in the region of the nodule, "a hot nodule", and decreased activity in the remainder of the gland. The optimal treatment is then radioactive iodine. Surgery is reserved for the occasional nodule that remains very resistant to I131 therapy or very large goitre.

iii) Toxic multinodular goitre

The natural history of multinodular goitre is for gradual but unpredictable growth of nodules and for the eventual development of autonomy within one or more of the nodules potentially rendering the patient hyperthyroid. Such nodules require higher doses of radioactive iodine than usual or surgery where indicated.

B. Hypothyroidism

The commonest cause of hypothyroidism is Hashimoto's thyroiditis in which one-third of patients will have a moderate-sized diffuse goitre, one-third will have a normal sized gland and one-third will have an atrophic gland. A diagnosis of Hashimoto's thyroiditis is suggested by a strong family history of hypothyroidism, a firm goitre, and a high titre anti-TPO (thyroid peroxidase) antibodies (previously known as anti- microsomal Abs). Other common causes are the post radioactive iodine treated patient and status post thyroidectomy. Temporary hypothyroidism may follow an episode of silent (post-partum) or painful (viral) thyroiditis.

It is generally unnecessary to determine the etiology of hypothyroidism. Standard treatment is replacement therapy with l-thyroxine (known as "T4"). The starting dose of l-thyroxine is 1.6 ug/kg - the adequacy of replacement is based on the TSH 4-6 weeks later. The dose of l-thyroxine can then be titrated up or down by 12.5 - 25 µg as necessary to achieve a normal TSH. Once normalized the TSH need only be checked annually or biennially.

C. Thyroid Nodule in Euthyroid Patient

In the euthyroid patient a solitary nodule should always be biopsied. This can be done in the office providing the correct transport medium and fixation is available and local pathology expertise exists. I use a 25 gauge needle with a non-aspiration technique.

The needle is held like a dart and the skin overlying the nodule entered without local anesthetic. Several passages (without withdrawing the needle) through different planes of the nodule are made, the needle withdrawn and the contents of the needle squirted onto a slide using an air-filled syringe. Two slides are pressed together over the material and pulled apart. Most pathologists like to have one of the slides air-dried without fixative and the other fixed (Clark's fixative is commonly used). The non-aspiration technique should be repeated at least once and often twice until two samples of visible material are obtained. The pathologist will usually be able to render an etiologic diagnosis. The specificity for malignancy is very high. The only common diagnostic dilemma for pathologists is determining the etiology of a follicular neoplasm (differentiating follicular adenomas from well differentiated follicular carcinomas). In most cases these patients should have such a lump surgically excised although repeat aspiration with careful clinical follow up may be considered.

Cystic goitres may be reduced in size by using a larger gauge needle, say 20 or 21 gauge. Recurrent aspiration is often required and eventually surgery is needed in many of these patients.

Suppressive thyroid therapy has often been used in the past to shrink benign nodules but is not supported by evidence from controlled clinical trials.

D. Multinodular Goitre in Euthyroid Patient

The incidence of cancer in multinodular goitre is only minimally higher than that of the general population. However if one nodule should continue to grow and become dominant, fine needle aspiration biopsy should be performed. Patients with cosmetically unacceptable multinodular goitres may be considered for partial thyroidectomy. There is no evidence that thyroid replacement or thyroid suppression therapy shrinks such glands. Indeed there is the risk that the patient may become thyrotoxic if one nodule is autonomous. If the TSH is elevated a 6-12 month trial of thyroid hormone replacement therapy is worthwhile.

E. Thyroid Malignancy

The natural history of papillary and follicular carcinoma is relatively benign. Medullary Ca of the thyroid carries an intermediate prognosis while anaplastic Ca is incurable. The primary treatment is surgical. Once total or near sub-total thyroidectomy has been completed and the remaining thyroid tissue ablated with I 131, at an interval further I 131 in large doses can be used to attempt ablation of any metastatic disease. External beam radiotherapy is also useful for local disease and for bony metastatic disease.