# Thyroid surgery

## Introduction

Most specialist endocrine surgeons in general surgical units see, manage and operate on patients with thyroid disease. Knowledge of the conditions encountered, preparation for surgery, operations performed, postoperative care and potential complications is essential in the management of these patients.

## Common conditions encountered in surgery

Thyroid conditions seen in surgery are listed in *Table 1*. By far the commonest of these is a generalized enlargement of the thyroid (goitre), an example of which is shown in *Figure 1*, followed by a discrete thyroid swelling as a result of a nodule. Patients with thyrotoxicosis refractory to medical treatment are often referred for surgery. Thyroid carcinoma is a less common but very important cause of a neck lump or symptoms attributable to a thyroid abnormality. Congenital anomalies, such as a thyroglossal cyst or fistula, or lingual thyroid, are rarely encountered in the surgical clinic but not infrequently asked about in exams.

## Symptoms and signs

While the systemic manifestations of hyper- and hypothyroidism are encountered, it is generally the local neck symptoms and signs which prompt referral to the surgical clinic. Most patients present with only a lump in the neck, but other local symptoms and signs can be present as a result of compression of surrounding structures, such as the oesophagus, trachea and neck veins, leading to dysphagia, difficulty in breathing and distended neck veins.

Thyroid carcinomas tend to invade rather than compress local structures, resulting in cervical lymphadenopathy, hoarseness of the voice as a result of recurrent laryngeal nerve palsy and pain which is often referred to the ear.

**Table 1. Conditions encountered in thyroid surgery**

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|---|
| Goitre |
| Nodule |
| Thyrotoxicosis or hyperthyroidism |
| Thyroid cancer |
| Lingual thyroid |
| Thyroglossal cyst |

**Mr Jasper Gill** *is Specialist Registrar and* **Mr Avi Agrawal** *is Consultant Surgeon in the Department of Breast and Endocrine Surgery, Portsmouth Hospitals NHS Trust, Portsmouth PO6 3LY*

*Correspondence to: Mr A Agrawal*

## Management of thyroid lumps

The surgical management of thyroid lumps is shown in *Figure 2*.

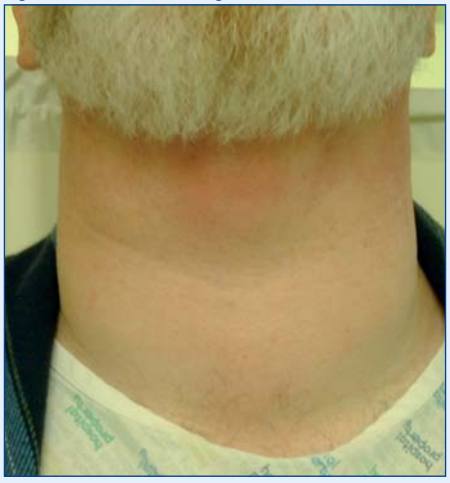
## Preparation for surgery

All patients undergoing thyroid surgery should ideally be rendered both clinically and biochemically euthyroid with medication before surgery in order to prevent a thyroid crisis.

Carbimazole is the medication of choice in hyperthyroidism and an 8–12-week course is generally needed preoperatively. Beta-blockers, e.g. propranolol, can be used as an alternative for 1–2 weeks preoperatively but it is important to continue these for 1 week postoperatively as they do not act on the thyroid itself but block peripheral conversion of thyroxine (T4) to triiodothyronine (T3).

Lugol's iodine can be given for 10 days preoperatively to decrease the vascularity of the gland at surgery. Any pre-existing vocal cord palsy should also be documented preoperatively by performing nasendoscopy on all patients undergoing thyroid surgery.

***Figure 1. A multinodular goitre.***



## Types of thyroid surgery

There are four types of thyroid operation which can be carried out. A thyroid lobectomy is performed when the disease is confined to one lobe. This is usually carried out for benign disease or small well-differentiated tumours. A total thyroidectomy, in which the entire gland is excised, is performed for multinodular goitre or thyroid carcinoma.

Subtotal thyroidectomy involves a subtotal excision of both lobes and full excision of the isthmus leaving bilateral thyroid remnants. This offers the best prospect of euthyroidism after surgery for bilateral Graves' disease but makes a potential future re-operation hazardous in terms of recurrent laryngeal nerve and parathyroid damage. This operation is now rarely carried out other than for Graves' disease.

Near-total thyroidectomy, in which one lobe is fully excised along with the isthmus and the other lobe not fully excised, can be performed for multinodular goitre (*Figure 3*), thyroid carcinoma and Graves' disease. Again, re-operation may be hazardous.

Thyroglossal cysts and fistulas are treated by performing a Sistrunk's operation in which the cyst or fistula is excised along with the thyroglossal tract and central portion of the hyoid bone and a section of muscle from the tongue, up to the foramen caecum.

## Surgical approach to the thyroid

A good exposure of the neck is achieved by placing the head on a head ring, putting a support behind the shoulders and extending the neck. A collar incision is made through the skin and platysma midway between the thyroid cartilage and the suprasternal notch extending laterally as far as the sternocleidomastoid muscle. This incision is preferably placed in a natural skin crease.

The superior and inferior flap of skin, fat and platysma are then dissected as far

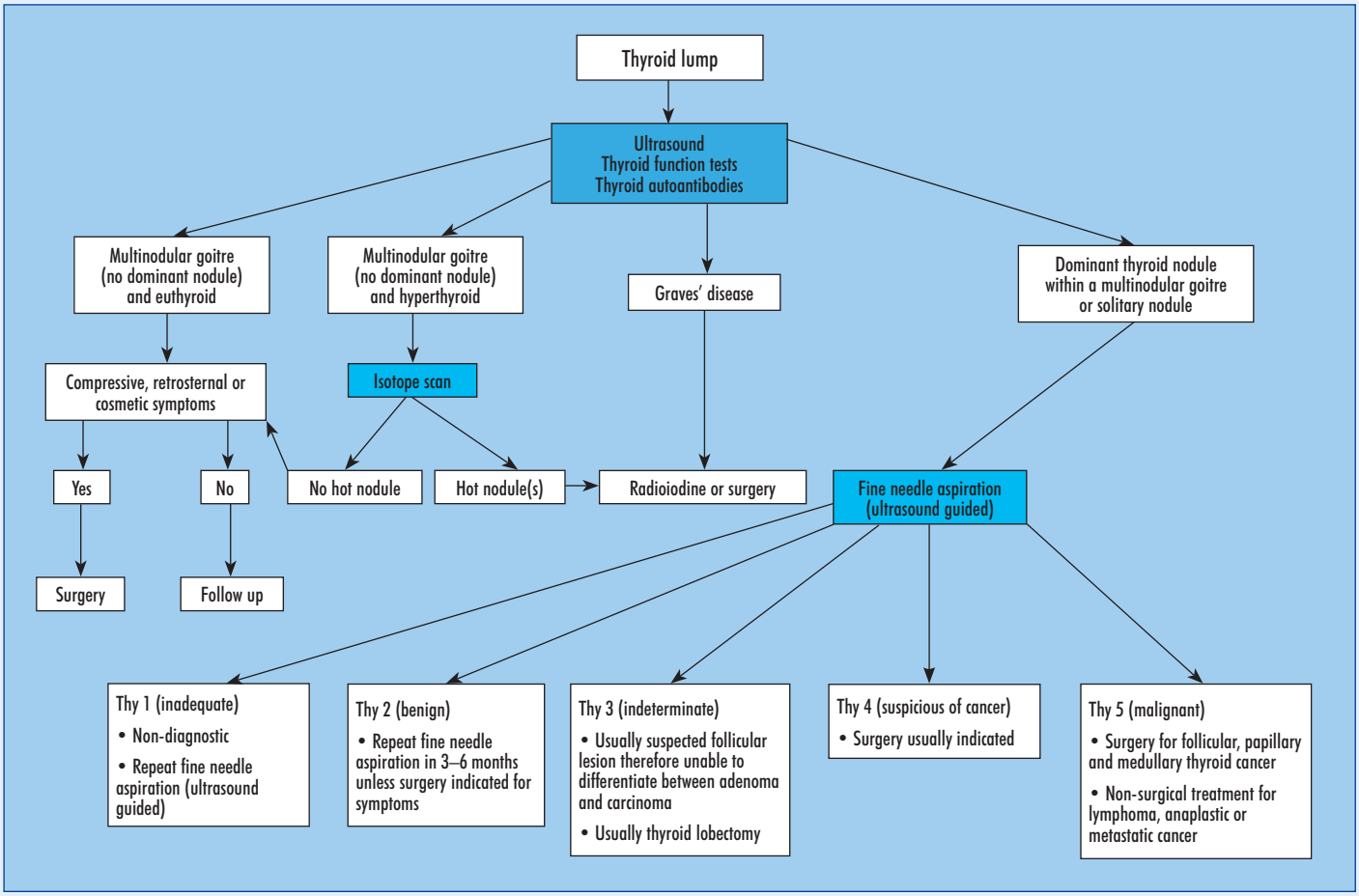



***Figure 2. Surgical management of a thyroid lump.***

as the thyroid cartilage notch and suprasternal notch respectively. With these flaps retracted, the deep cervical fascia between the strap muscles (sternohyoid and sternothyroid) in the midline is divided to expose the thyroid capsule. The strap muscles are retracted and the lobe of the thyroid being excised is carefully dissected free of the deep cervical fascia.

***Figure 3. Total thyroidectomy specimen for a multinodular goitre.***

The middle thyroid vein is divided, followed by mobilization of the upper thyroid pole with division and ligation of the upper thyroid vessels. The inferior thyroid vessels are ligated or diathermied as they enter the thyroid capsule, allowing anterior mobilization of the lobe out of its bed. The recurrent laryngeal nerve should be identified, running in the tracheo-oesophageal groove usually between the branches of the inferior thyroid artery, and preserved. Parathyroid glands are normally situated on the posterior surface of the thyroid lobe and should be sought, carefully dissected from the lobe and preserved.

The lobe is then dissected with the isthmus off the trachea and either divided (if performing a lobectomy) or dissection is continued to the other lobe (if performing a total thyroidectomy). Following haemostasis a drain may be placed in the thyroid bed, with closure of the strap muscles and platysma subsequently performed. Either a subcuticular suture or clips are applied to close the skin.

## Postoperative care

All patients undergoing a total, near-total or subtotal thyroidectomy tend to stay in hospital overnight and increasingly thyroid lobectomy is being carried out as a day-case procedure. Postoperatively, the voice should be checked on the ward. Any voice change noted at this time or subsequently at follow up requires that the patient undergo further indirect laryngoscopy to document abnormal vocal cord movement. Any drains placed are generally removed the next day unless there is copious drainage.

Serum calcium estimation is performed postoperatively, either on the night of or the morning after surgery. If it is normal and has not fallen significantly, the patient can be safely discharged; if low, daily calcium levels should be checked until they are back to normal. If the patient becomes symptomatic from hypocalcaemia, he/she should be treated with oral calcium supplements and alpha-calcidol. If the symptoms are severe, intravenous calcium gluconate may be required.

Those undergoing total thyroidectomy need oral thyroxine replacement to start postoperatively. This should be triiodothyronine if surgery is carried out for cancer. All other patients should have their thyroid function tests checked approximately 6 weeks after surgery.

## Complications

*Table 2* lists complications that may occur following thyroid surgery. Wound infection is uncommon following thyroid surgery and consequently prophylactic antibiotics are not routinely given. Although these wounds tend to heal with minimal visible scarring, hypertrophic and keloid scars may occur and are particularly visible on the neck.

Postoperative haemorrhage is a potentially life-threatening complication if it causes respiratory compromise, necessitating removal of both the skin and deeper sutures to release superficial or deeper haematomas. Not all haematomas need to be evacuated, particularly if they are not expanding or causing compromise. Respiratory tract obstruction may also be caused by laryngeal oedema from the operation itself or intubation at the time of operation. This is treated by further intubation, steroids and rarely a tracheostomy.

Recurrent laryngeal nerve paresis resulting in a hoarse voice is usually transient and recovers within 3 months. A permanent palsy is rare if the nerve has been correctly identified at operation. Superior laryngeal nerve palsy produces a weaker voice and is generally noticed only among professionals needing to project their voice, such as professional singers or teachers.

Thyrotoxic crisis, also known as a thyroid storm, is a severe acute form of hyperthyroidism seen postoperatively in thyrotoxic patients who are not adequately prepared for surgery. The symptoms and signs are those of severe hyperthyroidism and often include cardiac symptoms such as atrial fibrillation and cardiac failure. Treatment includes oxygen therapy, intravenous fluids, cooling, digoxin, beta-blockers, steroids and carbimazole.

**Table 2. Postoperative complications in thyroid surgery**

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| Infection |
| Unsightly scar |
| Haemorrhage |
| Respiratory tract obstruction |
| Recurrent or superior laryngeal nerve palsy |
| Hypothyroidism |
| Hypocalcaemia |
| Thyrotoxic crisis |

## Conclusions

Thyroid surgery is commonly carried out to investigate and treat symptomatic or suspicious thyroid lumps. A good working knowledge of the conditions encountered, surgical management and potential complications, is essential to ensure it is carried out safely and effectively. BJHM

*Conflict of interest: none.*

## KEY POINTS

- A good knowledge of the surgical management of thyroid disease is essential as these patients are regularly encountered both in general practice and in the surgical clinic.
- The commonest thyroid conditions seen in the surgical clinic are goitres, thyroid nodules and Graves' disease. Thyroid cancers are less commonly encountered but need to be excluded.
- Initial investigation of these patients includes a history taking, clinical examination, thyroid function and autoantibody tests, ultrasound and fine needle aspiration of thyroid nodules.
- Hyperthyroid patients undergoing surgery need to be rendered euthyroid before surgery in order to prevent a thyrotoxic crisis.
- Major complications can arise following thyroid surgery, the most serious of which is haematoma formation causing respiratory compromise. Recognition and immediate evacuation in this situation are essential.