Thyroid Disease and Surgery

Surgery has a significant role in the management of thyroid disease in patients with simple goitre, benign thyroid tumours, hyperthyroidism (including hyperthyroidism in pregnancy), thyroid cancer and thyroid eye disease.

Goitre

Most euthyroid multinodular goitres do not necessarily require surgery or medical therapy. Serial thyroid ultrasound is useful to follow the size of individual nodules. Larger multinodular goitres require either MRI or CT scan in order to exclude tracheal compression and to assess thyroid size. The definitive treatment for toxic multinodular goitres is biopsy of suspicious nodules or surgical excision, followed by radio-iodine therapy. Surgical treatment is recommended for benign nodules causing compressive symptoms and can be considered for toxic nodular disease and thyroid cysts.\(^1\)

Surgery is indicated in simple goitre if:

- There is clinical or radiological evidence of compression of surrounding structures, especially the trachea.
- There are substernal goitres, which are best removed surgically, as biopsy is difficult and clinical observation without frequent CT or MRI scans is impossible.
- The goitre continues to grow.
- There are cosmetic reasons - for example, large or unsightly.

Types of thyroid operations\(^2\)

- Thyroid lobectomy to remove a nodule (solitary hot or cold nodules) and goitres that occur in one lobe.
- Partial thyroid lobectomy to remove a solitary nodule in one specific part of the thyroid.
- Thyroid lobectomy with isthmectomy for benign Hürthle cell tumours and for non-aggressive thyroid cancers.
- Subtotal thyroidectomy (leaving enough of the gland to produce some hormones) is now little used and has been replaced by total thyroidectomy or thyroid lobectomy alone.
- Total thyroidectomy for thyroid cancers, Hürthle cell tumours and also increasingly for multinodular goitres and patients with Graves’ disease.
- Robotic surgery: advantages include three-dimensional imaging and tremor elimination. Robotic thyroid surgeries include thyroid lobectomy, total thyroidectomy, central compartment neck dissection, and radical neck dissection for benign and malignant thyroid diseases.\(^3\)

Thyroid surgery is safe in the elderly, assuming careful pre-operative evaluation and risk stratification.\(^4\)

Pre-operative assessment\(^2\)

In addition to investigations for the underlying hyperthyroidism and any thyroid swelling or nodule, serum calcium (to check parathyroid status; parathyroid hormone if there is any abnormality of calcium level) and laryngoscopy are often recommended.

Preparation for surgery

- Thyrotoxic patients should have treatment with propranolol and/or carbimazole to ensure they are euthyroid at operation.
- Potassium iodide has also been used.
- In view of the possible operative damage to the recurrent laryngeal nerve, the vocal cords should also be checked prior to thyroid surgery. The National Institute for Health and Care Excellence (NICE) recommends that intraoperative nerve monitoring during thyroid surgery should be considered, especially for more complex operations such as re-operative surgery and operations on large thyroid glands.\(^5\)

Complications

Possible complications following thyroid surgery include:

- Minor complications such as collections of serous fluid (they resolve spontaneously if small and asymptomatic but may require single or repeated aspiration if large) and poor scar formation.
- Bleeding, which may cause tracheal compression.
Recurrent laryngeal nerve injury:
- Innervates all of the intrinsic muscles of the larynx, except the cricothyroid muscle.
- Patients with unilateral vocal fold paralysis present with postoperative hoarseness.
- Presentation is often subacute and voice changes may not present for days or weeks.
- Unilateral paralysis may resolve spontaneously.
- Bilateral vocal fold paralysis may occur following a total thyroidectomy and usually presents immediately after extubation.
- Both vocal folds remain in the paramedian position, causing partial airway obstruction.

Hypoparathyroidism: the resulting hypocalcaemia may be permanent but is usually transient. The cause of transient hypocalcaemia postoperatively is not clearly understood.

Thyrotoxic storm: is an unusual complication of surgery but is potentially lethal.

Superior laryngeal nerve injury:
- The external branch provides motor function to the cricothyroid muscle.
- Trauma to the nerve results in an inability to lengthen a vocal fold and thus to create a higher-pitched sound.
- The external branch is probably the most commonly injured nerve in thyroid surgery.
- Most patients do not notice any change but the problem may be career-ending for a professional singer.

Infection: occurs in 1-2% of all cases. Peri-operative antibiotics are not recommended for thyroid surgery.

Hypothyroidism.

Damage to the sympathetic trunk may occur but is rare.

In one large study, the rate of complications following thyroid surgery was as follows: [6]

- Persistent hypoparathyroidism in 1.7%, and temporary hypoparathyroidism in 8.3%.
- Permanent recurrent laryngeal nerve palsy in 1.0% of patients and transient palsy in 2.0%.
- The superior laryngeal nerve was damaged in 3.7%.

Video-assisted thyroidectomy has allowed several operations to be performed with minimally invasive techniques.

Further reading & references

- Paralysed Vocal Folds and Voice; British Voice Association
- Intraoperative nerve monitoring during thyroid surgery; NICE Interventional Procedure Guidance, March 2008

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