Thyroidectomy

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Abstract

This article discusses the procedure and technique for performing a thyroidectomy: explaining complications, potential pitfalls and methods of avoiding them. We also discuss the indications for surgery and the preparation required especially for thyrotoxic patients and those with retrosternal goitres. We also discuss the ever increasing issues with consent and how thyroid surgeons are monitored in the UK.

Keywords Complications; consent; indications for thyroidectomy; lobectomy; thyroid; thyroidectomy

Introduction

Thyroidectomy refers to the surgical excision of part of or all of the thyroid tissue; currently most surgeons would understand a 'thyroidectomy' to take the form of one of the following – isthmectomy, lobectomy (hemi-thyroidectomy), total thyroidectomy or near-total thyroidectomy. Many patients presenting to clinics have previously had sub-total thyroidectomies, but this is not a common operation in the UK, given the risk of recurrent disease and the difficulties with re-operation[1] (for definitions see Table 1).

Thyroidectomy has evolved considerably from a 100 years ago where the mortality and morbidity was unacceptably high to the current stage where mortality is negligible and morbidity is low, with transparent audit and governance procedures in place.[2] Thyroidectomy continues to evolve with new techniques such as robotic and minimally invasive thyroidectomy growing in popularity.[3] A thyroid resection remains a challenging but usually elegant operation; all those who wish to perform it should be adequately trained and maintain a log of their outcomes.

This article will give an overview of the important facets to thyroidectomy in general, including indications, techniques, risks and the consent process.

Indications for surgery

A thyroidectomy may be performed for benign or malignant pathology. Benign pathology includes a goitre with pressure symptoms and/or cosmetic concerns, toxic nodule(s)/toxic-multi nodular goitre and recurrent or treatment resistant Graves' disease. Thyroidectomy may be performed on recurrent cysts or a retrosternal goitre that is enlarging or is associated with significant tracheal deviation or compression.

From a malignant perspective, indications for thyroidectomy include biopsy proven thyroid carcinoma, indeterminate lesions (Thy3f cytology) and prophylactic thyroidectomy for those with the RET genetic mutation, predisposing to medullary thyroid carcinoma. The type of resection and need for lymph node dissection will vary with the clinical, radiological and cytological findings. In the UK, recent trends are towards more limited resection (hemithyroidectomy instead of total thyroidectomy) in and avoidance of prophylactic lymph node dissection in low risk, well differentiated cancer.[4]

Extent of resection

Thyroid surgery encompasses a variety of resection types (Table 1). This may be based on pathology (for example, total thyroidectomy for Graves' disease) or tailored to the anatomy of the goitre (isthmectomy or hemi-thyroidectomy in asymmetrical goitre) or prognosis of disease (limited resection in good prognosis thyroid cancer). The need for and extent of lymph node dissection in thyroid cancer depends on the presence of proven lymph node disease and overall risk of recurrence. When describing lymph node dissections, it is most accurate to describe the precise anatomical compartments dissected (i.e. 'levels II–V) rather than using unclear terminology such as 'lateral dissection'.[4]

Perioperative assessment and planning

All thyroidectomies should be planned to reduce the morbidity involved. It is uncommon for thyroidectomy be performed urgently other than for tracheal compression with stridor.

Assessment includes a full history and examination, focussing on symptoms of thyroid dysfunction, compression of neighbouring structures and changes in gland or nodule(s) size. A family history of endocrinopathy and exposure to previous radiotherapy can influence the risk of malignancy, threshold for surgery and extent of resection. If a previous neck operation has been performed, assessment of voice and laryngeal function and ongoing calcium and/or vitamin D supplements are important.

Preoperative investigations should include thyroid function tests (TFTs), thyroid antibody levels and ultrasound with or without fine needle aspiration cytology (FNAC) for assessment of any nodules.[5] Any patient with non-Graves' thyrotoxicosis should undergo a technetium scan, as technetium uptake by hyper-functioning ('hot') nodule(s) will allow the surgeon to decide between a total or hemithyroidectomy for cure of thyrotoxicosis. Where hyper-functioning nodules are encountered, cytology is generally unhelpful; as frequently give atypical results are obtained.[4] A CT scan may help in patients with compressive symptoms or suspected retrosternal extension. To evaluate distortion or narrowing of the trachea and to predict the likelihood of the need for manubriotomy or formal sternotomy. In patients with suspected locally advance thyroid cancer, CT and MRI staging may be helpful[4] for assessment of major vascular invasion, extent of lateral lymph node involvement, oesophageal and tracheal invasion or invasion of vertebral fascia (thus indicating inoperability). Advanced tumours are, however, only a small percentage of most differentiated thyroid cancers. Preoperative discussion at a thyroid cancer MDT is highly desirable[4] in all cases of suspected and confirmed cancer.

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Definitions for thyroid resections and thyroid-related lymph node dissections

Term	Definition
Thyroid lobectomy (hemi-thyroidectomy)	Complete resection of a lateral lobe of the thyroid including the isthmus
Isthmusectomy	Excision of the Isthmus (±any pyramidal tissue) with preservation of both lateral lobes of the thyroid
Total thyroidectomy	Complete excision of both lobes, the isthmus & any pyramidal lobe
Near-total thyroidectomy	Resection of >99% of the thyroid tissue with preservation of a non-functional remnant(s) of tissue preventing injury to the RLN or parathyroid
Sub-total thyroidectomy	Partial resection of the thyroid (although no specified amount) with the aim to achieve functional status, however this is no longer an advisable operative strategy in the UK.
Central neck dissection	Excision of the lymph nodes in Level VI ± Level VII of the neck
Lateral neck dissection	Excision of the lymph nodes in the neck – classically Level II–V
Selective neck dissection	Tailored dissection of the lymph nodes from levels I–VII

Adapted from the UK 2014 Guidelines for the management of thyroid cancer: *'Surgery for differentiated thyroid cancer' tables 7.1 & 7.2*

Table 1

The British Association of Endocrine and Thyroid Surgeons (BAETS) and American Academy[6] recommend routine pre- and postoperative vocal cord assessment with laryngoscopy to rule out pre-existing recurrent laryngeal nerve palsy, which may be asymptomatic. Occasionally, flow-volume loops may help in the assessment of the breathless patient with a possible obstructing goitre to differentiate between lung disease and tracheal narrowing by the goitre as the cause of breathlessness.

All patients should be euthyroid for the day of surgery. Even in patients intolerant or allergic to common anti-thyroid medications, control can be achieved with beta blockers, cholestyramine, Lugol's iodine and high-dose steroids. Perioperative Lugol's-iodine solution 10 days before surgery will also reduce the vascularity of a Graves' disease.[7] It is helpful to ensure the patient is vitamin D replete so as to reduce the risk and severity of hypocalcaemia in the postoperative phase.

Consent

As with all consent processes, clinicians should discuss the indications for surgery, alternative treatment options, explanation of the procedure and the side effects of the proposed treatment; written information leaflets and drawings should supplement this process. The patient will need time to consider information so it may be better to avoid consenting on the day of surgery. Clinicians broadly discuss risks such as bleeding with return to theatre (~1.0%); infection, RLN injury causing change to voice and/or swallowing (~1–2%); the need for postoperative calcium and vitamin D supplements (this may be temporary or permanent); hypertrophic scarring (additional warnings about keloid scarring if appropriate); and potential for hormone replacement with levothyroxine. Complication rates may be higher in re-do surgery, retrosternal disease and malignancy.

Recently, consent law in England has changed; following the case of Montgomery v Lanarkshire Health Board [2015] UKSC 11, the focus of consent has changed from a clinician driving what the patient should be consented about, *to what the patient would want to know*. The change in practical terms means a patient should be consented regarding the risks that an individual patient *would want to know* and w*ould affect their decision making about this procedure,* rather than with the risks that a respectable body of thyroid surgeons would deem important to patients. Although this may seem a subtle change, it suggests we need to tailor the consent more closely to the individual, rather than adopt a generic consent process to fit all. Examples would be greater detail on change in voice especially in singers or lecturers from EBSLN injury, and rare, but highly significant, events such as need for tracheostomy, chyle leak and oesophageal injury should be considered in patients having extensive surgery.

Operative procedure

A description of a thyroidectomy via a low-transverse cervical ('collar') incision will follow; many elements of the approach will reflect the senior author's preferences and experience. Other surgical approaches, such a trans-axillary thyroidectomy will be briefly discussed; but it should be borne in mind that most patients will not be suitable for minimally invasive surgery and conventional thyroidectomy will remain the most common procedure.[8]

Preparation

Before surgery, it is the responsibility of the operating surgeon and anaesthetist to review relevant investigations and decide on the surgical strategy. The consent should ideally be refreshed with the patient on the day of surgery and the side marked, if appropriate.

General anaesthesia with endotracheal (ET) intubation is most commonly used, although occasionally local aesthetic techniques have been employed. The use of an intermittent or continuous nerve monitoring system will require a specialist ET tube to be placed, with electrodes on the tube to capture movement of the vocal cords intraoperatively (see Figure 1 for classic EMGs); long-acting neuromuscular blocking agents should therefore be avoided. Following intubation, the patient is positioned supine on the table with a shoulder support and head ring

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