Surgical therapy of thyroid disorders represents various operations performed on the thyroid gland (Pic. 1). Possible reasons for a thyroid surgery are:

- Presence of a nodule in the thyroid gland that might be of cancerous origin.
- Diagnosed thyroid cancer.
- A thyroid nodule or goiter (swelling of the whole thyroid gland, Pic. 2) that is causing symptoms because of its pressure on surrounding structures – visible mass, narrowing of trachea or difficulty with swallowing.
- A thyroid nodule or goiter that is causing hyperthyroidism (a condition of excessive production of thyroid hormones).

Surgical treatment of thyroid gland diseases involves well-established procedures. The most common thyroid gland operations are classified as follows:

- **An open thyroid biopsy**, which involves directly excising a nodule that might be of cancerous origin. This operation is nowadays uncommon as it is usually replaced by the diagnostic procedure known as Fine needle aspiration biopsy, which does not require surgical approach.
- **Hemi-thyroidectomy** or thyroid lobectomy, where one lobe of the thyroid gland is removed. This operation is performed in cases of thyroid cancer affecting only one lobe.
- **Isthmusectomy**, where only the isthmus of the thyroid gland is removed. This operation is used to remove small tumors localized in the isthmus of the thyroid.
- **Total or complete thyroidectomy**, where all of the thyroid gland tissue is removed (Pic. 3).
- **Subtotal thyroidectomy**, where most of the thyroid tissue is removed.

The choice of a specific operation for the treatment of a thyroid disorder depends upon the nature of the disease. In case of small or early-stage thyroid cancers, hemi-thyroidectomy or isthmusectomy are usually performed. For advanced cancers affecting both lobes, the whole thyroid gland is usually removed using total thyroidectomy, as leaving the seemingly unaffected thyroid tissue in the body would pose a risk for a later cancer recurrence. In these cases, neck dissection (removal of surrounding neck lymph nodes) is sometimes also performed.

In cases of hyperthyroidism, such as Graves’ disease (autoimmune inflammation of the thyroid gland, causing hyperthyroidism) which cause local symptoms by the swelling of the thyroid, subtotal thyroidectomy may be performed.

The surgery is generally performed under general anaesthesia. A pillow is inserted under the patient’s neck to help the head tilt back a bit. An incision about four inches long is made in the neck and the thyroid gland is visualized. Sometimes, several lymph nodes are removed together with a par or the whole thyroid gland. After the surgery is finished, the incision is sewn closed. The patient gets a liquid diet in the evening, and when there are no complications, can usually leave the hospital the next morning.

**Success or failure factors**

The prevalence of thyroid disease and thyroid malignancy increases with age. Common surgical indications in the elderly include hyperthyroidism resistant to medical management, symptoms of compression due to retrosternal goiter extension (thyroid gland tissue present behind the chest bone) suspicion of a malignant...
nodule requiring histologic diagnosis, or thyroid carcinoma. While age itself is not a contraindication for major surgery, controversy remains regarding the safety of surgical interventions for thyroid disease in aging patients.

Because of an elevated risk for perioperative morbidity (complications associated with surgery) among elderly patients undergoing surgical procedures, indications for thyroidectomy in this population are often restricted to overt compressive symptoms or a strong suspicion for malignancy.

For patients >45 years with well-differentiated thyroid cancer that is ≥1 cm in size, current American Thyroid Association (ATA) guidelines recommend near-total or total thyroidectomy with adjuvant radioiodine ablation (RAI) for patients with metastases or a functional thyroid remnant.

### Complications

Thyroid gland surgery is generally a very safe procedure. Complications are uncommon, but they may occur. Due to the anatomic localization, the most common complications include:

#### Post-operative hemorrhage (bleeding)

Most cases of post-operative hemorrhage (POH) occur within 4 hours after the surgery. Arterial hemorrhage is usually the primary cause of POH and is identifiable prior to venous bleeding, making it the first sign of POH. Although some hematomas present superficially, in severe cases, hematomas can be lethal if they result in airway compression. Occasionally, blood transfusions are required. Therefore, patients undergoing thyroidectomy need close postoperative monitoring for any signs of bleeding.

#### Damage to recurrent laryngeal nerve

Recurrent laryngeal nerve is one of the structures adjacent to thyroid gland that are most susceptible to damage during the operation. The recurrent laryngeal nerves provide motor control for all external muscles of the larynx except for the cricothyroid muscle, which also runs along the posterior thyroid. Accidental laceration (tearing) of either of the two or both recurrent laryngeal nerves may cause paralysis of the vocal cords and their associated muscles, changing the voice quality.

#### Damage to parathyroid glands

The parathyroid glands produce parathyroid hormone (PTH), a hormone needed to maintain adequate amounts of calcium in the blood. As they are directly adjacent to the thyroid gland, they are susceptible to damage or accidental removal during thyroid surgeries. Removal results in hypoparathyroidism (insufficient function of the parathyroid glands) a need for supplemental calcium and vitamin D each day. In the event that the blood supply to any one of the parathyroid glands is endangered through surgery, the parathyroid gland(s) involved may be re-implanted in surrounding muscle tissue.

### Prognosis

Thyroid surgeries nowadays are extremely safe and most patients have excellent prognosis following their operation on thyroid gland. The most common long-term effect of thyroid gland surgery, especially of total thyroidectomy, is subsequent hypothyroidism (a state of low amount of thyroid hormones in the body), which can, however, be easily managed by supplementation of the hormones.

The surgery itself usually does not affect fertility of the patients in any way.
An illustration showing the anatomy of the thyroid gland and its adjacent structures.

A photograph of a patient suffering from swelling of the thyroid gland, a condition known as goiter.

A diagram showing the anatomy of the thyroid gland region before and after total thyroidectomy.

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