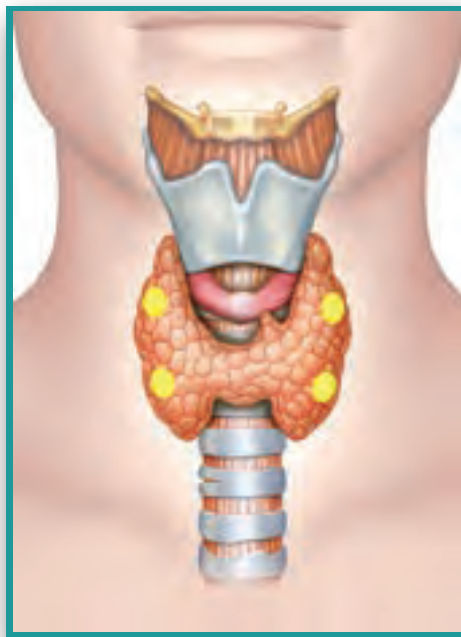




ENT CENTRAL

THYROID & PARATHYROID GLAND DISORDERS



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THYROID GLAND CONDITIONS

The thyroid gland is a butterfly-shaped organ located at the front of the neck, responsible for producing hormones that regulate metabolism. The isthmus is a narrow bridge of tissue that connects the two lobes of the thyroid gland in the midline of the neck.

A. THYROID NODULE

A thyroid nodule specifically refers to a discrete abnormal growth or lump within the thyroid gland. Nodules can present as solid, cystic, or a combination of both. They can also vary in size and may be solitary (one nodule) or multiple (multiple nodules). Thyroid nodules are more commonly found in women and tend to increase in frequency with age. Benign nodules are frequently observed in areas where there is iodine deficiency, among individuals with autoimmune thyroiditis, and in those who have undergone radiation exposure to the thyroid gland. Additionally, the occurrence of thyroid nodules within families suggests a genetic component in their development.



Symptoms may include:

- Visible neck lump
- Shortness of breath, coughing or wheezing
- Voice changes
- Pain in neck or throat
- Hyperthyroid Symptoms like tremors, palpitations, heat intolerance, excessive sweating, weight loss, restlessness, anxiety or nervousness
- Hypothyroid Symptoms like fatigue, weight gain, cold intolerance, dry skin or constipation

B. THYROID TUMOUR

A thyroid tumour refers to an abnormal growth that develops within the thyroid gland. Adenomas are the most common type of benign thyroid tumor. It may also present as a fluid-filled sac called cyst. Treatment often involves removing the affected thyroid lobe, which is then examined to determine if the tumour is cancerous.

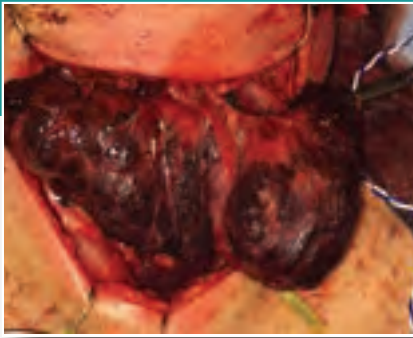


C. THYROID CANCER

A malignant tumour can potentially spread to lymph nodes in the neck and, less commonly, to distant organs like the lungs. This type of cancer is called **Differentiated Thyroid Cancer** and is quite common.

Although thyroid cancer can affect individuals of any age it is more prevalent in women and becomes more common as we get older. It is also more frequent in people who have a history of exposure of the thyroid gland to radiation or a family history of thyroid cancer.

Symptoms may include a visible thyroid lump, swollen neck lymph nodes, hoarseness, and difficulties in swallowing or breathing.



D. OTHER ABNORMALITIES OF THE THYROID GLAND

Individuals with a higher risk of developing thyroid disease include those with a family history of the condition, as well as those with underlying medical conditions such as pernicious anaemia, type 1 diabetes, lupus, rheumatoid arthritis, Sjögren's syndrome, and Turner syndrome. Additionally, the use of medications containing high levels of iodine can increase susceptibility. Age also plays a significant role, with individuals over 60, particularly women, being at greater risk.

Goitre refers to a generalised swelling or enlargement of the thyroid gland. A large goitre may extend beyond its usual position in the neck and descend into the chest, pressing down on the trachea and oesophagus. This can result in shortness of breath, voice change, cough, increased pressure sensation in the neck and sometimes difficulty swallowing. Such retrosternal goitres may need surgery. **Although this challenging surgery can be accomplished through the neck (transcervical approach), few patients may need a manubrium-sternal split.**

DIAGNOSIS OF THYROID GLAND CONDITIONS

Diagnostic evaluation typically includes physical exam, blood tests and thyroid function tests (to determine over/under – active thyroid) along with ultrasound imaging, fine needle aspiration cytology and possibly genetic testing to determine the nature of the nodule or mass, and guide in appropriate treatment. Radiological tests like a CT scan may also be conducted to check the position of a lump. Understanding underlying factors helps in the diagnosis and management of thyroid nodules, particularly in distinguishing between benign and potentially malignant ones.



TREATMENT OF THYROID GLAND CONDITIONS

Regular monitoring and follow-ups are crucial for individuals diagnosed with thyroid tumours to ensure timely detection of any recurrence or progression, and to adjust treatment as needed to optimise outcomes. For thyroid cancer, surgery is the primary treatment, with the extent determined by the cancer's stage and type. It may involve removing part or all of the thyroid gland, possibly including lymph nodes in the neck, if the cancer has spread.

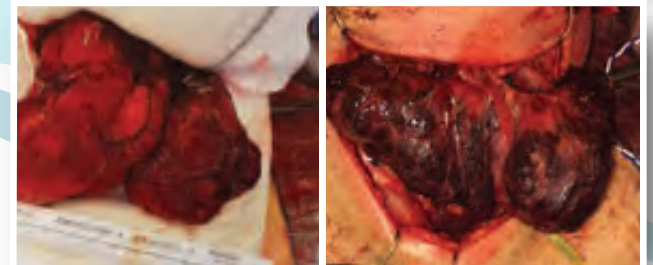
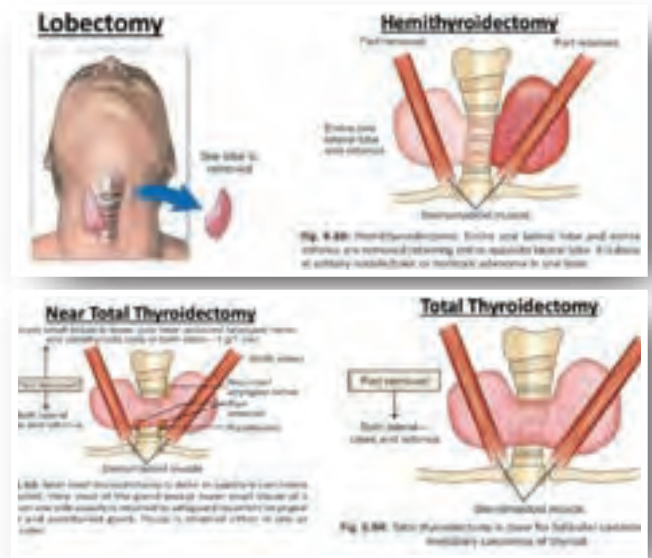
Prognosis is typically favourable with prompt diagnosis and appropriate treatment, ensuring good long-term survival outcomes for most patients.

A. THYROIDECTOMY

Thyroidectomy is a surgical procedure to remove part or all of the thyroid gland. It is performed for various reasons, including thyroid cancer, goitres, hyperthyroidism (overactive thyroid), and suspicious thyroid nodules.

In **Total Thyroidectomy**, the entire thyroid gland i.e. both lobes, along with the isthmus, are dissected and removed. This is typically done in cases when a nodule is confirmed to be cancerous on biopsy especially for papillary and follicular thyroid cancers - to prevent recurrence or spread.

A **Lobectomy** involves removing a lobe of the thyroid gland. Benign thyroid nodules confined to one lobe, solitary thyroid nodules, or when the diagnosis of thyroid cancer is confined to one lobe without evidence of spread, are some of the indications for this surgery. A **Hemithyroidectomy** involves lobectomy and resection of the isthmus (**Isthmusectomy**).



B. CENTRAL COMPARTMENT NECK DISSECTION

Depending on the stage and grade of thyroid cancer, the patient may need **Central Compartment Neck Dissection** or lateral neck dissection which could be accomplished concurrently during the thyroid surgery. This procedure involves removing all lymph node(s) containing tissues around the recurrent laryngeal nerve supplying the voice box, and tissues between the major vessels (carotid artery and internal jugular vein) and the windpipe (trachea). It challenges, however, to identify and preserve the parathyroid gland with its blood supply, to avoid inadvertent damage.



C. RADIOACTIVE IODINE THERAPY (RAI)

Also known as I-131 therapy, Radioactive iodine therapy is often used post-surgery for differentiated thyroid cancers to eliminate any remaining cancer cells. RAI is taken about three months after surgery, and emits radiation that damages these cells, leading to their destruction. Depending on the dose administered, patients may need to stay in a hospital isolation room for a period, to limit exposure to others, due to radioactivity. Other treatments that may follow include hormone therapy, and in some cases, external beam radiation therapy or chemotherapy.

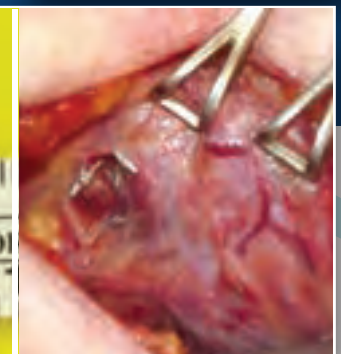
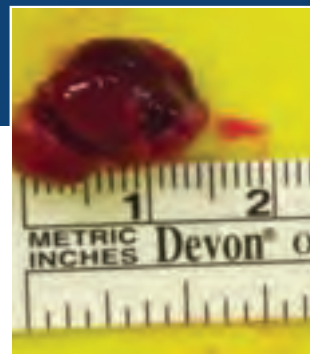
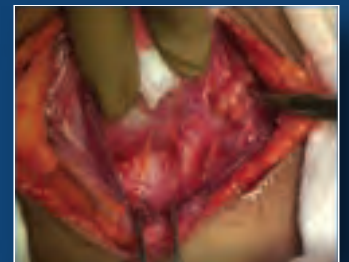


PARATHYROID GLANDS & HYPERPARATHYROIDISM

The parathyroid glands are small, pea-sized glands located near the thyroid gland in the lower part of the neck. Their primary function is to regulate the body's calcium and phosphate levels through the production of parathyroid hormone (PTH).

Overproduction of PTH can lead to hypercalcaemia (increased calcium levels) in the blood causing hyperparathyroidism which often presents with symptoms such as fatigue, lack of energy and various bodily discomforts, though some individuals may be asymptomatic.

Hyperparathyroidism	Calcium	PTH	Vitamin D	Phosphate
Primary	↑	↑ →	↑	↓
Secondary	↓ →	↑	↓	↑ or ↓
Tertiary	↑	↑↑	↓	↑



PRIMARY HYPERPARATHYROIDISM

Primary Hyperparathyroidism arises when one or more parathyroid glands become enlarged and produce excessive PTH independently of calcium regulation. Secondary Hyperparathyroidism develops in response to conditions like calcium deficiency, vitamin D deficiency, or chronic kidney failure. Longstanding cases can develop into Tertiary Hyperparathyroidism, often due to chronic kidney disease.

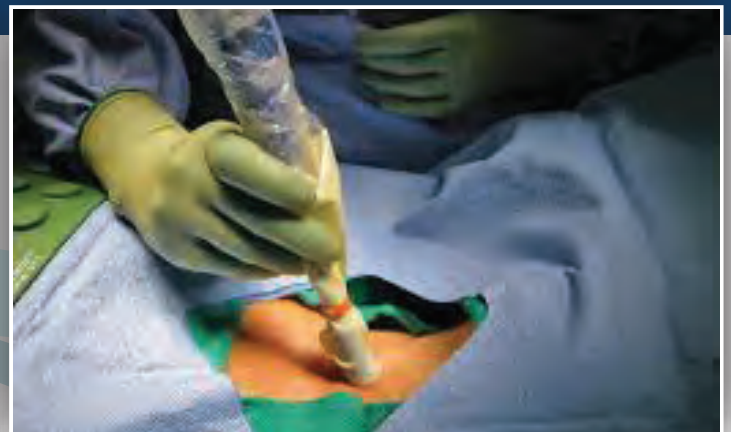
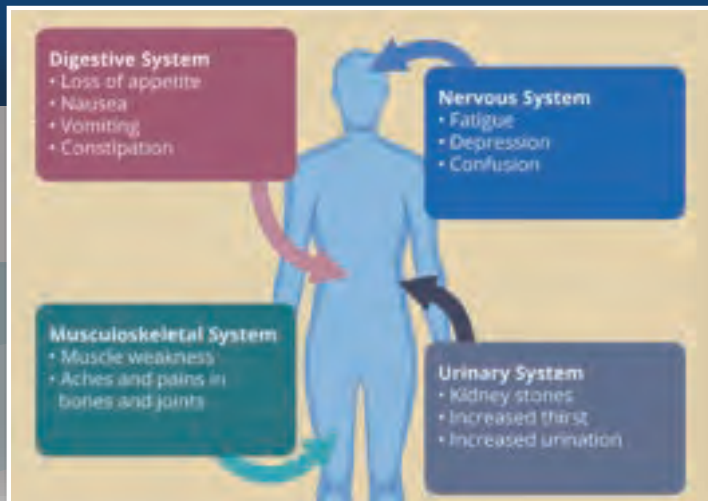
Causes for primary hyperparathyroidism could be the commonly occurring Parathyroid Adenoma, a benign tumour in one of the parathyroid glands, or Parathyroid Hyperplasia - enlargement of all parathyroid glands. Very rarely, it can also develop from the presence of multiple adenomas and even more rarely from parathyroid cancer.

Several underlying abnormalities can also trigger this condition with symptoms possibly overlapping with various other medical conditions. This can make diagnosis challenging. It is essential for individuals experiencing unexplained symptoms, especially those at higher risk (such as older women), to undergo thorough evaluation, including blood tests, to assess calcium levels and PTH.

DANGERS OF UNTREATED PRIMARY HYPERPARATHYROIDISM

Hypercalcaemia can lead to dehydration, the formation of stomach ulcers, and high blood pressure; and can contribute to abdominal pain, discomfort, and a feeling of overall tiredness. Over time, the parathyroid glands become hyperplastic and autonomous, meaning they continue to produce excess PTH even after the underlying cause of hypocalcemia has been corrected. Elevated levels of PTH eventually lead to the depletion of calcium from bones, increasing the risk of osteoporosis and fractures. Additionally, patients may suffer from complications like kidney stones, constipation, stomach ulcers and pancreatitis. In more severe cases, elevated calcium levels can affect neurological function causing symptoms such as mental confusion, cognitive impairment or even depression.

Secondary hyperparathyroidism could be a result of vit-D deficiency, renal failure or GI malabsorption and generally need medical management whereas **Tertiary hyperparathyroidism** is managed surgically and generally needs total parathyroidectomy +/- autotransplantation of partial parathyroid gland.



DR NAVEED BASHEETH AND THYROID & PARATHYROID SURGERIES

Dr Naveed Basheeth is a pioneer in minimally invasive thyroid and parathyroid surgery. Having immense experience from some of the best institutes in the world such as Tata Memorial, Cambridge University, Dalhousie University, and premier training hospitals in Dublin, Cork, Ireland, he has successfully helped several patients with thyroid and parathyroid pathologies.

Thyroidectomy is a well-established procedure with low complication rates when performed by experienced surgeons. His expertise stems from his vast demographic experience in large goitres in the Indian subcontinent population; and complex thyroid cancers in the people of the UK-Ireland, North America, Asia and New Zealand.

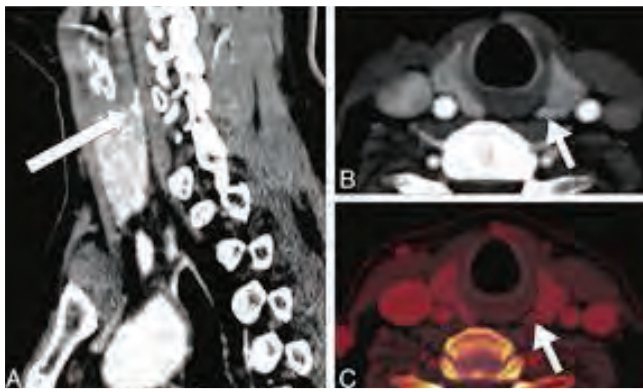
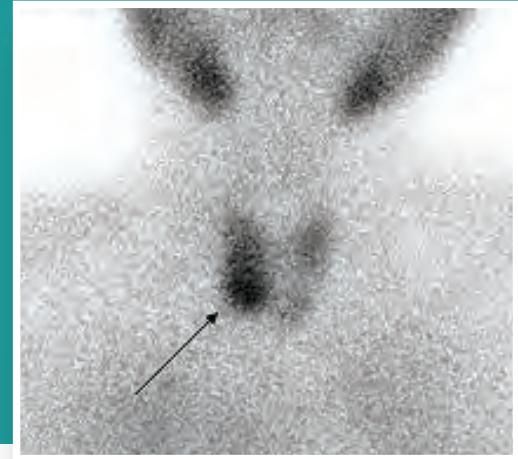
Dr Basheeth performs **Minimally Invasive Radioguided Parathyroidectomy (MIRP)** which is now possible for the removal of one or more glands but with shorter incisions and streamline treatment to achieve optimal results for the patient.

Following a radionuclide sestamibi tracer injection, a gamma probe is used to detect the radioactivity in vivo and remove the abnormal glands. He also utilises technologies like Indocyanine Green Tracer (ICG) - for intraoperative visualisation; intraoperative nerve monitoring (IONM); and intraoperative PTH assay, depending on the complexity of the condition, to achieve optimum results for his patients.

DIAGNOSIS OF PARATHYROID CONDITIONS

A. Sestamibi Scan

Sestamibi scan, also known as a parathyroid scan, is a diagnostic imaging technique used primarily to locate abnormal parathyroid glands in cases of hyperparathyroidism. It is employed both prior to and during the operation helping surgeons plan for a more targeted and effective surgical intervention. In some cases, a dual-phase scan may be performed, where images are taken shortly after the injection and again several hours later. This dual-phase approach can enhance the detection of abnormal parathyroid glands that might not be visible on initial imaging.



B. 4DCT Scan

4DCT stands for Four-Dimensional Computed Tomography, a specialised CT with timed contrast and reconfiguration to get 4D interpretation of abnormal parathyroid glands. 4DCT scans capture images over a period, typically focusing on how structures move and change with time. This tool allows for detailed imaging of the tiny parathyroid glands and can sometimes provide functional information, such as distinguishing between active and inactive tissue.

C. Rapid Parathyroid Hormone Assay

The Rapid Parathyroid Hormone (PTH) Assay, also known as intraoperative PTH monitoring or quick PTH assay, is a specialised test used to provide real-time feedback on PTH levels in the blood during parathyroid surgery. Its primary goal is to confirm the removal of hyperfunctioning parathyroid tissue responsible for primary hyperparathyroidism.

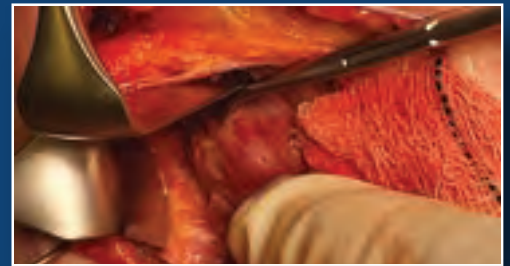


D. Ultrasound of Neck

An ultrasound of the neck uses high-frequency sound waves to create detailed images of the structures in the neck region. It is commonly used to assess the thyroid and parathyroid glands. It can help detect and characterise thyroid nodules; evaluate the lymph nodes in the neck; assess the salivary glands for stones, cysts, or tumors; and identify parathyroid adenomas that may be causing hyperparathyroidism. Ultrasound imaging also helps visualise blood vessels in the neck, in order to assess blood flow and detect abnormalities like narrowing or blockages.

PARATHYROIDECTOMY

Parathyroidectomy or Parathyroid Surgery is a surgical procedure performed to remove one or more of the parathyroid glands, typically due to overactivity or disease. It utilises preoperative techniques like ultrasound and Sestamibi scan paving the way for small incisions, shorter operations and more reliable outcomes. Rapid PTH Assay is also taken in regular intervals during parathyroidectomy. Intraoperative nerve monitoring is also used to identify and avoid damage to the recurrent laryngeal nerve supplying the voice box.



INFORMATION FOR PATIENTS

Both thyroidectomy and parathyroidectomy are typically performed under general anaesthesia, although the specific approach may vary depending on the patient's health status and the preferences of the surgical team. Most patients stay in the hospital for 1-2 days after surgery, depending on the extent of the procedure and any complications.

Patients who undergo total thyroidectomy require lifelong thyroid hormone replacement therapy to maintain normal thyroid function. Regular follow-up visits are necessary to monitor thyroid hormone levels, manage any complications, and assess for recurrence or metastasis in cases of thyroid cancer.



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Advanced Head and Neck Microvascular Reconstruction, Robotic Surgery and Advanced Facial Plastic Surgery (Dalhousie University, Halifax, NS, Canada).

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