Neck

15

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15.1 Median and Lateral Neck Masses

General Considerations

- The differential diagnosis of masses in the neck should include
  - Congenital
  - Inflammatory
  - Neoplastic
- The differential diagnoses of median and lateral neck masses are shown in Table 15.1
- An algorithm for the treatment of a neck mass is presented in Fig. 15.1

Table 15.1 The differential diagnoses of median and lateral neck masses

Lateral	Median
• Lymph node enlargement (inflammatory, systemic, neoplastic) • Neurogenic tumor (neuroblastoma) • Vascular tumor • Parotid/salivary gland • Laryngocele • Branchial cyst • Thyroid swelling • Mesenchymal tumor • Teratoma • Lymphangioma (Cystic hygroma) • Cervical rib • Epidermoid cyst	• Submental lymph node • Dermoid • Ectopic salivary tissue • Thyroglossal cyst • Ectopic thyroid tissue • Thyroid swelling • Ectopic thymus

15.2 Congenital Malformations

15.2.1 Thyroglossal Cysts and Fistulas

General Considerations

- Thyroglossal fistulas/cysts are found along the line of the embryological descent of the thyroid gland in the neck from its site of origin at the foramen cecum of the tongue to the hyoid bone
- They rarely extend beyond the hyoid bone
- Smooth, firm, rounded swellings sitting in the midline over the hyoid bone
- Occasionally extend inferiorly
- If infected, they become enlarged and inflamed and may discharge
- Differentiation from midline dermoid cyst, lymph gland or aberrant thyroid is required
- Over 50% of the patients are children with a prevalence in males
- Also referred to as medial neck cysts/fistulas

Signs

- Usually asymptomatic but patients wish resection for cosmetic reasons
- Become painful and tender if infected
- Move during swallowing
- Move superiorly on extrusion of tongue

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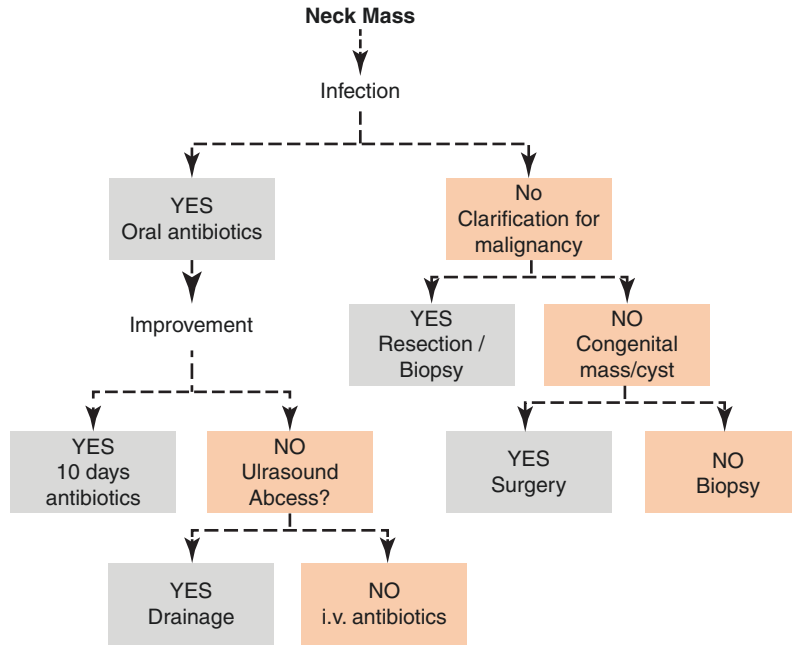

Fig. 15.1 Algorithm for neck mass

Preoperative Work-Up
- Antibiotic cover (against oral flora) is advised
- Antibiotic therapy if an abscess forms

Surgical Procedure (Sistrunk's Procedure)
- Transverse (collar) incision over the hyoid bone
- A skin ellipse is incorporated if the cyst is noticeably adherent to skin
- The central segment of the hyoid is removed with the cyst by dividing the hyoid using a bone-cutter
- The tract of the fistula is excised with a midline strip of hyoglossus muscle up to the foramen cecum
- The dissection is made easier if a surgical assistant places a gloved finger into the patient's mouth
- The operation is illustrated in Fig. 15.2

Complications
- Bleeding/hematoma formation may lead to swelling and upper airway obstruction
- Infection is a risk when the cyst is initially infected or when the fistula tract is opened
- Recurrence rate low (2.6–5%) after complete excision using the Sistrunk procedure
- Recurrence rate higher (20%) for cyst removal alone with fistula remnant

15.2.2 Branchial Arch/Cleft Remnants

General Considerations
- Branchial remnants are usually related to the second arch/cleft (92.45%). Other arch remnants are very rare
- They are located along the anterior edge of the sternocleidomastoid muscle around its midpoint
- They may extend from the tonsillar fossa of the pharynx to the skin surface
- First arch remnants occasionally present as cysts and fistulas at the angle of the jaw and around the external auditory meatus account for less than 1% of branchial cleft malformations
- Third and fourth arch remnants arise at the level of the thyroid
- Also referred to as lateral neck cysts/fistulas

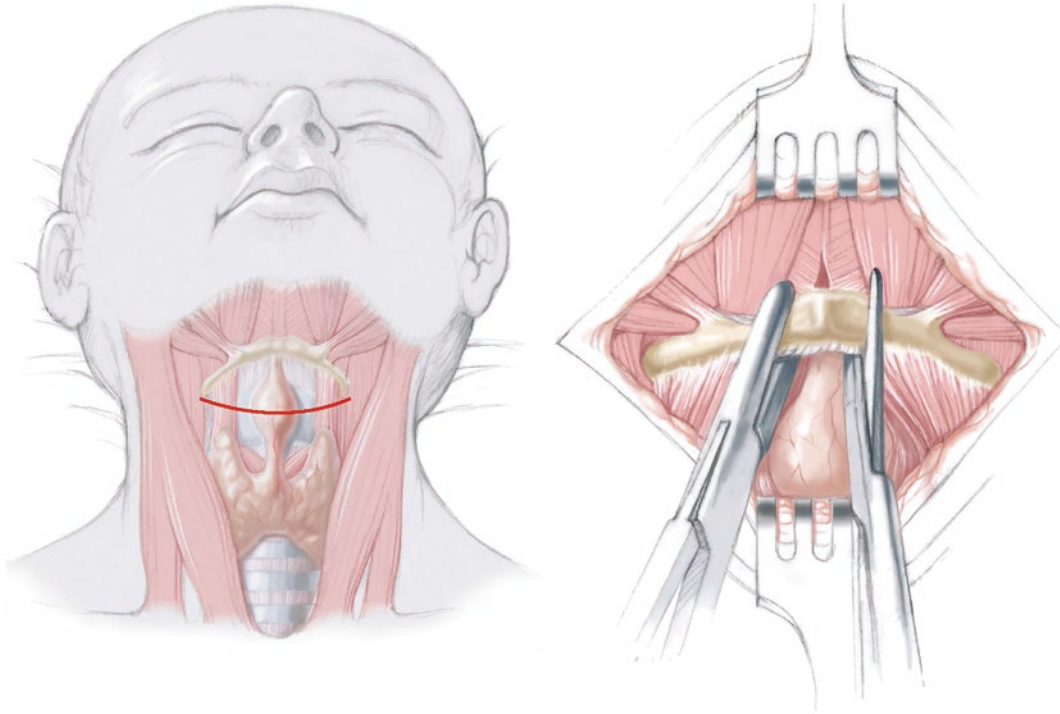

Fig. 15.2 Operative steps: thyroglossal cyst

Signs

- May appear as a smooth, asymptomatic swelling at the anterior sternomastoid border
- Infection causes inflammation and tenderness and may lead to suppuration, abscess formation, and discharge
- A fistula or sinus presents as a small skin point with viscid mucous discharge
- In atypical cases, differentiation from other cervical masses may be aided by ultrasonography or CT scanning

Preoperative Work-Up

- Palpation of the cyst from outside and from the pharyngeal opening with the finger in the mouth
- Ultrasonography
- CT for third and fourth branch remnants
- Antibiotic cover is needed if there is any evidence of infection

Surgical Procedure

- A probe may be inserted into a sinus/fistula to aid in defining the direction
- Dye (methylene blue) may be instilled but any spillage/leakage stains normal tissues and may obscure dissection
- An incision is made over the swelling or elliptically around a sinus orifice in the line of the cervical skin creases
- Excision of deep components and extensions is necessary to avoid recurrence

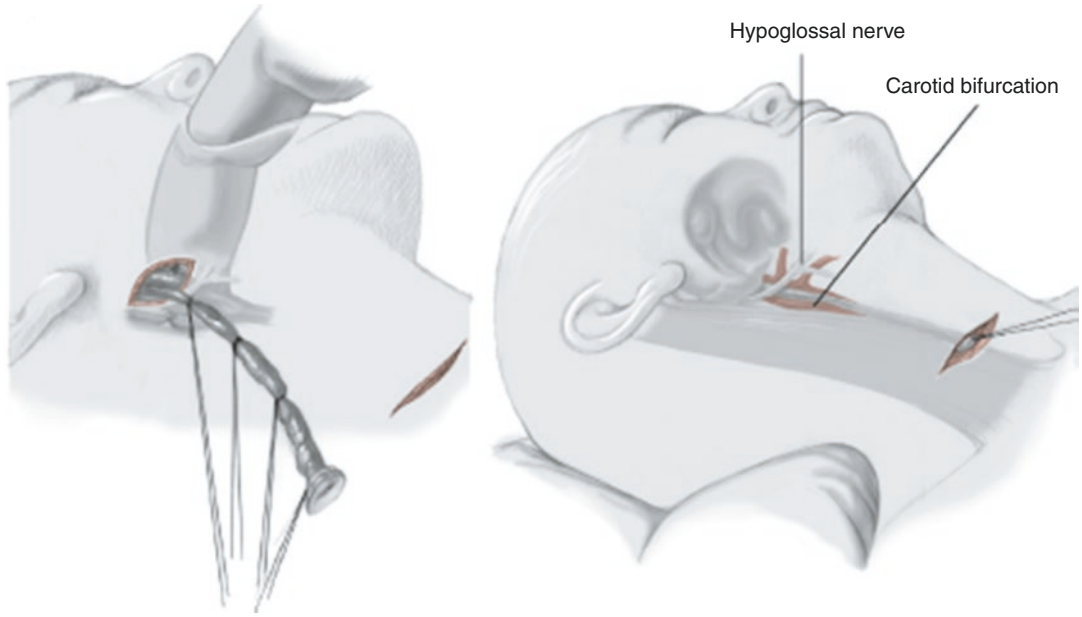

Fig. 15.3 Operative steps: brachial arch/cleft remnants

- Dissection should be carried upwards between the two main carotid artery branches to the pharyngeal wall
- A second higher transverse incision may be needed to complete excision
- The operation is illustrated in Fig. 15.3

Complications

- Recurrences of second branchial arch remnants are rare and imply incomplete excision

15.2.3 Congenital Torticollis/ Sternomastoid Tumor

General Considerations

- The sternocleidomastoid muscle is prone to localized thickening (endomysial fibrosis) and swelling due to trauma and hematoma caused by difficult parturition or due to hamartoma development
- This leads to shortening, torticollis (wry neck) and, eventually, to an asymmetric head shape (plagiocephaly) Fig 15.4

Fig. 15.4 Torticollis

Signs

- Usually asymptomatic but noticed by parents or at routine examination
- Thickened, tight sternocleidomastoid muscle with olive-shaped central segment

- Head tilted to the side of the lesion, with restriction of rotation to that side and of lateral deviation (flexion) to the opposite side
- When the head is viewed from above, the frontal area is prominent on the side of the lesion and the occipital area on the opposite side; the ear is relatively forward on the side of the lesion
- Secondary facial growth asymmetry is apparent when diagnosis is delayed
- Ultrasonography will define thickened muscle

Therapy
- Physiotherapy and instruction of parents in neck manipulation exercises (stretching, massage) in the first 6 months
- Physical therapy can include local heat, sensory biofeedback, and transcutaneous electrical nerve stimulation (TENS)
- Nonsteroidal anti-inflammatory drugs (NSAIDs), benzodiazepines and other muscle relaxants, anticholinergics
- Local intramuscular injections of botulinum toxin, or phenol
- Resistant or delayed cases will need surgical release

Surgical Procedure
- Skin incision just above clavicle gives access to sternocleidomastoid tendon insertions
- Division of the tight sternocleidomastoid muscle using a tenotomy knife or an open technique
- In delayed cases, release of fibrous tissue in the cervical fascia may be needed

Postoperative Care
- Postoperatively a collar support is initially helpful but early physiotherapy is important
- Parents/patient should be warned about transient diplopia due to ocular imbalance

Prognosis
- Very good

15.3 Cervical Lymphadenitis

General Considerations
- Enlargement of cervical lymph nodes is common
- Often it is a non-specific reactive hyperplasia due to viral etiologies; jugulodigastric and deep cervical nodes are commonly involved
- Mouth, ears, nose, and scalp are primary sites for secondary cervical lymphadenitis

Signs
- Palpable, tender neck mass — may be multilocular
- Inflammation and fluctuation suggest abscess formation
- Fever and systemic illness not often marked

Differential Diagnosis
- Viral—upper respiratory viruses
- Cat scratch disease
- HIV
- Toxoplasmosis
- Actinomycosis
- Acute suppurative—bacterial infection, e.g., *Staphylococcus aureus, Streptococcus hemolyticus.* Develops over a few days but may persist for weeks to months
- Chronic bacterial tuberculous, atypical mycobacterial *(MAIS complex, e.g., Mycobacterium avium, M. intracellulare, M. scrofulaceum)*
- Neoplastic—Hodgkin and non-Hodgkin lymphomas

Consideration for Lymph Node Biopsy
- Size
  - >2 cm
  - Increasing over 2 weeks
- Location
  - Supraclavicular lymph node
- Consistency
  - Hard
  - Mattered
  - Rubbery
- Additional signs
  - Fever
  - Weight loss
  - Spleno-/hepatomegaly

Preoperative Work-Up

- Ultrasonography may elucidate the presence of pus
- Antibiotics if patient present with systemic illness or is a young child
- Needle aspiration (with antibiotic instillation) may be diagnostic and therapeutic
- Occasional retropharyngeal extension poses risks for intubation anesthesia

Therapeutic Strategy

- Abscess may be encouraged to discharge spontaneously or to point when using warm poultice
- When pointing, incision and drainage (with packing if large cavity) is definitive
- Atypical mycobacteria infection is insensitive to antituberculous drugs and requires complete excision
- Solid masses may need biopsy for tissue diagnosis

15.4 Thyroid Enlargement

General Considerations

- Thyroid enlargement in children is unusual and is most commonly due to simple goiter (ca.3%)
- Thyroiditis, neoplasia, acute inflammation, cysts and Graves' disease (hyperthyroidism) all cause enlargement
- The anatomy of the thyroid gland is shown in Fig. 15.5

Signs

- Symptoms may not always be present in goiters, but if present may include
  - A visible swelling at the base of the neck
  - A tight feeling in the throat
  - Coughing
  - Hoarseness
  - Difficulty swallowing
  - Difficulty breathing

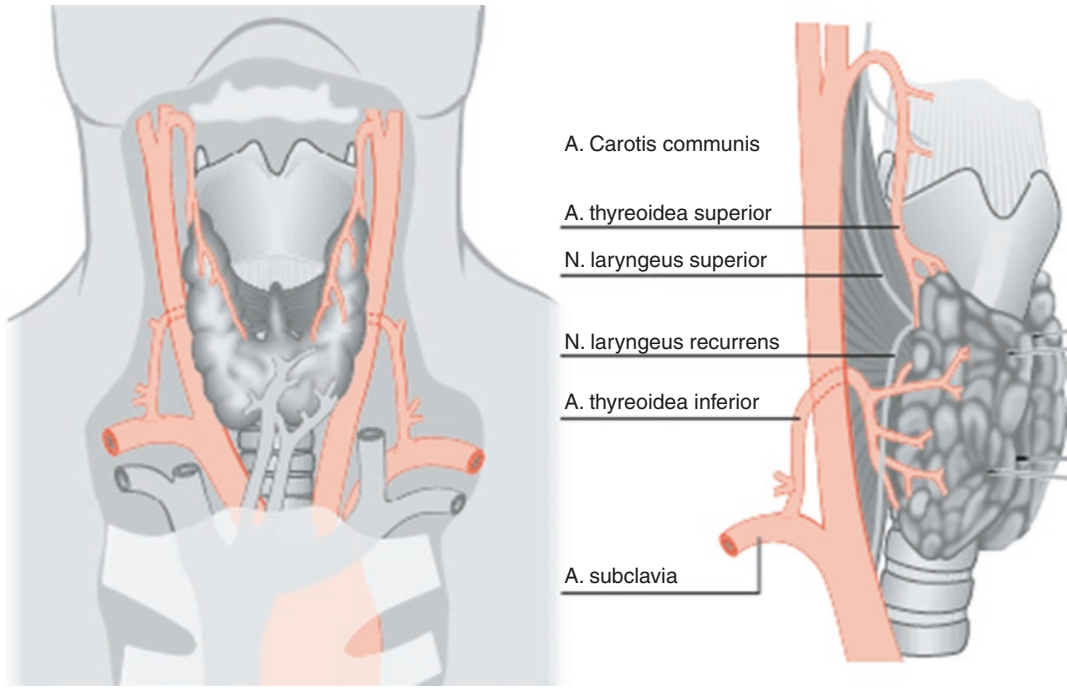

Fig. 15.5 Thyroid anatomy

Table 15.2 Differential diagnosis of thyroid enlargement

Thyroid enlargement	State	Age	Description
Congenital hypothyroidism	Euthyroid	Newborns	Usually not enlarged, but may have an ectopic gland
Simple colloid goiter	Euthyroid	Adolescence	Smooth, uniform or nodular gland enlargement
Chronic lymphocytic thyroiditis (Hashimoto)	Euthyroid but can progress to hypothyroid	Adolescence	Autoimmune disease, firm gland
Subacute viral thyroiditis (de Quervain)	Euthyroid	Any age	Usually tender and painful, mildly thyrotoxic
Acute suppurative (bacterial) thyroiditis	Euthyroid	Any age	Acute swollen and painful, sepsis
Toxic goiter (Graves')	Hyperthyroid	Any age	Diffuse enlargement
Thyroid nodules and cysts	Hypothyroid	Any age	Adenoma most common but risk of malignancy
Thyroid carcinoma	Both	Adolescence	More common in girls, usually papillary

Table 15.3 Classification of hyperparathyroidism (*HPT*)

Primary HPT	Secondary HPT	Tertiary HPT
• Hyperplasia • Pituitary adenoma	• Vitamin D deficiency (rickets) • Chronic renal disease • Maternal hypoparathyroidism	• Chronic hypocalcemia

Differential Diagnosis

- The differential diagnosis of thyroid enlargement is given in Table 15.2

Preoperative Work-Up

- Palpation of gland—size, symmetry, firmness (hard-neoplasia), tenderness (inflamed)
- Thyroid state—eu-/hypo-/hyperthyroid—based on physical signs in addition to thyroid-stimulating hormone (TSH) and free thyroxine (T_4) estimations in plasma
- Imaging may include ultrasonography, radionuclide scintigraphy (^{131}I) and ^{99m}TC-scan
- Biopsy by fine needle aspiration (FNA)
- Consider possible association with multiple endocrine neoplasia (MEN) syndromes

Conservative Treatment

- Antithyroid medications for thyrotoxicosis
- Radioactive gland ablation—possible long-term cancer risk

Surgical Procedure

- Thyroidectomy—subtotal or total—recurrent laryngeal nerves at risk

Complications

- Transient hypocalcemia
- Transient nerve palsy
- Permanent hypoparathyroidism
- Permanent nerve injury

15.5 Hyperparathyroidism

General Considerations

- The four parathyroid nodules are located posterior to the lateral thyroid lobes and are derived from the third and fourth branchial arches
- Neonatal hypoparathyroidism induced by untreated hyperparathyroidism in pregnant women may cause dangerously low levels of calcium in newborns

Classification

- Hyperparathyroidism is classified as primary, secondary or tertiary (Table 15.3)
- Chromosomal microdeletions (22q11.2, 10p15.3p14) also can result in hypoplastic or absent parathyroid glands in association with defined syndromes

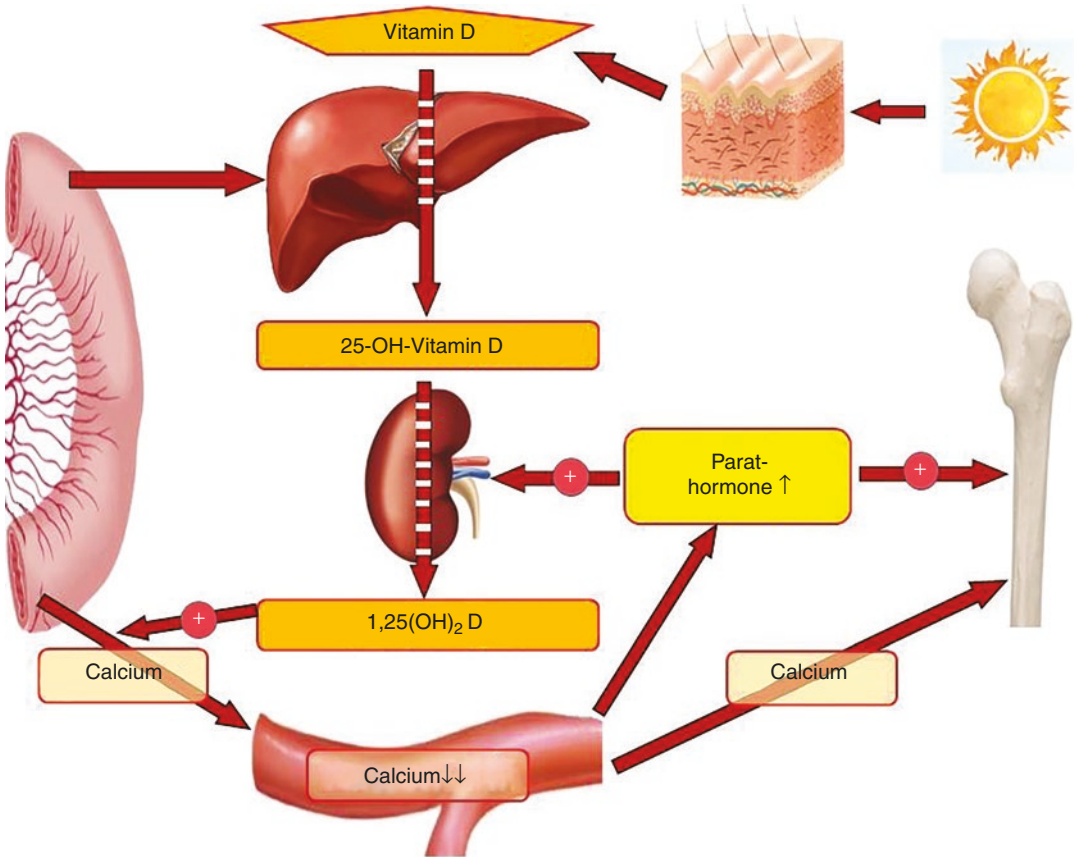

Fig. 15.6 Vitamin D/Parathormone metabolism

- DiGeorge syndrome (velocardiofacial syndrome) including maldevelopment of tissues between the heart and palate is the most known syndrome related to hyperparathyroidism

Signs

- Hyperparathyroidism (HPT) may present with a variety of symptoms
  - Frequent complaints of illness with no apparent cause
  - Fatigue with muscle weakness
  - Depression
  - Confusion
  - Headache
  - Bone pain with or without fractures due to diminished bone density (osteoporosis)
  - Kidney pain due to urolithiasis
  - Excessive urination
  - Cardiovascular disease
  - Abdominal pain
  - Nausea, vomiting or loss of appetite
  - Weight loss
  - Constipation or Diarrhea
  - Peptic ulcer

Vitamin D/Parathormone Metabolism

- The metabolism of these two substances regulates the calcium concentration in blood (Fig. 15.6)

Laboratory Investigations and Findings

- Laboratory investigations vary according to the type of HPT (Table 15.4)

Preoperative Work-Up

- Neck ultrasonography
- Tc^{99m} Sestamibi scan for localization of possible adenomas

Table 15.4 Laboratory investigations and findings according to the type of HPT

Investigation	Primary HPT	Secondary HPT
Parathormone	Raised	Normal, raised
Serum calcium	Raised	Normal, lowered
Urine calcium	Normal, raised	Raised
Serum phosphate	Normal, lowered	Normal, lowered, raised
Urine phosphate	Raised	Lowered
Alkaline phosphatase	Normal, raised	Raised

- Computed tomography scan in combination with Sestamibi scan improves detection
- Localization of tumor by selective thyroid vein sampling and parathormone estimation
- Magnetic resonance imaging

Surgical Therapy

- Resection of adenoma or selected glands
- In case of removal of all 4 glands parathyroid auto-transplantation is recommended
  - Parathyroid tissue is placed into a muscle pocket of either the neck or forearm for easy access in case a hypertrophy occurs

Complications

- Damage to nerves controlling the vocal cords
- Long-term low calcium levels requiring the use of calcium and vitamin D supplements