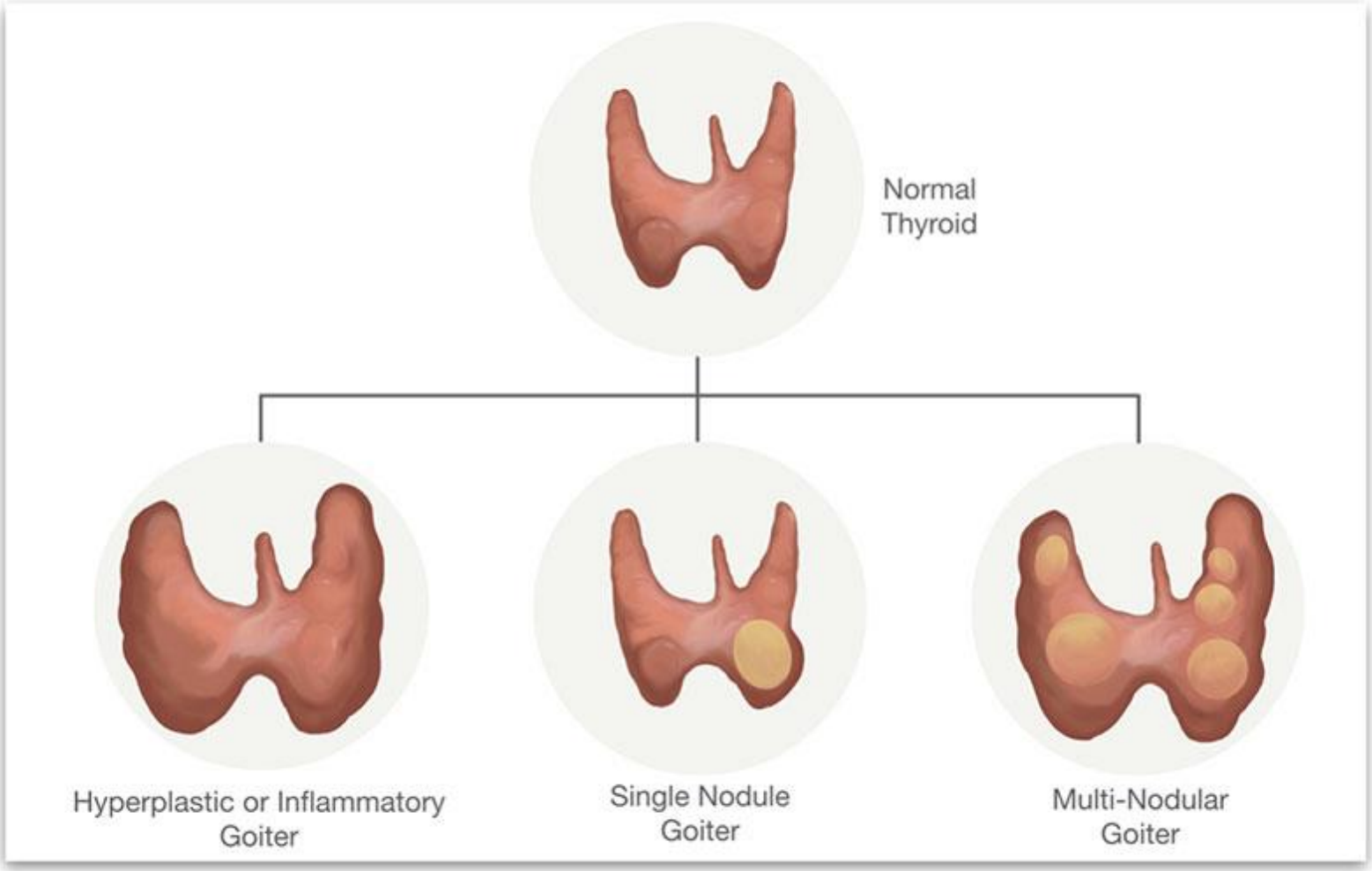
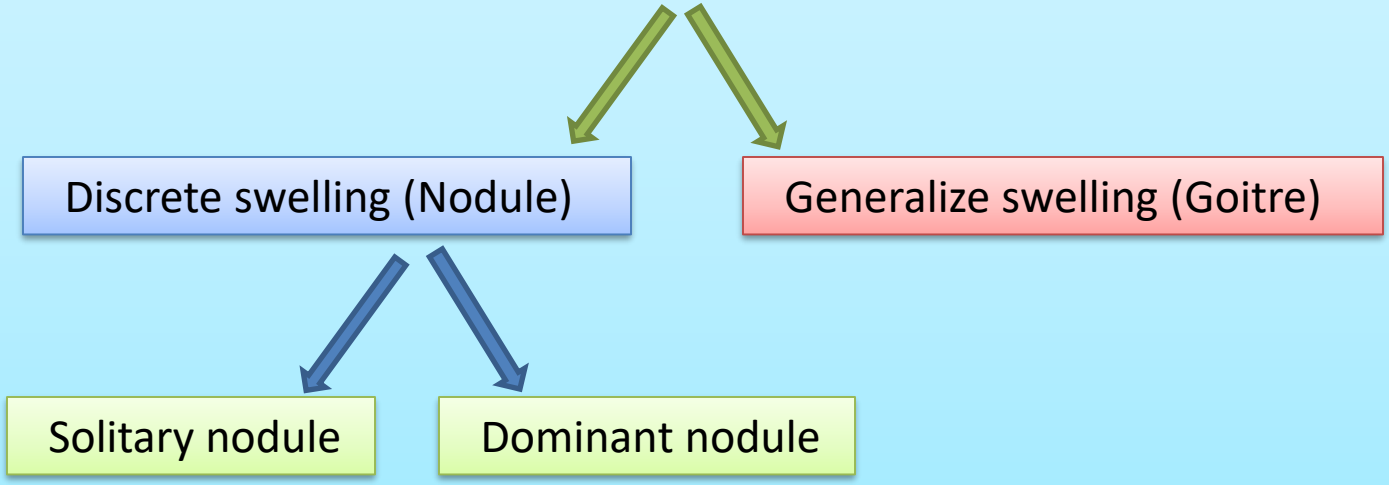
Multinodular Goitre



Thyroid Enlargement

- Thyroid abnormalities can be due ;
  - –Epidemiological Abnormalities
  - –Functional Abnormalities
  - –**Morphological Abnormalities**



Thyroid Enlargement

- The normal thyroid gland is impalpable
- The term **goitre** is used to describe generalised enlargement of the thyroid gland
- A discrete swelling (nodule) in one lobe with no palpable abnormality elsewhere is termed an isolated or **solitary swelling**
- **Discrete swellings** with evidence of abnormality elsewhere in the gland are termed dominant

Thyroid Enlargement

Classification of generalize thyroid swellings		
Simple goitre (euthyroid)	Diffuse hyperplastic	Physiological. Pubertal, Pregnancy
	Multinodular goitre	
Toxic	Diffuse (Graves' disease)	
	Multinodular	
	Toxic adenoma	
Neoplastic	Benign	
	Malignant	
Inflammatory	Autoimmune	Chronic lymphocytic thyroiditis
		Hashimoto's disease
	Granulomatous	De Quervain's thyroiditis
	Fibrosing	Riedel's thyroiditis
	Infective	Acute (bacterial thyroiditis, viral thyroiditis, 'subacute thyroiditis')
		Chronic (tuberculous, syphilitic)

Simple Goitre

Aetiology

- Simple goitre may develop as a result of stimulation of the thyroid gland by TSH, either as a result of inappropriate secretion from a microadenoma in the anterior pituitary (which is rare), or in response to a chronically low level of circulating thyroid hormones.
- The most important factor in endemic goitre is dietary deficiency of iodine
- But defective hormone synthesis probably accounts for many sporadic

Simple Goitre

- TSH is not the only stimulus to thyroid follicular cell proliferation and other growth factors, including immunoglobulins, exert an influence
- The heterogeneous structural and functional response in the thyroid resulting in characteristic nodularity may be due to the presence of clones of cells particularly sensitive to growth stimulation

Goitrogens

- Well-known goitrogens are
  - Vegetables of the brassica family (cabbage, kale and rape), which contain thiocyanate
  - Para-aminosalicylic acid
  - Antithyroid drugs
- Thiocyanates and perchlorates interfere with iodide trapping
- Carbimazole and thiouracil compounds interfere with the oxidation of iodide and the binding of iodine to tyrosine

Goitrogens

- Surprisingly, iodides in large quantities are goitrogenic because they inhibit the organic binding of iodine and produce an iodide goitre
- Excessive iodine intake may be associated with an increased incidence of autoimmune thyroid disease

Stages in goitre formation

1. Persistent growth stimulation causes diffuse hyperplasia; all lobules are composed of active follicles and iodine uptake is uniform.This is a diffuse hyperplastic goitre, which may persist for a long time but is reversible if stimulation ceases
2. Later, as a result of fluctuating stimulation, a mixed pattern develops with areas of active lobules and areas of inactive lobules
3. Active lobules become more vascular and hyperplastic until haemorrhage occurs, causing central necrosis and leaving only a surrounding rind of active follicles

Stages in goitre formation

4. Necrotic lobules coalesce to form nodules filled either with iodine-free colloid or a mass of new but inactive follicles
5. Continual repetition of this process results in a nodular goitre.Most nodules are inactive, and active follicles are present only in the internodular tissue

Diffuse Hyperplastic Goitre

- Diffuse hyperplasia corresponds to the first stages of the natural history
- The goitre appears in childhood in endemic areas but, in sporadic cases, it usually occurs at puberty when metabolic demands are high
- If TSH stimulation ceases the goitre may regress, but tends to recur later at times of stress such as pregnancy

Diffuse Hyperplastic Goitre

- The goitre is soft, diffuse and may become large enough to cause discomfort
- A colloid goitre is a late stage of diffuse hyperplasia, when TSH stimulation has fallen off and when many follicles are inactive and full of colloid

Multiodular Goitre

- Nodules are usually multiple, forming a multinodular goitre
- Occasionally, only one macroscopic nodule is found, but microscopic changes will be present throughout the gland; this is one form of a clinically solitary nodule
- Nodules may be colloid or cellular, and cystic degeneration and haemorrhage are common, as is subsequent calcification

Multiodular Goitre

- Nodules appear early in endemic goitre and later (between 20 and 30 years) in sporadic goitre, although the patient may be unaware of the goitre until his or her late 40s or 50s
- All types of simple goitre are more common in the female than in the male owing to the presence of oestrogen receptors in thyroid tissue

Types of nodules in MNG

- Colloid
- Cellular
- Cystic degeneration
- Haemorrhagic
- Calcified

Complications of MNG

- Calcification
- Secondary Hyperthyroidism (30%)
- Follicular carcinoma (May be papillary)
- Haemorrhage into a nodule causes dyspnoea
- Tracheal obstruction
  - Dyspnoea
  - Cough
  - Stridor
- Retrosternal extension
  - SVC obstruction
  - Dysphagia

Complications of MNG

- People with a solitary nodule or a dominant nodule in a multinodular goitre there is a 5% chance of malignancy
- A hot nodule is only rarely malignant; however, a cold nodule is malignant in 10% of cases

Investigations

Thyroid function tests	• Should include measurement of TSH plus free T4 or T3
Thyroid autoantibodies	• Assessed to exclude an autoimmune etiology
USS of Thyroid	• Sensitive method for delineating nodules • Can demonstrate whether they are cystic or solid • Multinodular goitre may be demonstrated when only a single nodule is palpable

Investigations

Fine needle aspiration (FNAC)	• Should be performed in the outpatient clinic or during ultrasound if the appearance is suggestive of potential malignancy, based on defined ultrasound criteria
Chest &Thoracic inlet X rays or CT scan	• Detect tracheal compression and large retrosternal extensions in people with a very large goitre or clinical symptoms
Thyroid scan (99m Tc)	• can be useful to distinguish between functioning (hot) or non-functioning (cold) nodules

USS Features

Sonographic features of benign pathology	Sonographic features of malignant pathology
Spongiform texture	Irregular margins
Cystic without solid components	Intra-nodular vascularity
Iso-echogenicity	Micro-calcifications
Hypoechoic halo	Cervical lymphadenopathy
Avascular nodules	
Nodules with peripheral vascularity	

Management

- In the early stages, a hyperplastic goitre may regress if thyroxine is given in a dose of 0.15–0.2 mg daily for a few months
- Although the nodular stage of simple goitre is irreversible, more than half of benign nodules will regress in size over 10 years
- Most patients with multinodular goitre are asymptomaticmand do not require surgery

Management

- Surgery is indicated for nodular goitres ;
  - with features of underlying malignancy
  - for swallowing symptoms if other causes have been excluded or for
  - cosmetic reasons
  - If the goitre is causing tracheal compression
- There is a choice of surgical treatment in multinodular goitre: **total thyroidectomy** with immediate and **lifelong replacement of thyroxine** or some form of **partial resection** to conserve sufficient functioning thyroid tissue

Management

- More often, the multinodular change is asymmetrical, with one lobe more significantly involved than the other.
- In these circumstances, particularly in older patients, **total lobectomy on the more affected side is the appropriate** management with either subtotal resection (Dunhill procedure) or no intervention on the less affected side

Management

- In many cases, the causative factors persist and recurrence is likely
- After subtotal resection, it has been customary to give thyroxine to suppress TSH secretion, with the aim of preventing recurrence

Management

- Reoperation for recurrent nodular goitre is more difficult and hazardous and, for this reason, an increasing number of thyroid surgeons favour **total thyroidectomy in younger** patients
- There is some evidence that radioactive iodine may reduce the size of recurrent nodular goitre after previous subtotal resection and, in some circumstances, this may be a safer alternative than reoperation