Thyroid Disorders

History

• Galen (160-200AD)	De Voce
•Vesalius(1543)	The Fabrica
•Wharton(1656)	coined ‘thyroid’ or ‘Oblong Shield’
•Kocher’s(1883)	Myxoedema
•Graves, Parry, Von Basedow	Hyperthyroidism
•Murray	Thyroid extract
•Kendall, Harrington, Gross & Pitman	Thyroid function
•Albucasis(1000 AD)	Thyroidectomy

Solitary Thyroid Nodule

- **History**
  - Duration, recent enlargement, voice change, H/O hypo/hyperthyroidism, irradiation, F/H goitre/cancer

- **Physical examination**
  - Dominant nodule, movement on deglutition, cervical lymph nodes, fixation, hardness

- **Thyroid function studies**
  - Serum TSH
  - T4 & T3 levels
  - Antibody levels; ATA, AMA 1:100
  - Thyroid imaging; Scanning (99mTc, 123I, 131I)

Solitary Thyroid Nodule

- **CXR**
- **Ultrasound**
  - Solid/cystic
  - Multicentric
  - Lymph node involvement
  - Ultrasound-assisted FNA

- **CT/MRI of neck**
  - Mainly for large/recurrent cancers
  - Vascular/lymphatic invasion
  - Cervical/mediastinal metastasis

Solitary Thyroid Nodule

- **FNAC (Fine Needle Aspiration Cytology)**
  - Easy, safe, cost effective
  - Negative predictive value 89%- 98%
  - False Negative rate 6%
  - False Positive rate 4%

- **FNAC Cytodiagnosis**
  - Benign
    - Colloid adenoma, thyroiditis, cyst
  - Malignant
    - Papillary (70%), follicular (15%), medullary (5%-10%), anaplastic(3%), lymphoma (3%), metastasis (rare)
  - Indeterminate
    - Microfollicular, Hurthle cell, embryonal neoplasm

Solitary Thyroid Nodule

- **FNAC Result**

• **Benign**	Observe and repeat FNAC 1 year	
• **Malignant**	Surgery	
• **Indeterminate**	serum TSH normal	Surgery
	Serum TSH low	Scintiscan
• **Inadequate**	Repeat FNA	

Thyroid Cancer

- **Incidence** 1%
- **M/F ratio** 3:1
- **Risk factors**
  - **Radiation exposure**
  - **External**
    - **Medical treatment for benign conditions**
    - **Medical treatment for malignancies**
    - **Environmental exposure- Nuclear weapons or accidents**
  - **Internal**
    - **Medical treatment of benign condition with I131**
    - **Diagnostic tests with I131**
    - **Environmental- fallout from nuclear weapons**
  - **Other factors**
    - **Diet- Iodine deficiency, goitrogens**
    - **Hormonal factors- female gender predominance**
    - **Benign thyroid disease**
    - **Alcohol**

Thyroid Cancer

- **Pathology**
- Papillary carcinoma;
  - 60-70% of all cases
  - Multifocal
  - Nonencapsulated, but circumscribed
  - Lymphatic spread
  - 80% 10 year survival
- Follicular carcinoma
  - 15-20% of thyroid cancers
  - Usually encapsulated
  - 60% 10 year survival

Thyroid Cancer

- Hurthle cell neoplasm
  - 5% of thyroid cancers
  - Variant of follicular cancer
  - Lymph node spread slightly higher than follicular cancer
  - Lees avidity for 131I
- Medullary cancer
  - Parafollicular C cells
  - Autosomal dominance inheritance in 20%
  - Unilateral involvement in sporadic, bilaterality in familial forms
  - Calcitonin secretion
  - Metastasis both by lymphatic and blood stream
  - 10 year survival 90% in localised disease, 70% with cervical mets, 20% with distant mets

Thyroid cancer

- Anaplastic cancer
  - Undifferentiated
  - Rapidly growing, often inoperable
  - Invade locally, metastasize both locally and distantly
  - Mean survival 6 months
  - 5 year survival rate 7%
- Lymphoma
  - Rare, rapidly enlarging tumour
  - Primary or secondary
  - Seventh decade, 6:1 F/M ratio
  - 5 year survival rate 75-80%, when confined to thyroid

Thyroid cancer

- Staging and Prognosis
- AGES and AMES scoring systems
  - **A** **Age of patient**
  - **G** **Tumour Grade**
  - **M** **Distant metastasis**
  - **E** **Extent of tumour**
  - **S** **Size of tumour**
- Both scoring systems have identified 2 distinct subgroups;
  - **Low-risk group**; Men 40years or younger, women 50 or younger, without distant metastasis (bone & lungs)
  - Older patients with intrathyroid follicullar/papillary carcinoma, with minor capsular involvement with tumours < 5cms in diameter
  - **High –risk group**; All patients with distant metastasis
  - All older patients with extrathyroid papillary/follicular carcinoma & tumours >5 cms regardless of extent of disease

Thyroid cancer

- Treatment of thyroid cancer
- Papillary cancer
  - < 1.5 cms — Lobectomy & isthmusectomy
  - > 1.5 cms — Total thyroidectomy
- Follicular cancer — Total thyroidectomy
- **Hurthle** — Total thyroidectomy
- **Medullary** — Total thyroidectomy & central neck dissection

Thyroid cancer

- **Adjuvant therapy**
  - **TSH suppression**
  - **Post operative radioactive Iodine ablation**
  - **External beam radiotherapy**

- **Surveillance**
  - **Serum thyroglobulin levels**
  - **CXR or CT scan**
  - **Repeat 131I if positive**

Parathyroid Disorders

- Hyperparathyroidism
  - **Primary; most commonly PARATHYROID ADENOMA 80%-85%**
  - **Primary chief-cell hyperplasia**
  - **Parathyroid carcinoma 1%**
- **Signs and Symptoms**
  - **Nonspecific and involve multiple organs**
  - **Skeletal system; Osteitis fibrosa cystica, osteoclastomas, etc**
  - **Kidneys; Kidney stones, nephrocalcinosis.**
  - **Gastrointestinal tract; Vague abdominal pain, PUD, pancreatitis**
  - **Neuromuscular & neuropsychiatric; muscle weakness, fatigue, lassitude, forgetfulness, depression, psychomotor retardation**
  - **Thyroid cancer esp nonmedullary thyroid cancer**
  - **Hypertension, hyperuricemia, gout, Idiopathic hypertrophic subaortic stenosis, band keratopathy**

Parathyroid Disorders

- **Diagnostic Methods**
  - **Blood chemistry; Hypercalcemia, hypophosphatemia, hyperchloremia, raised alkaline phosphatase.**
  - **Urinalysis; hypercalciuria,.**
- **Ultrasonography**
  - **Wide discrepancy, sensitivity (36%- 76%)**
  - **Inferior, juxtathyroidal or intrathyroidal glands better visualised**
  - **Substernal, retrotracheal, retroesophageal glands difficult to visualise**
- **Nuclear Medicine (Sestamibi scan)**
  - **Wash out scan**
  - **Taken up by mitochondria**
  - **Both false positive and false negative results**
- **CT and MRI**
- **Angiography & venous sampling**
- **Intraoperative localisation**

Phaeochromocytoma

- **Called a 10% tumour.**
- **10% bilateral, malignant, multiple, extra-adrenal, familial, and children.**
- **Neural crest in origin, APUD cells (Kulchitsky cells)**
- **Secrete excessive amounts of catecholamines**
- **Pathology**
  - **Size variable range 1 – 30 cms in size, malignant tumours larger in size**
  - **Highly vascular, therefore haemorrhage & necrotic areas common**
  - **Metastasis to lymph nodes, liver, lungs, bones, etc.**

Phaeochromocytoma

- Localisation
- CT scanning
  - Overall accuracy 90%-95% for adrenal tumours
  - Less accurate for extra adrenal tumours
- Isotope scintigraphy (MIBG scanning)
  - 131I-MIBG stored in chromaffin granule
  - Sensitivity 99%
  - False negative 11%
  - False positive 2%
- Blood and Urine analysis
  - Plasma catecholamine levels > 1000micrograms
  - Urinary VMA and Metanephrine levels

Phaechromocytoma

- Preoperative preparation
- To control hypertension & prevent CVS complications.
- Alpha adrenergic blockade
  - Phenoxybenzamine 10 mg qds 1-2 weeks before surgery
  - Beta blockade propanolol 10 mg qds 2-3 days
- Intraoperatively
- Phentolamine
- Sodium nitroprusside

Adrenal incidentalomas

- Unexpected lesions on imaging studies
- Found in approximately 0.3 – 5.0% of patients
- Differentiate from cortical adenoma, adrenocortical carcinoma, cyst, phaeochromocytoma, myelolipoma, ganglioneuroma, adenolipoma and metastasis.
- Laboratory evaluation
  - Serum K, 24 hours VMA, metanephrines, 17 hydroxycorticosteroids and 17-ketosteroids

Adrenal Incidentalomas

- 3 cms mass in young patient(< 50 years) adrenalectomy
- 3-6 cms mass with ominous signs of malignancy Adrenalectomy
- Observation for 3-6 cms mass in patients 50 years or < 3cms in all ages and metabolically inactive
- Follow up with serial CT scans

Zollinger-Ellison Syndrome

- First described in 1955
- Fulminant PUD, marked hypersecretion of HCL and non-beta islet cell pancreatic tumour
- Diagnosis
  - Hypergastrinemia
  - Serum levels > 1000 picograms/ml
  - Secretin provocation test
- Preoperative localisation
  - CT scanning
  - Ultrasound
  - MRI
  - 123I-Octreotide scan

Zollinger-Ellison Syndrome

- Treatment
  - **Total Gastrectomy abandoned, but still reserved for patients who fail to take PPI's, recurrent ulcers, or nonhealing ulcers in stomach and duodenum**

Crohn's Disease

- Inflammatory disease of the bowel of unknown cause
- Stimulation of the immune cascade
- Medical therapies
- Aminosalicylates;
  - Sulfasalazine first used in 1930 for RA.
  - Sulfasalazine composed of two moieties, sulfapyridine & 5ASA.
  - 5 ASA is the active moiety
  - Most efficacious against active ileo colic and colonic disease
  - Maintenance medication
  - Side effects N, V, abdomnal pain, headache, malaise, anorexia. Rash, fever, hepatitis, agranulocytosis, pneumoniyis, pericarditis, etc.

Crohn’s

- Corticosteroids
  - Decrease eicosanoid production, inhibit release of proinflamatory cytokines, IL-1 & IL-2, and decrease nuclear faactor-kappa B production.
  - Budesonide; rapidly metabolised.
- Antibiotics
  - Metronidazole; possesses anti inflammatory and immunosuppressive effects
  - Beneficial in peri anal Crohn’s disease and fissures.
- Ciprofloxacin
  - For patients intolerant or unresponsive to metronidazole
  - For peri anal disease
  -

Crohn’s

- Antimycobacterials agents
  - Inconsistent results
  - Cannot be recommended
- Immunomudutlators
- Azathiopurine and 6 MP
- Thiopurine analogues
- Steroid sparing
- Methotrexate
  - Inhibits folate production
  - Anti inflammatory and immunosuppressive
  - Beneficial in fistulising crohn’s

Crohn's

- Cyclosporin A
  - Inhibits IL-2 production, IL-3, TNF alpha, gamma interferon.
  - Rapid action
- Tacrolimus & Mycophentolate Mofetil
  - Tacrolimus (FK-506) macrolide antibiotic
  - 50-100 fold potent than CSA.
- Biological therapy
  - Infliximab TNF alpha antiboby
  - CDP571 Humanised antibody
  - Thalodimide
  - ISIS-2302 antisense oligonucleotide