1. Wound Infection
2. Keroi
3. Gangrene

Complications of RAS:
- Progression of Grave's ophthalmopathy
- A risk of nodular goitre
- Risk of hypoparathyroidism
- A risk of cardiovascular mortality
- Higher incidence of hypothyroidism
- Initial dose higher.
Papillary = M/C in Scaic & Sufiecet area
M/C in External Radiation
Pathology = Papillary projections
Orphan annie Eye nuclei
Psammoma bodies

C/I:
Swellip & AN Mets
- Lateral Abbered Thyroid.
- Dungs M/C site of Mets.

Dx - FNAC f/lb complete neck USG
to evaluate Centrolateral lobe & LN.

It - Total or Near Total Thyreoidectomy
for Mets = MRND

Excellent prognosis.
Female

Papillary Capsule

M/C in iodine deficient areas

Carcinoma Ducts of follicles devoid of colloid

Capsular or vascular Invasion

CEA usually as STN

Thyroid Swellly + lytic bone metastasis

Cervical lymphadenopathy

FNAC / frozen ineffective

Frozen section

Follicular Benign - Hemithyroidectomy

Ca = Total Thyroidectomy

For mets - RAI 131

OR Ext. RT

NO prophylactic @ LN X
Medullary:
From parafollicular cells
Sporadic or familial
- Boy
- One gland
- MEN 2A/B
- Hyperparathyroid
- Pheochromocytoma
- Familial histos

Pathology:
Amyloidosis
Stroma

Diagnosis:
Difficult to dx clinically
↑ Calcitonin & CEA in Serum
Diarrhoea
Cervical LN
Both Blood & Lymph mets
- Mic organ - liver

Histology:
FNAC
I$^{131}$ Scan - No USP

Treatment:
- Total Thyroidectomy
- Central LN dissection
Summary of the malignant tumours of thyroid gland

<table>
<thead>
<tr>
<th></th>
<th>Papillary</th>
<th>Follicular</th>
<th>Anaplastic</th>
<th>Medullary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aetiology</td>
<td>Irradiation</td>
<td>Endemic goitre</td>
<td>Unknown</td>
<td>Sporadic or familial</td>
</tr>
<tr>
<td>2. Incidence</td>
<td>60%</td>
<td>17%</td>
<td>13%</td>
<td>6%</td>
</tr>
<tr>
<td>3. Age (years)</td>
<td>20–40</td>
<td>30–50</td>
<td>50 and above</td>
<td>Middle age</td>
</tr>
<tr>
<td>4. Diagnosis</td>
<td>Thyroid swelling with lymph node metastasis</td>
<td>Thyroid swelling with bony metastasis</td>
<td>Thyroid swelling, local fixity, stridor</td>
<td>Difficult to diagnose clinically</td>
</tr>
<tr>
<td>5. Microscopy</td>
<td>Orphan Annie eye nuclei, psammoma bodies</td>
<td>Angioinvasion, capsular invasion</td>
<td>Poorly differentiated cells</td>
<td>Amyloid stroma-like carcinoïd</td>
</tr>
<tr>
<td>6. Spread</td>
<td>Lymphatic</td>
<td>Blood</td>
<td>Local infiltration</td>
<td>Lymphatic, blood</td>
</tr>
<tr>
<td>7. Investigation</td>
<td>FNAC</td>
<td>Frozen section</td>
<td>FNAC, incision biopsy</td>
<td>FNAC, calcitonin</td>
</tr>
<tr>
<td>8. Treatment of the primary</td>
<td>Near-total/Total thyroidectomy</td>
<td>Near-total/total thyroidectomy</td>
<td>Isthmusectomy, external RT</td>
<td>Total thyroidectomy</td>
</tr>
<tr>
<td>9. Treatment of metastasis</td>
<td>Functional neck dissection</td>
<td>Radiodine ¹³¹I or external RT</td>
<td>Palliative external radiotherapy</td>
<td>Radical block dissection</td>
</tr>
<tr>
<td>10. FSH dependence</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>11. Hormone production</td>
<td>Very rare</td>
<td>Very rare</td>
<td>No</td>
<td>Calcitonin, 5-HT, ACTH</td>
</tr>
<tr>
<td>12. Prognosis</td>
<td>Excellent</td>
<td>Good</td>
<td>Worst</td>
<td>Bad</td>
</tr>
</tbody>
</table>
Adrenal Tumours

Adrenal Cortex

Adrenoma

Carcinoma

- Aggressive
- Rare

Adrenal Medulla

Neuroblastoma

- Chromaffin cystoma

Minority of them are functional

- Usually rate dx
- Usually invade large vessels

DX: CT

Size ≤ single small mass,
most imp. criteria

TX: En bloc resection

- Feminization of male
- Vaginization and female development

CT/mRI:

≤ 2 cm in greatest diameter
- Encapsulated, solid, homogeneous
- Functional

Excision of functional

Ketamine

Aminoglutethimide
Max of Adrenal mass

1. Evaluation: History + Physical examination
   To know:
   - Whether the mass is functional or not
   - Whether it's metastatic

Hormonal evaluation for suspected

Cushing
- Serum Cortisol
  - ACTH
  - Dexam Suppres Test

Hyperaldosteronism
- Serum Potassium levels
- Serum Aldosteron levels

Pheochromocytoma
- Plasma free Metanephrine
- 24 Hr urine Metanephrine

Imaging studies
- CT
- MRI
- PET

FNAB = only for suspected Mets
**Primary Adrenal CA:** Open Sx Adrenelectomy

For others: Lap. Adrenelectomy

**MNX**

Non-functional tumours → follow up

- **Functional**
  - Need T/I
  - Size

- **Size**
  - >5 cm
    - Need removal unless benign nature is established
    - Lap. or open adrenelectomy

- <5 cm
  - Follow up considering age and size
    - **Age <50 years**
      - Size <4 cm → follow up
    - **Age ≥50 years**
      - Size <4 cm → follow up
      - 4–5 cm → removal
      - ≤4 cm → follow up
Neuroblastoma = Malignant tumour from Sympathetic System

MIC Solid tumour of infancy and childhood
Adrenal is MIC site

Pathology: Well encapsulated Homer Wris leosotte

NF - Child < 3 year Abdominal mass O/D Renal mass

Surgically higher Hard Nodular Fixed

Sick child. DL loss. Abdo. distension

Functional tumour - VIP Diarrhoea. Hypokalaemia

Metastases - Proptosis, pedorcibital swelling, Raccoon's Eye sign
Post Mediastinal Neuroblastoma - Cord Compression

Dumbell Tumour
Diagnosis:
- Anemia, Thrombocytopenia or Thrombocytosis

Urinalysis:
- VMA

Imaging:
- CT Scan: Stippled calcification
- MRI: Superior to CT to assess
  - Vessels encasement, vessels patency
  - Spinal cord compression & bone marrow involvement.

For metastasis:
- MIBG Scan

Appearance of neuroblastoma in bone marrow mimic ALL for which monoclonal antibody phenotype needed.
Localised = Excision

Unresectable = Biopsy

Disseminated = Chemoradiation

Sx

Chemotherapy

Cyclophosphamide + Vincristine + dacarbazine

Diagnosis = Shimada class

O/D Surgical Causes of HTN

- Pheochromocytoma

- Renal Artery Stenosis

- Hyperthyroidism

- Hyperparathyroidism

- Coarctation of aorta

- Obesity

- Renal tumour
Pheochromocytoma
- Tumour of chromaffin cells
- 4th-5th decade

- Tumours of 10
  - Bilateral
  - Malignant
    - Familial
    - Extra adrenal
    - Pediatric

Etiological Assos - Synacthen Assos
- MEN 2A/2B
- VHL
- Sturge-Weber Syndrome
- von Recklinghausen

Patho - Clustering of chromaffin cell (Zelbally)

Salt & pepper chromatin

Malignancy - Exclusively based on mets

Generally NA > Adren
d but extra adrenal - Exclusively NA

But MEN Associated - Adren alone

Malignant - Dopamine & HVA 1
47. Ans. c. T2-weighted MRI with gadolinium contrast
48. Ans. a. Arises from chromaffin cells of adrenal medulla
49. Ans. a. Dopamine (Ref: Schwartz 9/e p1400; Sabiston 19/e p684; Bailey 26/e p785; 25/e p815; Harrison 18/e p2964)

**MALIGNANT PHEOCHROMOCYTOMA**

- Risk of malignancy increases with size.
- Malignant tumors are more likely to express p53, Bcl-2 and have activated telomerase.
- Capsular and vascular invasion may be seen in benign lesions as well.
- Malignancy usually is diagnosed when there is evidence of invasion into surrounding structures or distant metastasis.
- Increased production of dopamine and homovanillic acid is usually seen in malignant lesions.
- MC site of metastases is bone > liver > lymph nodes.
- Treatment: Resection followed by chemotherapy (cyclophosphamide + vincristine + dacarbazine)
- MDH: Malignant pheochromocytoma secretes Dopamine and HVA.

50. Ans. d. FNAC is must for diagnosis
51. Ans. b. Headache
52. Ans. a. VMA
53. Ans. (None)
54. Ans. d. Metaiodobenzylguanidine (MIBG)
55. Ans. a. Organ of Zuckerkandl
56. Ans. c. Measurement of catecholamine
57. Ans. b. Urinary catecholamine and aspiration of nodule
NEUROBLASTOMA

88. Ans. e. Hyperdiploidy (RC: Schwartz 9/e p1144; 1450; Sabiston 19/e p1859; 1861; Bailey 26/e p786, 25/e p814-815; Harrison 18/e p836; Ghai p500-501)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Favorable</th>
<th>Unfavorable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage</td>
<td>Stage 1, 2A, 2B, 4S^a</td>
<td>Stage 3, 4^a</td>
</tr>
<tr>
<td>Age</td>
<td>&lt;18^o months</td>
<td>&gt;18 months</td>
</tr>
<tr>
<td>Evidence of schwannian stroma and gangliocytic differentiation</td>
<td>Present^a</td>
<td>Absent</td>
</tr>
<tr>
<td>Mitosis-karyorrhexis index</td>
<td>&lt;200/5000 cells</td>
<td>Hyperdiploid or near-triploid^a</td>
</tr>
<tr>
<td>DNA ploidy</td>
<td>Not amplified</td>
<td>Near-diploid</td>
</tr>
<tr>
<td>N-MYC</td>
<td>Absent</td>
<td>Present^a</td>
</tr>
<tr>
<td>Chromosome 17q gain</td>
<td>Absent</td>
<td>Present^a</td>
</tr>
<tr>
<td>Chromosome 1p loss</td>
<td>Absent</td>
<td>Present^a</td>
</tr>
<tr>
<td>Chromosome 11q loss</td>
<td>Absent</td>
<td>Present^a</td>
</tr>
<tr>
<td>TRKA expression</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>TRKB expression</td>
<td>Low or absent</td>
<td>Present^a</td>
</tr>
<tr>
<td>Telomerase expression</td>
<td>Highly expressed^a</td>
<td>Absent</td>
</tr>
</tbody>
</table>

Prognostic Factors in Neuroblastomas

- Arise from neural crest^o and may originate anywhere along the distribution of sympathetic chain.
- MC tumor diagnosed in infants <1 year of age^o.
- MC intra-abdominal malignancy in children^o.
- Sporadic in majority of cases.
  - MC site: Adrenal (30%)^o > Paravertebral retropertitoneum (28%)^o > Posterior mediastinum (15%)^o > Pelvis (5%)^o
  - Cervical area^o
- Associated with neurofibromatosis, Hirschprung's disease, heterochromia, fetal hydantoin, fetal alcohol syndrome and Freidreich's ataxia.
- Spontaneous regression is unique behavior especially in stage 4S^o.

Pathology
- Classic neuroblastomas: Small, primitive-appearing cells with dark nuclei, scant cytoplasm.
- Mitotic activity, nuclear breakdown ("karyorrhexis")^o, and pleomorphism may be prominent.
- Homer-Wright pseudo-rosettes^o can be found.
- Immunochemical detection of neuron-specific enolase^o.

Clinical Features
- MC presentation: Fixed, lobular mass extending from the flank toward the midline^o of the abdomen.
- Most (80%) cases present before 4 years and peak incidence is 2 years^o of age.
- Metastasis is present in 60-70% of patients at the time of diagnosis^o.
  - Orbital metastasis commonly present with peri-orbital ecchymoses and proptosis called as Racoon eyes^o.
  - Infants with stage 4S may display cutaneous metastasis called as blueberry muffin lesions^o.
  - Chronic watery diarrhea^o (due to secretion of VIP) and opsoclonus-myoclonus^o (Dancing eyes, dancing feet^o) are unusual paraneoplastic manifestations.
- MC site of metastasis in older children are bones^o (Long bones–MC, facial bones, skull particularly sphenoid), bone marrow and LN.
- In infants metastasis is confined to liver or subcutaneous tissue^o.
- Lung metastasis are rare^o in neuroblastoma.
Surgical removal with good preparation

1. IV fluids to correct hypovolemia

2. Phenylephrine for 4 weeks before surgery to control HTN

3. PPI for 7 days before surgery to correct dacycaceuria & arrhythmia

4. IV fluids before surgery to correct hypovolemia

5. Lap. adrenalectomy is gold standard

6. CVP monitoring

- LIGATE keep Nitroprusside ready
- Ligate adrenal vein first
- Search another side too
- Gentle handling

Post-op hypovolemia - can be corrected by large volume plasma expanders, BT, colloids, vaso pressors.
**CLF** = Classical Headache + Diplopesis + palpitation

**CVS** - NV - HTN - Pachyceadia - SV-f - Volume depletion

\( \Delta x \) screening = Urinary uMA + Catecholamines

Best for \( \Delta x \) = Fractionated plasma metanephrines

- MRS = IOC for Adrenal extra adrenal pregnancy

CT should be c/o contrast

- MIBG for extra adrenal but IOC is MRS

- Box Contraindicated.
For malignant - Suspected when mets

Open Adrenalectomy

MDH

Cyclophosphamide + vincristine + Decarborazine
Breast

Fibroadenosis  Adenoma  Abscess  Ca

Fibroadenosis = Fibrocystic dys.
  Cyclic mastalgia & nodulosity

AND

Mock

Lumpiness & mastalgia
Exaggerated
cyclic change
Fibroadenosis

C/I
Women age 40 years
  Decreased childlessness
  Cyclic mastalgia - upper outer quadrant
  Nipple discharge - serous or green may+

Exam. = Coarse nodule tender lump multiple irregular
Medical

1. Evening primrose oil
   \[ \text{MOA} = \text{EFA} \rightarrow \text{Correct Abnormal PG Synthesis} \]
   - First choice
   - NO S/E but costly.

2. Danazol
   \[ \text{MOA} = \text{Interferes CFSH/LH} \]
   - Amenorrhea, wt. gain

3. Bromocriptine
   \[ \text{MOA} = \text{Inhibit release} \]

4. Tamoxifen
   \[ \text{MOA} = \text{Antiestrogen} \]

5. Goserelin
   \[ \text{LH releasing hormone analogue} \]

Surgical

- FNAC suggest epithellosis
  - Painful lump
  - Hard lump
  - Pt. Anxious

- Mx
  - As no capsule
  - It's a messy s.
**Fibroadenoma**

**Causes:**
- Small adenomas (<1 cm) are normal
- Larger (1-3 cm) are disorders
- Giant (>3 cm) are disease

**ORC:**
- Fibrocystic benign tumour of female breast
  - Age: 15-30
  - Breast mass: smooth, round borders, firm to hard, freely mobile

**Etiology:**
- Increased sensitivity to estrogen

**Pathology:**
- Encapsulated
- Composed of fibrous & glandular

**Types:**
- Pericanalicular
  - Hard
- Intracanalicular
  - Soft

**Bcification of connective tissue inside the lining**
- Outside coming