1. Title

Medicine I: Part II

Laboratory Tests
and
Signs and Symptoms (S/S) of Diseases

Kanchan Ganda M.D.

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2. Significant Lab Tests in Dentistry

Significant Lab Tests in Dentistry

Hematological Tests:
- CBC: Complete Blood Count with Platelets & WBC differential
- ESR: Erythrocyte Sedimentation Rate
- P.T.T.: Partial Thromboplastin Time

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3. Significant Lab Tests in Dentistry

**Significant Lab Tests in Dentistry**

- **Renal Tests:**
  - Serum Creatinine (S. Cr.)
  - Blood Urea Nitrogen (BUN)

- **Diabetes Tests:**
  - FBS: Fasting Blood Sugar
  - PPBS: Post Prandial / Post Meal Blood Sugar
  - HbA1c: Hemoglobin A1c

- **Hepatic Serology & Liver Function Tests: (LFTs)**

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4. Significant Lab Tests in Dentistry

**Significant Lab Tests in Dentistry**

- **Bone Assessment Tests:**
  - Serum Calcium
  - Serum Phosphorus
  - Alkaline Phosphates

- **HIV/AIDS Status Assessment:**
  - CD4 Count
  - Viral Load
  - CBC w / Plts. & WBC Diff.
  - L.F.T.s
  - PT/INR

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Role of Laboratory Data Analysis

- Laboratory tests are done AFTER completion of thorough History Taking & Physical Examination
- They are TOOLS to determine the presence or absence of a diagnosis
- They are used to follow the course of a disease process

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6. CBC

CBC

<table>
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<tr>
<th>WBC</th>
<th>RBC</th>
<th>HGB</th>
<th>HCT</th>
<th>MCY</th>
<th>MCH</th>
<th>MCHC</th>
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<td>4.73</td>
<td>13.8</td>
<td>41</td>
<td>86</td>
<td>29</td>
<td>34</td>
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<td>4.5–11.0</td>
<td>3.60–5.30</td>
<td>11.5–16.0</td>
<td>37–47%</td>
<td>80–100 IL</td>
<td>27–34 Pg</td>
<td>31–36 g/dL</td>
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</tbody>
</table>

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7. CBC

CBC

<table>
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<tr>
<th>RDW</th>
<th>MPV</th>
<th>PLAT</th>
<th>NEUT</th>
<th>LYMP</th>
<th>MONO</th>
<th>EOS</th>
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<tbody>
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<td>10.2</td>
<td>158</td>
<td>60</td>
<td>29</td>
<td>7</td>
<td>4</td>
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<td>11.5-14.5 %</td>
<td>6.6-11.0 IL</td>
<td>140-400 thou/mL</td>
<td>50-75%</td>
<td>20-40%</td>
<td>0-8%</td>
<td>0.5-5%</td>
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</tbody>
</table>

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8. Complete Blood Count (CBC)

Complete Blood Count (CBC)

- WBC: White Blood Cells: 4,000 - 10,000 / mm$^3$
- RBC: Red Blood Cells: 4.2 - 5.9 million / mm$^3$
- Hb.: Hemoglobin: Males: 14 - 18 g / dL
  Females: 12 - 16 g / dL
- Hematocrit: Males: 40 - 54%
  Females: 37 - 47%
- MCV: Mean Corpuscular Volume: 86 - 98 μm$^3$ / cell
- MCH: Mean Corpuscular Hemoglobin: 27 - 32 μg / RBC
- RDW: Red Cell Distribution Width – 11.5-14.5
- Platelet Count: 150,000 - 400,000 / mm$^3$
- WBC Differential:
  Neutrophils: 40-75%
  Lymphocytes: 15-45%
  Monocytes: 1-10%
  Eosinophils: 1-8%
  Basophils: 0-2%

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9. RBC Analysis and Anemias

RBC Analysis and Anemias

- RBC count can be normal or decreased with anemia
- **Decreased RBC count can be due to:** Under production OR Over destruction
- Hematoct (Hct) measures the percentage of formed elements in the blood: RBCs, WBCs, Platelets
- Hb, Hct, MCV & MCH are collectively evaluated to detect the type of anemia

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10. RBC Analysis and Anemias

RBC Analysis and Anemias

RDW (11.5-14.5):
- Measures the degree of variability in the RBC size in the Peripheral Smear
- Immature RBCs are larger in diameter compared to the mature RBCs
- Presence of a small percentage of immature RBCs is “normal”
- Increased RDW: Indicates an “Active Bone Marrow”
- Decreased RDW: Indicates an “inactive Bone Marrow”

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11. Analysis of RBC and RDW Patterns

**Analysis of RBC and RDW Patterns**

*Decreased RBC count with an increased RDW:*
  - Active bone marrow
  - This pattern is frequently seen with many anemias

*Decreased RBC count with a decreased RDW:*
  - Depressed bone marrow
  - Often associated with Pancytopenia

**PANCYTOPENIA:**
  - Decreased WBCs, RBCs & Platelets

*Tissue hypoxia, infection & bleeding is of concern with PANCYTOPENIA*

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12. Anemia Classification by MCV / MCH Pattern

**Anemia Classification by MCV / MCH Pattern**

**Microcytic, Hypochromic:**
  - Decreased Hb
  - Decreased Hct.
  - Decreased MCV
  - Decreased MCH

**Causes:**
  - Iron Deficiency Anemia
  - Thalassemia

**Macrocytic / Megaloblastic:**
  - Decreased Hb
  - Decreased Hct
  - Increased MCV
  - Increased MCH

**Causes:**
  - Pernicious anemia
  - Vit. B$_{12}$ deficiency
  - Folic acid deficiency

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13. Anemia Classification: MCV / MCH Pattern

Anemia Classification: MCV / MCH Pattern

**Normochromic, Normocytic Anemia:**
- Hemoglobin: Decreased
- Hematocrit: Decreased
- MCV: Normal
- MCH: Normal

**Causes:**
- Acute hemolysis
- Aplastic anemia
- Chronic diseases: SLE; Rheumatoid Arthritis (RA)

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14. Anemia: Classification by Types

Anemia: Classification by Types

**Congenital / Hemolytic:**
- Sickle cell anemia
- Thalassemia: Major / Minor
- Hereditary Spherocytosis
- G6PD Deficiency Anemia

**Nutritional Anemias:**
- Iron deficiency
- B12 or Folic acid deficiency
- Mal absorption associated anemias

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15. Anemia: Classification by Type

Anemia: Classification by Type

Acquired Anemias due to chronic use of:
- Aspirin
- NSAIDs
- Corticosteroids

Anemia Associated with Chronic Renal Disease:
- Due to decreased Erythropoietin production

Anemia Associated with Bone Marrow Infiltration:
- Often associated with Pancytopenia

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16. Iron Deficiency / Microcytic Anemia

Iron Deficiency / Microcytic Anemia

- The most common type of Nutritional anemia
- Affects all ages
- Often associated with chronic blood loss due to:
  - Heavy menstruation (Menorrhagia)
  - Frequent menstruation (Metrorrhagia)
  - Chronic gastrointestinal (G.I.) bleeds
  - Intestinal parasites
- PICA:
  - Abnormal craving to chew on ice / chalk / crayon

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17. Iron Deficiency / Microcytic Anemia

Iron Deficiency / Microcytic Anemia

- Check for chronic use of Aspirin, NSAIDs or Corticosteroids
- Check for H/O of black tarry stools / fresh blood in the stools
- Guaiac test is positive when there is blood in the stools
- The Guaiac test detects microscopic G.I. tract bleeding

Oral findings:
- Recurrent Aphthous Ulcerations
- Angular Cheilitis
- Oral Candidiasis

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18. Macrocytic Anemia

Macrocytic Anemia

- B₁₂ deficiency is confirmed by the Shilling’s test
- B₁₂ deficiency / Pernicious anemia is common in Women 50 years & older
- Folic acid deficiency affects ALL ages
- Macrocytic cells seen on CBC with both
- S/S are the same for BOTH the deficiencies

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19. Folic Acid Deficiency

Folic Acid Deficiency

Folic acid deficiency can be caused by:

- Alcoholism: Most common cause
- Phenytoin Sodium (anti-seizure med.)
- Anti-Metabolites (Cancer drugs)
- HIV / AIDS drugs

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20. Macrocytic Anemias

Macrocytic Anemias

Symptoms:

- Burning tongue: Often the first symptom
- Dysphagia (difficulty swallowing)
- Odynophagia (painful swallowing)
- Circum oral tingling numbness: Early symptom
- Tingling numbness in the hands & feet: Early symptom

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21. Macrocytic Anemias

Macrocytic Anemias

Signs:
• Microglossia: Late in the disease
• Depapillation of the tongue: Late in the disease
• Beefy Red tongue: Late in the disease

Treatment:
• Replace B₁₂ with monthly IM injections
• Replace Folic acid with daily PO intake

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22. Hemolytic Anemias

Hemolytic Anemias

• Populations most affected are:
  – Blacks, Middle Eastern and Mediterranean
• Strong family history
• Anemia appears early in life
• Past History of "Acute crisis" is very common

*Acute Crisis* is often associated with:
  – Fever and Malaise
  – Pain in the long bones
  – Worsening of the anemia
  – Hospitalization

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23. Hemolytic Anemias

Hemolytic Anemias

Additionally, in "Acute crisis" the patient experiences:

- Pain in the left upper abdominal quadrant (LUQ)
- Pain is caused by an enlarged Spleen
- Thus, increased sequestration of RBCs occur
- Splenectomy history is very common in the 20s

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24. Chairside Staging of Anemia

Chair-side Staging of Anemia

Staging depends on the Percentage drop of Hb.:

- Normal: Females: 12-15 g / dL
  Males: 14-18 g / dL
- Mild anemia: Hb. decreased by 25% from normal
- Moderate anemia: Hb. decreased by 25-50% from normal
- Severe anemia: Hb. drops by more than 50% from normal

Differ routine dental treatment in severe anemia

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25. Mild Anemia: General Symptoms

Mild Anemia: General Symptoms

These symptoms occur on EXERTION ONLY:
• Tiredness
• Weakness
• Fatigue
• Palpitations
• Decreased stamina

• The patient also experiences anorexia

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26. Moderate and Severe Anemia: Symptoms

Moderate and Severe Anemia: Symptoms

Moderate Anemia:
• Mild anemia symptoms worsen & now occur at rest too

Severe Anemia:
• Further worsening of anemia symptoms at rest
• Occurrence of Orthopnea
• Orthopnea is an inability to lay flat in bed
• Palpitations
• CHF (Congestive Heart Failure) symptoms & signs

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27. Congestive Heart Failure (CHF)

Congestive Heart Failure (CHF)

CHF Symptoms & Signs:
- Palpitations
- Orthopnea
- Cough with frothy sputum
- Distended Neck Veins: Jugulars are engorged
- Functional Systolic murmur
- Rales in the base of BOTH lungs
- Ankle edema

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28. Signs Associated with the Anemias

Signs Associated with the Anemias

General Signs of Anemia:
- Pallor of Conjunctiva
- Pallor of the Oral Mucosa
- Pallor of the Nail beds
- Chronic Iron Deficiency Anemia causes:
  Kolonychia / Spooning of the nails
- White Palmer creases occur when the hemoglobin is:
  Below 50% of normal

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29. Mechanism of Clot Formation

Mechanism of Clot Formation

Vessel Wall Injury $\xrightarrow{\text{Platelet aggregation}}$ Vessel Wall Contraction $\xrightarrow{\text{Platelet Adhesion}}$

Fibrin formation $\xrightarrow{\text{Plugging of injured vessel wall}}$

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30. Elements of Hemostasis

Elements of Hemostasis

Primary Hemostasis:
- Adequate Vascular Response
- Adequate Platelet Numbers
- Adequate levels of Von Willebrand’s Factor (VWF)
- Aspirin and NSAIDs affect Primary Hemostasis

Secondary Hemostasis:
- Adequate levels of Clotting Factors
- Heparin and Coumadin affect Secondary Hemostasis

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31. Elements of Hemostasis

Elements of Hemostasis

Blood Vessels:
- Constrict on injury, release Tissue Factor & attract Platelets

Platelets:
- Normal Platelet Count: 150,000-400,000 / mm³
- Bleeding Time (B.T.) measures the Platelet function
- B.T. is prolonged with Thrombocytopenia & Plt. Dysfunction

Von Willebrand’s / VWF:
- Enhances Platelet cohesiveness
- Factor VIII-VW helps transport Factor VIIIc of Clotting Cascade

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32. The Clotting Pathway

The Clotting Pathway

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33. Elements of Hemostasis

Elements of Hemostasis

Clotting Factors:
- Clotting Factors interact to form the Fibrin Clot
- Factor VIII is produced in the Endothelial cells of the blood vessels
- All other Clotting Factors are manufactured in the liver

Tests that measure the function of the Clotting Factors are:
- PT / INR: Extrinsic Pathway
- PTT: Intrinsic Pathway

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34. Von Willebrand's Disease

Von Willebrand's Disease

- Familial condition affecting Males & Females
- Immediate Type of bleeding S/S occur more commonly
- Delayed Type of bleeding S/S are experienced less often S/S occur only when the Factor VIIIc levels drop below 50% of normal
- The B. T. is always prolonged
- PTT may be prolonged

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35. Clotting Factor Tests

Clotting Factor Tests

Prothrombin Time (PT):
- Measures the Extrinsic Pathway
- Normal range is 10-12 seconds
- Affected by Coumadin intake

International Normalized Ratio (INR) test:
- INR is the universally standardized test currently used
- It is used to monitor Coumadin levels

36. International Normalized Ratio (INR)

International Normalized Ratio (INR)

\[ \text{INR} = \frac{\text{Patients PT}}{\text{Control PT}} \times \text{ISI}^* \]

- The normal INR range is 0.9-1.2
- The INR is monitored during Coumadin therapy
- The INR is repeated every 4-6 weeks

*ISI: International Sensitivity Index of Thromboplastin

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37. Clotting Factor Tests

Clotting Factor Tests

Partial Thromboplastin Time (PTT):
- Measures the Intrinsic Pathway
- Normal range of PTT is 25 - 38 seconds
- Usually monitored when I.V. Heparin is used

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38. Clotting Factors and Platelet Levels in Cirrhosis

Clotting Factors and Platelet levels in Cirrhosis

- Platelet sequestration by an enlarged spleen can occur with Cirrhosis
- Cirrhosis is not always associated with a prolonged PT / INR
- CF* reserves have to be less than 50% normal to ↑ the PT / INR
- Always check for immediate & delayed type of bleeding history
- In Cirrhosis always check Plt. count & PT/INR prior to probing
  *(CF: Clotting Factor)

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39. Bleeding in Relation to Surgery and S/S

Bleeding in Relation to Surgery and S/S

Immediate Type of Bleeding:
- Oozing that continues for more than 24 h Post Op.
- So ask the patient about the duration of Post Op. bleeding
- Positive H/O mucus membrane bleeding, superficial Nickel/Dime size bruises & Petechiae
- Tests: Platelet Count; Bleeding Time (BT)

Delayed Type of Bleeding:
- Deep tissue bleeding that occurs 4-10 days Post Op.
- So ask the patient about any start of bleeding 4-10 days Post Op.
- Positive H/O deep lemon/orange size hematomas &/or hemarthrosis
- Tests: PT/INR; PTT

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40. Causes of Deep Tissue Bleeding

Causes of Deep Tissue Bleeding

Clotting factor deficiencies can be due to:
- Hemophilia A*
- Hemophilia B**
- Chronic Liver disease: Cirrhosis
- Chronic Small Bowel disease due to mal-absorption of Vit. K
- Anti Coagulants:
  - Heparin
  - Coumadin

* Deficiency of Factor VIII: Only Males are affected
** Deficiency of Factor IX: Only Males are affected

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41. Immediate Type of Bleeding: Steroids

**Immediate Type of Bleeding: Steroids**

- Chronic Corticosteroid use can cause Immediate Type of Bleeding
- Chronic use thins the connective tissue lining of the small arterioles
- The small arterioles become fragile
- The Platelet Count & Bleeding Time (BT) are NORMAL

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42. Cardiopulmonary Diseases

**Cardiopulmonary Diseases**

**CARDIAC:**
- Rheumatic Fever (RF)
- Rheumatic Heart Disease (RHD)
- Hypertension: Htn.
  - Primary
  - Secondary

**PULMONARY:**
- Sinusitis
- Asthma
- Chronic Obstructive Pulmonary Disease: COPD
- Mycobacterium Tuberculosis: MTB

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43. Erythrocyte Sedimentation Rate (ESR)

**Erythrocyte Sedimentation Rate (ESR)**

- ESR: Males: 0-15mm/hr
  - Females: 0-20mm/hr

- ESR is a nonspecific test
- It measures the level of Globulin and Fibrinogen

Serial ESRs are used to follow the course of:
- Infections
- Chronic inflammatory disease states
- Connective tissue disorders
- ESR is also used as a screening tool for Malignancy

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44. Strep Throat

**Strep Throat**

- Normal Oral Flora contains:
  - *Strep viridans* / *α*-Hemolytic Streptococcus

- Strep Throat: Caused by *β*-hemolytic streptococcus
- *β*-hemolytic streptococcus is an invading bacteria
- Throat culture is always positive

- Strep Throat is associated with:
  - Fever, Sore Throat, Myalgia (muscle aches),
  - Dysphagia (difficulty swallowing)
- **NO WATERY EYES & RUNNY NOSE SYMPTOMS**
- Rx: Antibiotics

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45. Rheumatic Fever (RF)

Rheumatic Fever (RF)

RF is an acute inflammatory response to a PAST

- Group A, β hemolytic streptococcal infection

- RF occurs 3-4 weeks after an untreated / partially treated β - hemolytic streptococcal infection

- An antigen-antibody response triggers tissue damage in specific areas of the body

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46. Rheumatic Fever (RF)

Rheumatic Fever (RF)

- β-Hemolytic strep is associated with 2 Types of Antigens:
  - Streptolysin O : Strongly antigenic
  - Streptolysin S : Weekly antigenic

- Streptolysin O triggers an Antigen-Antibody reaction

- A positive Anti Streptolysin O Titer (ASLO) occurs

- Thus a positive ASLO titer confirms that a β - hemolytic strep infection has occurred in the recent past

- Throat culture is always negative with RF

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47. RF: Jones Criteria

**RF: Jones Criteria**

- RF affects specific areas / tissues in the body
- Major & Minor Jones Criteria specify the areas involved
- The Criteria were recognized & described by Dr. Jones

**Major Jones Criteria:**
- Arthritis
- Carditis
- Rheumatic Chorea
- Erythema Marginatum
- Erythema Nodosum

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48. RF: Minor Jones Criteria and Diagnosis

**RF: Minor Jones Criteria and Diagnosis**

**Minor Jones Criteria:**
- Fever
- Pain in the Right Upper Abdominal Quadrant (RUQ)
- Elevated Erythrocyte Sedimentation Rate (ESR)
- Increased C - reactive protein
- Elevated ASLO titer
- EKG changes

A Diagnosis of RF is made when the Patient has:
- Two Major Criteria OR One Major and Two Minor Criteria

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49. Rheumatic Arthritis

Rheumatic Arthritis

- Rheumatic arthritis is seen most commonly in children
- Rare in adults
- Major joints are affected bilaterally
- Joints are swollen, painful & filled with aseptic fluid
- It is thus an aseptic arthritis
- Resolution of joint swelling occurs in a few weeks
- No residual joint deformity persists following recovery
- In the acute phase as one set of joints recovers another gets involved
- The Rheumatic arthritis is referred as a Fleeting type of Arthritis

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50. Rheumatic Heart Disease (RHD): Carditis

Rheumatic Heart Disease (RHD): Carditis

- All 3 layers of the Heart can be affected by RHD:
  - Endocardium
  - Myocardium
  - Pericardium
- The Endocardium is most frequently involved
- Fibrosis of the affected Valves can cause:
  - Stenosis or Narrowing
    and / or
  - Incompetence or Widening
- Regurgitation/Reverse flow occurs with Incompetent Valves

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51. Rheumatic Heart Disease (RHD): Carditis

Rheumatic Heart Disease (RHD): Carditis

- Valve lesions more common in Children are:
  - Mitral Stenosis (MS)
  - Mitral Incompetence (MI)
- Valve lesions more common in Adults are:
  - Aortic Stenosis (AS)
  - Aortic Incompetence (AI)
- Mitral valves are most commonly affected by RHD
- Pulmonic valves are least commonly affected by RHD
- Premedication prior to invasive Dentistry is required

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52. RHD: Carditis

RHD: Carditis

- Involvement of the Myocardium is rare
- H/O Cardiomyopathy requires Premedication
- Pericardial involvement is common in Children
- Pericardial effusion with aseptic fluid occurs
- Always Premedicate with a Past H/O Pericarditis
- RF with RHD: Premedication for all invasive procedures
- RF without RHD: No Premedication required

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53. Rheumatic Chorea

**Rheumatic Chorea**

- Occurs exclusively in Children
- Involuntary, jerky movements occur
- Emotional distress worsens the movements
- Movements are absent during sleep
- Females are affected more than Males
- Rheumatic Chorea improves with age
- Stress management during Dentistry is extremely helpful

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54. Erythema Marginatum

**Erythema Marginatum**

- The rash is a RARE finding
- 10% of patients only give a positive history of the rash
- Light skinned patients only demonstrate the rash
- Presence of the rash is DIAGNOSTIC of RF
- It is a Doughnut shaped, Serpeneous (snake-like) rash
- The rash has a pale center and dark margins
- The rash starts on the lower trunk & migrates upwards
- The lower rash disappears as the upper rash begins

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55. Erythema Nodosum

Erythema Nodosum

- Also called Subcutaneous Nodules
- Pea-sized, RECURRING Painless nodules
- Occur at the Elbows and Shins

- Can also be seen with:
  - Tuberculosis
  - Sarcoidosis

- Thus E. Nodosum is not specific for Rheumatic Fever

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56. Minor Jones Criteria

Minor Jones Criteria

- Fever: Moderately high
- Pain in RUQ: Liver engorgement due to CHF
- Elevated Erythrocyte Sedimentation Rate (ESR): Inflammation
- Increased C-reactive protein:
  - Marker for a recent past β hemolytic streptococcal infection
- Elevated ASLO titer
- EKG changes: Myocardial changes affecting Cardiac conduction

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57. RF: Interrogation

RF: Interrogation

Was there a childhood illness with the following S/S?
• High fever
• Joint swellings or pain
• Skin rashes
• Chest pains
• Heart murmurs that started with the acute illness
• Did the patient get hospitalized for the illness?

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58. RF: Interrogation and Rx Facts

RF: Interrogation and Rx Facts

• Was the patient given any Preventive Therapy for 5 years on recovery after the first attack of RF?

PREVENTIVE THERAPY:
• 1.2 million units of Benzathine Penicillin I.M, monthly
  or
• Azithromycin, 250 mg per day

• This therapy prevents future attacks with β-Hemolytic Strep.
• Research shows that a 5 year protection is sufficient

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RF: Interrogation and Rx Facts

- For Premeditation during Preventive therapy, always select an antibiotic from ANOTHER FAMILY

- With Benzathine Penicillin I.M., use:
  Macrolides, P.O. OR Clindamycin, P.O.
- These antibiotics can be combined as the routes are different

- With Azithromycin use: Clindamycin, P.O. ONLY

- The Preventive Therapy is not stopped during Dentistry

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Bacterial Endocarditis: Pathology

Bacterial Endocarditis: Pathology

Endothelial trauma can occur with:
- Valvular Regurgitation
- Valvular Stenosis
- High pressure gradients due to ASD or VSD

- Deposition of Platelets & fibrin occur at the trauma site
- A sterile, ASEPTIC vegetation is formed
- This vegetation is extremely FRIABLE

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61. Bacterial Endocarditis: Pathology

Bacterial Endocarditis: Pathology

- Invasive treatment causes bacteremia
- The aseptic vegetation thus becomes SEPTIC
- The friable septic thrombus can dislodge into the circulation causing Bacterial Endocarditis

Bacterial Endocarditis can manifest as:
- Acute Bacterial Endocarditis (ABE)
  - or
- Subacute Bacterial Endocarditis (SBE)
- SBE is more common than ABE

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62. Bacterial Endocarditis: Etiology

Bacterial Endocarditis: Etiology

Etiology of ABE:
- Staphylococcus
- Viral
- Fungal

Etiology of SBE:
- \( \alpha \) - hemolytic streptococcus

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63. Acute Bacterial Endocarditis

**Acute Bacterial Endocarditis**

- ABE is rare - is more aggressive than SBE & can be fatal
- Common in: Elderly patients & I.V. drug users
- S/S develop within 7 days
- S/S experienced are:
  - Acute malaise and spiking temperatures
  - Joint pains
  - Cardiac arrhythmia
  - Hematuria (blood in the urine)
  - Splinter hemorrhages in the finger nails
  - Profound Hypotension

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64. Subacute Bacterial Endocarditis

**Subacute Bacterial Endocarditis**

- SBE is more common and less debilitating than ABE
- SBE has no specific age / population prevalence, unlike ABE
- S/S occur in 2-3 weeks, occasionally in 2-3 months

S/S:
- Gradual onset of flu like symptoms
- Joint pains
- "Salmon colored" urine due to hematuria
- Splinter hemorrhages in the finger nails

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65. Premedication / Prophylaxis: Rationale

Premedication / Prophylaxis: Rationale

- AHA recommended Prophylaxis is thus specifically directed against α - Hemolytic Streptococcus

- Schedule successive appointments at least 7 days apart when using the same antibiotic for Premedication

- This prevents the α - Hemolytic Streptococcus from becoming resistant to the antibiotic

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66. Premedication / Prophylaxis: Recommended

Premedication / Prophylaxis: Recommended

- RF with RHD
- Cardiomyopathy, with or without RF
- Systemic Shunts
  - Hemo dialysis shunt
  - Intra Cranial Hydrocephalic shunt
- Prosthetic Cardiac Valves:
  - Mechanical valves
  - Bio Prosthetic valves
- Past H/O Bacterial Endocarditis

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Premeditation / Prophylaxis: Recommended

Premedication / Prophylaxis: Recommended

- Most Congenital Cardiac Malformations
  Exception: Ostium Secundum ASD
- Acquired Valvular Dysfunction:
  Long standing DM / SLE / Hyperlipidemia causes valvular fibrosis
- Mitral Valve Prolapse (MVP) with Regurgitation:
  Confirmed by an ECHO Cardiogram
- Dacron graft, outside the heart:
  Premedication needed for life
- Intra Cardiac Dacron graft:
  Premedication needed for the first 6 months following repair ONLY

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Premeditation / Prophylaxis: Recommended

- Valvular damage caused by the diet drug Fenfluramine
  Recent studies have shown reversal of damage in some patients
  ALWAYS confirm reversal with patient’s MD
  No premedication required following confirmed recovery
- Infuse Port/ Hickman Catheter Line used for chemotherapy
- STENTS with Angioplasty:
  Occasionally recommended by some PCPs for the first month only
- Prosthetic Joints: Initial 2 years (a must) or beyond (if the patient is medically compromised)

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Joint Prosthesis

- Staph. Aureus most commonly infects joint Prosthesis
- Staph. Aureus is often resistant to Penicillin

Antibiotics that can be used for Joint Prosthesis prophylaxis are:
- Cephalexin
- Cephadroxyl
- Clindamycin
- Azithromycin
- Clarithromycin

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Prophylaxis Not Recommended

Prophylaxis *Not* Recommended

- Ostium Secundum ASD
- 6 months after surgical correction of ASD/ VSD/ PDA defect
- Coronary artery bypass surgery
- MVP without regurgitation
- Functional heart murmur caused by:
  - Severe anemia
  - Multiple pregnancies
  - Hyperthyroidism
- RF without valvular dysfunction
- Cardiac Pacemakers or Defibrillators

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AHA Premedication Regimens

Standard Regimen:
- Amoxicillin: 2.0 g P.O (oral) 1 h before procedure

Non Penicillin allergic patients unable to take Oral medication:
- Ampicillin: 2.0 g I.M. or I.V. 30 min. before procedure

For Penicillin - Allergic Patients use any one of the following Antibiotics:
- Clindamycin: 600 mg P.O. 1 h before procedure
- Cephalexin: 2.0 g P.O. 1 h before procedure
- Cefadroxil: 2.0 g P.O. 1 h before procedure
- Azithromycin: 500 mg P.O. 1 h before procedure
- Clarithromycin: 500 mg P.O. 1 h before procedure

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AHA Premedication Regimens

For Penicillin allergic patients unable to take Oral Medication use:

- Clindamycin, 600 mg IV 30 min. before procedure

or

- Cefazolin, 1.0 g IV or IM 30 min. before procedure

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73. **Adult Blood Pressure Classification**

## Adult Blood Pressure Classification

<table>
<thead>
<tr>
<th>Category</th>
<th>SBP: mmHg</th>
<th>DBP: mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>&lt;80</td>
</tr>
<tr>
<td>Pre Htn</td>
<td>120-139</td>
<td>80-89</td>
</tr>
<tr>
<td>Hypertension:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage I</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>Stage II</td>
<td>≥ 160</td>
<td>≥ 100</td>
</tr>
<tr>
<td>Defers Rx</td>
<td>≥ 180</td>
<td>≥ 110</td>
</tr>
</tbody>
</table>

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74. **Hypertension: Types**

## Hypertension: Types

**Primary:**
- More common
- Gradual in onset
- Age: Affects after 40
- S/S occur years after onset of Htn.
- Strong Family History (FH)
- Cause: Premature Artherosclerosis
- Htn. Is life long

**Secondary:**
- Less common
- Dramatic in onset
- Age: 1st-2nd Decade / 5th-6th Decade
- S/S occur at the start of the Htn.
- F.H. May/may not be present
- Causes: Endocrine tumors
  - Arterial Stenosis
  - Chronic Contraceptives
  - Chronic Steroids
- Surgical Rx or Drug withdrawal:
  - Htn. May or may not resolve

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75. Hypertension and the Circulations

**Hypertension and the Circulations**

Htn can affect: Cerebral, Coronary, Renal or Peripheral Circulations

Involvement of the Cerebral Circulation can cause:
- Transient Ischemic Attacks (T.I.A.s)
- Cerebro Vascular Accidents (C.V.A.s)

Involvement of the Coronary Circulation can cause:
- Classic Angina: Stable or Unstable
- Myocardial Infarction (MI)

Involvement of the Renal Circulation can cause:
- Chronic Renal Failure (C.R.F.) / End Stage Renal Disease (E.S.R.D.)

Involvement of the Peripheral Circulation can cause:
- Intermittent Claudication

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76. Transient Ischemic Attacks (T.I.A.)

**Transient Ischemic Attacks (T.I.A.)**

*Clinical Features:*
- The S/S last for seconds to minutes
- The S/S often recur over a 24 hour period
- The S/S completely resolve within 24 hours
- The patient does NOT experience loss of consciousness

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77. Transient Ischemic Attacks (T.I.A.s)

Transient Ischemic Attacks (T.I.A.s)

The Sensory & / or Motor deficits S/S experienced are:
- Headaches and Disorientation
- Parasthesias: Tingling, numbness and / or weakness in the muscles
- Blurring of vision or Temporary loss of vision
- Slurring of speech or Temporary loss of speech

Vital Signs:
- The Pulse is Rapid and Bounding
- The Blood Pressure is always ELEVATED

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78. Cerebrovascular Accident /C.V.A./ Stroke

Cerebrovascular Accident /C.V.A./ Stroke

Thrombus, Embolus or ruptured Cerebral Aneurysm results in a CVA

Clinical Features due to a Thrombus or an Embolus:
- Are Gradual in onset
- Loss of consciousness is rare
- Headaches, Dizziness & Progressive Neurological deficits occur
- The patient also experiences Nausea and Vomiting

Vital Signs:
- The Pulse is Rapid and Bounding
- The Blood Pressure is ELEVATED

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Cerebrovascular Accident (C.V.A.)

Ruptured Aneurysm / Intracranial Hemorrhage Stroke is:
- Dramatic in onset
- Loss of consciousness is common
- Vital Signs:
  - The Pulse is Slow but occasionally can be Normal
  - The Respiration is Slow and Shallow
  - The BP is elevated
  - The BP can DROP with a massive bleed

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Coronary Circulation: Classic Angina

Coronary Circulation: Classic Angina

- Classic Angina is due to Premature Artherosclerosis
- Classic Angina is precipitated by activity
- Activity increases the Myocardial oxygen demand
- Classic Angina can be classified as:
  - Stable
  - Unstable

Stable angina:
- Always brought on by increased activity
- Attacks are infrequent
- Treated with 1-2 Nitroglycerine, S.L. (sublingual)

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81. Coronary Circulation: Classic Angina

Coronary Circulation: Classic Angina

Unstable Angina:
- Requires minimal or no activity for the Angina to occur
- More frequent attacks occur compared to before
- There is greater need for more NTG now than before
- Unstable Angina convert to a Myocardial Infarction (MI)
- S/S of Unstable Angina are the SAME as Stable Angina
- Vital Signs for Stable & Unstable Angina are the same

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82. Classic Angina Pectoris

Classic Angina Pectoris

- Chest discomfort lasts for 2-5 minutes, max 10-15 minutes
- The Clinical Features experienced are:
  - The patient is motionless
  - Hunched over and with a closed fist across the chest
  - Anxiety, particularly if it is the first attack of Angina
  - Sweating
  - Chest tightness
- Vital Signs:
  - Pulse rapid and bounding
  - The BP is ELEVATED
  - There is some dyspnea if this is the first attack of Angina

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83. Classic Angina Pectoris

Classic Angina Pectoris

Patients with Moderate to Severe Angina may give a H/O:

- Using Isordil / Isosorbide, a long acting Nitrate
- Using a Nitro Patch
- These patients at some future time can have an MI

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84. Myocardial Infarction

Myocardial Infarction

“Crushing” pain that lasts more than 15 minutes to hours

- Clinical Features:
  - Acute distress
  - Pallor
  - Perspiration and cold moist skin
  - Nausea, Vomiting, and Abdominal bloating

- Vital Signs:
  - Rapid Thready Pulse; can frequently be irregular
  - DECREASED or DROPPING Blood Pressure
  - Respiration is shallow and the patient experiences dyspnea

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85. Chronic Renal Failure (CRF)

Chronic Renal Failure (CRF)

- Initial H/O increased urine output: 1-3 L/day
- Associated H/O Nocturia (night urination)
- The urine output declines with progression of CRF

- Renal damage is judged by elevated serum Creatinine
- Normal serum Creatinine value is 0.4 - 1.2 mg/dL

- The renal status is considered compromised once the serum Creatinine value is above 1.2 mg/dL

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86. Chronic Renal Failure (CRF)

Chronic Renal Failure (CRF)

- CRF is often associated with a progressive rise in the DBP
- Chronic renal failure is often associated with facial edema
- It is a "pitting" type of edema

To purify the blood, CRF / ESRD* patients may undergo:
- Peritoneal Dialysis
  or
- Hemodialysis

*ESRD: End Stage Renal Disease

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87. Kidney Disease

Kidney Disease

Hemodialysis patients get premedicated for Dentistry.

Hemodialysis:
- Is done 3 times / week
- Duration of dialysis: 4 hours / turn
- Heparin is injected for the first 3 hours
- Treat patients on the "off" days of Dialysis
- If treatment is needed on day of dialysis, treat 6-8 hrs. after dialysis

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88. Peripheral Circulation

Peripheral Circulation

Intermittent Claudication:
- Due to narrowing of the medium sized arteries of the legs
- Patient experiences severe pain in the calves or the legs on walking uphill or on an even surface
- The Patient has to suddenly stop the activity
- Rest relieves the discomfort

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89. Sinusitis

Sinusitis

Sinusitis can involve:
- The Frontal, the Ethmoid or the Maxillary sinuses

S/S associated with Viral infection or Allergy sinusitis are:
- Fever, Headaches
- Postnasal drip, nasal discharge and nasal congestion
- Watery itchy eyes, itchy nose and itchy throat
- Sneezing
- Bacterial Sinusitis is not associated with a runny, itching nose or watery eyes

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90. Sinusitis

Sinusitis

- Sinus infections cause headaches & facial pain
- The pain is more pronounced on leaning forward as the patient flexes the head towards the chest
- Application of mild pressure over the affected sinuses will elicit pain / tenderness
- Bacterial sinusitis is treated with antibiotics

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Asthma

Asthma is a state of ACUTE Bronchial constriction causing Wheezing

Asthma is characterized by:

- **Wheezing:**
  - Wheezing occurs in *Expiration* at the start of the attack
  - Wheezing occurs in *Inspiration* also in a prolonged attack
- **Dyspnea and Shortness Of Breath (SOB)**
- **Coughing**
- The patient is not symptomatic between attacks
- There are 2 types of Asthma:
  1. Extrinsic asthma
  2. Intrinsic asthma

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Extrinsic / Childhood / Allergy Associated Asthma

Extrinsic / Childhood / Allergy Associated Asthma

- Most common in Children
- Improves with age, often disappearing in adulthood
- If it persists (in about 1% of patients), it’s often mild
- An occasional patient may develop COPD, but it is rare

Precipitating Factors:
- Stress
- Allergens like dust, animal fur
- Drugs like Aspirin, NSAIDs, Penicillin

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93. Intrinsic Asthma / Adulthood Asthma

Intrinsic Asthma / Adulthood Asthma

- Occurs around the age of 35 - 40
- Begins as a lung infection
- The infection triggers progressive, irreversible, destructive changes in the lung parenchyma
- Progressive dyspnea and asthma attacks occur
- Asthma attacks worsen over time
- Asthma attacks become more prominent and severe
- Progression towards Chronic Obstructive Pulmonary Disease (COPD) is very common

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94. Chronic Obstructive Pulmonary Disease (COPD)

Chronic Obstructive Pulmonary Disease (COPD)

- COPD is a Progressive, Irreversible, Destructive disease state
- COPD is associated with persistent airway obstructions
- The Diseases present in a COPD patient are:
  - Chronic Bronchitis
  - Emphysema
    and / or
  - Intrinsic Asthma

Chronic Bronchitis definition:
- The patient with a H/O Chronic productive cough for:
  2-3 months of the year for 2 successive years

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95. Chronic Obstructive Pulmonary Disease (COPD)

Chronic Obstructive Pulmonary Disease (COPD)

**Emphysema:**
- It is an irreversible dilation of airspaces distal to the terminal bronchioles, i.e; the alveoli
- Associated with destruction of the alveoli
- Alveolar surface for air exchange is decreased
- The patient experiences dyspnea and hypoxia
- Cyanosis can occur
- Over time the chest becomes barrel-shaped

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96. Mycobacterium Tuberculosis (MTB)

Mycobacterium Tuberculosis (MTB)

- The My. Tuberculosum bacteria causes MTB
- It is an airborne infection

MTB affects areas of high $O_2$ tension:
- The Lungs:
  - The Hilum is most affected in Children
  - The Apex is most affected in Adults
- The Kidneys
- The Growing Bones
- The lungs are most commonly affected

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97. Mycobacterium Tuberculosis (MTB)

Mycobacterium Tuberculosis (MTB)

- A Patient is said to be an "Open" Case when there is:
  - Chronic cough with expectoration
  - The expectorant can be with or without blood
  - The sputum droplets contain the MTB organism
  - The untreated "open" case is a health hazard
  - Exposure to an open case causes transmission of MTB
  - The sputum is negative after 2 weeks of anti-TB treatment
  - MTB is not transmitted if there is no coughing

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98. Mycobacterium Tuberculosis (MTB)

Mycobacterium Tuberculosis (MTB)

The Symptomatic Patient gives a chronic H/O:
- Tiredness, Weakness, Fatigue
- Anorexia, Weight loss
- Headaches, Night Fevers, Night Sweats
- Cough with expectoration
- Expectorant could be with / without blood

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99. Multi-Drug Resistant TB (MDR-TB)

**Multi-Drug Resistant TB (MDR-TB)**

MDR-TB can be caused by:
- Incomplete Treatment
- Interrupted Treatment
- Lack of adequate anti-TB Treatment
- The MDR-TB strains are resistant to conventional anti-TB treatment

MDR-TB is commonly seen in:
- HIV patients
- Homeless populations
- Individuals living in crowded environments

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