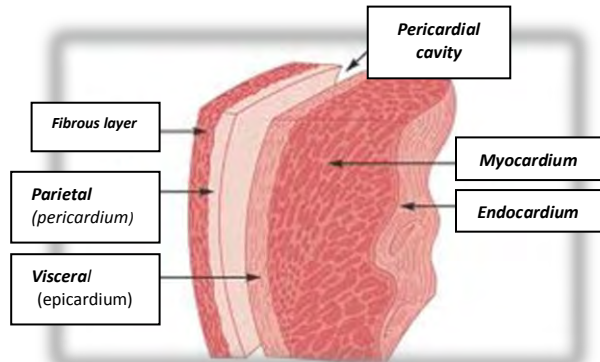
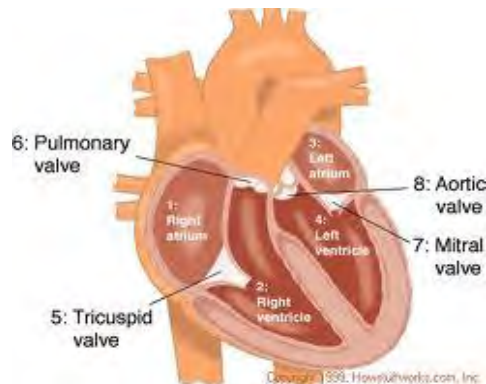


MEDICAL-SURGICAL**Layer of the Heart:**

- **Endocardium** (inner) - facilitates blood flow, contains valve & chambers
- **Myocardium** (middle) - contracting muscle, cardiac muscle
- **Pericardium** (outer)
 - o Layer of Pericardium
 - **Visceral** (epicardium)
 - **Pericardial** (5-20cc of fluid) serves as cushion, lubricant
 - **Parietal**

**Circulation:**

	from	to		
right	Vena cava	Lungs	deoxygenated	Pulmonary circulation
left	Pulmonary veins	System	oxygenated	Systemic circulation

Valves & Chambers:

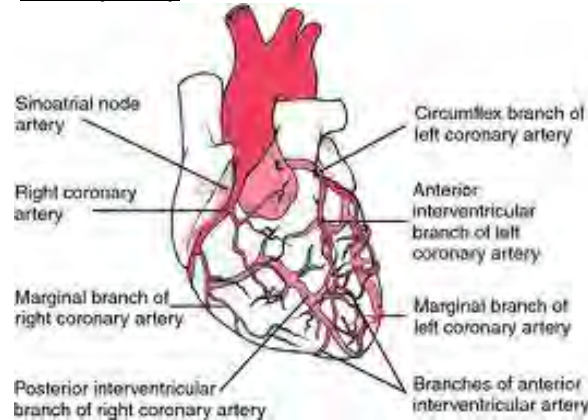
- **AV valves** (atrioventricular valves) “Atria”
 - o 1 way flow of blood
 - **Tricuspid** (right atria)
 - **Bicuspid/ Mitral** (left atria)
- **SL valves** (semilunar valves)
 - **Pulmonary SL valve**
 - **Aortic SL valve**

Ventricle contract : Semi Lunar valve open

- (AV valve closed)

Ventricle relax : Semi Lunar valve closed (blood filling)

- (Av valve open)

Coronary Artery

- Branch out from ascending aorta

Right Coronary Artery – supplying the **Right Atrium / Right Ventricle / inferior portion of Left Ventricle**

Left Coronary Artery

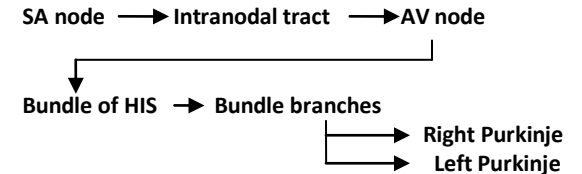
- o **Circumflex** – supplying the **Left Atrium / posterior portion of Left Ventricle**
- o **Left Anterior Descending Artery (LADA)** – supplying the **Left Ventricle / Apex**

Electrophysiologic Properties

- A** – **utomaticity** –
- C** – **ontractility** – transmit impulse
- C** – **onductivity** – contraction
- E** – **xcitability** – respond to stimuli
- R** – **efractiones** – ability to finish a response before initiating another response.

Conduction System

- **SA node (sinoatrial node)** main pacemaker of the heart : 60 – 100bpm
- **AV node (atrioventricular node)** 2nd pacemaker of the heart : 40 – 60bpm
- **Bachmann’s node** (node in the left atrium)

**Cardiac Cycle**

- **Two main phase**
 - o **Systole** : contraction / ejection
 - o **Diastole** : relaxation / refill
 - Difference between Systolic & Diastolic is the **PULSE PRESSURE**

(**PP: 30 – 40cpm**) narrowed pulse – hypovolemia

(**PP: 60cpm**) wided pulse – increased in Stroke volume

Cardiac Output

- Amount of blood pump by the heart particularly by the left ventricle per minute

Stroke Volume (SV) – amount of blood pump by the heart in every beat

$$SV = \frac{\text{amt (ml)}}{\text{Beat}}$$

- **Contractility** : (Inotropic) ability of cardiac muscle to contract
- **Preload** : amount of the blood from the ventricle after the end of diastolic phase (Frank Staring Law : the greater the stretch, the better the pump)
 - o Venous returns
 - o Regurgitation of the blood
- **Afterload** : resistance of LV must surpass as the heart pump blood to the circulation
 - o Systemic resistance (HPN)
 - o Blood viscosity (DM. polycythemia vera, multiple myeloma)

Heart Rate (HR) – number of heart beat per minute

$$HR = \frac{\text{Beats}}{\text{Minute}}$$

- Vit.B12 supplementation
- Blood transfusion

APLASTIC ANEMIA

- Characteristic by bone marrow hypoplasia
 - o Immature bone marrow
- Result to Pancytopenia (decrease RBC / WBC / platelet)

Causes:

- Congenital
- Radiation
- Medication
- Infection

DX:

- CBC
- Bone marrow aspiration

CM

- Anemia
- Leukopenia (recurrent infection)
- Thrombocytopenia

TX:

- Anemia:
 - o Activity pacing (promote oxygenation)
- Prevent infection:
 - o **Provide isolation**
 - **Strict**
 - **Reverse**
- Encourage hygiene
- Avoid raw / fresh fruit / vegetable

Bleeding precaution:

- Avoid sharp object
- Minimize invasive procedure
- Avoid contract sport

Medical management:

- Bone marrow transplant
- Blood transfusion

SICKLE CELL ANEMIA

- Hgb is replace by Hgb S
- Inherited
- Resulting to severe chronic anemia

Causes: (DISH)

- **D-ehydration** (#1 causes)
- **I-nfection**
- **S-tress**
- **H-ypoxia**

Types of Sickle Cell:

- **Vaso occlusive** (painful)

- **Splenic Sequestration** (spleen)
- **Aplastic** (decrease RBC / WBC / platelet)
 - o Parnovirus (decrease red bone marrow)

DX:

- Blood smear
- Sickle turbidity test
- Amniocentesis

NI:

- Prevent DISH
- During crisis
 - o Promote oxygenation during hydration

THALASSEMIA

- Inherited group of hemolytic anemia
- Cause by few hemoglobin peptide chain
- Resulting to decrease Hgb & life span
- Common for Mediterranean blood

4 forms:

- **Thalassemia Minor**
 - o Silent carrier
- **Thalassemia Major**
 - o Very severe
- **Thalassemia Intermedian**
 - o Moderate severe w/ hemolysis
- **Thalassemia Tract**
 - o Mild microcytic anemia

Sign & Symptoms:

- Frontal bossing
- Maxillary prominence
- Splenomegaly
- Hemosiderosis (iron overload)

DX:

- **PBS (Peripheral Blood Smear)**
- Hgb electrophoresis
- CBC

TX:

Goal: Supportive Treatment

- No known cure
- Blood transfusion
- Admission of **Deferoxime** (iron overload)
- Splenectomy

OTHER DISORDER (RBC)

POLYCYTHEMIA

- Increase RBC

POLYCYTHEMIA VERA

- Primary (hyperactive bone marrow)

- Increase RBC / WBC / platelet

SECONDARY POLYCYTHEMIA

- Release of erythropoietin

Complication:

- Thrombosis
- Increased cardiac workload

DISORDER OF WBC

LEUKEMIA

- Malignant disorder characterized by rapid & unregulated proliferation of immature WBC

Classification:

- **ALL** – Acute Lymphocyte Leukemia
- **AML** – Acute Myeloid Leukemia
- **CLL** – Chronic Lymphocyte Leukemia
- **CML** – Chronic Myeloid Leukemia

Causes:

- Idiopathy (cannot pin point causes)
- Viral infection
- Familiar susceptibility (carcinogenic genes)
- Genetic disorder
- Radiation and Chemical

Theories / CA (cellular aberration)

- *Failure of the immune response theory*
- *Cellular transformation & dearrangement*

CM:

- Decrease mature WBC / RBC / platelet
- Bone pain & Arthralgia (pain in the joint w/out inflammation)
- Hepato – Splenomegaly
- Abdominal pain
- Sign & symptoms of electrolyte imbalance

DX test:

- Bone marrow aspiration
- PBS (Peripheral Blood Smear)
- CBC

Medical management:

- Chemotherapy
- Bone marrow transplant
- BT

NI:

- Prevent bleeding
- Prevent infection
- Promote oxygenation

BLEEDING DISORDER

DIC (Dissiminated Intravascular Coagulation)

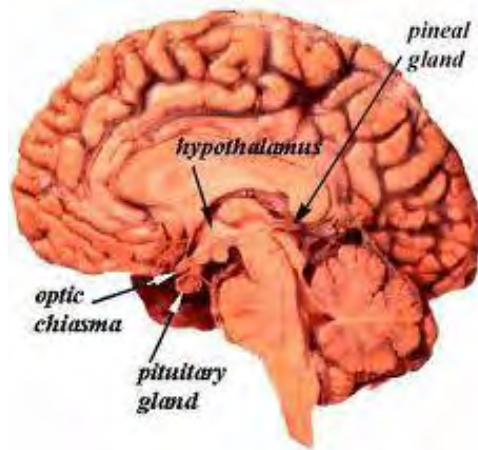
- Acquired thrombotic / Hemorrhagic syndrome
- Abnormal activation of clotting & fibrolysis

ENDOCRINE**2 types**

- **Exocrine (w duct)**
- **Endocrine (w/ out duct)**

Pineal Gland

- is a small endocrine gland in the vertebrate brain. It produces the serotonin derivative melatonin, a hormone that affects the modulation of wake/sleep patterns and seasonal functions.

**Pituitary Gland**

- Located at the sella turcica - inferiorly of the hypothalamus (controlled)

Composed of 2 parts

- **Anterior (adenohypophysis)** glandular
- **Posterior (neurohypophysis)** nervous (+ feedback mechanism)
 - **Oxytocin**
 - Milk let down reflex
 - Increase uterine contraction
 - **ADH (vasopressin)**
 - Controlled osmolarity
 - Controlled water reabsorption

DIABETES INSIPIDUS

- Decrease ADH
- Inability of the renal tubules to retain water

DX:

- Water deprivation test
 - No water intake (8 – 12 hours)

CM:

- Polyuria
- Polydypsia
- Constipation
- Signs of FVD

TX:

- Fluid replacement
- Monitor V/S & LOC
- Monitor hydration status
- TUC
 - Tumor, surgery stroke, trauma, infection

Pharmacotherapy

- **Desmopressin acetate (DDVAP)**
- **Vasopressin (pitressin)**
- **Clofibrate (antilipidemic medication)**

SIADH

- Excessive water retention

Cause

- **Brain trauma (increase ICP)**
- **Cushing triad hyper brady brady**
- **Ectopic ADH production**
 - Some cell are capable of producing hormone (lung carcinoma, CNS infection, stroke, trauma)

CM:

- Edema
- Weight gain
- HPN
- Hyponatremia
- Signs of hypovolemia
- Decrease urine output (concentrated)

TX:

- Fluid restriction
- Monitor V/S
- Assess cardio respiratory function
- Assess neurological assessment
 - **Cerebral edema - most feared**
 - **Cushing triad**
 - **Widen pulse pressure**
- Monitor hydration status
- TUC

Pharmacotherapy

- **Demeclocycline (Declomycin)**
 - Antagonize effect of ADH in the kidney
- **Diuretics (loop diuretics)**

ADENOHYPOPHYSIS***Samatotropin* (growth hormone)**

- Stimulates growth
- Affect CHO, CHON & fat metabolism
- Antagonizing effect of insulin (hyperglycemia)

Prolactin

- Necessary for breast development and lactation

***TSH* (thyroid stimulating hormone)**

- T3 & T4 - Responsible for production of TSH

Adrenocorticoid hormone

- Stimulates adrenal cortex

***MSH* (melanocyte stimulating hormone)**

- Signals to the brain have effects on appetite and sexual arousal.

Gonadotropic hormone

- TSH & LH
- Development of secondary hormone

HYPERPITUITARISM

- Hyper function of adenohypophysis

Related disorder

- **Acromegaly / Gigantism**
- **Gigantism** (increase GH before closure of epiphyseal plate / lengthening of the bone)
 - **Epiphyseal line – not active**
- **Acromegaly** (increase GH after closure of epiphyseal plate / widening of the bone)
- **Cushing syndrome**
- **Galactorrhea** (excessive milk production)
- **Hormonal imbalances**

TX:**Surgery**

- **Transphenoidal hypophysectomy**
 - **Removal of pituitary** – lifetime hormone replacement therapy
 - Insition site (between upper lip & upper gum)

Pharmacotherapy

- **Bromocriptine (Parlodel)** only effective in inhibiting growth hormone

HYPOPITUITARISM

- Hypo function of anterior pituitary gland
- SSTT & CNS infection

Related disorder

- Pituitary dwarfism

- Bone pain even without activity
- Fracture

DX

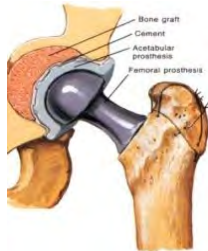
- Radiographic findings (pathologic fracture) sclerotic bones

Laboratory analysis

- Increase ALP
- Increase **Urine Hydroxy Proline**
 - Substance similar structure to amino acid only found on collagen
- Increase serum level

ORTHOPEDIC SURGERY**TOTAL HIP REPLACEMENT**

- Replacement of both articular surfaces of hip joint

**Indication**

- Osteoarthritis
- Rheumatoid Arthritis
- Femoral neck fracture
- Avascular necrosis (head & neck of femur)

Post op care

- WOF for bleeding (24-48 hours / 500ml blood)
 - After 48 hrs – 1 week (minimal bleeding) 100 -200cc
- Pain management
 - **PCA (patient control analgesia)** narcotic morphine (48-72hrs)
 - After 72hrs (non narcotic analgesia)

NI:

- 1st post op week (use abductor device)
- Use bed pan
- Client therapy
 - Use assistive device
 - Methods to prevent dislocation
 - Sexual activity

Avoid

- External rotation
- Prevent hip flexion
- Adduction
- Do not bend
- Do not cross the legs

Do's

- Place trochanter walls
- Use high chair
- Used Abduction splint
- Use slip on shoes
- Keep feet flat

TOTAL KNEE REPLACEMENT

- Hinged joint
- Metal or Acrylic prosthesis

Indication

- Osteoarthritis
- Rheumatoid Arthritis
- Trauma

Flexion failure

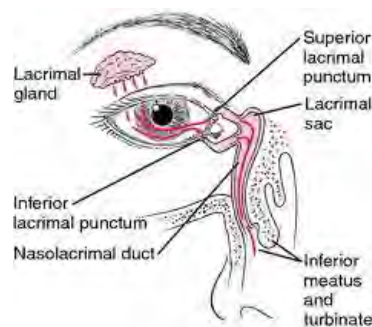
- Wrong insertion

Manifestation

- Unable to flex the knee (1st week)

NI:

- 1st 48hrs (apply ice)
- Wound drainage (200ml / 8 hrs) 3rd day no bleeding
- Physical therapy (*aggressive*) after 8 hrs – prevent flexion
- Prescribe CPM (*control passive machine*)
- Keep leg elevated
- Pain management (NSAID's)
- Monitor limb neurovascular status (6P)
- Monitor for complication

NEUROSENSORY SYSTEM**Lacrimal Apparatus****Lacrimal gland**

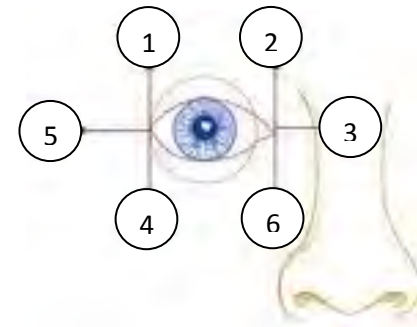
- Produce tears (diluted salt)

Tears

- *Lysozyme* (protects & moisten the eye)

Hyperactive Lacrimal Gland

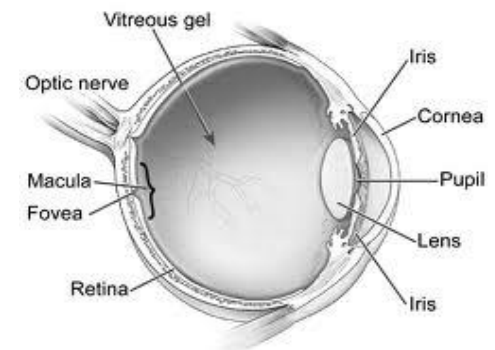
- Chemical irritation
- Foreign object
- Emotional stress

6 Extra Ocular Muscle**Cranial Nerve 3**

1. Superior Rectus
2. Inferior Rectus
3. Medial Rectus
4. Inferior Oblique

Cranial Nerve 6

5. Lateral Rectus
6. Superior Oblique

Layer Of The Eye**Outer layer (fibrous tunic)**

- Trauma

Assessment

- Facial Paralysis
 - o Unilateral (2 weeks)
- Loss of taste
 - o anterior 2/3 of tongue

Intervention

- Protect eyes from dryness
- Instruct client to chew on affected side

GUILLAIN BARRE SYNDROME (Spinal nerve)

- **Acute (sudden onset) -Post -Infection (Resp. GI infection) –Polyneuritis**
- Form of an autoimmune disorder
 - o Damage Myelin Sheath (Polyneuritis)

Ss/Sx:

- Clumsiness (**Initial**)
- Paresthesia
- Ascending muscle weakness
- Dysphagia
- Arrhythmic
- Respiratory failure (**#1 complication**)

DX:

- CSF analysis

NI:

- Maintain patient airway
- Continuous monitoring
- Promote safety
- Plasmapheresis
 - o Extracorporeal treatment (outside the body – antecubital vein)
 - Cell separator (Centrifugal force) separates plasma

Pharmacotherapy

- Corticosteroids (SAWSO)
- Anti arrhythmia

CVA (Cerebro Vascular Accidents)

- Disrupted cerebral blood flow

Common location

- Middle Cerebral Artery (MICA)
- Internal Carotid Artery (ICA)

Types:

- **Thrombotic (Ischemic Stroke)**
 - o Form inside the cerebral blood vessel
- **Embolic (Ischemic Stroke)**

- o Form outside the cerebral blood vessel

- **Hemorrhagic (Hypertensive Stroke)**
 - o Rupture of aneurysm

Risk Factors:

- **Atherosclerosis (narrowing)**
- **HPN, DM, MI**
- **Valvular Heart Disease (valvular stenosis)**
- **Post Heart Surgery (valvular replacement)**
- **Lifestyle**
 - o Smoking
 - o Sedentary Lifestyle
 - o Hyperlipidemic
 - o Prolonged use of Contraceptives
 - Abdominal pain
 - Chest pain
 - Headaches
 - Eye problem
 - Severe leg cramps

Stages of CVA

- 1. Transient Ischemic Attack**
 - Reversible : Ss/Sx subside in 2hr
 - Same as CVA (causes, effect, affection)
 - o Headaches
 - o Dizziness
 - o Numbness
 - o Tinnitus
 - o Visual / Speech Disturbances
 - 2. Stroke in evolution**
 - o Progressive Ss/Sx of stroke
 - 3. Complete stroke**
 - o Paralysis
 - o Anorexia, Nausea & Vomiting
 - o Dysphagia
- Late sign:**
- o **Cheyne Stroke Respiration** (hypercapnea with period of apnea)

Other Ss/Sx:

- **(+) Kernigs & Brudzinkis (hemorrhagic)**
 - o Meningeal Irritation
- **Neurological Deficits**
 - o **Hemiplegia** - Neglect Syndrome (Unilateral Neglect)
 - o **Homonymous Hemianopsia** - Neglect Syndrome (Unilateral Neglect)
 - Approach on intact vision

- Encouraged client to scan environment

o Aphasia

- Receptive
- Expressive
 - Provide alternative ways for expression
 - Put extra patience
 - Simple phrases

o Agraphia

- Inability to write

o Alexia

- Inability to comprehend

o Ataxia

- Unsteady / Jerky movements

o Speech changes

- Dysarthria

o Decreased sensation

- o Bowel & Bladder dysfunction
- o Nuchal rigidity

DX procedure

- CT scan
- Angiography (perfusion of blood vessel)

Management for CVA

Acute phase

- Promote oxygenation
- BP maintenance at 140/90mmHg
- Suction secretion as needed
- WOF increased ICP (herniation of medulla oblongata)
- Proper positioning (semifowlers)

Post Acute phase

- Maintain patent airways
- Elevate head of the bed
- Monitor V/S, I&O, neurocheck
- Prevent complication of immobility
- Prevent aspiration (thicken fluid)
- Alternative means of complication
- Maintain side rails

Pharmacotherapy

- Osmotic diuretic
- Loop diuretic
- Corticosteroid