

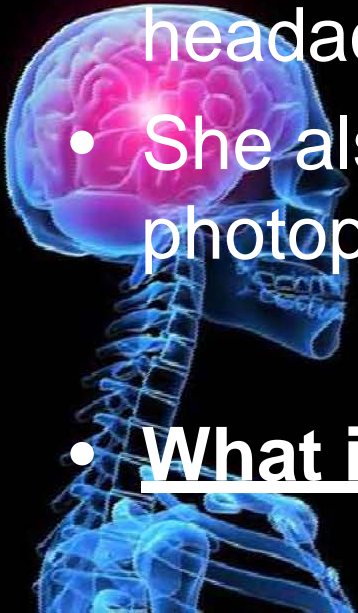
Management of Patient with Meningitis



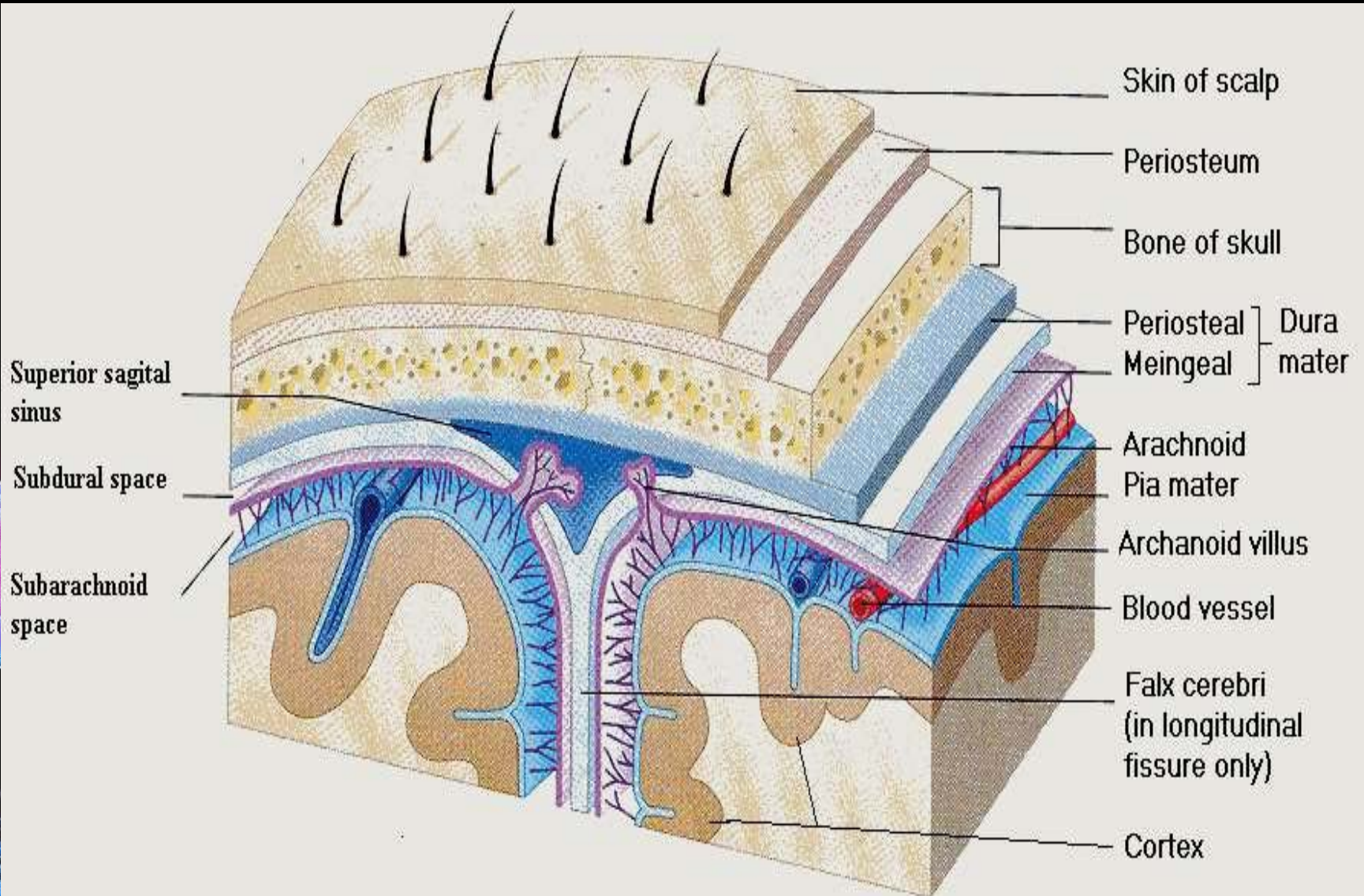
Mrs.AMBA V

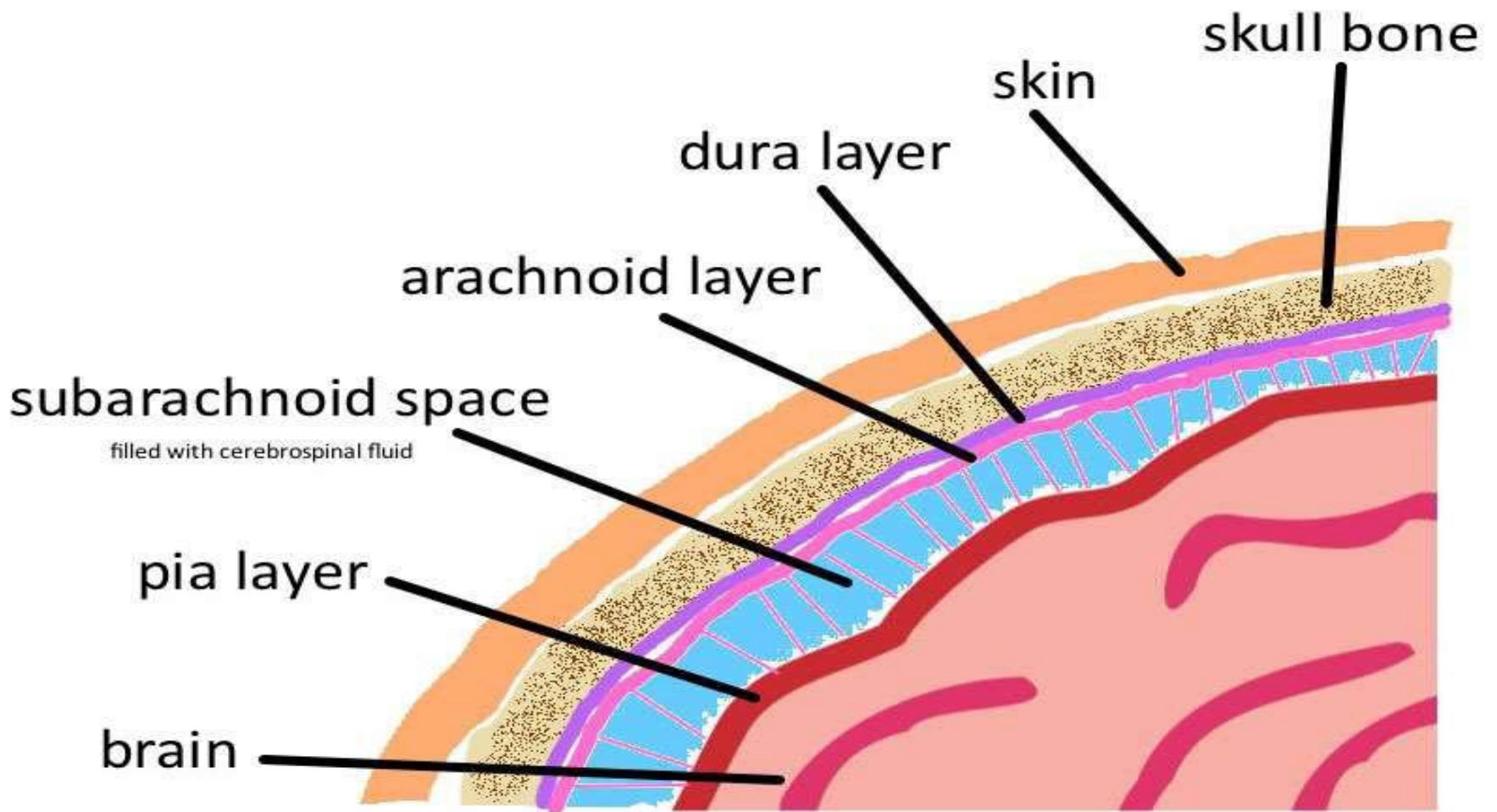
Case scenario

- Mr. 'A' a 15-year-old male was diagnosed with acute myeloid leukemia in April '15. he received two courses of chemotherapy with partial response.
- Beginning August'15, he complained about an increasingly disturbed gait due to a weakness. She also complained of fever and vomiting along with headache and drowsiness.
- She also complains of nuchal rigidity and photophobia.
- What is the diagnosis?



ANATOMY





Introduction.

- Although meningitis is a notifiable disease, the exact incidence rate is unknown.
- In 2010 – 420, 000 deaths
- In 2013 - 303,000 deaths.
- It can occur as a complication of other disease and 50% is an opportunistic infection.



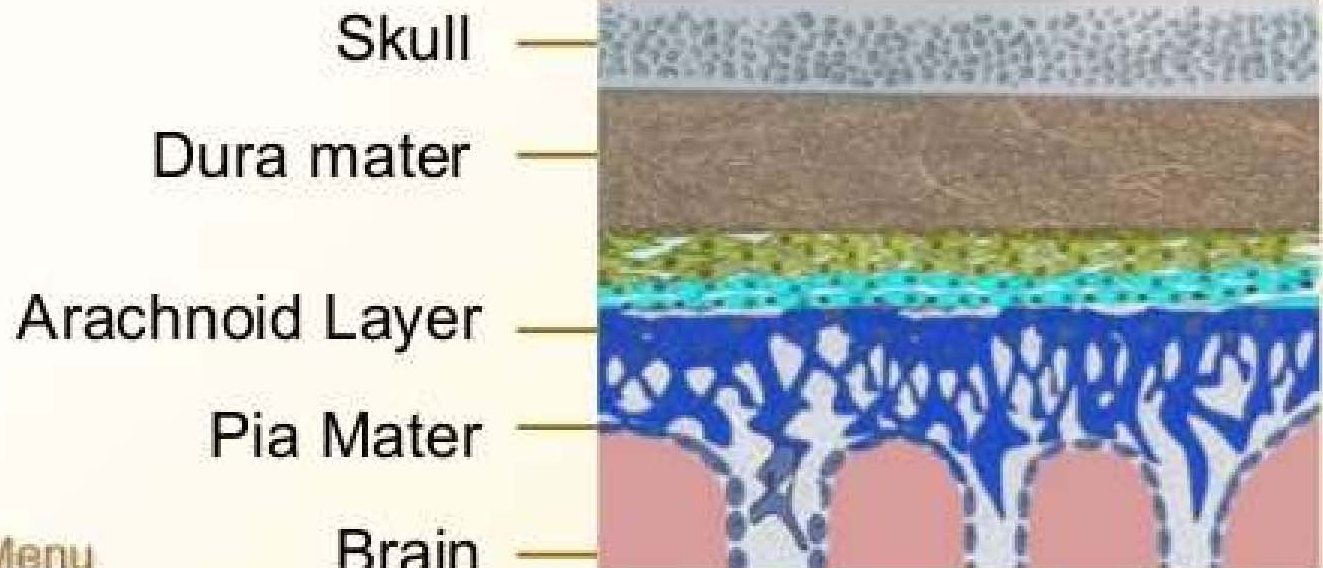
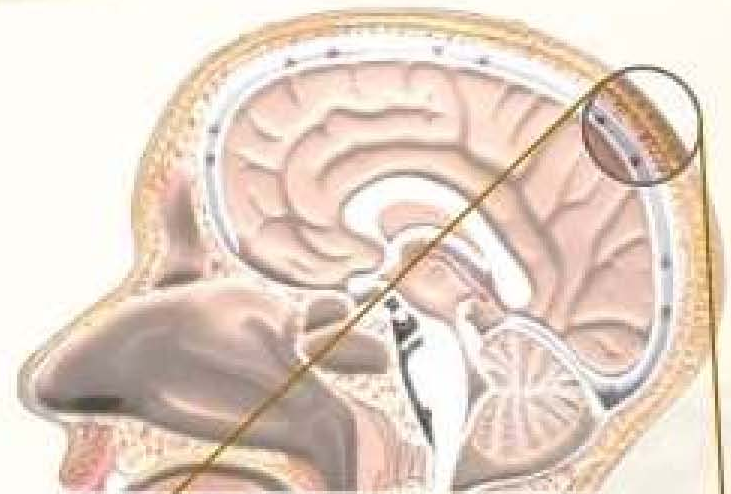
Incidence.

- Of newborns, 20–30% may die from bacterial meningitis.
- This risk is lower in older children.
- Rises again in adulthood.
- In adults, 66% of all cases emerge without disability. The main problems are deafness (14%) and cognitive impairment (10%)



The Meninges

The meninges are layers of tissue that separate the skull and the brain.



[Anatomy Menu](#)

[Main Menu](#)

Definition.

- **Meningitis** (from Greek *méninx*, "membrane") is an acute inflammation of the meninges.

- Caused by either bacteria or virus.



Route of Entry in CNS

- Skull or Back bone Fractures (trauma)
- Medical Procedures
- Along peripheral Nerves
- Blood or Lymphatic system



Etiology.

❖ The causes can be classified into:

- Bacterial Infections
- Viral Infections
- Fungal Infections
- Inflammatory diseases (SLE)
- Cancer
- Trauma to head or spine



Pathophysiology.

Bacteria enters blood stream/ trauma



Enters the mucosal surface/ cavity



Breakdown of normal barriers



Crosses the blood brain barrier



Proliferates in the CSF



Inflammation of the meninges



Increase in ICP



Bacterial Meningitis

- Also known as septic meningitis.
- Extremely serious that requires immediate care.
- Can lead to permanent damage of brain or disability and death.
- Spreads by:
 - coughing or sneezing



Bacterial Meningitis.

- Treatment available : antibiotics as per causative organism.
- Causative Agents:

- ✓ Streptococcus Pneumonia 30-80%

- ✓ Neisseria meningitis 15- 40%

- ✓ Hemophilus Influenza 2-7%

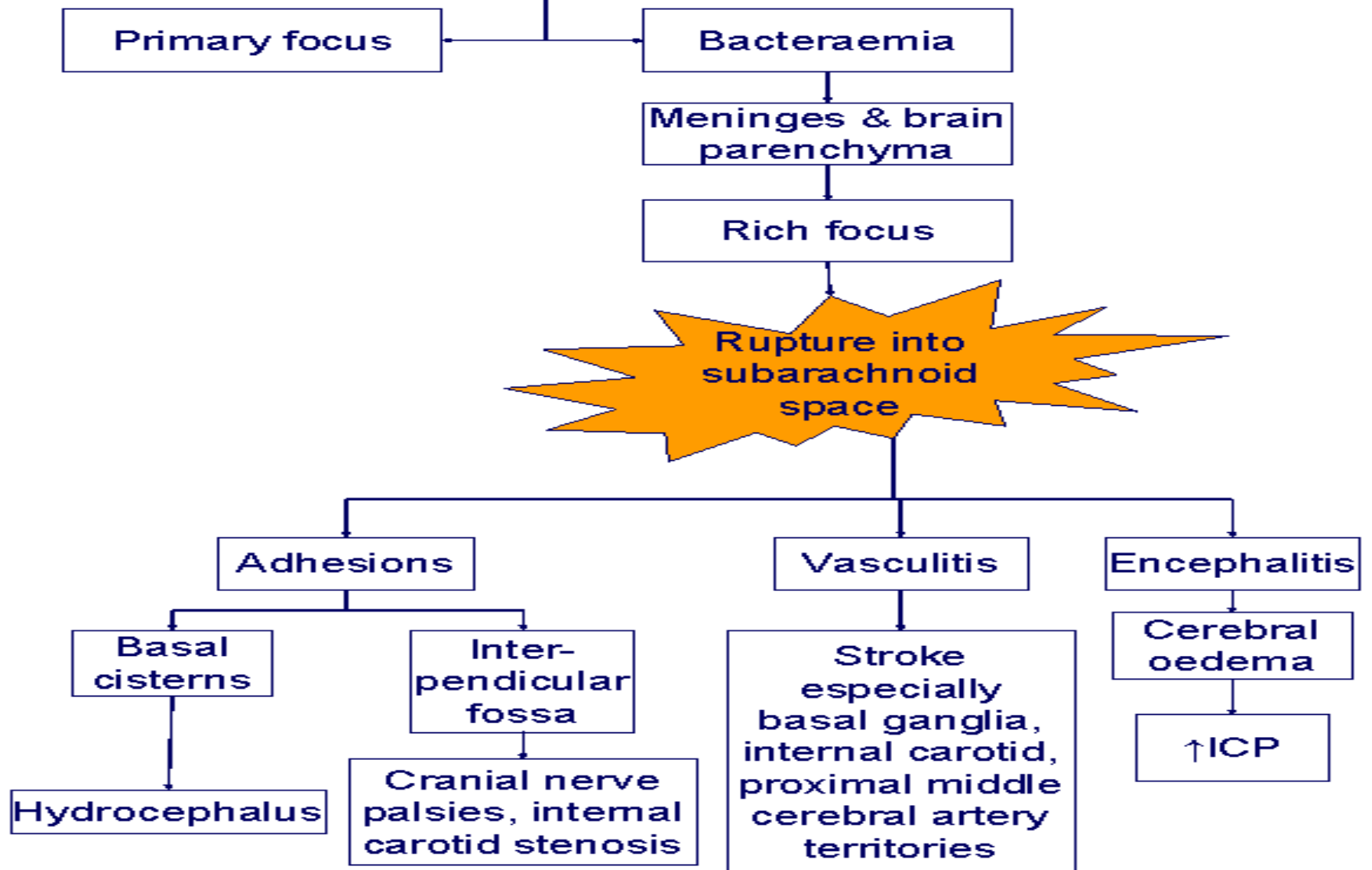


Tubercular Meningitis.

- TB meningitis is caused by *Mycobacterium tuberculosis*.
- Infection with this bacterium begins usually in the lungs
- 1 – 2% of cases the bacteria travel via the bloodstream.
- Unlike other types of meningitis its progresses very slowly and symptoms are vague



Droplet infection



Viral Meningitis

- Also known as aseptic meningitis.
- More common than bacterial form and usually less serious.
- Less likely to have permanent brain damage after the infection resolves.
- Treatment: *No specific treatment available.*
- Most patients recover completely on their own



Viral Meningitis.

- Causative agents:
 - ✓ Enterovirus
 - ✓ Adenovirus
 - ✓ Arbovirus
 - ✓ Measles virus
 - ✓ Herpes simplex virus
 - ✓ Varicella



Fungal Meningitis

- It is much less common than the other two infections.
- It is rare in healthy people but it is more likely in persons who have impaired immune system.



Risk factors

- Systemic infections
- Viral RTIs
- Tobacco use
- Impaired Immune system
- Over crowding



Risk Factors

- Vaccinations
- Seasonal:
 - Winter
 - Spring



Clinical manifestation



INFANTS



Fever, possibly with cold hands & feet



Refusing feeds or vomiting



High pitched moaning cry or whimpering



Dislike of being handled or fretful



Neck retraction with arching of back



Blank & staring expression



Child is difficult to wake, lethargic



Pale, blotchy complexion

CHILDREN/ADULTS



Stiff neck



Headache



Fever



Vomiting



Light Sensitivity



Drowsiness or
confusion



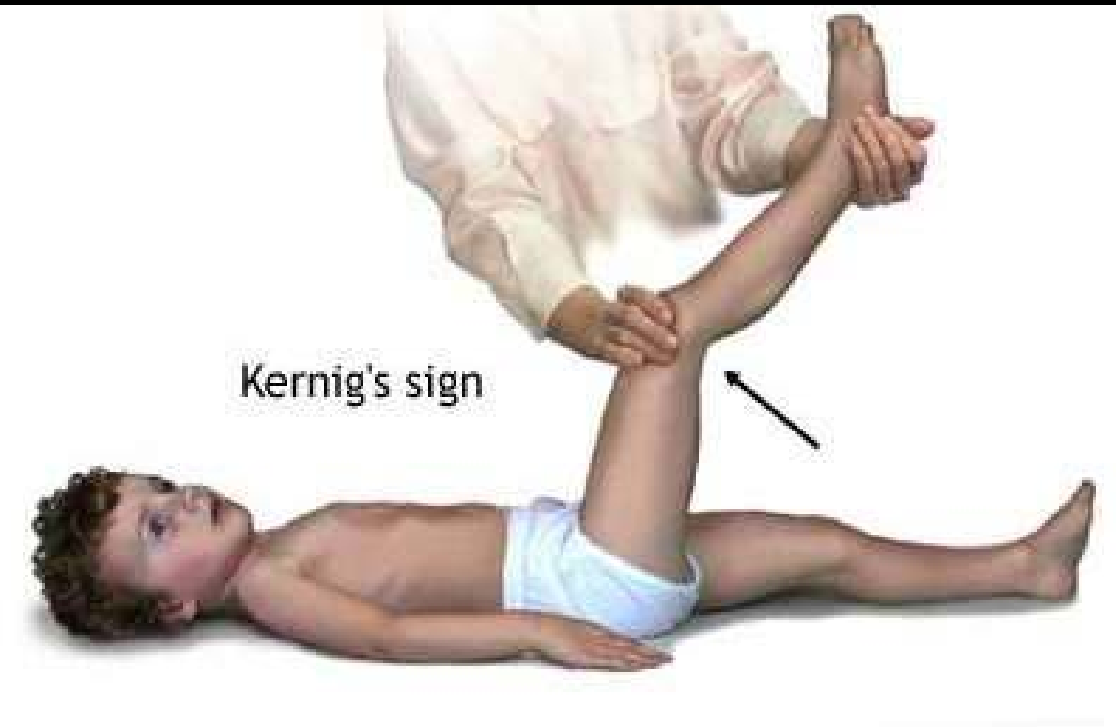
Joint pain



Fitting

KERNIG'S SIGN

- Severe stiffness of the hamstrings causes an inability to straighten the leg when the hip is flexed to 90 degrees.



Kernig sign: A sign indicating the presence of meningitis (inflammation of the meninges covering the brain and spinal cord).

The test for **Kernig sign** is done by having the person lie flat on the back, flex the thigh so that it is at a right angle to the trunk, and completely extend the leg at the knee joint.



BRUDZINKI'S SIGN

- Severe neck stiffness causes a patient's hips and knees to flex when the neck is flexed.



Assessment and Diagnosis

- History taking
- Physical assessment
- CT and MRI
- Blood culture and sensitivity
- Lumbar Puncture



CSF finding

	Normal	Bacterial	Viral	Fungal/TB
Pressure (cmH20)	5-20	> 30	Normal or mildly increased	
Appearance	Normal	Turbid	Clear	Fibrin web
Protein (g/L)	0.18-0.45	> 1	< 1	0.1-0.5
Glucose (mmol/L)	2.5-3.5	<2.2	Normal	1.6-2.5
Gram stain	Normal	60-90% Positive	Normal	
Glucose - CSF:Serum Ratio	0.6	< 0.4	> 0.6	< 0.4
WCC	< 3	> 500	< 1000	100-500
Other		90% PMN	Monocytes 10% have >90% PMN 30% have >50% PMN	Monocytes

Complications.

- Sensori-neural hearing loss
- Epilepsy/ seizures
- Memory loss
- Paralysis
- Learning difficulty



Contd.

- Behavioral difficulty
- Decreased intelligence
- Septicemia
- Death



Medical Management

- Bacterial meningitis:
 - ❖ Third-generation cephalosporin such as cefotaxime or ceftriaxone
 - ❖ Vancomycin is added in the regime in case of resistance.



Contd..

- ❖ Dexamethasone
- ❖ Dehydration and shock can be treated with fluid therapy.

❖ Phenytoin for seizure management.



Tubercular Meningitis:

- ❖ ATT medications are started:
Isoniazid; rifampacin; pyrazinamide and streptomycin.
- ❖ Second line drugs:
Aminoglycosides; Fluroquinolones
- ❖ Conventional therapy is given for 6-9 months
- ❖ In children BCG vaccine offers (approx 64%) protective effect



Viral Meningitis:

- Treatment is mostly supportive and no medicines are prescribed.

- ❖ **Seizure prophylaxis:**

Lorazepam or phenytoin or barbiturate.

- ❖ **Increased ICP:**

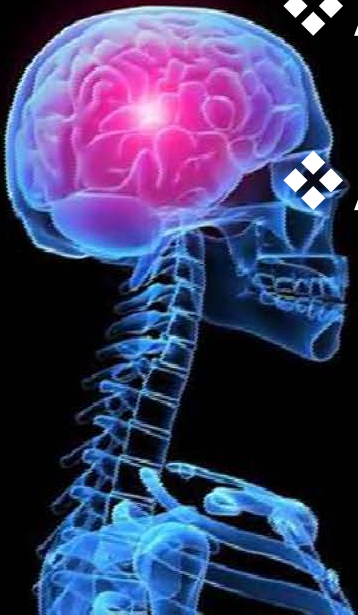
Inj. Mannitol 1g/kg followed by 0.25-0.5g/kg Q6H or/and dexamethasone

- ❖ **Rest is advised**



Contd

- ❖ In case hydrocephalus is present VP or LP shunt is required.
- ❖ Adequate hydration is to be maintained
- ❖ Antipyretics
- ❖ Anti emetics



Encephalitis.



Definition

- **Encephalitis** (from Ancient Greek, *enképhalos* “brain”) is an acute inflammation of the brain.
- Encephalitis with meningitis is known as meningo-encephalitis.



Incidence

- In western countries incidence is 7.4 cases per 100,000 population per year.
- In tropical countries, the incidence is 6.34 per 100,000 per year
- In 2013: 77,000 deaths from encephalitis from 92,000 in 1990.



Etiology

- Viral cause
 - ✓ HSV encephalitis.
 - ✓ Arthropod borne virus encephalitis.

- Bacterial cause
- Fungal cause
- Auto immune



Herpes Simplex virus Encephalitis.

- Caused by herpes Simplex virus;
- Its of two types:
 1. HSV-I typically affects children and adults
 2. HSV-II common in neonates
- Treatment: Acyclovir or ganciclovir



Contd.

- Diagnosed by serology antigen-antibody of blood or CSF
- Treatment: no specific medication is prescribed.



Japanese Encephalitis.

- Japanese encephalitis (JE) is a flavivirus
- Spread by mosquitoes.
- There is no cure for the disease.
- Treatment is focused on relieving severe clinical signs and supporting the patient to overcome the infection.



Contd

- Safe and effective vaccines are available to prevent JE.
- WHO recommends JE vaccination in all regions where the disease is a recognized public health problem.



Arbovirus Encephalitis.

- Arthropod Borne virus belongs to several family of viruses.
- Most commonly due to mosquito bite.
- Usually increases in summer and autumn when the mosquitoes increases.



Contd.

- Diagnosed by serology antigen-antibody of blood or CSF
- Treatment: no specific medication is prescribed.



Clinical manifestations

➤ Younger children or infants:

- Irritability
- Poor appetite
- Fever
- Drowsy or confused patient.



Contd

➤ In Adults:

- Acute onset of fever
- Headache
- Confusion
- Seizures.
- Malaise



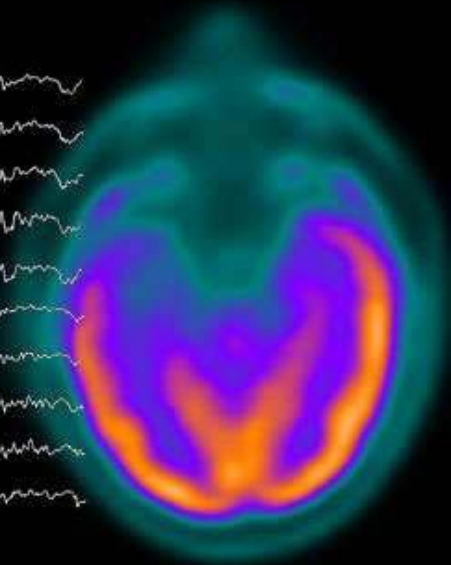
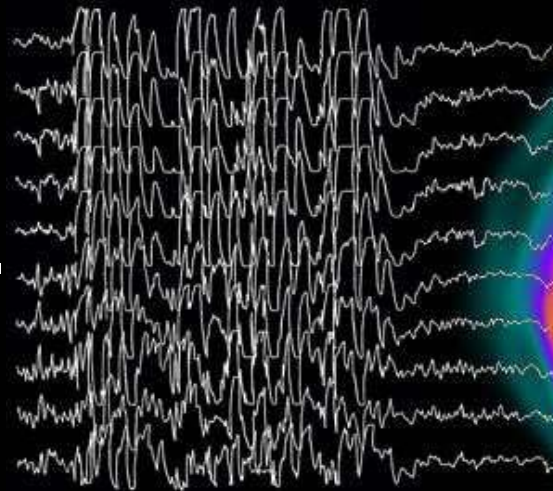
Contd

- Cranial nerve dysfunction
- Hemi paresis
- Dysphasia.
- Change in LOC
- Increased ICP related to hydrocephalus.



Assessment and Diagnosis

- MRI (determine inflammation.)
- EEG
- Lumbar puncture.
- Blood test.
- Urine analysis.



Complications

- Seizures
- Learning difficulty in children
- Behavioral difficulty
- Hemi paresis
- Death



Medical Management

- Treatment (which is based on supportive care) are as follows:
 - ✓ Antiviral medications (if virus is cause)
 - ✓ Antibiotics, (if bacteria is cause)

- Steroids



Contd

- Sedatives for restlessness
- Acetaminophen for fever
- Physical therapy (if brain is affected post-infection)



NURSING MANAGEMENT



Assessment

- Admission history and physical exam.
- Baseline vital signs.
- Ongoing assessment for disease progression is critical.
- The patient is monitored for life-threatening complications e.g, respiratory failure.



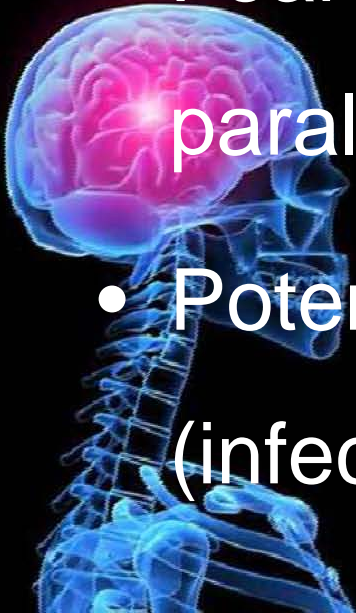
Nursing Diagnosis

- Ineffective gas exchange r/t decreased tissue perfusion
- Impaired physical mobility r/t paralysis, fatigue.
- Pain r/t disease condition.
- Altered nutrition less than body requirement r/t dysphagia (c. nerve dysfunction).



Contd..

- High risk for injury r/t seizures episodes
- Impaired verbal function r/t cranial nerve dysfunction.
- Fear and anxiety r/t loss of control and paralysis.
- Potential for secondary complication (infections etc)



Maintain Respiratory function.

- Assess respiratory rate and quality frequently.
- Monitor perfusion with pulse oximetry.
- Monitor the patient for respiratory insufficiency.
- Ventilator support, oxygen therapy.



Contd

- Chest physiotherapy.
- Elevation of head of bed.
- Monitor vitals
- Suctioning.



Reducing effects of physical immobility.

- Change position 2hrly
- The paralyzed extremities are supported in functional positions,
- ROM exercises every 2 hourly
- Use of comfort devices



Contd.

- Adequate nutrition and hydration
- Use of elastic stocking
- Massage
- Hygiene maintenance



Nutritional Support.

- NG tube feeding
- Assess for bowel sounds
- Check the weight of the patient.
- Total parental nutrition if needed



Contd.

- Assesses for the return of the gag reflex and bowel sounds before resuming oral nutrition.
- Monitor intake and output



Improving communication.

- Lip reading.
- Use of picture cards.
- Speech therapy.
- Give pen and paper.



Relieving fear and anxiety.

- Providing information about patient's condition.
- Positive appraisal
- Encouraging relaxation exercise
- Positive feedback



Contd.

- Clear their doubts.
- Manage pain with analgesic
- Diversion therapy



Any questions?



Question 1

A 10 year old child diagnosed with meningitis admitted in hospital. According to nurse child placed which unit in hospital ?

1. In strict isolation
2. With other older infant
3. In respiratory isolation
4. With another child with meningitis



Question 2

during lumbar puncture procedure
which position to given to patient ?

1. Prone position
2. Knee chest position
3. Sitting position
4. Side lying position with his neck flexed



Question 3

- Which are the confirm diagnostic tests done for bacterial meningitis?
 1. Blood test
 2. CSF exam.
 3. Urine test
 4. X ray



Summary

- Introduction
- Definition
- Incidence
- Causes and risk factors
- Patho-physiology
- Clinical manifestations
- Assessment and Diagnosis
- Complications
- Medical and Nursing management.



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**THANK
YOU**

for

LISTENING