SNS COLLEGE OF ALLIED HEALTH SCIENCES
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DEPARTMENT : PHYSICIAN ASSISTANT

COURSE NAME : NEUROLOGY

UNIT : NEUROPATHOLOGY

TOPIC : INFLAMMATORY DISORDERS - PYOGENIC AND TUBERCULOUS MENINGITIS, TUBERCULOMA

INFLAMMATORY DISORDERS

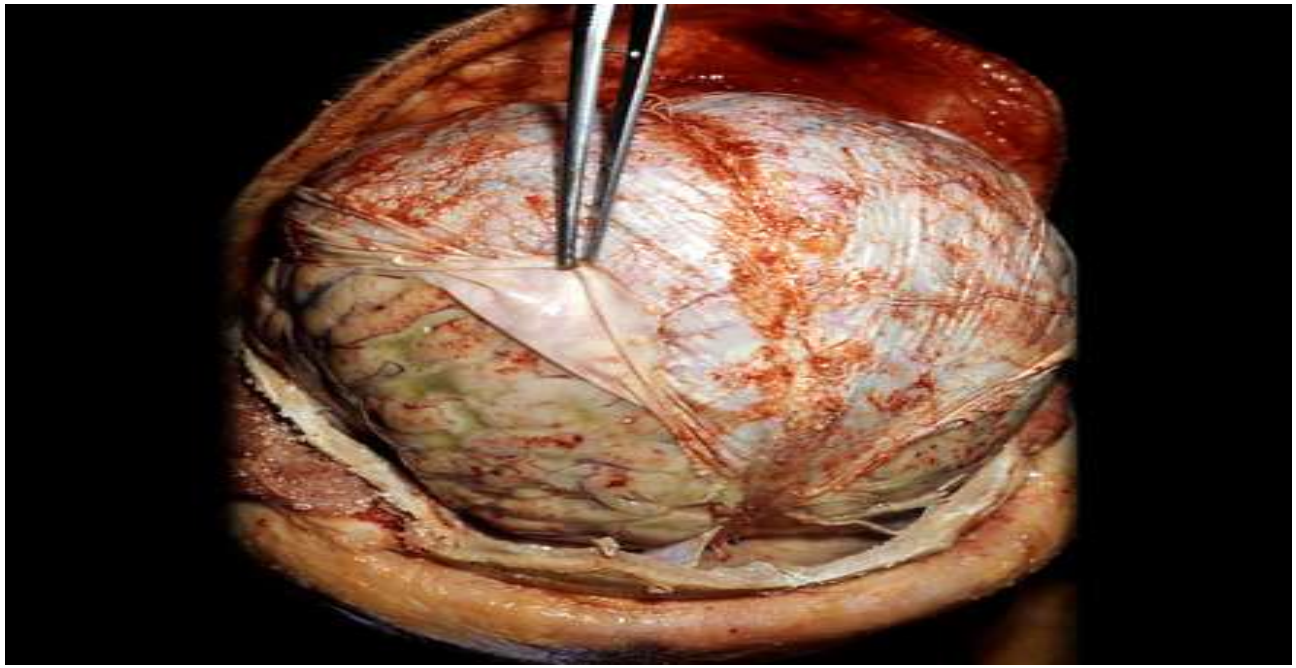
- Inflammatory disorders of the brain refer to a group of conditions characterized by inflammation within the central nervous system (CNS), including the brain parenchyma, meninges, and associated structures.

- These disorders can arise from various causes, including infections, autoimmune reactions, and other inflammatory processes

PYOGENIC MENINGITIS

- Pyogenic meningitis is an acute bacterial infection characterized by inflammation of the meninges.

- Pyogenic meningitis, also referred as bacterial meningitis, is a life-threatening CNS infectious disease affecting the meninges



Etiology:

- Pyogenic meningitis is caused by bacterial pathogens, with Streptococcus pneumoniae, Neisseria meningitidis, and Haemophilus influenzae type b being the most common culprits in adults and children.
- Other bacteria, such as Group B Streptococcus and Escherichia coli, are more common in neonates and infants.

Pathogenesis:

- Bacteria gain access to the meninges through various routes, including hematogenous spread from distant sites of infection, direct extension from adjacent structures (such as sinuses or middle ear), or traumatic introduction (e.g., penetrating head injury or neurosurgical procedures).

Clinical Features:

- Common symptoms include fever, severe headache, neck stiffness (nuchal rigidity), photophobia, altered mental status, and neurological deficits.
- In infants, symptoms may be nonspecific, such as irritability, poor feeding, and lethargy.

CSF Findings:

- Lumbar puncture reveals elevated opening pressure, cloudy appearance, increased white blood cell count (predominantly neutrophils), elevated protein levels, and decreased glucose levels in the cerebrospinal fluid (CSF).
- Gram stain and culture of CSF are essential for identifying the causative organism.

Complications:

- Pyogenic meningitis can lead to a variety of complications, including cerebral edema, hydrocephalus (due to obstruction of CSF flow), brain abscess formation, cranial nerve palsies, and septic shock.
- Mortality and morbidity rates remain significant, particularly if diagnosis and treatment are delayed.

Treatment:

- Prompt initiation of empirical antibiotic therapy targeting common pathogens is crucial pending culture results. Antibiotic selection is guided by the patient's age, risk factors, and local epidemiology.
- Supportive measures, such as antipyretics, analgesics, and management of intracranial pressure, are also vital components of therapy.

TUBERCULOUS MENINGITIS (TBM)

- Tuberculous meningitis (TBM) is caused by the seeding of the meninges with the bacilli of Mycobacterium tuberculosis (MTB) and is characterized by inflammation of the membranes (meninges) around the brain or spinal cord.

Etiology:

- Tuberculous meningitis is caused by Mycobacterium tuberculosis, the same bacterium responsible for pulmonary tuberculosis.
- It typically occurs through hematogenous dissemination of the bacilli from a primary pulmonary focus or other extrapulmonary sites.

Pathogenesis:

- After entering the CNS via the bloodstream, M. tuberculosis infects the meninges, triggering an inflammatory response.
- The bacteria induce the formation of caseating granulomas, leading to basal exudates, vasculitis, and cerebral infarctions.

Clinical Features:

- TBM often presents insidiously with subacute or chronic symptoms, including fever, headache, nausea, vomiting, neck stiffness, altered mental status, focal neurological deficits, and cranial nerve palsies.
- The classic triad of TBM consists of fever, headache, and focal neurological signs.

CSF Findings:

- CSF analysis typically reveals lymphocytic pleocytosis, elevated protein levels, and decreased glucose levels.
- Acid-fast bacilli (AFB) staining and nucleic acid amplification tests (e.g., PCR) can aid in the diagnosis.

Complications:

- TBM can lead to severe complications, such as hydrocephalus, cerebral infarctions (resulting from vasculitis and thrombosis), tuberculomas, and cranial nerve palsies.
- Mortality and morbidity rates are high, particularly in cases of delayed diagnosis or inadequate treatment.

Treatment:

- Treatment involves a multidrug regimen consisting of rifampicin, isoniazid, pyrazinamide, and ethambutol, followed by continuation therapy with rifampicin and isoniazid.
- Corticosteroids may be adjunctively used to reduce inflammation and improve outcomes.

ASSESSMENT

- What is Pyogenic Meningitis ?
- What is Tuberculous Meningitis ?