**SNS COLLEGE OF ALLIED HEALTH SCIENCES**

SNS Kalvi Nagar, Coimbatore - 35

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**DEPARTMENT :** PHYSICIAN ASSISTANT

**COURSE NAME :** NEUROLOGY

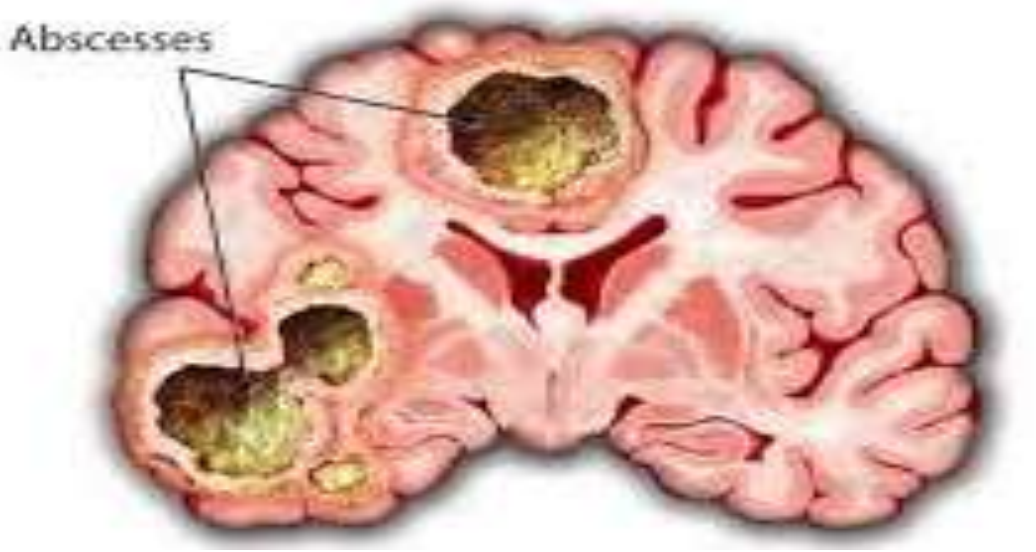
**UNIT :** NEUROPATHOLOGY

**TOPIC :** INFLAMMATORY DISORDERS - BRAIN ABSCESS

# BRAIN ABSCESS

- A brain abscess is a pus-filled swelling in the brain. It usually occurs when bacteria or fungi enter the brain tissue after an infection or severe head injury.

# Brain abscess



# ETIOLOGY (Causes)

Direct Extension: Infection can spread from adjacent areas, such as:

- Otitis Media: Middle ear infections.
- Mastoiditis: Inflammation of the mastoid bone.
- Sinusitis: Infections of the paranasal sinuses.

Hematogenous Spread: Infection can spread through the bloodstream from a distant site:

- Endocarditis: Infection of the heart valves.
- Lung Infections: Such as pneumonia or lung abscess.
- Other Septicemia: Bacterial infections spreading through the blood.

- Trauma: Penetrating head injuries or neurosurgical procedures can introduce infectious agents.

- Cryptogenic: In some cases, the source of infection remains unidentified.

# PATHOGENS

- Bacteria: Streptococcus spp., Staphylococcus aureus, anaerobes, and Gram-negative bacilli.
- Fungi: Aspergillus, Candida.
- Parasites: Toxoplasma gondii (particularly in immunocompromised patients).

# PATHOPHYSIOLOGY

Early Cerebritis (Days 1-3):

- Inflammatory response to bacteria leads to localized swelling and tissue necrosis.
- Microglia and astrocytes activate and proliferate.

Late Cerebritis (Days 4-9):

- Continued inflammation results in more pronounced necrosis.
- Liquefactive necrosis begins, and a ring of granulation tissue starts to form.

Early Encapsulation (Days 10-13):

- A capsule of fibroblasts and collagen forms around the necrotic center.
- The capsule helps to limit the spread of infection but can also contribute to mass effect and increased intracranial pressure.

Late Encapsulation (Day 14 onward):

- The capsule matures and thickens.
- Central necrotic area becomes a collection of pus.

# CLINICAL PRESENTATION

- Headache: Often localized and severe, refractory to standard analgesics.
- Fever: Present in about 50% of cases.
- Focal Neurological Deficits: Depending on the abscess location, symptoms can include hemiparesis, aphasia, visual disturbances, or cerebellar signs.

- Altered Mental Status: Ranging from confusion to coma.
- Seizures: Can occur in up to 25% of cases.
- Nausea and Vomiting: Typically related to increased intracranial pressure

# DIAGNOSIS

Neuroimaging:

- CT Scan: Rapid and widely available; shows a ring-enhancing lesion with surrounding edema.
- MRI: More sensitive than CT, particularly in early cerebritis; better for posterior fossa lesions.
- DWI (Diffusion-Weighted Imaging): Can help differentiate abscess from tumors or other cystic lesions.

Laboratory Tests:

- Blood Cultures: To identify the causative organism.
- Complete Blood Count (CBC): May show elevated white blood cells.
- Erythrocyte Sedimentation Rate (ESR) and C-Reactive Protein (CRP): Markers of inflammation.

Microbiological Studies:

- Aspiration and Culture: Stereotactic needle aspiration for definitive diagnosis and pathogen identification.
- Blood Cultures: Often positive in hematogenous spread.

# TREATMENT

Medical Management:

- Antibiotics: Empirical therapy should cover common pathogens (e.g., Streptococcus spp., Staphylococcus aureus, anaerobes). Typical regimen includes a third-generation cephalosporin, metronidazole, and vancomycin if MRSA is suspected.
- Duration: Usually 6-8 weeks of intravenous therapy followed by oral antibiotics.

Surgical Intervention:

- Aspiration: Stereotactic or open aspiration for diagnostic and therapeutic purposes.
- Excision: Indicated for large abscesses, multiloculated abscesses, or if there is a poor response to aspiration and antibiotics.

Supportive Care:

- Management of Increased Intracranial Pressure: Use of corticosteroids, osmotic diuretics (mannitol), and hyperventilation if necessary.
- Antiepileptics: For seizure control

# PROGNOSIS

- Mortality Rate: Has significantly decreased with early diagnosis and improved therapeutic strategies, currently around 10-20%.
- Complications: Can include persistent neurological deficits, seizures, and recurrence of the abscess.

# ASSESSMENT

- What is Brain Abscess ?
- What is the Treatment of Brain Abscess ?