



## Imaging in Bacterial Meningitis

Gowthami Bainaboina<sup>1\*</sup>

Meningitis is a clinical syndrome characterized by inflammation of the meninges. The most common cause of meningeal inflammation is bacterial or viral infection. Most cases of bacterial meningitis are localized over the dorsum of the brain; however, under certain conditions, meningitis may be concentrated at the base of the brain, as with fungal diseases and tuberculosis. Bacterial meningitis must be the first and foremost consideration in the differential diagnosis of patients with headache, neck stiffness, fever, and altered mental status. Acute bacterial meningitis is a medical emergency, and delays in instituting effective antimicrobial therapy result in increased morbidity and mortality. The decision to obtain a brain CT scan before LP should not delay the institution of antibiotic therapy; such delay can increase mortality. Pyogenic meningitis, also referred as bacterial meningitis, is a life-threatening CNS infectious disease affecting the meninges, with elevated mortality and disability rates. Three bacteria (*Haemophilus influenzae*, *Streptococcus pneumoniae*, *Neisseria meningitidis*) account for the majority of cases [1,2]. Neuroimaging can identify conditions that may predispose to bacterial meningitis; thus, it is indicated in patients who have evidence of head trauma, sinus or mastoid infection, skull fracture, and congenital anomalies. In addition, neuroimaging studies are typically used to identify and monitor complications of meningitis, such as hydrocephalus, subdural effusion, empyema, and infarction and to exclude parenchymal abscess and ventriculitis.

### Epidemiology

Chronic and Immuno compromising conditions are common predisposing factors for bacterial meningitis among adults, including [3].

- Elderly patients (>65 years)
- Splenectomy and hyposplenic state
- Alcoholism
- HIV/AIDS
- Diabetes mellitus
- Cancer
- Anatomical defect (related with recurrent meningitis)
- Organ transplant recipients

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\*Corresponding author: Gowthami Bainaboina, Department of Pharmacy, Chalapathi Institute of Pharmaceutical Sciences, AP, India, E-mail: gowthamibainaboina@gmail.com.

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**CT and MRI:** On post contrast MRI the most common positive findings are thin and linear leptomeningeal enhancement (however only seen in 50% of patients). More specifically, if seen, smooth or linear enhancement is more characteristic of acute pyogenic (bacterial) and lymphocytic viral meningitis. If a more nodular thick enhancement pattern is seen especially involving the basal cisterns, Leptomeningeal carcinomatosis or granulomatous disease is more likely. Other findings on MRI may include cerebral sulcal restricted diffusion relative to normal cortex [4].

### Prognosis & Treatment

Empirical antimicrobial therapy for purulent meningitis is guided by the age of the patient [3].

The adult case fatality has a straight correlation with increasing age, the overall rate is estimated at around 16% in the USA, ranging from ~9% among patients 18 to 34 years of age vs. ~23% among those older than 65 years.

### References

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### Author Affiliations

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<sup>1</sup>Department of Pharmacy, Chalapathi Institute of Pharmaceutical Sciences, Guntur, AP, India