

Picture Quiz - Microbiology

Primary Amoebic Meningoencephalitis (PAM) — A Clinical Case

Renu Mathew

Department of Microbiology, Believers Church Medical College Hospital

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CASE HISTORY

A twelve-year-old girl presented with high-grade fever, severe headache, persistent vomiting and altered sensorium for the past 24 hours.

History revealed that she had been bathing in a home water tank which was used to store water. No history of trauma.

CSF REPORT

Parameter	Result
Appearance	Turbid
WBC Count	1200 cells/mm ³
Differential Count	90% neutrophils, 6% lymphocytes, 4% monocytes
Glucose	16 mg/dl
Protein	857 mg/dl
Gram Stain	No bacteria seen
Wet Mount	Motile structures observed

examination: Neck stiffness was present; GCS 9/15.

I brain showed diffuse cerebral oedema.

Spinal tap puncture was performed.

MICROSCOPY IMAGE



Figure 1. Wet mount of CSF showing motile trophozoites.

QUESTIONS

Q1. Which is the closest differential diagnosis when the CSF Gram stain is negative and the cell count is neutrophilic?

- A) Herpes encephalitis
- B) Leptospira meningitis
- C) Primary Amoebic Meningo-encephalitis
- D) Cryptococcal meningitis

✓ **Correct Answer: C**

Primary Amoebic Meningoencephalitis (PAM) presents with neutrophilic pleocytosis and negative Gram stain, closely mimicking bacterial meningitis.

Q2. Which is the most likely etiological agent?

- A) Acanthamoeba species
- B) Naegleria fowleri
- C) Balamuthia mandrillaris
- D) Entamoeba histolytica

✓ **Correct Answer: B — Naegleria fowleri**

Naegleria fowleri is a free-living thermophilic amoeba found in warm freshwater and inadequately chlorinated domestic water. It is the causative agent of PAM, entering via the nasal mucosa.

DISCUSSION

PAM (Primary Amoebic Meningoencephalitis):

A fulminant, neutrophilic meningoencephalitis caused by *Naegleria fowleri*, a free-living thermophilic amoeba found in warm freshwater and inadequately chlorinated domestic water sources. Infection occurs through the nasal mucosa during water exposure, with subsequent invasion via the olfactory nerve into the central nervous system.

CSF Findings:

Turbid appearance, marked neutrophilic pleocytosis, very low glucose, and high protein. Gram stain is negative; motile trophozoites can be seen in fresh wet mount preparations, which is pathognomonic.

Kerala Update:

Recent sporadic PAM cases (2024–2025) have been reported from multiple districts of Kerala, often following bathing in household or natural freshwater sources. No confirmed clonal variant has been reported so far. Early clinical suspicion and prompt antifungal/antiprotozoal therapy remain critical for improving outcome.

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