

The Uninvited Guest: Escherichia coli Meningoencephalitis in an Immunocompetent Child

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ABSTRACT

Escherichia coli is a well-recognized cause of neonatal meningitis, but its occurrence beyond infancy—particularly in immunocompetent older children—is exceedingly uncommon. We report a previously healthy twelve-year-old male who presented with high-grade fever, headache, vomiting, seizures, behavioral changes, non-fluent speech and altered sensorium along with hematuria. Cerebrospinal fluid analysis demonstrated mild lymphocytic pleocytosis with raised protein and normal glucose. Multiplex CSF PCR detected *Escherichia coli* K1. MRI Brain was reported normal. The child improved with intravenous ceftriaxone, dexamethasone, antiepileptics, and supportive care.

Keywords: *Escherichia coli*; meningoencephalitis; child; atypical presentation

INTRODUCTION

Escherichia coli, particularly the K1 serotype, is a well-recognized pathogen in neonatal meningitis, but its presence beyond infancy—especially in immunocompetent individuals—is exceedingly rare¹. In older children and adults, *E. coli* central nervous system infections are usually associated with trauma, neurosurgical intervention, or systemic infection. However, recent literature demonstrates that severe

intracranial disease may occur even in healthy individuals without predisposing factors, including a documented case of an *E. coli* brain abscess in an immunocompetent adult⁵. This broadens the clinical understanding of *E. coli* neuroinvasive potential and highlights the need to consider it in atypical presentations of meningitis or encephalitis across age groups.

Take Home Message

Early recognition and prompt treatment are crucial in atypical Escherichia coli CNS infections in immunocompetent children.

CASE DETAILS

A twelve-year-old previously healthy male child presented with high-grade fever, severe headache, vomiting, and loose stools 4 days before acute onset and gradually progressive followed by generalized seizures, altered sensorium, behavioral disturbances and non-fluent speech since 2 days. Examination revealed fever, irritability, GCS of twelve out of fifteen, neck stiffness and hematuria.

Cerebrospinal fluid revealed mild pleocytosis (10 WBCs, lymphocyte predominance) with elevated protein (MPR 64 ng/mL) and normal glucose. Multiplex PCR detected *Escherichia coli* K1. Blood and urine cultures were sterile. MRI brain was reported normal. The child received intravenous ceftriaxone, dexamethasone, levetiracetam, and supportive care with full recovery.

DISCUSSION

Community-acquired *Escherichia coli* central nervous system infections beyond infancy remain exceptionally rare². The CSF profile may mimic viral, autoimmune, or tuberculous meningitis³, complicating timely diagnosis. Differential diagnoses included viral encephalitis, tuberculous meningitis, septic encephalopathy, cerebral malaria, arboviral infections, and HIV-related CNS infections. In this case the overall clinical picture remained incongruent with classical bacterial CNS infection, necessitating a broader differential and cautious interpretation of PCR findings as CSF cytology raises suspicion for an early or atypical presentation of *E. Coli* meningoencephalitis.

Recent evidence from adult literature further illustrates rare but severe intracranial infections,

such as an *E. coli* brain abscess in an immunocompetent adult without classical risk factors⁵. Such cases, including ours, suggest that virulent *E. coli* strains may occasionally cause CNS invasion even in healthy individuals.

Multiplex PCR has emerged as an indispensable diagnostic tool for early identification, particularly when CSF findings are atypical for bacterial infection. Early empirical antibiotics with adjunctive corticosteroids to reduce meningeal inflammation causing cerebral edema, raised intracranial pressure, vasculitis and decrease risk of sensorineural hearing loss remain critical for preventing neurological sequelae and complications to ensure optimal outcomes.

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