



“A Rare Presentation of Mumps Encephalitis in a Child with Missed MMR Vaccination: A Case-Based Insight”

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ABSTRACT:

This case report describes an uncommon presentation of mumps meningoencephalitis in a 7-year-old malnourished child who had not completed the MMR vaccination schedule, having missed the second dose. The child developed high-grade fever, persistent headache, vomiting, neck stiffness, and parotid swelling after recent exposure to an infected sibling. Clinical evaluation showed no focal neurological deficits, and initial investigations including a normal noncontrast brain CT and CSF analysis pointed toward viral etiology, with lymphocytic predominance, normal glucose, and mildly elevated protein. Multiplex PCR of CSF confirmed mumps virus and ruled out herpes simplex and enterovirus. Empirical intravenous acyclovir and ceftriaxone were initiated and later withdrawn upon confirmation of the viral cause. Supportive management with fluids and antipyretics led to progressive improvement, and the child recovered fully without neurological complications. This case underlines the need to consider mumps in pediatric encephalitis cases involving parotid swelling and incomplete immunization, while also stressing the diagnostic value of CSF PCR. Moreover, it highlights how inadequate vaccination and poor nutritional status can contribute to the severity of preventable viral CNS infections, reinforcing the necessity of timely immunization and proper nutrition in children.

1. Introduction

Viral encephalitis – inflammation of the brain parenchyma due to infection – is the most common cause of encephalitis worldwide. The incidence in children is estimated at roughly 10–14 per 100,000 population. Many cases remain idiopathic, but identified viral causes include herpesviruses (HSV-1, HSV-2, VZV), enteroviruses, arboviruses, and vaccine-preventable viruses (e.g. mumps, measles). In industrialized countries, herpes simplex virus (HSV) is the single most common cause of sporadic encephalitis. However, vaccine-preventable agents still occur, especially where immunization coverage is incomplete. Historically, mumps virus accounted for a large proportion of encephalitis cases – as much as 36% of reported encephalitis in the pre-vaccine era. Since routine MMR vaccination, mumps encephalitis has become rare. Young children are particularly vulnerable to severe viral CNS infections, and factors such as malnutrition, immunodeficiency, and lack of vaccination increase risk.

Clinically, pediatric viral encephalitis often presents with fever, headache, altered consciousness or irritability, seizures, and focal neurologic signs. Meningeal irritation (neck stiffness) or rash may occur if meningitis is concurrent. Parotitis or pancreatitis (as seen in mumps) may provide diagnostic clues. Neuroimaging (MRI preferred) is essential to exclude alternative causes and may show characteristic changes (e.g. temporal lobe edema in HSV). CSF analysis typically reveals lymphocytic pleocytosis with normal glucose and modest protein elevation. PCR testing of CSF for viruses (HSV-1/2, enterovirus, arboviruses, and in our case mumps) is highly sensitive and specific (>95%) and guides etiologic diagnosis. IDSA guidelines recommend immediate empiric IV acyclovir in all suspected encephalitis pending PCR results.

2. Case Presentation

A 7-year-old boy (weight 15 kg, BMI 8.9; underweight) was admitted with 3 days of high fever (max 101°F), severe headache, vomiting (8 episodes), and right facial swelling. Ten days earlier, his 10-year-old sister had mumps. The



child’s immunizations were incomplete: he had not received the 2nd MMR dose (for mumps) on schedule, or his DPT booster at age 2. There was no history of head trauma or other illness. Family history was notable only for the sister’s mumps infection. He had a known food allergy to eggplant (brinjal).

On admission, the patient was drowsy and ill-looking, with moderate dehydration. Vital signs: BP 100/60 mmHg, pulse 98/min, respirations 20/min, temperature 38.3°C. Examination showed bilateral parotid gland swelling and neck stiffness; cranial nerves were intact and no focal motor deficits or sensory changes were evident. Cardiac and respiratory examinations were normal. Abdominal examination was unremarkable.

Initial workup included a non-contrast CT scan of the brain, which was normal. Lumbar puncture revealed an opening pressure of 20 mmHg. CSF analysis showed 10 white cells/mm³ (predominantly lymphocytes), protein 16 mg/dL, and glucose 75 mg/dL. CSF Gram stain and culture were negative. A multiplex PCR panel for viral encephalitis on CSF returned positive for viral nucleic acid (mumps virus) on hospital day 2; CSF PCR for HSV and enterovirus was negative. Blood counts showed mild leukocytosis. Other studies (blood chemistries, liver function tests) were normal.

The patient was managed in the pediatric ward. Empiric IV antibiotics (ceftriaxone) and IV acyclovir (10 mg/kg q8h) were started pending results. Intravenous fluids maintained hydration. Once CSF PCR confirmed mumps virus and bacterial cultures remained negative, antibiotics and acyclovir were discontinued. He received antipyretics and antiemetics as needed. Mannitol was given briefly for raised intracranial pressure. Over the next 5 days, his fever subsided, mentation improved, and vomiting ceased. By hospital day 7, he was fully alert with resolved neck stiffness and decreasing parotid swelling. He was discharged on day 8 in good condition, with no neurologic deficits. At 2-week follow-up he remained well.

3. Clinical Timeline and Management Summary:

Hospital Day	Clinical Events	Investigations/ Findings	Interventions/ Medications
Day 1	Admission with fever, vomiting, drowsiness	CT Brain: Normal; CSF: Lymphocytic pleocytosis	Started IV fluids, IV ceftriaxone, IV acyclovir
Day 2	Persistent symptoms	CSF PCR positive for mumps virus;	Continued supportive care; close

		Bacterial cultures negative	neuro monitoring
Day 3	Reduced vomiting, better mentation	Fever subsiding	Continued IV hydration, antipyretics
Day 4-5	Full recovery of sensorium, neck stiffness gone	Normal vitals; parotid swelling reduced	Discontinued acyclovir and antibiotics
Day 7	Stable, afebrile, eating well	No neurological deficits	Discharged; advised follow-up, immunization counselling

4. Discussion

This child’s presentation (fever, headache, vomiting, neck stiffness) was consistent with meningoencephalitis. The presence of parotitis and exposure history strongly suggested mumps etiology. Mumps virus is a known, vaccine-preventable cause of viral encephalitis; prior to widespread vaccination it caused a large fraction of encephalitis cases (~36% in the 1960s). In vaccinated populations, mumps complications are rare (≤1% of mumps cases). This patient’s incomplete MMR immunization left him susceptible. His sister’s mumps likely transmitted virus via saliva/droplets. Underlying malnutrition (BMI 8.9) probably contributed to immunosuppression and disease severity. Indeed, studies show undernutrition is common in children with viral encephalitis and portends worse outcomes.

Diagnosis of viral encephalitis relies on neuroimaging and CSF studies. IDSA guidelines recommend MRI (if available) or CT before LP to exclude mass lesions. Although this patient’s CT was normal, MRI would have been more sensitive (especially for HSV-related changes). CSF PCR testing is critical: it can identify specific viral pathogens in over 95% of cases. In our case, CSF PCR confirmed mumps virus. Empiric IV acyclovir is advised for all suspected encephalitis until HSV is ruled out. We followed this by initiating acyclovir immediately, though his symptoms and CSF findings were atypical for HSV (no focal findings, and parotitis pointed to mumps). Once HSV PCR returned negative and mumps was identified, acyclovir was stopped. There is no specific antiviral for mumps encephalitis; treatment is supportive, including control of intracranial pressure and seizures if present.



Compared to bacterial meningitis, viral encephalitis typically shows lymphocytic CSF pleocytosis, normal glucose, and mild protein elevation. This child's CSF profile – 10 cells (mostly lymphocytes), normal glucose, protein 16 mg/dL – fit viral etiology. PCR turned positive for viral DNA by hospital day 2, aligning with prior studies showing PCR's high sensitivity in CSF. Empiric broad-spectrum antibiotics were discontinued once bacterial infection was excluded. Supportive care and monitoring (including intraventricular pressure measures) are mainstays; some protocols suggest steroids or osmotherapy for severe edema, though their benefit is not well proven.

This case underscores the importance of vaccination and nutrition in preventing encephalitis. Mumps remains a risk wherever MMR coverage is suboptimal. A recent pediatric encephalitis series in India found mumps was the most frequently identified virus (especially in school-age children), and low vaccination rates were noted. Our patient similarly was school-aged, unvaccinated, and developed mumps meningoencephalitis. The global epidemiology of encephalitis is shifting: classical endemic causes like Japanese encephalitis are declining with vaccination, while other viruses (mumps, HSV, dengue) are now common etiologies. Clinicians must remain vigilant for vaccine-preventable causes.

In summary, this pediatric case illustrates that viral encephalitis can present with meningeal signs and parotitis, and a thorough history (exposures, immunization status) is key. Early neuroimaging and CSF testing, including PCR for multiple viruses, enabled a definitive diagnosis. Empiric acyclovir should be given promptly in any suspected encephalitis pending results. Ultimately, the patient's favorable outcome reflects timely supportive management and the self-limited nature of mumps encephalitis. Prevention via full immunization (MMR) and addressing malnutrition are critical to reduce such cases.

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