Case report

High-Dose of Methylprednisolone in Children with headache in viral encephalitis

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Abstract

Three children diagnosed as viral encephalitis of ages 15,14,7 years respectively presenting with severe headaches responding well to high doses of methylprednisolone. This case study evaluates the clinical response to high doses of methylprednisolone, assessing its efficacy in alleviating headache symptoms. Findings suggest a positive therapeutic outcome, highlighting the potential role of methylprednisolone as an alternate and more beneficial treatment for these headaches.

Introduction

Viral encephalitis (VE) is an inflammation of the brain parenchyma caused by a viral infection, presenting with a range of neurological symptoms, including headache, fever, neck stiffness, and seizures along with motor deficits (1). The most common causes of VE include herpes simplex virus, varicella-zoster virus and human enterovirus with other rare causes. The frequency of specific agents varies according to multiple factors (2).

Among the symptoms headaches are a prominent symptom, affecting majority cases. It is typically severe, diffuse, non-pulsatile, and may be accompanied by nausea, vomiting, and photophobia. The severity of the headache depends on the underlying viral aetiology and the extent of brain inflammation and can be treated symptomatically (3).

Methylprednisolone has been experimentally used in the treatment of VE, in cases with severe headache. It is an anti-inflammatory agent that helps reduce inflammation in the brain, thereby alleviating symptoms (4). However, it's efficacy in VE remains controversial, and further studies are needed.

In this case-series, we discuss about three VE cases presenting with severe headaches that responded to Methylprednisolone.

Case 1

A 15-year-old girl presented with fever, headache, neck rigidity for 3 days. On examination she was drowsy with a Glasgow Coma Scale (GCS) score of 14/15, with brisk deep tendon reflexes while examination was unremarkable. Initially treated as meningoencephalitis. She was given ceftriaxone with anti-viral and dexamethasone that was discontinued after high WBC count with predominant lymphocytes and Biofilm array was negative in CSF D/R report. MRI brain showed abnormal cortical and subcortical hyper-intense signal suggestive of acute VE. Neuroprotective measures, hypertonic saline infusion was started. GCS improved but complained of severe headache, despite of NSAIDs and opioids, so Methylprednisolone 30mg/kg/day for 3

days was given followed by tapering dose of prednisone for 1 week. Within three days, she improved. Patient was discharged with prednisone 5g twice a day and became asymptomatic on follow-up.

Case 2

A 14-year-old girl presented with fever, with escalating headache and vomiting for the past 2 days. On examination the patient looked sick, no sign of meningeal irritation and rest of the examination was unremarkable. Initial assessment of meningitis was made and recommended lumbar puncture, but patient left against advice.

Patient readmitted with complains of worsening headache, diplopia and blurring vision. Antibiotic vancomycin was prescribed but headache persisted, MRI was unremarkable. Lumbar puncture was done, CSF-D/R was suggestive of high TLC count with 98% lymphocytes. Multiple painkillers were tried but headache was not getting better so high dose methylprednisolone 30mg/kg/day for 3 days was prescribed, and headache improved.

Upon discharge the patient was prescribed tapering dose of prednisolone 20mg every 12 hours along with paracetamol, sucralfate and esomeprazole. On follow-up she remained asymptomatic.

Table 1. Case Summaries

	Age of patient	Duration of symptoms	GCS	CSF analysis	MRI findings
Case 1	15 years	Fever, headache, drowsiness for 3 days	14/15	TLC count 123 with 98% lymphocytes Biofire negative	Abnormal cortical and sub cortical hyper intense signal.
Case 2	14 years	Fever and headache for 2 days	15/15	TLC count 464 with 98% lymphocytes Biofire negative	Normal
Case 3	7 years	Hallucinations for 10 days and inability to speak and severe headache for 1 day.	14/15	TLC count 11 with 95% lymphocytes Biofire negative	Normal

Case 3

A 7-year-old girl presented with episodic visual hallucinations and disorientation for 10 days along inability to speak and severe headache for 1 day. She had episodic seizures for over 1 week with history of fever and sore-throat while being unable to identify her family.

On examination, weakened reflexes and normal tone was found. Rest was unremarkable except right perforated tympanic membrane without discharge.

EEG was done suggestive of left sided theta and delta slow waves. MRI brain was unremarkable. Initially prescribed ceftriaxone, antiviral and dexamethasone. Her CSF-DR showed pleocytosis and negative biofire and was diagnosed with acute VE. Antibiotics and antivirals were discontinued but headaches remained severe despite of opioid analgesics. She was prescribed Methylprednisolone 30mg/kg/day for 3 days along with omeprazole and ondansetron. The patient improved and remained asymptomatic on follow-up.

Discussion

We have 3 cases of headaches with VE that improved using methylprednisolone. Headache is one of the most common symptoms of VE and may present with other symptoms and suspected to be due to the role of the inflammatory cascades causing meningeal swelling and increased intracranial pressure.

The presentation of headaches ranges from mild, dull, generalised to severe, throbbing, and specific with different temporal patterns (5). This can be seen in our patients presenting with severe headaches along with other symptoms.

It is diagnosed by a wide variety of tests. A negative test may not be accurate due to multiple causative agents that may not test positive. It is diagnosed by CSF sampling characterised by high proteins, normal glucose levels and lymphocytic pleocytosis as seen (5). Even EEG can be done when VE is suspected as seen in case 3. MRI is used to detect pathological changes related to VE such as pyramidal signs and seizures (5).

Most presentations are nonspecific and initial treatments should be broad spectrum. The first-line measure includes supportive IV therapy and correction of electrolyte disturbances. If VE is suspected, then it is recommended to start acyclovir and if bacterial meningoencephalitis is suspected then vancomycin and third-generation cephalosporin should be prescribed as seen (6).

These patients were given Methylprednisolone showing improved symptoms. The efficiency of methylprednisolone in VE patients has been examined in multiple studies showing improved outcome (7). It is suspected that methylprednisolone's anti-inflammatory qualities reduce pressure on pain-sensitive areas by decreasing inflammation, which reduces headache intensity and alters the immune reaction (7).

Our case series showed early treatment with methylprednisolone improved the outcome in children with severe headache with VE. The outcomes were excellent in our patients who were treated with methylprednisolone therapy within 72 h after the onset of symptoms. The recommended dose and duration of methylprednisolone in in paediatrics remains controversial.

Conclusion

Methylprednisolone appears to be a better treatment option for severe headaches in VE due to its feasibility and accessibility in limited resource settings but further studies with a larger sample size are needed to understand before a definitive conclusion can be reached.

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