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HIGH DOSE METHYLPREDNISOLONE IN CHILDREN WITH SEVERE HEADACHE IN VIRAL ENCEPHALITIS: A CASE SERIES

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ABSTRACT

Severe headache is a common symptom in children with viral encephalitis (VE), yet effective symptom-specific therapies are limited. In this case series, we present three children of ages 15, 14, and seven diagnosed with VE who presented with severe headaches unresponsive to standard analgesics but showed significant clinical improvement following high-dose methylprednisolone therapy. Although this is not first line treatment, these cases suggest a possible role for methylprednisolone in alleviating severe VE-associated headaches. Further controlled studies are needed to establish its effectiveness and safety in such settings.

Keywords

Viral encephalitis, Methylprednisolone, Headache, Corticosteroids

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 condition is of particular concern in paediatric patients, where symptoms can rapidly evolve and cause long-term neurological sequelae. 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 Despite antiviral treatment, management of these symptoms remains challenging in paediatric patients with VE.

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

Corticosteroids like methylprednisolone have 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, its efficacy in VE remains controversial, and further studies are needed. This case series presents three paediatric patients with VE presenting with severe headache that was non-responsive to conventional treatments, responding positively to methylprednisolone, offering insights into its use in similar cases.

CASE 1

A 15-year-old girl presented to Aga Khan University Hospital with fever, headache and neck rigidity for three 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. Ceftriaxone was discontinued after high WBC count with predominant lymphocytes and Biofilm assay was negative in CSF DR report. MRI brain showed abnormal cortical and subcortical hyper-intense signal suggestive of acute VE. Initial treatment was started and neuroprotective measures, hypertonic saline infusion was started. GCS improved but she complained of severe headache despite NSAIDs and opioids, hence Methylprednisolone 30mg/kg/day for three days was initiated followed by tapering dose of prednisone for one week. Within three days, she improved. Patient was discharged with prednisone 5 mg twice a day and remained asymptomatic on follow-up.

CASE 2

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

Patient readmitted with complains of worsening headache, diplopia and blurring vision. Anti

vancomycin was prescribed but headache persisted.

MRI was unremarkable. Lumbar puncture was done, CSF DR showed high TLC count with 98% lymphocytes. In addition to antiviral, multiple analgesics were prescribed but headache remained static in severity hence high dose methylprednisolone 30mg/kg/day for three 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.

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 one day. She had episodic seizures for over one week and she was unable to identify her family.

Her neurological examination didn't reveal any sign of meningeal irritation or focal deficit. EEG was done which was suggestive of left sided theta and delta slow waves. MRI brain was unremarkable. Initially she was prescribed ceftriaxone, antiviral and dexamethasone. Her CSF DR showed lymphocytic pleocytosis and negative Biofire and she was diagnosed with acute VE. Antiviral was continued but headaches remained severe despite of opioid analgesics. She was prescribed methylprednisolone 30mg/kg/day for three days along with omeprazole and ondansetron. The patient had improved and remained asymptomatic on follow-up. Table 1 summarizes the three cases.

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

DISCUSSION

This case series highlights three paediatric patients with VE who developed severe throbbing, treatment resistant headache that responded to methylprednisolone therapy. While VE treatment focuses on antiviral therapies targeting its viral causative agent, the symptomatic burden especially headache is underestimated. The pathogenesis is believed to involve the inflammatory cascade that results in meningeal irritation and raised intracranial pressure.

The presentation of headaches can range from mild, dull, generalised to severe, throbbing, and specific with different temporal patterns.⁵ VE 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 elevated proteins, normal glucose levels and lymphocytic pleocytosis as seen in all three patients. Even EEG can be done when VE is suspected as seen in case 3 with finding consistent with encephalopathic changes. MRI is used to detect pathological changes related to VE.⁵

Most presentations are nonspecific and initial treatments should be empiric broad spectrum anti microbial and antivirals till a diagnosis is confirmed. 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.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 assumed 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 This finding is consistent with studies that suggest the effectiveness of methylprednisolone in improving clinical outcomes in these children with viral and autoimmune encephalitis.⁸

Methylprednisolone combined with intravenous immunoglobulin also has been associated to enhance treatment efficacy leading to better recovery rate and a faster resolution of symptoms.⁹ It is found to be safe in paediatric patients when given alone or in combination with no increase in adverse affects.¹⁰

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

CONCLUSION

This case series provides observational insights into the use of methylprednisolone for managing severe headaches in paediatric viral encephalitis. While the outcomes were favorable, the evidence remains controversial. Due to its accessibility and feasibility, especially in resource-limited settings, methylprednisolone could be considered as a treatment option, but larger studies are necessary to confirm its role.

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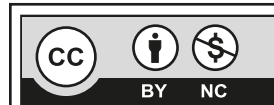
Authors' contribution:

Abia Abdullah; case management, manuscript writing

Jay Kumari; case management, manuscript writing

Prem Chand; concept, case management, manuscript revision

All the authors have approved the final version of the article and agree to be accountable for all aspects of the work.



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