Acute disseminated encephalomyelitis (ADEM) is an acquired inflammatory demyelinating disorder that is commonly a monophasic illness with a favorable prognosis. However, fulminant forms of the disease can lead to widespread demyelination, cerebral edema, and increased intracranial pressure (ICP), resulting in high morbidity and mortality. Anti-myelin oligodendrocyte glycoprotein (MOG) antibodies have been reported in association with ADEM with fulminant demyelination, 

Clinical or radiographic signs of increased ICP became evident by day 3–6 of hospitalization. Neuroimaging from all four children demonstrated restricted diffusion on MRI indicating cytotoxic edema and periventricular zones. She received therapeutic plasma exchange (PLEX) and Intravenous immunoglobulin (IV Ig) following T2 MP. Subsequent MRI showed areas of restricted diffusion. ICP normalized over 2 weeks and 3 days were removed. She arrived 28 days in hospital and was called to hospital rehabilitation. 3 months later, she exhibited marked motor and speech improvement. Neuroimaging finding revealed improvement of ICP. At age 6, she developed optic nerve swelling and was found to be positive for anti-MOG antibodies (1:100, not previously described) and was initiated on intravenous immunoglobulin.

We present a case series highlighting our institutions’ experience with severe cases of anti-MOG antibody associated ADEM requiring aggressive management of increased ICP. Salient features of the patients' demographics, clinical presentations, antidepressant symptoms/associated with increased ICP, treatment course, and outcomes are discussed.

Methods

We identified children who were hospitalized at Children’s Health Medical Center Dallas who were diagnosed with ADEM and had radiographic and clinical signs of increased ICP requiring urgent medical and/or surgical management. All subjects tested positive for anti-MOG antibodies, either concurrently or following ADEM. Chart reviews and data extraction were completed under protocols approved by the UT Southwestern institutional Review Board (STU-022011-211, STU-112016-017).

Results

- Four children were identified who presented from 2010-2018 with ADEM complicated by increased ICP, and were anti-MOG antibody positive.
- Their age of presentation ranged from 3 to 6 years and 2 of the 4 children were female.
- Common presenting symptoms included altered mental status, headache, and vomiting.
- Abnormalities on neurological examination included hypertension, hyporeflexia, ataxia, somnolence, and agitation.
- Clinical or radiographic signs of increased ICP became evident by day 3-6 of hospitalization.
- Intensive care admissions (ICU), therapeutic plasma exchange (PLEX), and/or intravenous immunoglobulin (IV Ig) were commonly utilized acute immunotherapies.
- Other frequently used medical treatments included hyperthermia therapy, barbiturate coma, and histamine blockers for management of increased ICP.
- 3 of the 4 patients underwent surgical management for increased ICP with external ventricular drain or lumbar drain placement.
- Pupillary abnormalities and/or decerebrate posturing were associated with increasing ICP and brain herniation.
- Neuroimaging from all four children demonstrated restricted diffusion on MRI indicating cytotoxic edema.
- Length of hospitalization was significant, ranging from 28 days to 72 days, with the majority of the time spent in intensive care.
- Duration of follow-up ranged from 34 days to 8 years.
- Patients had varying degrees of clinical improvement, but none returned to their baseline cognitive function.
- These patients tested positive for MOG antibodies, with a titer of 1:100 in the two patients tested following the initial ADEM event and 1:100-1,100,000 in the two patients tested during the acute period.
- 2 of 4 MOG patients have had recurrent demyelinating events, while one child is only 7 months past his initial illness and one child hospitalized for ADEM.

Conclusions

- Increased ICP is an uncommon but life-threatening complication of aggressive acute disseminated encephalomyelitis.
- This syndrome may be initially misdiagnosed as an infectious meningoencephalitis, leading to delays in initiating immunotherapy.
- Early signs of severe disease and increasing ICP includes headache, vomiting, and lethargy.
- Pupillary asymmetry, decerebrate posturing, and Cushing’s triad are late findings and are often associated with rapidly increasing ICP and impending herniation.
- Both medical and surgical management strategies should be considered in fulminant cases of ADEM.
- Length of hospitalization is significant and acute rehabilitation is often indicated.
- Neurological morbidity results from both the primary demyelinating syndrome as well as secondary injury from elevated ICP.
- Recurrent demyelinating events were observed 4-8 years after ADEM for the patients with longer durations of follow-up.
- MOG antibodies can be associated with ADEM with fulminant demyelination, cerebral edema, and life-threatening increased ICP.
- Future directions include devising guidelines for escalation of medical and surgical management of ADEM associated with increased ICP and determining the impact of MOG serostatus and likely on ADEM severity and recurrence of CNS demyelination.

Disclosures

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