The authors from the United States presented two children with severe acute manifestations of myelin oligodendrocyte glycoprotein antibody-associated disease (MOGAD). Their neurologic deficits did not respond to acute therapies, but IL-6 receptor blocker tocilizumab rapidly improved the condition in both patients with MOGAD within 24 hours after administration.

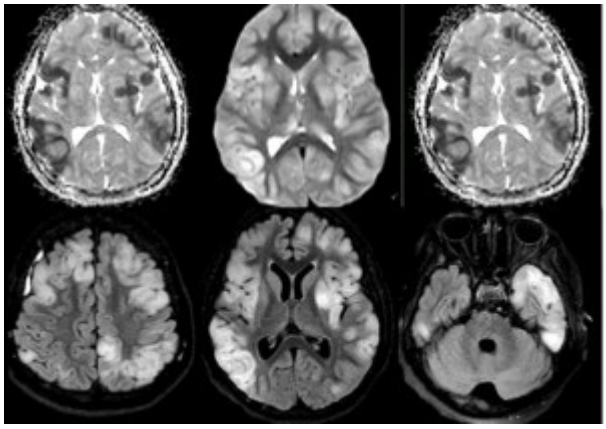
MOGAD is a monophasic or relapsing inflammatory demyelinating disorder. Acute disseminated encephalomyelitis, optic neuritis, and transverse myelitis are the most common clinical presentations. The malignant cerebral edema caused by MOGAD is potentially fatal and may not respond to corticosteroid therapy, intravenous immunoglobulin (IVIG), or therapeutic plasma exchange.

Interleukin (IL)-6 is known to promote CD4+ T-cell differentiation into a Th17 phenotype and is capable of activating plasmablasts and B cells (potentially promoting MOG-IgG production). IL-6 increases the permeability of the blood-brain barrier (BBB), facilitating the ingress of activated MOG reactive cells and circulating MOG-IgG antibodies. The authors emphasized that IL-6 receptor blockade is currently under investigation as a preventative strategy for a relapsing MOGAD. However, there is limited knowledge regarding the use of IL-6 receptor blockers in acute MOGAD attacks.

Cases

Case 1

A 7-year-old boy presented with headache, vomiting, and a generalized convulsive seizure. Analysis of cerebrospinal fluid revealed a predominant lymphocytic pleocytosis (68 cells/mm^3). A contrasted brain magnetic resonance imaging demonstrated multifocal areas of cortical and subcortical T2/FLAIR hyperintensities, and mild leptomeningeal enhancement. Over 48 hours, the patient deteriorated to a Glasgow Coma Scale (GCS) of 8. The brain’s computerized tomography showed diffuse cerebral edema with impending herniation. The serum MOG-IgG was clearly positive.



He was treated with intravenous methylprednisolone and therapeutic plasma exchange sessions, but, the elevation of intracranial pressure, which was continuously monitored by an intraparenchymal catheter, persisted. On day 13, one dose of tocilizumab was given intravenously. His GCS improved within 12 hours. Within the next 72 hours, he became fully alert. On day 19, he got a second dose of tocilizumab. After nine months, his neurological status returned to normal. The control magnetic resonance imaging demonstrated FLAIR hyperintensities, and encephalomalacia. He still suffers from mild behavioral disorder.

Case 2

A 15-year-old adolescent presented with headache, somnolence, and emesis. Analysis of cerebrospinal fluid showed lymphocytic predominant pleocytosis (149 cells/mm^3), and normal levels of proteins and glucose. He became progressively encephalopathic. A contrasted brain magnetic resonance imaging showed multifocal areas of T2/FLAIR hyperintensity and diffuse leptomeningeal enhancement. On day 11, his right pupil was dilated, and the brain's computerized tomography demonstrated diffuse cerebral edema with impending tonsillar herniation. His GCS was 8. He received methylprednisolone and IVIG. An external ventricular drain and meningeal and brain parenchymal biopsy showed neutrophilic predominant inflammation with microglia activation and scattered CD3+ lymphocytic inflammation. The serum MOG-IgG was clearly positive.

Two doses of tocilizumab were administered intravenously, three days apart (days 19 and 22). Within 24 hours of the first dose of tocilizumab, the intracranial pressure was normalized. By 48 hours, he was awake (GCS of 14). After therapeutic plasma exchange sessions, he received IVIG. Five months after the onset of the disease, he had a normal neurologic examination and a mild memory/cognitive impairment. The control magnetic resonance imaging demonstrated improvement in T2/FLAIR hyperintensity, and serum MOG-IgG was negative. Seven months after the onset, he presented with recurrent seizures,

positive serum MOG-IgG, and elevated serum level of IL-6 (246 pg/mL). Because of the concern for MOGAD relapse, IVIG was started. He recovered, and he was able to return to school without any further relapses.

The investigators also discussed the importance of BBB disruption for the use of anti-IL-6 receptor therapy. The findings showed that IL-6 receptor blocker rapidly improved the condition in children with MOGAD, so, the investigators suggested that tocilizumab might be considered for severe acute life-threatening form of MOGAD.

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