CR
CASE REPORT
E.P.C.M.S.

Neuromyelitis Optica - Devic's Disease

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ABSTRACT/BACKGROUND INFORMATION
Neuromyelitis optica (NMO) is an uncommon demyelinating disease that is considered a variant of multiple sclerosis (MS) affecting the optic nerves and spinal cord. We wish to report this case because often, distinguishing between NMO and MS can be extremely difficult. Clinical presentations of these autoimmune conditions often overlap and current imaging techniques make assessment of lesions extremely challenging. The management options for the two conditions are very different, and thus it is essential to make the correct diagnosis, and begin treatment measures promptly for the best possible prognosis.

CASE REPORT
A 15-year-old Hispanic girl presents to the ED complaining of pain, weakness, and some loss of sensation in all extremities, without history of injury. Weakness began in the right lower leg and left upper arm one month ago, and has since progressed bilaterally. She has now been unable to walk for one week.

Past medical history shows no complications or extended hospitalization during labor and pregnancy. History is significant for previous hospitalization and diagnosis of idiopathic thrombocytopenic purpura (ITP) two years ago. She has no previous history of surgeries, and current medications include Prednisone 50mg for managing the ITP. Drug allergies include diclofenac and fluconazole; upon administration, she develops a pruritic rash and edematous feet. She denies history of decreased vision, or any other constitutional symptom, however does mention a fever of one-day duration, which occurred two weeks ago. Family history is non-contributory, and currently the patient lives with her maternal aunt where she has no sick contacts.

Vital signs upon admission are within normal limits for her age. Physical exam reveals profound weakness in all extremities. She is alert and oriented to person, place, time, and situation. Motor strength is decreased - LUE 3/5, RUE 2/5, LLE 2/5 and RLE 3/5. Exam also shows diminished pinprick, pressure, vibration, and fine touch sensation bilaterally in all extremities. Deep tendon reflexes are brisk in both lower extremities and a Babinski response is observed bilaterally. Cranial nerves II-XII are grossly intact.

Pertinent laboratory findings ordered included CBC: Hb: 11.1, Hct: 33.9, MCV: 72.4, MCH 23.7; ESR: 57; CSF differential: 81% lymphocytes, glucose: 42. Other laboratory values were ordered for assessing autoimmune pathology via antibody testing:

- Serum NMO-IgG: (+) (Rules in NMO)
- HTLV-I/II Ab: (-) (Rules out HTLV-I/II infectious etiology)
- M. pneumo IgM Ab by IFA: (-) (Rules out M. pneumo infectious etiology)
- Lyme disease serology: (-) (Rules out Lyme disease)
- CSF IgG, synthesis rate: WNL (Rules out MS)
- CSF Oligoclonal banding, CSF and serum bands: (-) (Rules out MS)

Imaging tests were ordered to assess for mass effects secondary to tumors, infectious processes, or other vascular processes:

- CT Head/Brain without contrast: Normal in size and configuration with no mass effect, midline shift, or extra-axial fluid collection. (Rules out tumor and mass effects)
- MRA Head/Neck without contrast: Angiographic images of intracranial arteries fail to reveal focal stenosis, aneurysms, or vascular malformations. (Rules out stroke vs. encephalopathy)
- MRI Brain with and without contrast: MRI examination demonstrates a pattern of biphasic demyelinating disease. (Rules out stroke vs. encephalopathy)
- MRI Cervical/Thoracic spine with and without contrast: Presence of multiple expansive intraspinal intradural intramedullary lesions in the C-spine and entire thoracic cord. (Rules out encephalopathy vs. MS)
- Visual Evoked Response testing showed decreased vision in the left eye and confirmed suspicions of optic neuritis

She is admitted to the floor for additional evaluation and further workup is conducted.

DIAGNOSIS: Devic's Neuromyelitis Optica

DISCUSSION
Neuromyelitis Optica (NMO) is an inflammatory disease of the central nervous system which causes inflammation to myelin exclusively affecting the optic nerves and spinal cord (1). An IgG1 autoantibody (NMO-IgG) that binds aquaporin 4 has been identified in the sera of a significant number of patients, as well as in patients with optic neuritis (ON), and longitudinal extensive transverse myelitis.

There are two major types of NMO. In the first type, optic neuritis, (inflammation of the optic nerve), and myelitis, (inflammation of the spinal cord), episodes tend to come very close together, often within days or weeks; often, there is no recurrence

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after the initial flurry of symptoms. In the second form, repeated episodes of optic neuritis and myelitis occur that are separated by months or years without symptoms.

The inflammatory lesions seen in Devic's disease, or NMO, have been characterized as perivascular complement mediated demyelinization, however the exact mechanism of how an NMO IgG-mediated immune response leads to demyelination is still unknown. Mayo clinic guidelines (2006) – requires 2 absolute criteria and at least 2/3 supportive criteria.

Absolute criteria:
- Optic neuritis
- Acute myelitis

Supportive criteria:
- Brain MRI not meeting criteria for MS at disease onset
- Spinal cord MRI with contiguous T2-weighted signal abnormality extending over 3 or more vertebral segments, indicating a relatively large lesion in the spinal cord
- NMO-IgG seropositive status. The NMO-IgG test checks the existence of antibodies against the aquaporin 4 antigen

The treatment of initial attack includes combination of a corticosteroid (methylprednisone, prednisone) with an immunosuppressant (azathioprine, mycophenolate mofetil) to prevent subsequent attacks. If patient has recurrent Devic's disease, continued low dose steroids is recommended. If patient is unresponsive to corticosteroid therapy, plasmapheresis is often used to separate antibodies out of the blood stream. When our patient was readmitted 2 weeks later for noncompliance with medications, a series of 5 plasmapheresis procedures were conducted. The relapse rate is approximately 60% after 1 yr and 90% in 3 yrs (3). Observational reports show Rutiximab may induce remission in patients who continue to relapse (4).

REFERENCES

1. Cree BAC, Goodin DS, Hauser SL: Neuromyelitis Optica. Semin Neurol 2002, 22:105-22

2. Lennon VA, Kryzer TJ, Pittock SJ, Verkman AS, Hinson SR: IgG marker of optic-spinal multiple sclerosis binds to the aquaporin-4 water channel. J Exp Med 2005, 202:473-7

3. Wingerchuk DM, et al. The spectrum of neuromyelitis optica. Lancet Neurology. 2007; 6:805-815.

4. Capobianco M, et al. Variable responses to rutiximab treatment in neuromyelitis optica (Devic's disease). Neurol Sci (2007) 28:209–211

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