Atypical Demyelinating Syndrome: Young Adult with Acute Left Hemiparesis as First Sign of Rare Multiple Sclerosis Variant

Katherine Kitzenberg, PA-C, Alexandria Swanson, PA-C
Division of Neurology

BACKGROUND

Multiple sclerosis (MS) is a chronic disease of the central nervous system (CNS) characterized by inflammation, demyelination, and axonal injury [4]. Tumefactive multiple sclerosis (TMS) or a Tumefactive demyelinating lesion (TDL) is a rare MS variant (1-3 in 1000 case of MS) that presents with a large lesion that mimics other CNS tumors [1,3].

The symptoms associated with TMS vary depending on lesion size, location, and surrounding effect [3] A lack of pathognomonic characteristics often means misdiagnosis, especially without a prior MS diagnosis. An estimated 53% to 78% of patients have a TDL as first sign of MS [1].

Patients generally respond well to first line treatment, but some need additional therapies. Since recurrent attacks are a hallmark of MS, patient often go on to need lifelong preventative therapy.

We present this atypical case of TMS to broaden the knowledge and understanding of demyelinating diseases and highlight the importance of differentiating TMS from other space occupying lesions for prompt, proper management [4].

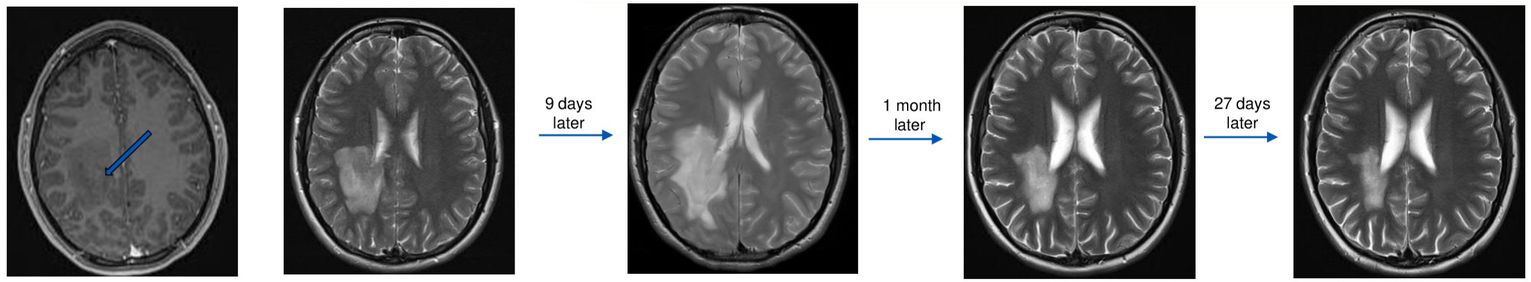
OBJECTIVES

1. Increase knowledge and understanding of TMS
2. Recognize the typical features of demyelinating lesions that make it stand out from mimickers, such as neoplasms, progressive multifocal leukoencephalopathy (PML), and abscesses.
3. Review treatment options and prognosis

CASE PRESENTATION

- 21-year-old female with history of ADHD and iron deficiency anemia presents to ER with acute left hemiparesis, neglect, and headaches progressing over 2 days
- Examination: Left arm and leg paresis and ataxia. Left visual and sensory neglect. Left homonymous hemianopia. Mild dysarthria. Brisk left reflexes. Sustained left ankle clonus. Left hand agraphesthesia and astereognosis.
- CT/CTA brain revealed a hypodense area within the right parietal lobe without vasogenic edema or mass effect with correlating decreased T-max.
- MRI brain (IMAGE 2) revealed a large (> 3 cm) right parietal lobe subcortical hyperintense mass with peripheral diffusion restriction, subtle nodular enhancement centrally (see arrow IMAGE 1), and mild elevation of cerebral blood volume. MRI of the cervical/thoracic spine without abnormalities.
- CSF: neutrophilic pleocytosis, elevated protein, & 5 oligoclonal bands. Flow cytometry and cytology unrevealing.
- Hospital day (HD) 1: Started on plasmapheresis x 7 days for suspected demyelination. Patient with a low-grade fever; Empirically started on Vancomycin and Zosyn. Steroids held for continued infectious work up.
- HIV and JC virus negative in both serum and CSF. Serum negative for NMO/AQP4.
- HD 3: Started on IV methylprednisolone x 5 days with plan to transition to oral prednisone taper after
- No clinical improvement over the next week. Repeat MRI (IMAGE 3) showed *increased* size of lesion with extension into posterior limb of internal capsule
- Started on cyclophosphamide x 5 cycles.
- Progressive improvement of left sided strength. Patient received daily physical and occupational therapy.
- HD 22: Discharged with diagnosis of TMS to acute rehab facility with oral steroid taper.
- Rehab day (RD) 14: Developed blurry vision. ED visit for possible optic neuritis. Patient was given IV methylprednisolone x 3 days. MRI brain (IMAGE 4) showed decreased size of parietal lobe mass
- Up to date, patient has had no new symptoms/attacks and her weakness has nearly resolved. She is walking independently, without the use of assistive devices, and able to execute all her activities of daily living. Her residual left visual field deficits prohibit her from safely driving. She is participating in outpatient physical therapy 3x per week.
- At neurology follow up appointment, decision was made to transition to maintenance therapy with Ocrevus, an anti-CD20 medication, pending authorization.
- Latest MRI (IMAGE 5): Continued interval decrease in FLAIR hyperintense posterior hemisphere lesion plus no new suspicious lesions.

ALL IMAGES: MR BRAIN, AXIAL VIEW



IIMAGE 1: **11/22/2023** T1 C+

IIMAGE 2: **11/22/2023** T2

IIMAGE 3: **12/1/2023** T2

IIMAGE 4: **12/31/2023** T2

IIMAGE 5: **1/27/2024** T2

DISCUSSION

TMS benefits from thoughtful diagnosis and early aggressive treatment.

- MAKING THE **DIAGNOSIS**
  - Clinical presentation can vary greatly and often different from that seen in typical MS. [2]. Often polysymptomatic including motor, sensory, cognitive and cerebellar deficits.
  - MRI is the best study (correlating *hypodensity* on CT can be a helpful sign). MRI features favoring TDLs include [1,4]:
    - white matter > grey
    - well circumscribed
    - frontal or parietal lobes
    - contrast enhancement **(95%)**
    - peripheral restriction
    - mass effect (45%)
    - edema (77%)
    - large (>2 cm)
  - Exclude mimics by testing for HIV, JC virus, ANA, ENA, etc. in serum and CSF. CSF can show *unmatched oligoclonal bands* and *elevated IgG* in TDL [4].
  - Brain biopsy can be considered in difficult cases including immunocompromised patients
- STARTING **TREATMENT** [2]
  - Start with high-dose IV corticosteroids
  - Observe clinical / radiograph response
  - Consider plasma exchange, cyclophosphamide or rituximab
  - Life-long therapy? Two thirds of these patients will progress to develop MS with a relapsing remitting course [2] warranting disease modifying therapies (DMT).

CONCLUSIONS

- This uncommon neurological disease can easily be mistaken for other CNS processes. Reaching the diagnosis of TMS is challenging and requires a high level of suspicion followed by thorough investigation. Knowing the typical MRI features of TDLs and other helpful diagnostic modalities to order can improve time to diagnosis and initiation of critical treatment.
- While we have treated our patient acutely and she is making great strides in her recovery, she may go on to develop MS with a relapsing-remitting course and we need to be prepared to assist with the medical and financial implications of that diagnosis on a young person's life.

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