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Area Postrema Syndrome: A Rare Initial Presentation of Neuromyelitis Optica Spectrum Disorder

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Clinical Presentation

- 26-year-old female initially presented to the ED with severe, intractable nausea and vomiting for one month
- Patient left AMA before complete work up could be obtained but returned six weeks later with new complaint of acute onset, painless vision loss in her right eye for five days
- Also reported generalized weakness and an unsteady gait leading to frequent falls for one month

Imaging Discussion

- MRI of the head obtained on patient's second presentation
- Findings
  - T2 FLAIR signal hyperintensities of bilateral optic pathways and periependymal regions along lateral and third ventricles
  - T2 FLAIR signal hyperintensities of periaqueductal gray

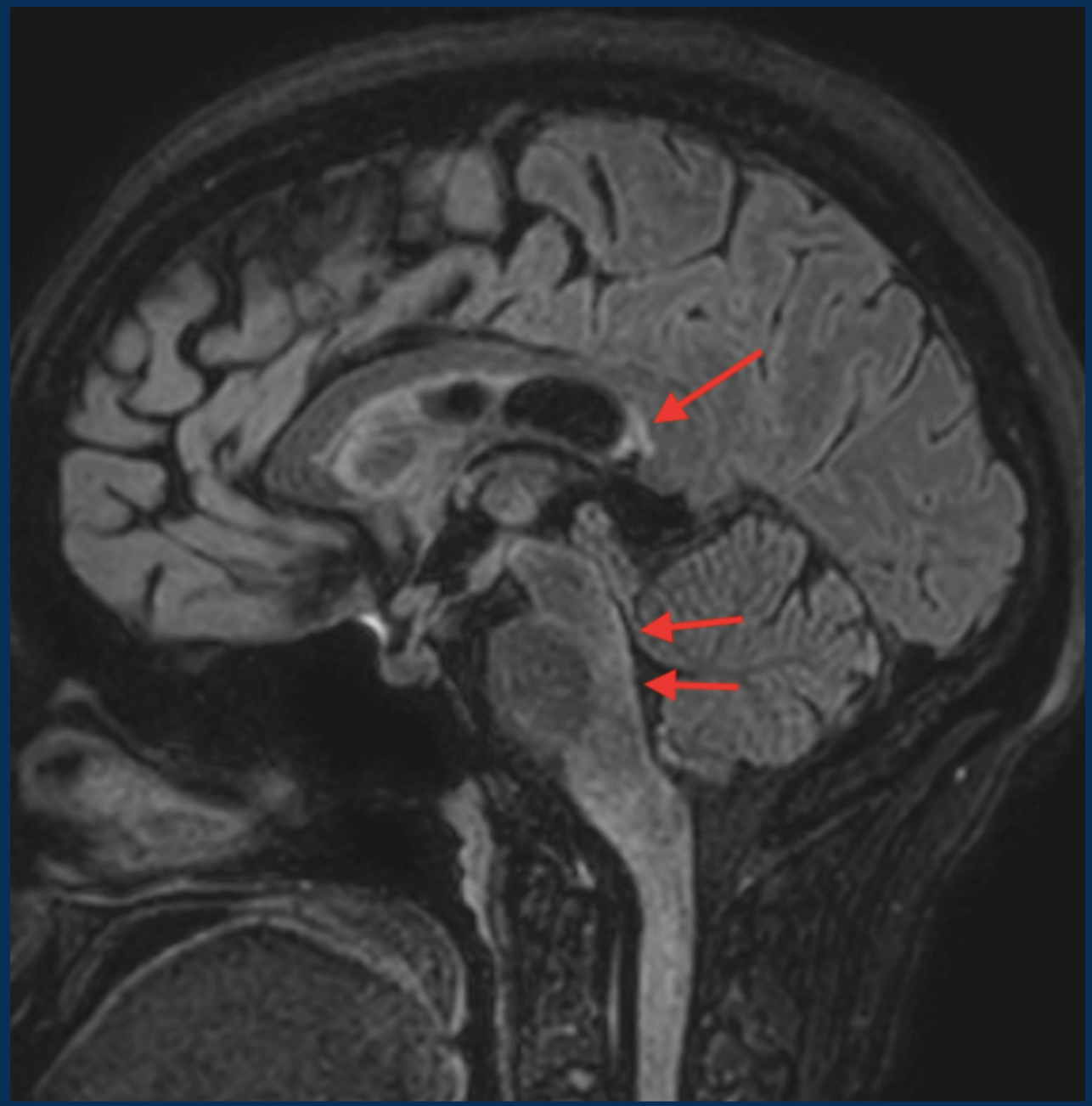

Figure 1. Sagittal T2 FLAIR of head with hyperintense lesions on second presentation (arrows).

Imaging Discussion

- Imaging features of Neuromyelitis Optica Spectrum Disorder (NMOSD) and Multiple Sclerosis (MS) have some overlap but can be useful to help distinguish between the two
- For this patient, pattern of lesions noted as not characteristic of MS and evaluation of CSF cytology was recommended

TABLE 2. Brain and Spinal MRI Features and MRI Measurements from NMOSD and MS Patients (All Patients)

Brain	NMOSD, n = 116	MS, n = 65	*p*	AQP4 pos, n = 98	AQP4 neg, n = 18	AQP4, pos vs neg, *p*
Patients with, n (%)						
≥1 brain WM lesion	94 (81.0)	65 (100.0)	<0.0001[a]	79 (80.6)	15 (83.3)	0.91[a]
≥1 typical NMOSD brain WM lesion	59 (50.9)	22 (33.8)	0.05[a]	50 (50.1)	9 (50.0)	0.94[a]
≥1 dorsal brainstem periependymal/periaqueductal lesion	21 (18.1)	16 (24.6)	0.29[a]	19 (19.4)	2 (11.1)	0.52[b]
≥1 periependymal lateral ventricle lesion	38 (32.7)	4 (6.1)	<0.0001[b]	32 (32.7)	6 (33.3)	0.95[a]
≥1 large hemispheric lesion	4 (3.4)	3 (4.6)	0.79[b]	4 (4.1)	0 (0.0)	1.00[b]
≥1 diencephalic lesion	7 (6.0)	0 (0.0)	0.05[b]	7 (6.0)	0 (0.0)	0.59[b]
≥1 CST lesion	5 (4.3)	1 (1.6)	0.42[b]	5 (5.1)	0 (0.0)	1.00[b]
2010 DIS McDonald criteria fulfilled	43 (37.1)	65 (100)	<0.0001[a]	35 (35.7)	8 (44.4)	0.48[a]
≥1 periventricular lesion	71 (61.2)	63 (96.9)	<0.0001[a]	59 (60.2)	12 (66.6)	0.60[a]
≥1 juxtacortical lesion	49 (42.2)	61 (93.8)	<0.0001[a]	44 (44.9)	5 (27.7)	0.20[b]
≥1 posterior fossa lesion	45 (38.8)	51 (78.5)	<0.0001[a]	38 (38.8)	7 (38.8)	0.99[a]
≥1 nonspecific lesion	94 (81.0)	65 (100.0)	0.003[a]	79 (80.6)	15 (83.3)	0.91[a]
≥1 cortical lesion	0 (0.0)	34 (52.3)	<0.0001[b]	0 (0.0)	0 (0.0)	—
≥1 Dawson finger	14 (12.1)	42 (64.6)	<0.0001[a]	11 (11.2)	3 (16.6)	0.45[b]
≥1 inferior temporal lobe lesion	17 (14.6)	24 (36.9)	0.001[a]	16 (16.3)	1 (5.5)	0.47[b]
Median brain T2 LV, ml (IQR)	0.36 (0.08–2.08)	3.84 (1.64–8.62)	<0.0001[c]	0.30 (0.06–2.08)	0.59 (0.08–3.62)	0.5[c]
Median brain T1 LV, ml (IQR)	0.13 (0.00–0.76)	2.58 (1.03–6.58)	<0.0001[c]	0.11 (0.00–0.77)	0.28 (0.04–0.92)	0.32[c]
Median brain T1/T2 LV (IQR)	0.49 (0.23–0.69)	0.66 (0.48–0.77)	0.0004[c]	0.49 (0.19–0.65)	0.60 (0.39–0.85)	0.15[c]

Cacciaguerra et al. Annals of Neurology, 2019.

Further Workup and Diagnosis

- Serological analysis confirmed presence of **aquaporin4-IgG (AQP4-IgG)**
- Given this along with clinical and imaging findings, patient met the diagnostic criteria for **Neuromyelitis Optica Spectrum Disorder**
- Original complaint of intractable N/V was attributed to **Area Postrema Syndrome (APS)** as an initial presentation of NMOSD

Imaging Discussion

- After initial diagnosis, patient returned to hospital with recurrent symptoms of APS three months later
- Symptoms consistent with the episodic course typical of NMOSD
- Compared to prior imaging, MRI of the head at this time showed **increased** T2 FLAIR signal hyperintensity and postcontrast enhancement along the dorsal medulla and in the bilateral optic pathways

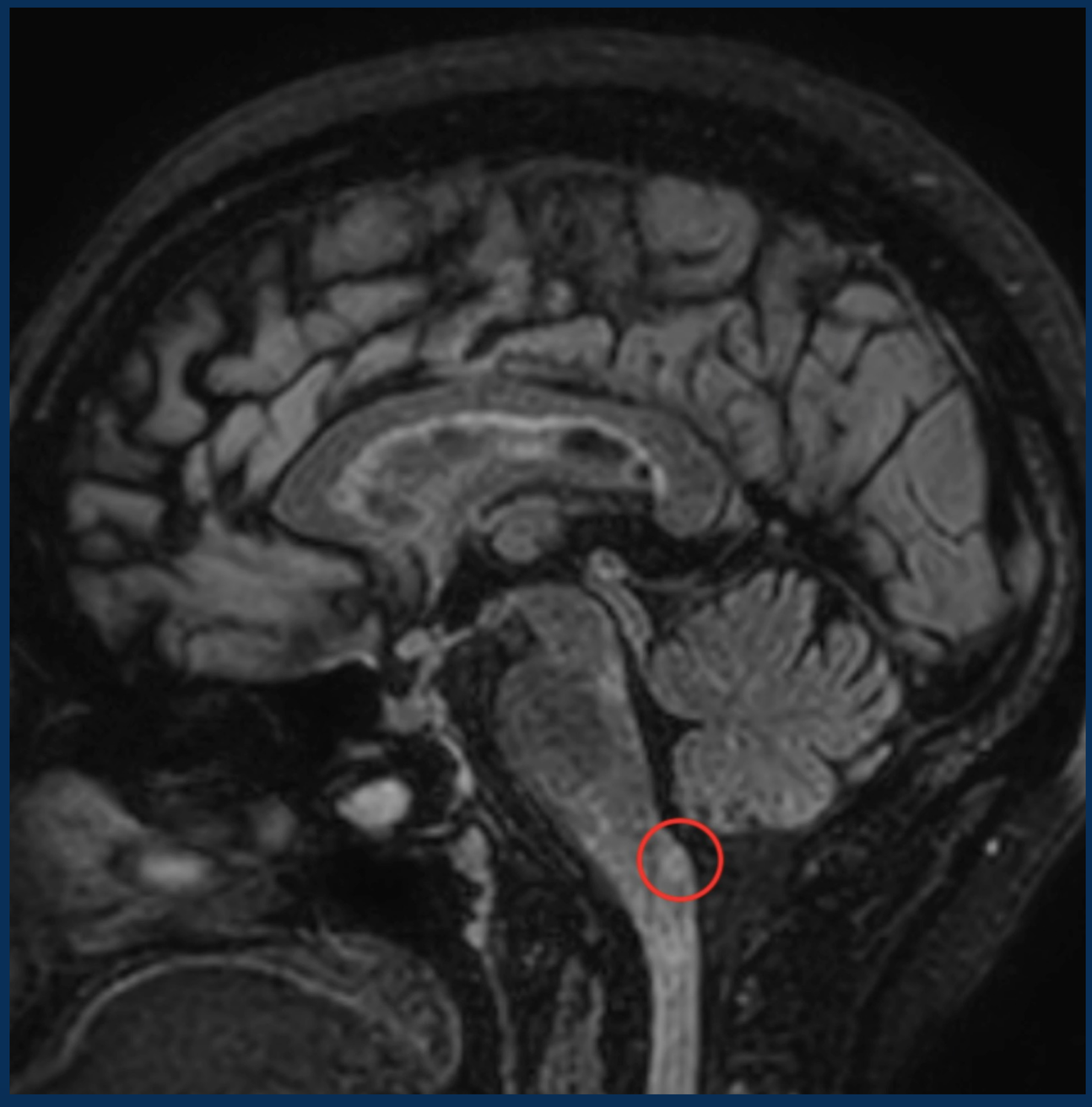

Figure 2. Sagittal T2 FLAIR of head with dorsal medulla hyperintensity (circle).

Management

- Acute management
  - Patient given high-dose methylprednisolone and plasmapheresis during flares of NMOSD
- Maintenance therapy
  - **Inebilizumab**: immunotherapy comprising of CD19-directed humanized IgG that depletes B-cells involved in production of AQP4-IgG
  - Reduces risk of NMOSD flares and long-term disability
  - Patient started on inebilizumab seven months after initial diagnosis

Outcomes

- Four months after starting inebilizumab, patient reported improved leg strength and gait
- No interval falls
- Interval imaging with MRI showed **near complete resolution** of signal abnormality changes in the anterior visual pathways, periependymal regions, and dorsal medulla

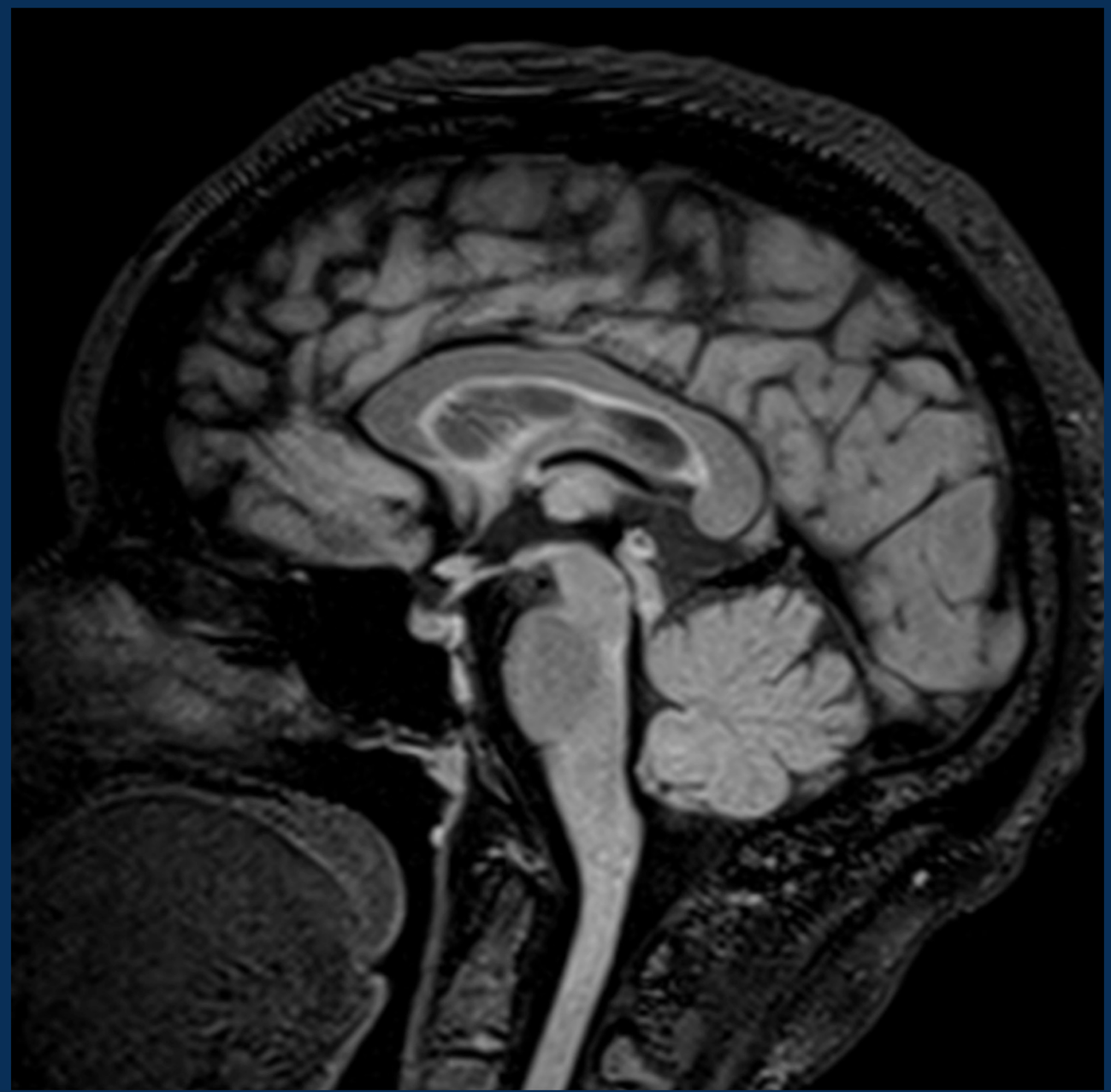

Figure 3. Sagittal T2 FLAIR of head four months after starting inebilizumab therapy.

Take Home Points

- NMOSD can present with symptoms of APS, such as intractable nausea and vomiting
  - May precede the onset of typical neurological manifestations
- MRI findings of the brain and spinal cord help differentiate NMOSD from alternative CNS demyelinating disorders like multiple sclerosis
- Imaging in conjunction with positive AQP4-IgG and one core clinical characteristic can establish the diagnosis
- Early recognition and treatment of NMOSD with immunomodulatory maintenance therapies is important to reduce disease flares and progression of long-term disability in patients with NMOSD

References

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