Acute onset ataxia and dysmetria in patient with ring enhancing left cerebellar lesion

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Cas: A 16 year old female patient with no PMH presented to CHNOLA ED with one week history of headache and three-day history of left-sided weakness. She had tested positive for COVID after a known exposure one week prior. After five days of progressive headache without aura, patient began to experience difficulty walking due to left leg weakness and discoordination. She denied frank numbness, tingling, burning sensation, vision or hearing changes, difficulty speaking or swallowing, or facial weakness. After two days of weakness, she presented to an OSH where Head CT showed focal hypodense cerebellar lesion in L hemisphere and MRA and labs were unremarkable. Radiologic interpretation and report are inconsistent with description of lesion as poorly vs. well circumscribed. She was transferred to CHNOLA with concerns of stroke. Notable on neurologic exam were intact cranial nerves and sensation, reduced muscle strength with stuttering effort on L extremities, LLE crossed adductor sign, and prominent dysmetria on left. MRI Brain wo contrast at CHNOLA showed hyperintense well-circumscribed peripherally enhancing lesion of the left superior cerebellum adjacent to the vermis and fourth ventricle with minimal, but present, mass effect on the adjacent fourth ventricle. Infectious and neoplastic causes were ruled out with consults from oncology, infectious disease, and neurosurgery teams. Patient improved on intravenous steroids after three days with weakness and mild dysmetria on left side remaining. After patients' departure, her CSF tested positive for oligoclonal bands. Patient completed outpatient steroid taper, weakness and dysmetria greatly improved, and is following outpatient with CHNOLA neurology team.

Discussion: Acute onset ataxia, dysmetria, one sided weakness, and headache in a previously healthy 16-year-old are concerning for post infectious syndromes (ADEM, cerebellitis), neoplasm, stroke, infectious cause (toxoplasmosis, abscess), and autoimmune/inflammatory syndrome (multiple sclerosis, sarcoidosis). Besides obtaining a thorough history and physical exam, workup includes initial brain imaging (MRI and/or CT head) [1]. If there is concern for stroke, both head and neck CT angiography or MR angiography are obtained. Initial laboratory work includes a CBC, CMP, UDS, and lumbar puncture in cases suspicious for infectious or inflammatory cases [2]. Neoplastic and infectious causes must be ruled out before assumption of post-infectious or autoimmune processes due to need for immediate treatment. In this case, a neoplastic cause was unlikely given the limited mass effect and inflammatory edema caused by the lesion. A metastasis from leukemia or lymphoma was considered, but her normal complete blood count and lack of B symptoms made this unlikely [4]. An infectious cause was ruled out based on the normal complete blood count, lack of fever, and unremarkable results on lumbar puncture [5]. Determining exact etiology of post-infectious or inflammatory cause is not necessary clinically as steroids are recommended in most cases. Etiology is thus more helpful to determine progression of disease and any possibly future risks. Post-infectious cerebellitis has been linked to COVID-19, though often presents with nausea, vomiting, and bilateral, diffuse cerebellar lesions [6, 7]. Though rare, demyelinating lesions such as in multiple sclerosis can cause mass effect that eventually subsides with treatment. Though diagnosis of any one disease process has not been made, presence of oligoclonal bands in CSF is concerning for recurrence of demyelinating lesions and possibly a future multiple sclerosis diagnosis. Furthermore, COVID-19 infections have been temporally linked to MS onset and exacerbation warrants outpatient monitoring and patient education on both MS and other inflammatory disorders [8,9].

1. Radhakrishnan, Rupa et al. “ACR Appropriateness Criteria® Ataxia-Child.” *Journal of the American College of Radiology*, Volume 19, Issue 11, S240 – S255
2. Caffarelli, Mauro et al. “Acute Ataxia in Children: A Review of the Differential Diagnosis and Evaluation in the Emergency Department.” *Pediatric Neurology*, Volume 65, 14 – 30
3. Waldman AT, Gorman MP, Rensel MR, et al. Management of pediatric central nervous system demyelinating disorders: consensus of United States neurologists. *J Child Neurol*. 2011;26(6):675-682. doi:10.1177/0883073810395141
4. Nabors LB, Portnow J, Ahluwalia M, et al. Central Nervous System Cancers, Version 3.2020, NCCN Clinical Practice Guidelines in Oncology. *J Natl Compr Canc Netw*. 2020;18(11):1537-1570. doi:10.6004/jnccn.2020.0052
5. Lu KH, Bruns N, Pentek C, et al. Pediatric Community-Acquired Brain Abscesses: A Single-center Retrospective Study. *Pediatr Infect Dis J*. 2024;43(6):e214-e217. doi:10.1097/INF.0000000000004308
6. Najdaghi, S., Narimani Davani, D., Hashemian, M., & Ebrahimi, N. (2024). Cerebellitis following COVID-19 infection: A case-based systematic review and pooled analysis. *Heliyon*, *10*(14), e34497. https://doi.org/https://doi.org/10.1016/j.heliyon.2024.e34497
7. Yildirim, M., Gocmen, R., Konuskan, B., Parlak, S., Yalnizoglu, D., & Anlar, B. (2020). Acute Cerebellitis or Postinfectious Cerebellar Ataxia? Clinical and Imaging Features in Acute Cerebellitis. Journal of child neurology, 35(6), 380–388. https://doi.org/10.1177/0883073820901407
8. Fragoso, Y. D., Pacheco, F. A. S., Silveira, G. L., Oliveira, R. A., Carvalho, V. M., & Martimbianco, A. L. C. (2021). COVID-19 in a temporal relation to the onset of multiple sclerosis. *Multiple sclerosis and related disorders*, *50*, 102863. https://doi.org/10.1016/j.msard.2021.102863
9. Avila, M., Tan, Y., Hernandez, R. et al. Multiple Sclerosis and Neuromyelitis Optica Spectrum Disorder: Onset Following Acute COVID-19 Infection, a Case Series. Neurol Ther 12, 319–327 (2023). https://doi.org/10.1007/s40120-022-00418-9