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Misleading Medulla: Atypical NMOSD Masquerading as Posterior Circulation Stroke

Deepika Dalal[1], Mridula Singh[2], Ritesh Kumar[3], Rajinder K Dhamija[4]

[1]Senior Resident Neurology, Department of Neurology, Institute of Human Behaviour and Allied Sciences, New Delhi, India
Email: *deepi.dalal.10[at]gmail.com*

[2]Assistant Professor Neurology, Department of Neurology, Institute of Human Behaviour and Allied Sciences, New Delhi, India

[3]Senior Resident Neurology, Department of Neurology, Institute of Human Behaviour and Allied Sciences, New Delhi, India

[4]Professor and Head of Department, Department of Neurology, Institute of Human Behaviour and Allied Sciences, New Delhi, India

Abstract: ***Neuromyelitis optica spectrum disorder (NMOSD) is an autoimmune astrocytopathy which typically involve the optic nerves, spinal cord and brain stem regions. It's an Aquaporin - 4 related channelopathy. Typically characterized by the core clinical features of optic neuritis, acute myelitis, area postrema syndrome, acute diencephalic syndrome, acute brainstem syndrome and symptomatic cerebral syndrome. Although clinical presentation of the patients can be variable. Herein we report an interesting case of 33 - year young female patient who initially presented with acute onset ataxia and vertigo, her imaging was suggestive of right lateral medullary infarct. Therefore, she was started on antiplatelets and statin. However, patient clinically worsened along with new symptoms. On further evaluation, patient serum serology was strongly positive for Aquaporin - 4 antibody thus turning out to be NMOSD. Subsequently our patient revealed that her maternal aunt also diagnosed with NMOSD four years back, suggesting likely a familial predisposition.***

Keywords: NMOSD, Aquaporin - 4, Astrocytopathy, LETM, Lateral Medullary Syndrome

1. Introduction

Eugène Devic and Fernand Gault described relatively new disease characterized by optic neuritis and acute transverse myelitis in 1894 [1] and named as Devic's disease. It was considered as an opticospinal variant of multiple sclerosis. In 2004, anti - Aquaporin 4 (anti - AQP4) antibodies were detected which reliably differentiated between the two [2]. After discovery of IgG antibody against Aquaporin - 4, various clinical spectrum of presentation of this disease reported. The International Panel for NMO Diagnosis (IPND) was convened between 2011 and 2013 to develop revised diagnostic criteria and thereafter in 2015, International consensus - based diagnostic criteria was published for NMOSD to cover the entire clinical spectrum of this disorder [3].

Estimated prevalence of NMOSD is nearly 2 - 4/100, 000 [4] and in India its 2.7/100 000. Non - Caucasian's are more frequently affected. It's 9 times more prevalent in women as compared to men, median age of onset is 40 years [5]. It is mainly sporadic disorder but few familial cases also reported, estimated prevalence of the familial cases around 3.0% [6].

Genetic inheritance pattern of NMOSD is still unknown. There have been some studies on associations with polymorphisms in some specific genes, particularly human leukocyte antigens (HLA) and genetic anticipation.

Here, we describe a case of a young woman from India who presented with acute onset right sided ataxia and vertigo. Her neuroimaging showed right lateral medullary infarct mimicking an ischemic stroke. However, on detailed evaluation, past history of recurrent vomiting and hiccups with severe itching was present which initially patient herself considered irrelevant and not conveyed to us. This led us to investigate for further workup beyond stroke. Eventually further workup led us to the final diagnosis of NMOSD.

2. Case Description

A 33 - years young female patient with no comorbidities presented to our hospital with acute onset ataxia and vertigo for one day. Her National Institute of Health Stroke Scale (NIHSS) score was 3. Her imaging was suggestive of right lateral medullary infarct, so provisionally diagnosed with lateral medullary stroke and managed with antiplatelets and statin. Young stroke workup was done, which was negative.

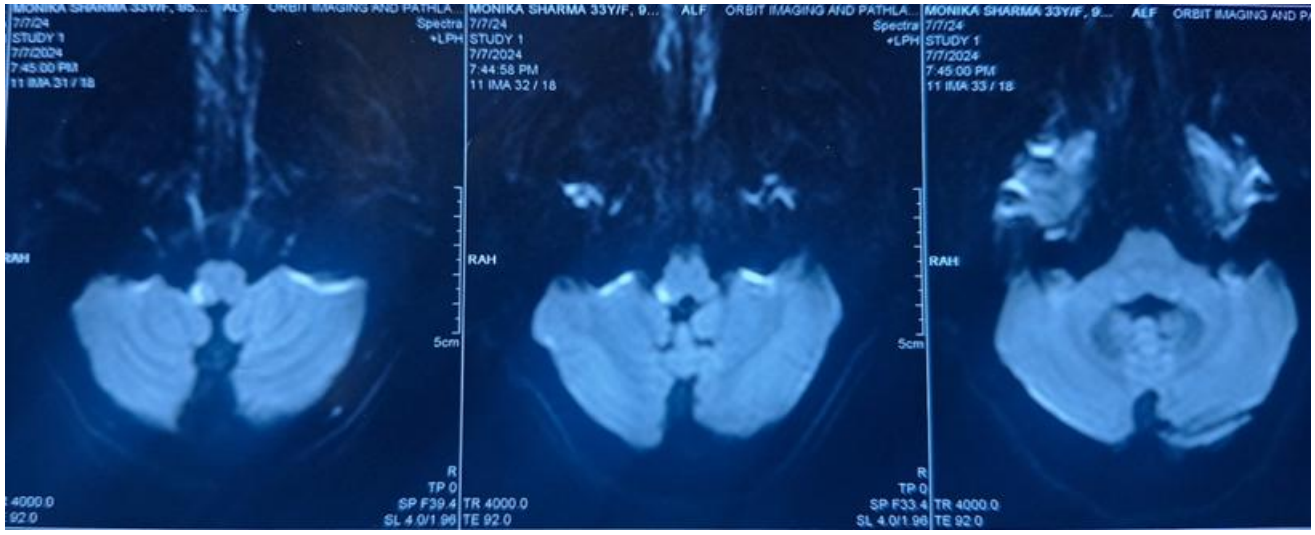


Figure 1: Magnetic resonance imaging (MRI) Brain diffusion weighted sequence axial view - showed diffusion restriction in right lateral medulla

However, two days later she had sensory symptoms and complained of multiple scorpions biting like sensation over her right upper and lower limb associated with severe itching. She also started having urinary complaints in the form of urgency and urge incontinence.

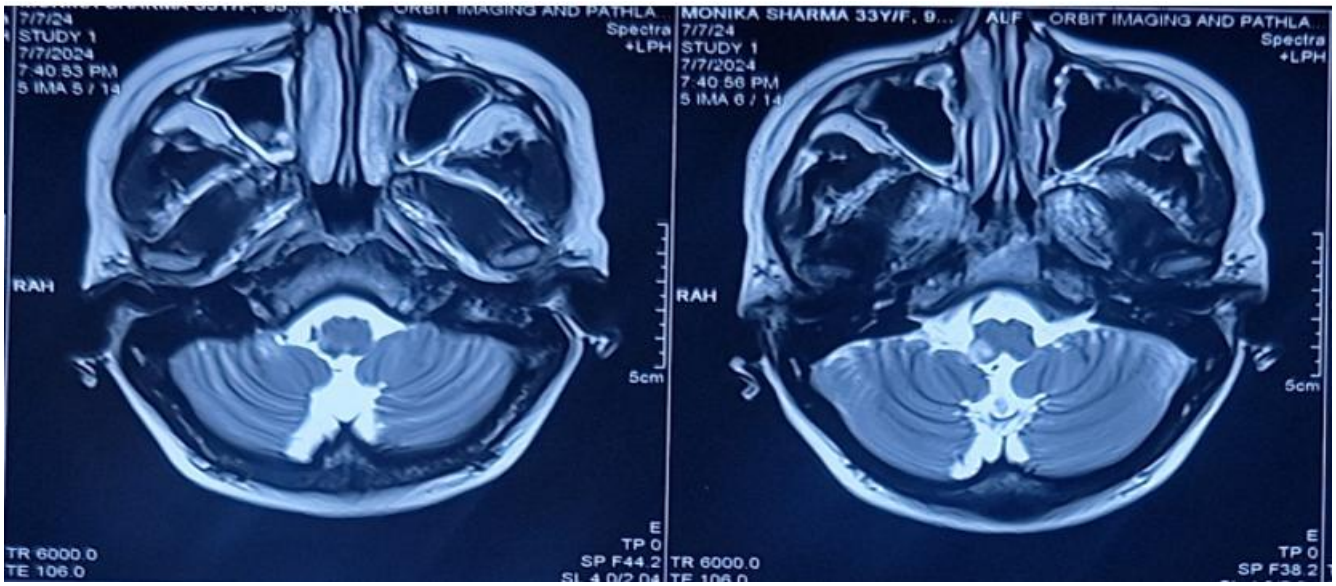
On revisiting her history, she had history of recurrent vomiting and hiccups three month back. She underwent endoscopy twice and got multiple treatment, her symptoms resolved only after around 2 weeks. She also had history of very severe itching over her right groin and inner aspect of thigh. she took dermatological consultation for that. She also had history of altitudinal diminution of vision in her left eye 1 month back, which resolved fully within 10 days.

So, that history provided us clues that patient was having some relapsing remitting disease. Hence an alternative diagnosis particularly neuroinflammatory condition was considered and further we worked up accordingly.

On examination - she was alert and well oriented to time place and person. She had left - sided gaze evoked nystagmus with left eye grade - 3 relative afferent pupillary defect (RAPD). Power in right upper limb and lower limb was 4+/5 and on left side normal. She had dysesthesia over cervical region (C2 - C4) dermatomal areas of right upper limb and lumbar region (L1 - L3) dermatomal area of right lower limb. Cerebellar signs were present on right side.

On workup, her biochemical and infectious blood profile were normal. CT Angiography of head and neck was normal. ANA profile was negative. On Visual Evoked Potential (VEP), P100 latency was prolonged (128) in left eye. Cerebrospinal fluid (CSF) had lymphocytic pleocytosis, with normal sugar and protein. CSF Oligoclonal Band (OCB) were present, three in number, no OCB in serum. Serum Anti - Aquaporin 4 IgG antibody was strongly positive using cell - based assay.

Further MRI brain was suggestive of T2 - FLAIR hyperintensity in peri - ependymal surface of 3rd ventricle, right lateral medulla and MRI Spine had LETM at Cervical region (C3 - C7) and Thoracic region (T6 - T11) region.



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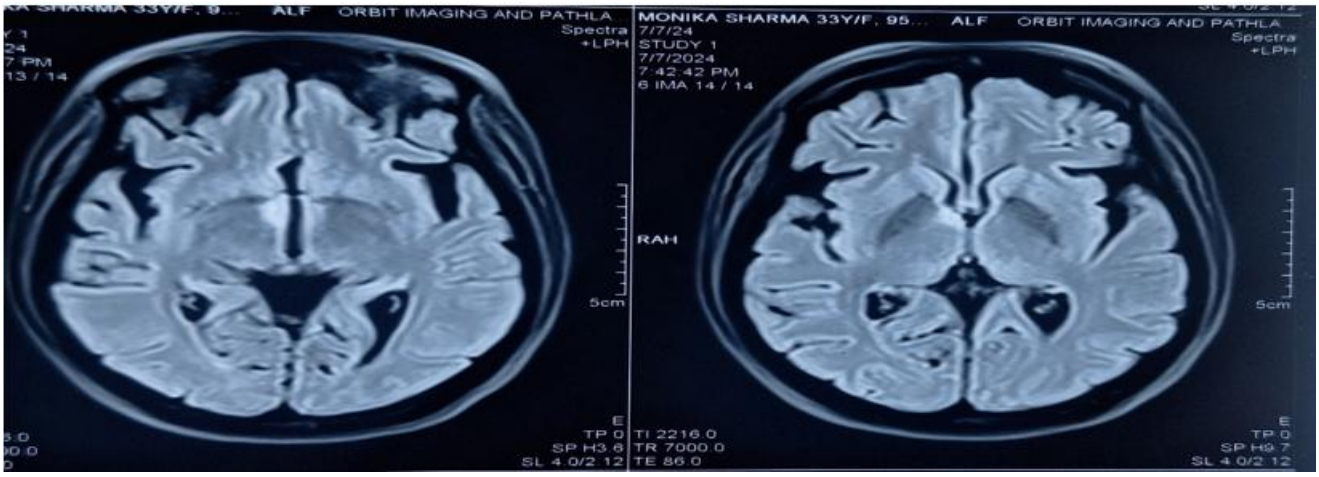
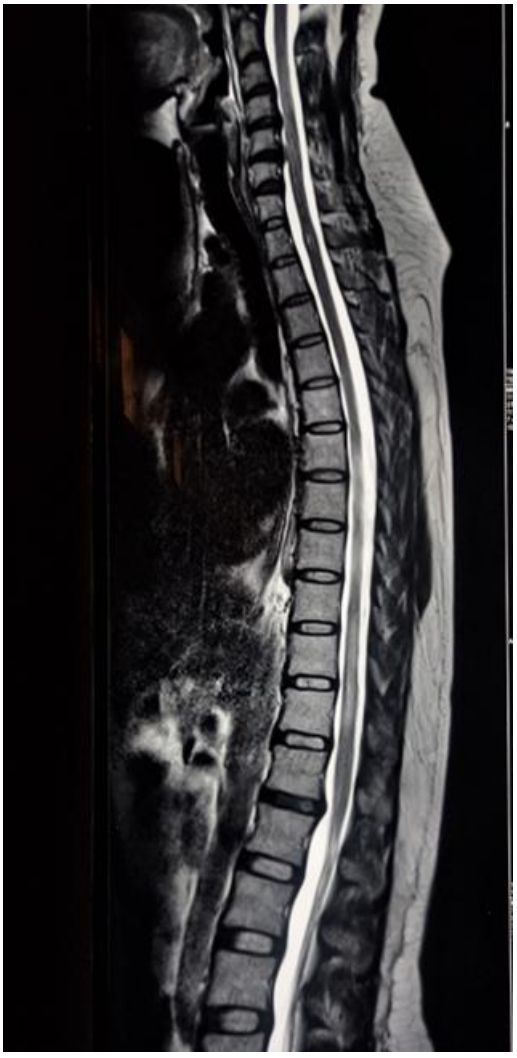


(B)

Figure 2: (A) MRI T2 - weighted sequence axial view showing - hyperintensity in right lateral medulla. (B) FLAIR sequence axial view showing - hyperintensity in peri - ependymal surface of third ventricle (diencephalic region)



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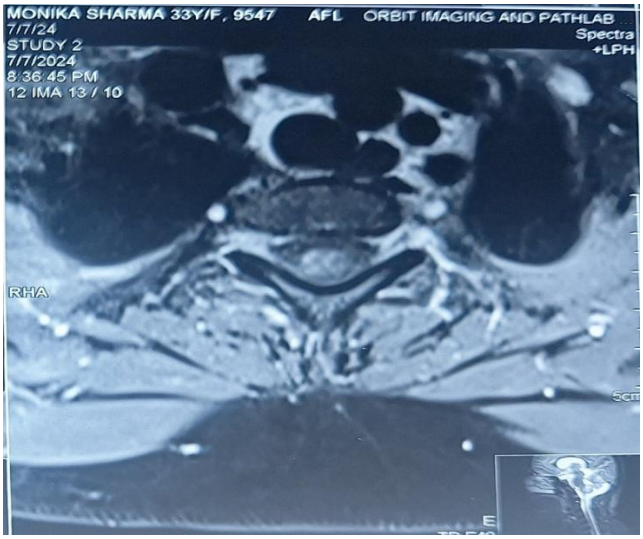

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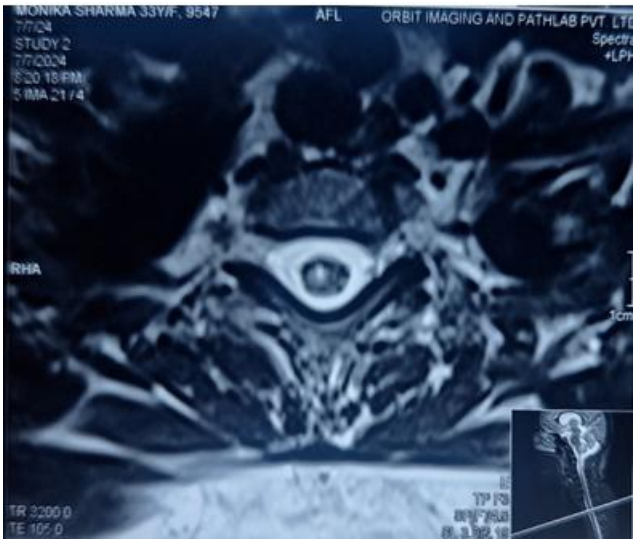

(C)

Figure 3: (A) - MRI spine T2 sagittal view showing longitudinally extensive transverse myelitis (LETM). (B) T1 post contrast axial image of spine showing central cord enhancement. (C) T2 - weighted axial view of spine showing

Bright spotty lesion (BSL), characteristic imaging finding in NMOSD.

According to International Panel for NMO Diagnosis criteria, patient was finally diagnosed with NMOSD. She was treated with intravenous (IV) pulse methylprednisolone (MPS) 1gm for 5 days followed by oral prednisolone. IV Rituximab was given (1gm, 2 weeks apart) to prevent relapse. She responded very well to treatment with no residual disability.

3. Discussion

Clinical syndromes associated with NMOSD are bilateral optic neuritis, longitudinally extensive transverse myelitis (LETM), area postrema syndrome, acute brain stem syndrome, diencephalic syndrome and symptomatic cerebral syndrome.

The interesting imaging feature in our case was involvement of lateral medulla with sparing of area postrema which usually a characteristic location of involvement. Area postrema lesions is the third most common site of involvement, after optic neuritis and myelitis (7).

Further, as the family history in maternal aunt was positive in our case, that emphasis on the genetic basis of the disorder. As genetic association studies done are very limited, our case underscores the need for further studies to understand the complex genetic basis. The association of Neuromyelitis Optica with other autoimmune diseases might be related to a genetic basis. AQP4 IgG positivity has been found to be associated with HLA - DRB1*03 (DR3) in French and Brazilian populations, HLA - DPB1*0501 in Japanese and Chinese populations [8].

On literature review, only two cases who typically mimic as lateral medullary syndrome have been reported (9, 10).

Severe pruritus is very frequent and this may be the only initial presenting symptom of this disease. Pathophysiological mechanism underlying this symptom described due to lesions of medullary neurons of the spinothalamic tract by anti - aquaporin antibodies. Hence Dermatologist can also play a significant role in diagnosis of NMOSD. Thus, the presence of pruritus in a patient with optic neuropathy or transverse myelitis may strongly suggests a neuromyelitis optica diagnosis.

Her CSF also showed three OCB which is only found only in 20% of NMOSD patients as opposed to 80%of multiple sclerosis patients. Thus, posing a challenge for us to diagnose it, as OCB positivity is a red flag for NMOSD

Management of NMOSD focused on attack treatment and attack prevention. For attack treatment, pulse intravenous methylprednisolone (MPS) is administered and if no response then apheresis therapy used, such as Plasmapheresis or immunoadsorption If patient still nonresponsive then iv cyclophosphamide is used as last resort. For attack prevention, traditional immunosuppressive therapies include, Azathioprine, Mycophenolate mofetil, Methotrexate and Rituximab. Four preventive immunotherapies approved for AQP4 - IgG - positive NMOSD are: eculizumab, ravulizumab, inebilizumab, satralizumab (11).

4. Conclusion

The interesting features in our patient was stroke like presentation mimicking lateral medullary ischemic stroke with positive family history. So, our case highlights the importance of considering the diagnosis of NMOSD in patients presenting with atypical stroke syndromes, especially in those with progressive or recurrent symptoms. This case also emphasizes on the need for further studies to understand the genetic basis of this disorder. Early diagnosis and treatment are essential to improve the functional outcomes in such patients to improve functional outcome in this disabling disorder.

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References

[1] Devic E. Myélite aigüe compliquée de névrite optique. Bull Med (Paris). 1894; 8: 1033–4.
[2] Lennon VA, Kryzer TJ, Pittock SJ, Verkman AS, Hinson SR (2005) IgG marker of optic - spinal multiple sclerosis binds to the aquaporin - 4 water channel. J Exp Med 202: 473– 477
[3] Wingerchuk DM, Banwell B, Bennett JL, Cabre P, Carroll W, Chitnis T, Diagnosis. IPfN: international consensus diagnostic criteria for neuromyelitis optica spectrum disorders. Neurology.2015; 85: 177–89.
[4] Marrie RA, Gryba C: The incidence and prevalence of neuromyelitis optica: a systematic review. Int J MS Care.2013, 15: 113 - 8.
[5] Wingerchuk DM, Lennon VA, Lucchinetti CF, Pittock SJ, Weinshenker BG. The spectrum of neuromyelitis optica. Lancet Neurol.2007; 6: 805–15.
[6] Ebadi Z, et al. Familial NMOSD. CRCP.2022; 7 (6): 301 - 305
[7] Bakulin IS, Simaniv TO, Konovalov RN, Zakharova MN. Area postrema lesion as a cause of intractable nausea, vomiting and hiccups in neuromyelitis optica spectrum disorders. Zh Nevrol Psikhiatr Im S Korsakova.2017; 117 (10. Vyp.2): 20 - 23. Russian. doi: 10.17116/jnevro201711710220 - 23. PMID: 29359729.
[8] Matsushita T, Matsuoka T, Isobe N, Kawano Y, Minohara M, Shi N, et al. Association of the HLADPB1* 0501 allele with antiaquaporin4 antibody positivity in Japanese patients with idiopathic central nervous system demyelinating disorders. Tissue antigens.2009; 73 (2): 171 - 6.
[9] Chau, Lily, et al. “Neuromyelitis Optica Mimicking Lateral Medulla Stroke (P6.398).” Neurology, vol.90, no.15_supplement, Apr.2018
[10] Zhou Z, Qian D, Liu L, Zhang W, Liu Z: Central nervous system inflammatory demyelinating diseases with stroke - like onset and their responses to thrombolysis. Neurol Sci.2015, 36: 1943 - 7.10.1007/s10072 - 015 - 2293

[11] Kümpfel, T., Giglhuber, K., Aktas, O. et al. Update on the diagnosis and treatment of neuromyelitis optica spectrum disorders (NMOSD) – revised recommendations of the Neuromyelitis Optica Study Group (NEMOS). Part II: Attack therapy and long - term management. J Neurol 271, 141–176 (2024).
[12] Steeve Genestet; Fabien Zagnoli Dermatology (2022) 238 (5): 823–828.