A Rare Case of Devic's Disease Presented with Reversible Optic Neuritis

[1]Dr Shyam Patel, [2]Dr Pushpraj Anand, [3]Dr Arpit Goel, [4]Dr Aswathy Joseph, [5]Dr Rajesh Khoiwal

[1,2]PG Resident, [3,4]Senior Resident, [5]Professor
Pacific Institute of Medical Sciences, Umarda, Udaipur, Rajasthan

***Abstract*- Neuromyelitis optica or Devic's disease is a rare inflammatory demyelinating autoimmune disease of the central nervous system which affects the spinal cord and optic nerves and usually associated with increased disability and morbidity.**

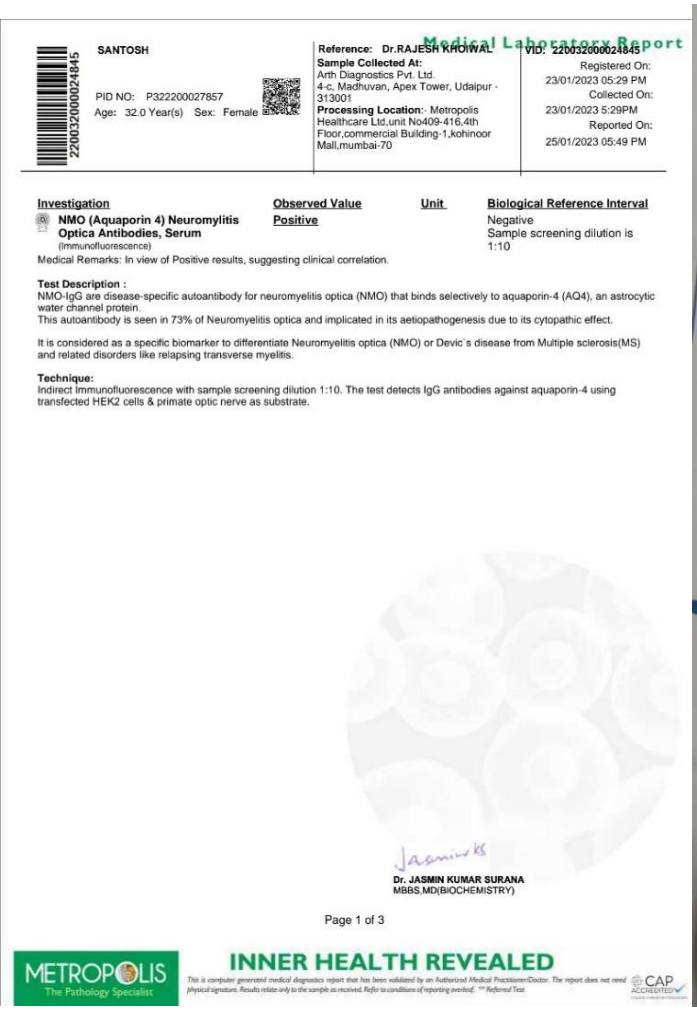
***Keywords*– Devic's, Demyelinating**

INTRODUCTION

Neuromyelitis optica (NMO), also known as Devic's disease, is a serious, idiopathic and inflammatory demyelinating syndrome of the central nervous system (CNS). This devastating disease is classically characterized by selective and severe attacks of the optic nerve and spinal cord with or without recovery, and is potentially fatal. It causes sudden loss of vision in one or both eyes, varying degrees of weakness or paralysis in the legs or arms, loss of sensation and/or bladder and bowel dysfunction. Although originally considered as a variation of multiple sclerosis (MS), clinical, radiological, pathological and especially immunological data have led to a novel definition of this clinical entity . Early differentiation between NMO and MS is particularly important because the course of NMO is more severe and the treatment strategies for attack prevention are different. Immunotherapy approved for MS treatment is ineffective and appears to aggravate NMO. Immunosuppressive therapy is the treatment of choice for reducing NMO relapses. The association of NMO with the specific biomarker AQP4-IgG is considered as an additional criterion supporting the diagnosis (sensitivity and specificity for NMO respectively 91% and 100%)

CASE REPORT

We present here a case of a 32-year-old female patient, coming from a poor socioeconomic background, complaining of weakness in the lower limbs and urine retention. The medical history of our patient includes a gradual loss of vision over period of 3 months,but not losing vision completely. No neurological diseases were reported in the family. The patient was hospitalized before in 2022 due to weakness in the lower limbs and blurrring of vision. MRI scan of the brain showed no lesions.The patient's financial constraints have been a great hurdle in the diagnosis and management of her condition.but ever since then she has experienced varying degrees of paralysis in the upper and lower limb, urinary retention and constipation every year and has been hospitalized to treat these symptoms Before being admitted here, she has had admission 4 times previously in Government Hospitals with no definitive diagnosis.Previous drug history was unknown.No any documents were available. 15 days ago, she presented to the hospital complaining of progressive weakness in her legsand urine retention. Neurological exam showed grade 5 strength in upper limbs and grade 3 strength in the lower limbs with hyper-reflexia. The patient was vitally and hemodynamically stable but her MRI Contrast Brain Revealed Multiple altered signal intensity areas in B/L frontal corona radiata,centrum semiovale and periventricular white matter apparing hyperintense on FLAIR images without true diffusion restriction.Three Differential Diagnosis were made on the basis of MRI Brain Contrast Results (1) ADEM (2)NMO (3)MOGD.CSF examination was done to rule out MS.Neuromyelitis Optica was suspected.Advanced immunological tests were performed at Pacific institute of medical sciences confirmed the presence of NMO (Aquaporin 4) Antibodies and Diagnosis of NMO was made. Improvement in her symptoms was seen after she was started on 5mg of prednisolone and during follow up azathioprine was added for prophylaxis for Relapse.



Medical Laboratory Report

SANTOSH

PID NO: P322200027857

Age: 32.0 Year(s) Sex: Female

Reference: Dr.RAJESH KHOIWAL

Sample Collected At:
Arth Diagnostics Pvt. Ltd.
4-c, Madhuvan, Apex Tower, Udaipur - 313001

Processing Location:- Metropolis Healthcare Ltd,unit No409-416,4th Floor,commercial Building-1,kohinoor Mall,mumbai-70

VID: 220032000024845

Registered On: 23/01/2023 05:29 PM
Collected On: 23/01/2023 5:29PM
Reported On: 25/01/2023 05:49 PM

Investigation	Observed Value	Unit	Biological Reference Interval
NMO (Aquaporin 4) Neuromylitis Optica Antibodies, Serum (Immunofluorescence)	Positive		Negative Sample screening dilution is 1:10

Medical Remarks: In view of Positive results, suggesting clinical correlation.

Test Description :
NMO-IgG are disease-specific autoantibody for neuromyelitis optica (NMO) that binds selectively to aquaporin-4 (AQ4), an astrocytic water channel protein.
This autoantibody is seen in 73% of Neuromyelitis optica and implicated in its aetiopathogenesis due to its cytopathic effect.

It is considered as a specific biomarker to differentiate Neuromyelitis optica (NMO) or Devic`s disease from Multiple sclerosis(MS) and related disorders like relapsing transverse myelitis.

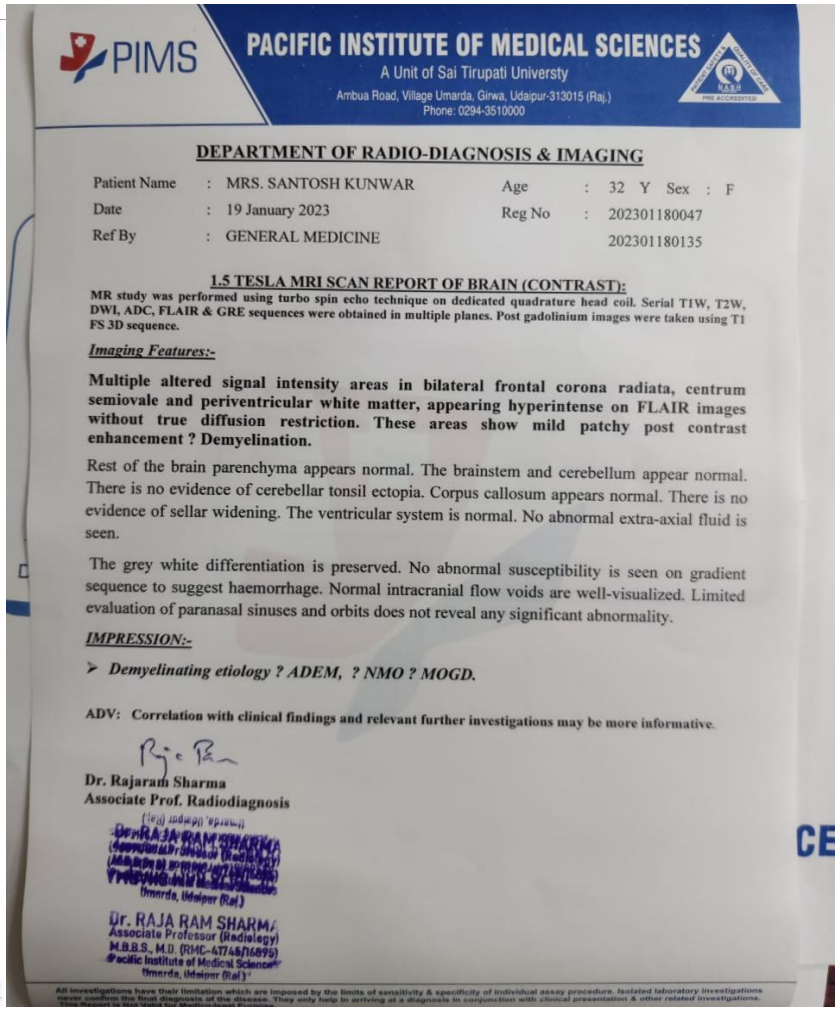
Technique:
Indirect Immunofluorescence with sample screening dilution 1:10. The test detects IgG antibodies against aquaporin-4 using transfected HEK2 cells & primate optic nerve as substrate.

Dr. JASMIN KUMAR SURANA
MBBS,MD(BIOCHEMISTRY)

Page 1 of 3

METROPOLIS The Pathology Specialist

INNER HEALTH REVEALED



PIMS

PACIFIC INSTITUTE OF MEDICAL SCIENCES
A Unit of Sai Tirupati University
Ambua Road, Village Umarda, Girwa, Udaipur-313015 (Raj.)
Phone: 0294-3510000

DEPARTMENT OF RADIO-DIAGNOSIS & IMAGING

Patient Name : MRS. SANTOSH KUNWAR Age : 32 Y Sex : F
Date : 19 January 2023 Reg No : 202301180047
Ref By : GENERAL MEDICINE 202301180135

1.5 TESLA MRI SCAN REPORT OF BRAIN (CONTRAST):

MR study was performed using turbo spin echo technique on dedicated quadrature head coil. Serial T1W, T2W, DWI, ADC, FLAIR & GRE sequences were obtained in multiple planes. Post gadolinium images were taken using T1 FS 3D sequence.

Imaging Features:-

Multiple altered signal intensity areas in bilateral frontal corona radiata, centrum semiovale and periventricular white matter, appearing hyperintense on FLAIR images without true diffusion restriction. These areas show mild patchy post contrast enhancement ? Demyelination.

Rest of the brain parenchyma appears normal. The brainstem and cerebellum appear normal. There is no evidence of cerebellar tonsil ectopia. Corpus callosum appears normal. There is no evidence of sellar widening. The ventricular system is normal. No abnormal extra-axial fluid is seen.

The grey white differentiation is preserved. No abnormal susceptibility is seen on gradient sequence to suggest haemorrhage. Normal intracranial flow voids are well-visualized. Limited evaluation of paranasal sinuses and orbits does not reveal any significant abnormality.

IMPRESSION:-

➢ ***Demyelinating etiology ? ADEM, ? NMO ? MOGD.***

ADV: Correlation with clinical findings and relevant further investigations may be more informative.

Dr. Rajaram Sharma
Associate Prof. Radiodiagnosis

Dr. RAJA RAM SHARMA
Associate Professor (Radiology)
M.B.B.S., M.D. (RMC-47745/16895)
Pacific Institute of Medical Sciences
Umarda, Udaipur (Raj.)

All investigations have their limitation which are imposed by the limits of sensitivity & specificity of individual assay procedure. Isolated laboratory investigations never confirm the final diagnosis of the disease. They only help in arriving at a diagnosis in conjunction with clinical presentation & other related investigations.

T2-weighted MRI of the thoracic spine revealed high-intensity signal changes in the spinal cord involving both halves extending from D2 to D9. Similar changes were noted in the cord at L1 L2. Diffuse edematous signals in entire cervico-dorsal cord with mild post-contrast enhancement was observed on T2 weighted MRI of the thoracic spine.

Medical Laboratory Report

SANTOSH
PID NO: P322200027857
Age: 32.0 Year(s) Sex: Female

Reference: Dr.RAJESH KHOIWAL
Sample Collected At:
Arth Diagnostics Pvt. Ltd.
4-c, Madhuvan, Apex Tower, Udaipur - 313001
Processing Location:- Metropolis Healthcare Ltd,unit No409-416,4th Floor,commercial Building-1,kohinoor Mall,mumbai-70

VID: 220032000024845
Registered On: 23/01/2023 05:29 PM
Collected On: 23/01/2023 5:29PM
Reported On: 25/01/2023 05:49 PM

Investigation	Observed Value
Oligoclonal band,CSF	
CSF Pattern	NO BAND
Serum Pattern	NO BAND
Interpretation	NORMAL PATTERN

Method: Isoelectric Focusing

Note: To assure comparative interpretation, it is imperative that the CSF and serum sample must be collected at the same time, from the same patient.

Interpretation:
The intrathecal synthesis, within the central nervous system (CNS) is indicated by the presence of IgG band in the immunofixation pattern of CSF that are not in the serum pattern from the same patient.

It should be noted that the number of bands in the oligoclonal patterns does not correlate with the diagnosis of the disease nor with its severity and prognosis.

5 patterns are defined as follows :-

1. No bands seen in CSF and serum :- Normal pattern
2. Oligoclonal band in CSF unrepresented in serum :- Intrathecal synthesis
3. Oligoclonal band in CSF and serum but numerous bands in CSF :- Intrathecal synthesis
4. Same oligoclonal bands in CSF and serum (mirror pattern) :- No intrathecal synthesis
5. Same monoclonal component in CSF and serum (split in several bands by IEF procedure) :- No intrathecal synthesis.

Observed CSF OCB pattern with corresponding absence in serum.	Suggested Interpretation & disease association
More than 10 bands	Highly specific(99%) for MS. But only 46% of MS show this classical pattern.
Between 3 to 10 bands	Associated with specificity(96%)& sensitivity (85%) for MS
1 to 3 bands	About one third of patients often evolve into classical pattern of MS; While the remaining are often associated with other non-demyelinating conditions & often revert to normal on follow up.

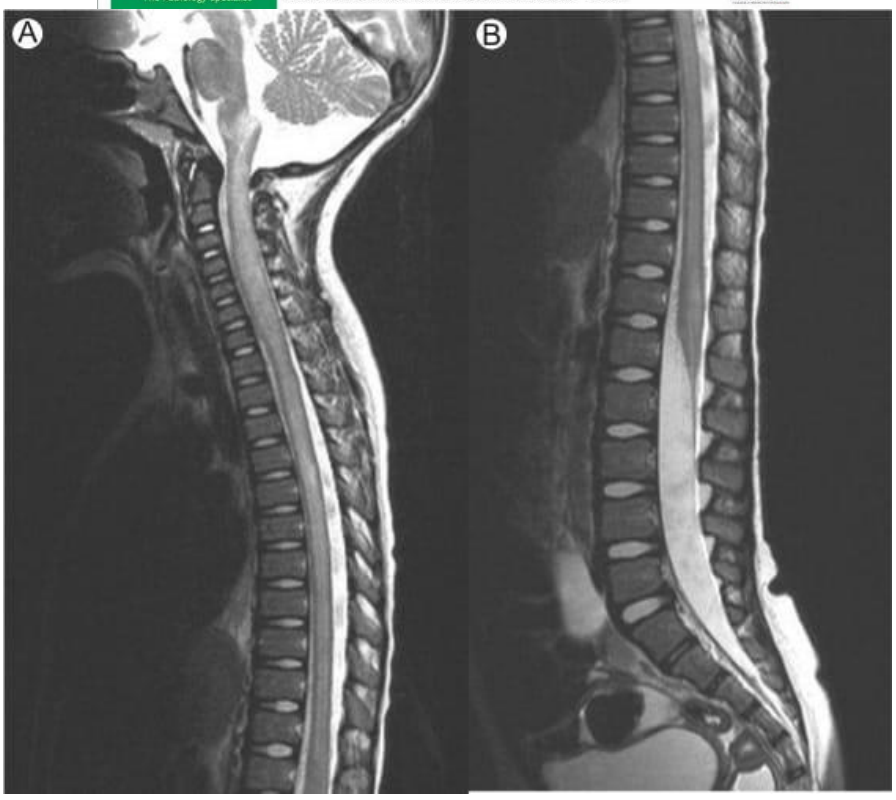
Reference-

- Freedman MS et al. Recommended standard of cerebrospinal fluid analysis in the diagnosis of multiple sclerosis: a consensus statement.Arch Neurol2005;62(6):86 5-70
- Davies G et al. The clinical significance of an intrathecal monoclonal immunoglobulin band: A follow up study. Neurology 2003; 60(7):11 63-6.

Dr. Jasmin Kumar Surana
MBBS,MD(BIOCHEMISTRY)

Page 2 of 3

METROPOLIS The Pathology Specialist
INNER HEALTH REVEALED



DISCUSSION

Through this study, we highlight the complexity of diagnosing neuromyelitis optica and the treatment challenges when socioeconomic factors are a hurdle. Because of lack of funding in public hospitals, plasmapheresis and the advanced immunological test of NMO was delayed. Patients' family was also reluctant to go through these tests and procedures due to financial constraints. NMO is quite similar to the optico-spinal form of MS hence it can be misdiagnosed, however, the course of NMO is more acute. Optic neuritis is severe with poor prognosis , our patient had a very severe case of optic neuritis and lost her vision reversibly. NMO Ig antibody is a highly specific diagnostic marker for NMO. NMO is a rare pathological entity with neurological manifestations. Previous literature suggests that in patients' with SLE or Sjogren's syndrome positive NMO IgG is not a secondary effect but

possibly these patients have two autoimmune disorders (10,11). In other studies, the presence of NMO IgG has been considered as a predictor for the manifestation of NMO spectrum disorder and predicts relapse of the disease. Co-existence of NMO is other autoimmune disorders either organ-specific or non-specific results in a poorer prognosis. The current diagnostic criteria for NMO requires the presence of optic neuritis and acute transverse myelitis along with supportive criteria which include aquaporin 4 seropositivity normal brain magnetic resonance imaging or not meeting the criteria for multiple sclerosis and longitudinally extensive cord lesion extending over 3 or more vertebral segments .

CONCLUSION

Neuromyelitis optica (NMO; also known as Devic syndrome) is a clinical syndrome characterized by attacks of acute optic neuritis and transverse myelitis. In most patients, NMO is caused by pathogenetic serum IgG autoantibodies to aquaporin 4 (AQP4), the most abundant water-channel protein in the central nervous system. In a subset of patients negative for AQP4-IgG, pathogenetic serum IgG antibodies to myelin oligodendrocyte glycoprotein, an antigen in the outer myelin sheath of central nervous system neurons, are present

REFERENCES:

1. Wingerchuk DM, Banwell B, Bennett JL, et al.: International consensus diagnostic criteria for neuromyelitis optica spectrum disorders. Neurology. 2015, 85:177-89.
2. Cacciaguerra L, Meani A, Mesaros S, et al.: Brain and cord imaging features in neuromyelitis optica spectrum disorders. Ann Neurol. 2019, 85:371-84.
3. Tatekawa H, Sakamoto S, Hori M, et al.: Imaging differences between neuromyelitis optica spectrum disorders and multiple sclerosis: a multi-institutional study in Japan. AJNR Am J Neuroradiol. 2018, 39:1239-47.
4. Kothbauer-Margreiter I, Sturzenegger M, Komor J, Baumgartner R, Hess CW: Encephalopathy associated with Hashimoto thyroiditis: diagnosis and treatment. J Neurol. 1996, 243:585-93.
5. Chong JY, Rowland LP, Utiger RD: Hashimoto encephalopathy: syndrome or myth?. Arch Neurol. 2003, 60:164-71.
6. Zarei S, Eggert J, Franqui-Dominguez L, et al.: Comprehensive review of neuromyelitis optica and clinical characteristics of neuromyelitis optica patients in Puerto Rico. Surg Neurol Int. 2018, 9:242.
7. Oertel FC, Schließeit J, Brandt AU, Paul F: Cognitive impairment in neuromyelitis optica spectrum disorders: a review of clinical and neuroradiological features. Front Neurol. 2019, 10:608.
8. Patterson SL, Goglin SE: Neuromyelitis optica. Rheum Dis Clin North Am. 2017, 43:579-91.
9. Pittock SJ, Lennon VA, de Seze J, et al.: Neuromyelitis optica and non organ-specific autoimmunity. Arch Neurol. 2008, 65:78-83.