POST COVID ANTI-NMDAR ENCEPHALITIS IN AN ADOLESCENT GIRL

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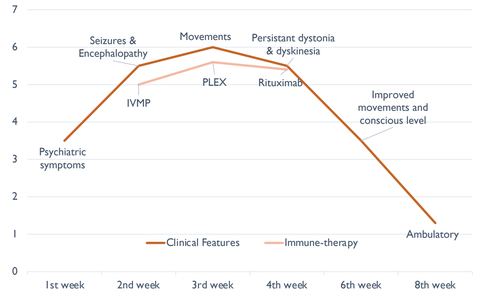
Introduction

- Anti-NMDAR encephalitis is not rare. First described in 2007, it is the most frequent autoimmune encephalitis (AE) after ADEM.[1]
- Non-paraneoplastic AE is triggered by infection or environmental factors resulting in autoantibodies production against cell surface neuronal antigens.
- There has been several neurological presentations reported with SARS-CoV-2 infection, both infectious and post-infectious. Asymptomatic and mildly symptomatic children with SARS-CoV-2 infection may not be identified during the acute illness but later may present with para infectious autoimmune phenomenon.[2]

Case Report

- 13 years old girl presented with behavioral issues for 1 week in terms of intermittent aggression, irritability with disturbed sleep wake cycle. Later she developed irrelevant talk and memory loss. In the 2nd week of illness, she had generalized tonic clonic seizures.
- Examination showed an encephalopathic girl with dystonic body posture, oro-facial dyskinesia and dystonia of ocular muscles with generalized upper motor neuron signs. She was tachycardiac with BP at 98th centile. Family history revealed mother being hypothyroid.
- She was investigated with MRI brain that was normal. Initial cerebrospinal fluid (CSF) examination showed <3 cells with 90% lymphocytes. Considering family history, high blood pressure and tachycardia, thyroid profile was reviewed and it was consistent with hyperthyroidism. Thyroid antibodies were negative excluding the possibility of Hashimoto's encephalopathy. Thyroid levels had become normal without anti-thyroid drug. Her initial alanine transaminase level was also raised (259 U/L). Repeat CSF for anti NMDAR antibody came out to be positive. Extensive imaging excluded the possibility of any neoplasm. EEG showed delta brush pattern. For possible triggers, viral serologies were sent and only SARS-CoV-2 Ig came positive, though there was no history of SARS-CoV-2 infection in past neither any contact.
- Immune-therapy was given with intravenous methyl prednisolone (IVMP) pulses (30mg/kg/day) with strict control of blood pressure and seizures alongside neuroprotective measures. Because of no response to IVMP, therapy was quickly escalated to plasmapheresis; 5 cycles in 10 days, but she showed no significant benefit with 1st line therapy. She had persistent dystonia, dyskinesia and encephalopathy; though autonomic instability was well controlled with medications. 2nd line immune-therapy with rituximab was given; 375mg/m^2: 4 doses: 1 week apart. After the second dose of rituximab, child significantly showed improvement in her conscious level and abnormal movements, though still not ambulatory. After 4th dose, she became ambulatory with support and able to self-feed. She was discharged on oral steroids, anti-epileptics and muscle relaxants.
- On follow up at 8 weeks, she was ambulatory unsupported with good control of seizures and movements. At 16 weeks follow up, she was ambulatory in all settings, able to self care, feed and perform daily activities with ease. However residual deficit in executive function was still present.



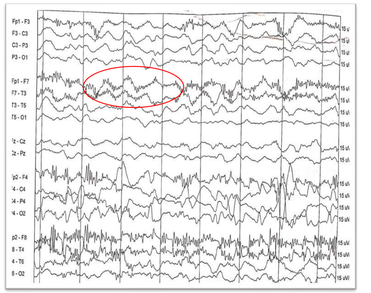


Figure 1: Delta-brush pattern on EEG

INVESTIGATION	RESULTS		
Cerebrospinal fluid examination	1ST CSF: WBC- 3 Lymphos-90% Polys-10% RBC- 4 Sugar- 69 mg/dL (50-80mg/dL) Protein- 27.6 mg/dL (15-45mg/dL)	2ND CSF: WBC <5 Lymphocytes-100% Protein-20 mg/dl Sugar-102 mg/dl Anti-NMDAR positive ++	
T3 T4 TSH Anti-thyroid Peroxidase Ab Thyrotropin Receptor Ab	2.0 (0.69-2.15 ng/ml) 140 (52-127 ng/ml) 0.2 (0.3-4.50 ng/ml) < 10 IU/ml (Normal) <0.800 IU/L (Normal)	1.09 (1.26-3.28 nmol/L) 17 (5.6-11.7 ug/dl) 0.6 (0.7-6.4 uIU/ml)	1.26ng/ml (N) 6.56ug/dl (N) 1.03 uIU/ml (N)

Discussion

- The neurological presentation of SARS-CoV2 in the pediatric age group is still surfacing. Morales S et al studied 10 pediatric patients with SARS-CoV-2 infection and found 3 patients with GBS, 2 optic neuritis, 2 acute ischemic stroke, 1 myositis, and 1 patient to be anti-NMDAR positive.
- Our patient had multisystem involvement including encephalitis, thyroiditis and tramsiminitis, not been reported previously, highlighting the possibility of immune mediated cytokine storm affecting various other systems.

References

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