Video 1. Segment 1. Before Treatment. Spontaneous, continuous, irregular, brief, involuntary movements restricted to the right lower limb, suggestive of myoclonic jerks, that worsen in amplitude and frequency with action. There is no rigidity or stimulus sensitivity. Gait is impaired by the involuntary movements. Segment 2. After Treatment – 1-Month Follow-up. Intravenous methylprednisolone pulse therapy improved symptoms. Involuntary movements are no longer observed. Gait is markedly improved.

30 ms, at a frequency of about 8 Hz, suggestive of myoclonus, in accordance with clinical observation. Electroencephalography (EEG), performed two times during the myoclonic jerks, showed mild disorganization of background activity, with 8 Hz alpha waves, but no paroxysms or focal slow waves. Back-averaging was not performed due to technical issues. EEG was compatible with mild encephalopathy. Brain and spinal magnetic resonance imaging showed non-specific mild T2 hyperintensities in the deep cerebral white matter and mild vertebral degenerative changes, respectively. Right and left tibial nerve somatosensory evoked potential (SSEP) was normal. Cerebrospinal fluid (CSF) revealed 20 white cells/mm^3, 70% lymphocytes, 14 mg/dL protein, and 61 mg/dL glucose. She had no infectious stigma, and herpes and CMV serology were negative, bacterial, fungal, and tuberculosis cultures were also negative. Whole-body positron emission tomography/computed tomography scan was normal. Serum and CSF autoantibody panel was positive for anti-glutamic acid decarboxylase 65 (anti-GAD) antibodies, with strong reactivity in a tissue-based assay and immunoblotting. Although this test can also be interpreted by a qualitative analysis, the quantitative measure would have been more reliable but was not available.[1] Antibodies to NMDAR, LGI1, GABAR, GlyR, AMPAR, and CASPR2 were negative. The patient's fasting blood glucose level was within normal limits.

Before the result of the autoantibody panel, the patient was pulsed with 5 g of intravenous methylprednisolone (1 g per day), with a great improvement in both motor and cognitive symptoms (Video 1 – Segment 2). Our diagnosis was steroid-responsive anti-GAD-related limb myoclonus.

Discussion

A similar case has previously been reported, but myoclonus was seen on both legs and there was no associated encephalopathic features.[2] A ''jerking stiff person syndrome'' has already been described, but the patient had additional axial rigidity and stimulus-sensitive multifocal myoclonus.[3] The myoclonus of the present case was characterized by brief (30 ms) duration, which indicates cortical myoclonus.

Cortical myoclonus may be either epileptic or non-epileptic. Continuous cortical epileptic myoclonus may reflect *epilepsia partialis continua*.[4] However, SSEP was normal, which does not further support the hypothesis of cortical myoclonus.[4,5] Spinal myoclonus might be another possible origin, as it is characterized by variable stimulus sensitivity, no SSEP enlarged responses, and no cortical spikes or sharp waves on EEG. EMG in spinal myoclonus commonly reveals synchronous activation of the affected muscle.[6] However, the classical duration range of spinal bursts is 50–500 ms,[6] mostly over 100 ms.[5] Also, the typical frequency is in the low range of 0.5–3 Hz.[6] By contrast, our patient's burst duration was around 30 ms and the frequency was 8 Hz.

The patient's previous epileptic syndrome could have been an anti-GAD-related epilepsy.[2] This previous epilepsy, in association with EEG encephalopathy at the time of examination, along with EMG short-duration and high-frequency bursts (30 ms and 8 Hz), supports the hypothesis of cortical myoclonus. We think that a cortical origin of myoclonus was the most likely in our patient. However, the level of the myoclonus generator could not be definitely ascertained due to several technical limitations. Notably, jerk-locked back-averaging was not performed.

The patient's first clinical presentation was responsive to antiepileptic drugs (AEDs). The second, 5 years later, was resistant to AEDs, but steroid responsive. Differences in responsiveness may be attributed to different cortical foci.

The anti-GAD antibody is found in various neurological syndromes, including stiff person syndrome (SPS), stiff limb syndrome (SLS), progressive encephalomyelitis with rigidity and myoclonus (PERM), opsoclonus–myoclonus, cerebellar ataxia, and autoimmune epilepsy.[7] SPS, SLS, and PERM are part of the stiff person spectrum disorders (SPSDs), a broad and expanding clinical spectrum.[8] SPSD can be linked with various antibodies other than anti-GAD.[8]

Anti-GAD antibody-associated neurologic syndromes are not strongly associated with cancer. Comprehensive investigation for tumors is not usually indicated.[6] However, a study from a large database of 121 patients with anti-GAD-related syndromes identified 15 (12%) patients with tumors, such as lung cancer and thymic neoplasms.[6] The clinical presentations were not always those typically observed in anti-GAD antibodies, such as limbic encephalitis.[6] Thus, the atypical features from the present case prompted screening for cancer.

The mild encephalopathy and associated pleocytosis may suggest a PERM-related disorder. However, classical features of PERM were missing, such as dysautonomia, prominent brainstem involvement, rigidity, and generalized myoclonus.[8] The current case may belong to SPSDs. SPSDs comprise focal variants, atypical forms, and generalized phenotypes.[10] SPSD is an expanding concept.[10] However, there was no clinical stiffness or related neurophysiological findings. In our opinion, it is thus not appropriate to classify this case under the umbrella of SPSDs. Our final diagnosis was an anti-GAD antibody-associated neurologic syndrome presenting with limb myoclonus.

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