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Case Report

A case of paroxysmal dystonia associated with LGI-1 antibody encephalitis

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1. Introduction

Leucine-rich glioma inactivated-1 (LGI-1) is one of the antigenic targets of voltage-gated potassium channel (VGKC) complex antibodies associated with limbic encephalitis (LE), and is known to present with faciobrachial dystonic seizures (FBDS), abnormal behavioral symptoms and memory impairment. Confirmation with serum or CSF antibody testing is paramount, as imaging, EEG, and routine CSF studies may be unremarkable [1]. Clinical syndrome with specific abnormal movements are rarely described in LGI-1 antibody associated encephalitis. For example, there has been only one case study illustrating kinesigenic dyskinesia in association with LGI-1 antibody encephalitis, with a basal ganglia lesion on MRI of the brain [2]. The aim of this case study is to describe an unusual case of a movement disorder as an early symptom in a patient who tested positive for LGI-1 antibody, and application of a term "paroxysmal dystonia" to the presentation.

2. Case report

A 38-year-old female with a history of migraine headache presented to an outside hospital with "flashing lights" in her right eye, followed by paralysis of the right arm lasting for 5 to 10 min. MRI of the brain and MRA of the head and neck were unremarkable. Her initial abnormal movements began 2 weeks later with flailing right arm movements (hemiballismus), 3 to 4 times per hour. She reported no cognitive impairment or any behavioral changes. Repeat MRI of the brain, CT angiogram of the head and neck, and a routine EEG were unremarkable. She was discharged on Levetiracetam (LEV) with the suspicion of possible seizures. She presented to our institution 4 weeks after onset of symptoms; her symptoms had resolved, but she developed prominent brief dystonic movements involving the right face, arm and leg lasting 1 to 2 s (without startle response). There was no change in consciousness or behavior during or between these attacks. These episodes began occurring 40 to 50 times per day, gradually increasing over several days to 400 to 500 times per day without exacerbating factors. Her general and neurological examinations were unremarkable. Laboratory workup, including electrolytes, hepatic and renal function, were normal. During 72-h Video-EEG monitoring, stereotyped dystonic movements were captured which had no electrographic correlate other than the movement artifacts (Fig. 1). The movements remained right sided with brief periods of paroxysmal dystonia, involving right sided extremity and face along with contraction of the right facial musculature and tongue protrusion (Video 1 in Supplementary material). Epilepsy and movement disorder specialists interpreted these movements as "paroxysmal dystonia". However, the possibility of seizure was not excluded. Over a few days, she developed intermittent agitation and confusional spells which also had no electrographic correlate on Video-EEG. With suspicion of possible side effect of agitation from LEV use, while no objective evidence of seizures, LEV was discontinued. Contrast-enhanced MRI of the brain (1.5 T) was repeated which revealed hyperintense signal in T2W images at the anterior left putamen with vague enhancement in the post-contrast image (Fig. 2 A–C). A CT of Thoracic-abdomen-pelvis was negative for malignancy. She was given intravenous Methylprednisolone 125 mg every 12 hourly for 3 days. Following the treatment with steroids, the frequency of her dystonic movements improved. Two weeks after discharge, paraneoplastic serology (anti-Hu, Yo, Ri, Ma2/Ta, and amphiphysin) were reported as negative. Autoimmune serology evaluation revealed positive anti-LGI-1 antibody, and was elevated to 220 pM (normal: < 100 pM) confirming an autoimmune basis for her illness. The positive antibody in either CSF

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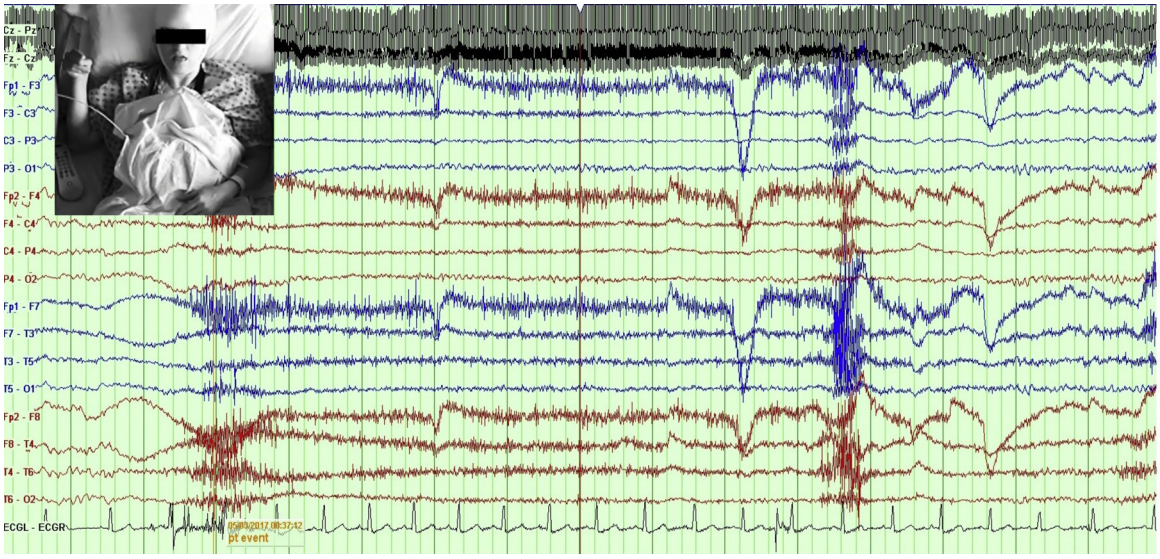

Fig. 1. Video-EEG monitoring showing abnormal movements with no electrographic correlate other than the movement artifacts.

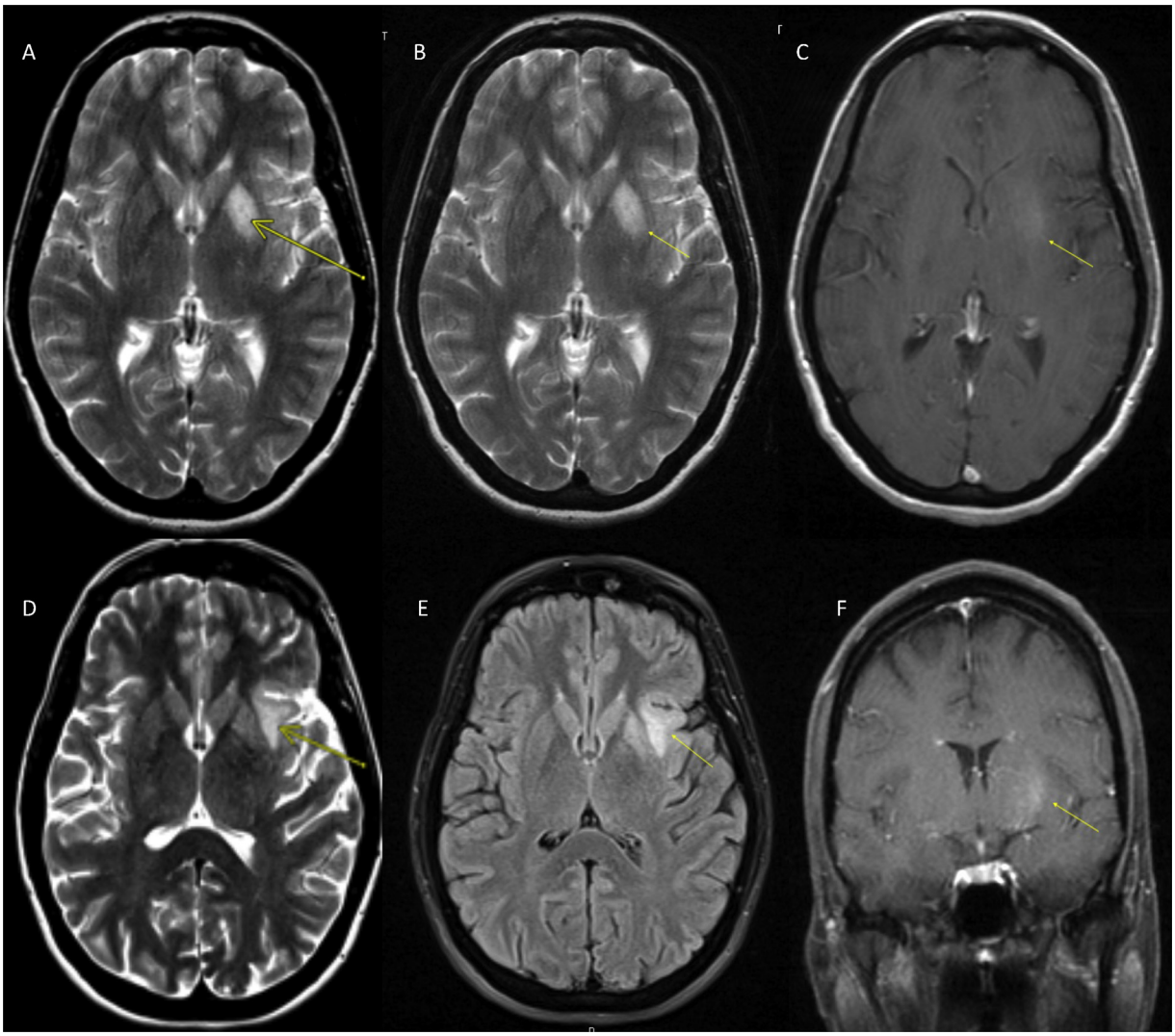

Fig. 2. MRI of the brain, **A–C** (4 weeks after symptom onset); **A:** T2 axial view with hyperintense signal at the anterior left putamen**, B:** T2 FLAIR axial view with hyperintense signal at the anterior left putamen**, C:** T1 Post-contrast axial view with vague enhancement at the anterior left putamen **D–F** (2 weeks after the treatment with steroids); **D and E:** T2 and T2 FLAIR axial views with resolving signal in the left putamen but new hyperintense signal along the left frontal operculum, **F:** T1 Post-contrast coronal view with vague enhancement at the left frontal operculum.

or serum confirms the diagnosis, therefore no CSF was obtained. [1,5] Follow-up MRI of the brain after 2 weeks of steroid course showed resolving T2-hyperintense signal in the left putamen but new T2-hyperintense signal along the left frontal operculum (Fig. 2D–F). She received a 5-day course of Intravenous Immunoglobulins (IVIG) at a dose of 0.4 mg/kg. Following the third dose of IVIG, her dystonic movements resolved. She received monthly IVIG 0.4 mg/kg for one year. Follow-up MRI of the brain showed diminished T2-hyperintense signal. No recurrence of symptoms has occurred.

3. Discussion

Faciobrachial dystonic seizures are involuntary contractions consisting of a dystonic posture of the arm followed by facial contraction lasting 1–30 seconds, may occur 10–200 times per day, often affecting unilateral side. Studies describing FBDS have argued against a paroxysmal movement disorder on the basis of preceding or associated brief loss of awareness and memory disturbances, a highly stereotyped semiology, and undetectable ictal episodes with surface EEG electrodes. A recent study using FDG-PET and simultaneous EEG and myographic records have suggested a cortical origin of the FBDS, with motor cortex and hippocampus are the two main cortical targets in LGI-1 antibody encephalitis [3].

"Paroxysmal dystonia" is a poorly defined entity in the literature. The dystonia society of UK has described the term as episodic periods of dystonic movements affecting unilateral or bilateral side which may be very brief or prolonged (seconds to hours), may occur many times during the day and are only visible during attacks. During the attacks, the patient does not lose consciousness, and remain completely aware of their surroundings. Patients are generally asymptomatic between attacks [4]. In this case, a pattern of evolving abnormal movements and agitation with MRI abnormalities involving the basal ganglia and frontal operculum is likely anatomically relevant. Although the pathophysiology is unknown, it is probable that a metabolic or immune-mediated neuronal damage may have led to the radiographic abnormalities.

Autoimmune encephalitis often responds well to immunotherapy. First line treatment consists of corticosteroids followed by or in conjunction with intravenous immunoglobulins (IVIG) or plasma exchangeand is reported to be effective in 80% cases. Relapses can be seen in about one-third of cases, within the first 6 months to 3 years of disease onset [5]. In this case, symptoms promptly responded to IVIG therapy and we have seen no relapse with monthly IVIG maintenance therapy for one-year.

4. Conclusion

Diagnosis of LGI-1 antibody encephalitis can be challenging; patients may present with atypical symptoms including abnormal movements such as hemiballismus, dyskinesia or dystonia. Although we do not exclude the possibility of FBDS, in this case, the atypical presentation and associated basal ganglia abnormality support "paroxysmal dystonia". Early institution and the appropriate length of maintenance immunotherapy may prevent permanent neurologic dysfunction and relapse.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.clineuro.2019.105508.

References

[1] F. Graus, M.J. Titulaer, R. Balu, et al., A clinical approach to diagnosis of autoimmune encephalitis, Lancet Neurol. 15 (2016) 391–404.
[2] E. Aradillas, R.J. Schwartzman, Kinesigenic dyskinesia in a case of voltage-gated potassium channel–complex protein antibody encephalitis, Arch. Neurol. 68 (4) (2011) 529–532.
[3] N. Vincent, K. Aurélie, A. Emmanuelle, et al., Motor cortex and hippocampus are the two main cortical targets in LGI1-antibody encephalitis, Brain 139 (4) (2016) 1079–1093.
[4] The dystonia society. Paroxysmal dystonia, (2019) Accessed February 28 https://www.dystonia.org.uk/paroxysmal-dystonia.
[5] A. Van Sonderen, R.D. Thijs, E.C. Coenders, et al., Anti- LGI1 encephalitis: clinical syndrome and long-term follow- up, Neurology 87 (2016) 1449–1456.