Great balls of fire! The basal ganglia on fire

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ABSTRACT

A 76-year-old man presented to the hospital with intermittent dizziness, memory impairment and jerky movements. Evaluation revealed them to be faciobrachial dystonic seizures and antibodies to voltage-gated potassium channel complexes were found. He was treated with intravenous methylprednisolone and rituximab, and made a remarkable recovery. Magnetic resonance imaging of the brain was normal, although positron emission tomography – computed tomography showed striking basal ganglia changes.

KEYWORDS: faciobrachial dystonic seizures, LGI1 antibodies, autoimmune encephalitis, PET-CT, FDG PET-CT

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Case presentation

A 76-year-old man presented with complaints of intermittent dizziness and memory impairment of 3 months' duration. These had increased in frequency in the previous 2 weeks. His daughter had noticed some intermittent brief jerks of his arms and face along with these. Of late, these episodes had increased in frequency occurring every 15 minutes or so. They lasted only for a few seconds, occurred even sleep, occasionally awakening him. There was no confusion or loss of consciousness accompanying these episodes. He was also finding it difficult to remember recent events but was able to recall remote events. He had no prior history of hypo- or hyperthyroidism, seizures, fever, headache or psychiatric illnesses. He was known to have diabetes and hypertension for the previous 2 decades, and was adequately controlled with oral medications. He was diagnosed with possible paroxysmal vertigo and was prescribed *Ginkgo biloba* tablets by his general practitioner. He had increased the dose of these tablets and had been on six tablets a day for the previous 2 months, without any change in his symptoms. He lived with his daughter and did not smoke or consume alcohol.

On examination, he was conscious, oriented and afebrile. Neurocognitive assessment revealed an impairment in logical memory, verbal fluency, visual memory, rate of learning, working memory, verbal memory, sustained action, focused attention, cognitive flexibility and error detection. He was intact on visuospatial construction and showed no significant stress, or behavioural or personality changes. Other elements of the nervous system examination were normal, including gait and cerebellum. There were no signs of meningism. Other systems were normal. He did not have any jerks during his outpatient examination.

Routine blood investigations revealed a normal full blood count and blood film, mild hyponatraemia (serum sodium 127 mmol/L), and normal renal and liver function tests. Magnetic resonance imaging (MRI) of the brain was normal. Cerebrospinal fluid analysis was normal, including an extensive meningo-encephalitic panel. HIV and venereal disease research laboratory tests were negative.

Diagnosis

With a normal MRI, the differential diagnosis included new late onset complex partial seizures (recently renamed as focal onset impaired awareness seizures), *Gingko biloba* toxicity, Creutzfeldt–Jakob disease (CJD), secondary paroxysmal non-kinesigenic choreoathetosis and faciobrachial dystonic seizures (FBDS). Other considerations included metabolic, neurodegenerative and paraneoplastic conditions.

We performed 24-hour video electroencephalography (EEG) that revealed multiple episodes of brief posturing of the right side of his face, and right arm and leg lasting a few seconds. These episodes were not accompanied by any EEG changes and were suggestive of FBDS. On day 3, his serum sample tested strongly positive for leucine-rich glioma-inactivated 1 (LGI-1) antibodies by indirect immunofluorescence on transfected cells. His sample was negative for contactin-associated protein-2 antibodies. On day 3,[18] fluorodeoxyglucose positron emission tomography – computed tomography (FDG PET-CT) of the brain showed uniform diffuse hypermetabolism of bilateral basal ganglia with relative hypometabolism of the rest of the cerebral parenchyma (Fig 1). There were no other suspicious hypermetabolic foci suggestive of a neoplasm anywhere else. A final diagnosis of autoimmune encephalitis with FBDS was made.

Key points

- Treatable conditions should be considered in the differential diagnosis of progressive memory complaints in the elderly.
- Not all jerky movements are seizures. Basal ganglionic pathology can result in unilateral jerky movements.
- Faciobrachial dystonic seizures are associated with antibodies to voltage-gated potassium channel complexes.

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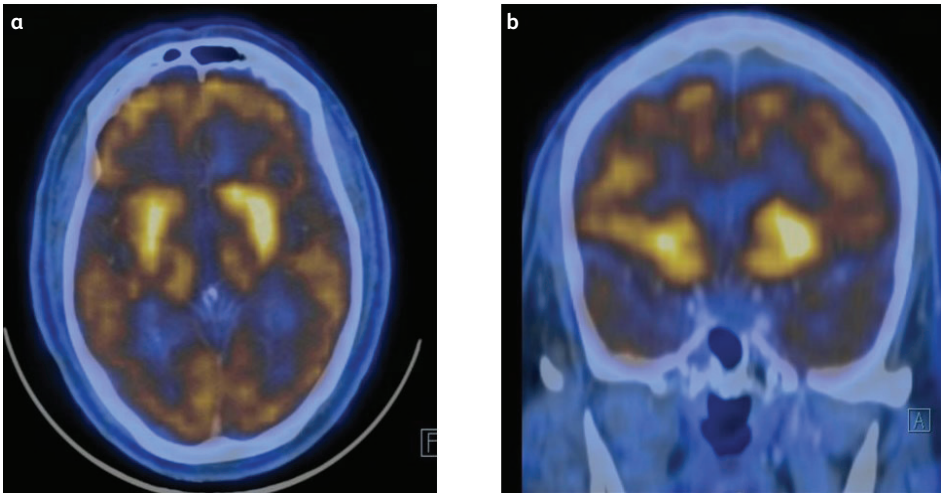

Fig 1. ^{18}Fluorodeoxyglucose positron emission tomography – computed tomography of the brain showing uniform diffuse hypermetabolism of bilateral basal ganglia with relative hypometabolism of rest of bilateral cerebral cortex. a) Axial plane. b) Coronal plane.

Initial management and prognosis

He was treated with intravenous (IV) steroids (methylprednisolone 1 g/day) for 5 days. He was then started on injection rituximab 1 g infusion, after which, the frequency of FBDS reduced.

Case progression and outcome

By day 7, his episodes had started diminishing. He was started on oral steroids (Wysolone 30 mg/day) and discharged with a plan for a second dose of rituximab 1 g after a month. Rituximab was preferred over IV immunoglobulins due to financial constraints.

Discussion

FBDS were first described in 2011, however, it was described in India only in 2013.[1,2] A PubMed search with the keyword phrase 'faciobrachial dystonic seizures' showed only 125 related articles published to date, which shows the rarity of the diagnosis. Most patients display antibodies to the voltage-gated potassium channel complexes (VGKC). The specific antigenic target is the LGI-1 in 89% of patients and it is usually a non-paraneoplastic autoimmune condition. FBDS shows a 2:1 male predominance and is usually seen in the elderly (median age of onset is 60 years).

The most common clinical presentations of FBDS are as newonset faciobrachial dystonic episodes, seizures, pilomotor seizures, memory deficits, personality changes, movement disorders (such as chorea) or as a rapidly progressive dementia. FBDS is characterised by a stereotypical brief (<3 seconds), intermittent unilateral dystonic contraction of the ipsilateral hemiface and arm more often than the leg.

It is commonly associated with hyponatraemia and it is postulated that LGI-1 antibodies bind to the antidiuretic hormone (ADH) producing paraventricular nucleus neurons in the hypothalamus. This binding increases ADH secretion causing water retention and hyponatraemia (syndrome of inappropriate antidiuretic hormone secretion).

Our patient had short duration non-epileptogenic dystonic episodes without any EEG correlates of seizures. MRI was normal but ^{18}FDG PET-CT showed striking symmetrical basal ganglia hypermetabolism.[3] The role of ^{18}FDG PET-CT in LGI-1 encephalitis has been highlighted in a recent study, wherein 82% of the patients had hypermetabolism in the basal ganglia region and 68% in the medial temporal lobe. Most of these patients had a normal MRI. These ^{18}FDG PET-CT changes were reversible in most patients after treatment. In fact, ^{18}FDG PET-CT is probably more sensitive than MRI in the diagnosis of this autoimmune encephalitis. Atypical facio-brachio-crural movements and nonspecific EEG changes may occasionally be found in patients with CJD. CJD is, thus, an important differential diagnosis, which should be considered and ruled out by appropriate investigations. It is important to recognise this autoimmune encephalitis early. Antiepileptic monotherapy per se may not be effective to control the FBDS and adjuvant longterm immunotherapy may be needed to achieve disease remission. First-line treatment options include IV methylprednisolone and immunoglobulins. Second-line options include rituximab. Although many patients improve, some continue to show progressive cognitive impairment. Nearly 20% of patients suffer relapses and long-term follow-up and treatment are necessary.[4,5] ■

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