LETTERS

Dystonia, tremor, and parkinsonism in a 54 year old man with 2-hydroxyglutaric aciduria

Glutaric aciduria is often considered to be a rapidly progressing dementing illness with only occasional extrapyramidal symptoms, usually described as dystonia.1,2 We present a case of late onset 2-hydroxyglutaric aciduria and slowly progressive dystonia and parkinsonism.

Case report

A 54 year old man was referred to the University of Florida movement disorders center for management of “end stage Parkinson’s disease”. He was diagnosed with developmental delay and mild cerebral palsy by his paediatrician, for a failure to meet motor milestones. He had below average grades in school and graduated high school two years behind his age matched peers. At age 26, he noticed a mild intention tremor in his right hand, a mild head tremor, and mild unsteadiness in walking. These were assumed to be potentially parkinsonian features, and later in his 30s he was given the assumed diagnosis of Parkinson’s disease. He was treated with levodopa, dopamine agonists, a monoamine oxidase inhibitor, and anticholinergics, which all failed to help his symptoms. He was gainfully employed by the city in a maintenance department until being fired in his mid-30s for incompetence. At the time of his clinic appointment, his mother noted progressive difficulty with swallowing, balance difficulties, and aggressive behaviour. There was no history of exposure to neurotoxins, and he did not smoke or drink alcohol. His brother also had a tremor.

On neurological examination he was alert and oriented to person and place. His memory was tested (3/3 registration and 1/3 recall after five minutes). He had a hypophonic dysarthria with pallilalia. Gerstmann features (right/left confusion, finger anoma, acalculia, and agraphia) were all impaired. He had frontal release signs including a root, a ‘hit and run’ and gait. He had some intention tremors. His posture was stooped with unsteady gait, and he had decreased arm swing and shuffling gait. His hands were mildly rigid, bradykinesia, shuffling gait, and mild cerebellar atrophy. Urine organic acids were sent and revealed 2-hydroxyglutaric aciduria.

Discussion

This case demonstrates that older patients with parkinsonism may have inborn errors of metabolism. Our patient was unique in that until his mid-20s and later when he lost his job in his mid-30s, he was assumed to have mild cerebral palsy, and only after developing other parkinsonian features was he later misdiagnosed as having Parkinson’s disease. The importance missed in this patient were the developmental delay, the progression of symptoms leading to a mental incapacity to hold his job, and the parkinsonian features that were unresponsive to levodopa and other agents. In addition, his MRI, which was carried with him to the appointment, had changes indicative of glutaric aciduria. A differential diagnosis in this case should have included other non-levodopa responsive disorders that can present with movement disorders, such as propionic acidemia, methylmalonic aciduria, glutaric aciduria, and leucodystrophy. Given his relatively benign course, he probably has L-2-hydroxyglutaric aciduria and not D-2-hydroxyglutaric aciduria. Our patient unfortunately died as a result of an accident shortly after his evaluation, making confirmation of the L isomor impossible.

2-Hydroxyglutaric aciduria is a rare inborn error of metabolism that was first recognised in the L isomor by Duran and colleagues3 and later defined clinically by Barth et al.4 There is less known about the molecular biology and underlying biochemical defect in other amino acidurias. Further cases have been identified and have detailed clinical, biochemical, radiological, and pathological characteristics that have established a spectrum of the disease. Several subtypes have been identified and hydroxyglutaric aciduria has been proposed to have an autosomal recessive inheritance, occurring in both D and L isofoms. Most of the cases reported in the literature are identified in early childhood. The D isomor usually presents with neonatal or early infantile encephalopathy, seizures, extrapyramidal symptoms, and cardiomyopathy.5,6 In contrast, the L isomor may present within the 1st years of life with non-specific motor delay, and later cognitive and motor developmental delay. Gait ataxia may occur as early as the 2nd year.7 Additional findings include occasional pyramidal and extrapyramidal features and dystonia, with a predilection for the hands. Progressive mental retardation is common in these patients. Most cases are diagnosed in childhood but Clerc et al.8 in 2000, reported an adult patient with tremor and excessive urinary excretion of L-2-hydroxyglutaric aciduria. Our case also highlights the possibility of this disorder presenting later in life with dystonia, tremor, and parkinsonism.

Imaging and urine samples are very helpful in making this diagnosis. Neuroimaging findings in L-2-hydroxyglutaric aciduria reveal subcortical leucoencephalopathy (as seen in our case), and may also show atrophy of the cerebellum.9,10 Larnaout and colleagues11 performed a necropsy on a patient with childhood onset of cognitive and motor delay and epilepsy whose brother was diagnosed with L-2-hydroxyglutaric aciduria and they described the diffuse white matter changes as demyelination with spongiform, cavitating cystic lesions and cerebellar white matter gliosis. This pattern of involvement was consistent with the MRI results and was considered to be the typical spongiosis encountered in disorders of amino acid metabolism.

The diagnosis of hydroxyglutaric aciduria is made by analysing urine samples with gas chromatography. The L isomor reveals a solitary peak of 2-hydroxyglutaric acid, whereas the D isomor may have other citric acid cycle intermediates present in addition to D-2-hydroxyglutaric acid.1 In the USA, testing is available for the urinary detection of 2-hydroxyglutaric acid, but unfortunately American laboratories are unable to distinguish between the L and the D isomer.

This case reminds us that inborn errors of metabolism can be a cause of parkinsonism, and in selected cases an investigation should...
be performed with urine organic acids so that this diagnosis can be quickly made. With the emergence of new genetic therapies for biochemical diseases it may be important in the future to make this diagnosis early in the course of the disease.

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doi: 10.1136/jnnp.2003.033571

References


Transient myasthenia gravis in an elderly woman

Myasthenia gravis is usually a chronic disorder, although remission rates of 25-30% can be expected with judicious interventions such as thymectomy and immunosuppression in appropriate cases. Spontaneous remission is rarely seen. Oosterhuis found a remission rate of only 1% per annum over 17 years among 180 patients with generalised myasthenia gravis treated with anticholinesterase alone.1 We describe a case of ocular and bulbar myasthenia in which there was complete recovery over a matter of weeks without immunosuppressive agents.

The patient, a 78 year old woman, developed acute, painless left sided ptosis in October 2002 while on holiday abroad. There was no diplopia. She had developed hypothyroidism one year before but was euthyroid on replacement therapy. The ptosis resolved gradually over the next few days. There was no family history of autoimmune diseases. Two weeks later she found she could not chew properly towards the end of a meal. The jaw weakness recovered the following day but later recurred, to the extent that she had to support her jaw while talking and eating. She had slight dysphagia but there was no history of choking, breathing problems, or limb weakness.

On examination in January 2003, there was no ptosis or orbital signs or ophthalmoparesis. No fatigability was demonstrated in the eyelids, and no weakness or fatigability was detected on testing jaw opening against resistance, although her jaw hung slackly open if not supported. Limb power and reflexes were normal.

Acetylcholine receptor antibodies (AChR-abs) were strongly positive at 11 nmol/l (normal range 0 to 0.25 nmol/l). Other autoantibodies were negative apart from a positive gastric parietal cell antibody.

Electromyographic examination of the right biceps, extensor digitorum communis, and left frontalis muscles was also normal.

COMMENT

To our knowledge, transient myasthenia gravis has not been described previously in a patient of this age. It is known to occur in 10-15% of infants born to mothers with myasthenia as a result of transplacental transfer of maternal antibodies, and there is a report of transient myasthenia in autoimmune disease resulting from HIV infection.2 In that study, seven HIV infected patients presented with transient myasthenic symptoms. Four of them had positive AChR-abs. In one, myasthenia gravis and coincident autoimmune thymocytopenia both resolved following anti-retroviral treatment. Our patient had no history of preceding infection, although there was a history of thyroid disease.

The persistence of high levels of AChR-abs despite clinical resolution is of interest. There is no direct correlation between antibody titre and clinical state of individual patients with myasthenia gravis.3 Neurology 1981;31:220-4.

REFERENCES


‘‘Doctor, I can hear my eyes’’: report of two cases with different mechanisms

An unusual but fascinating symptom is the one described by patients complaining that they can hear their own eye movements. We report two cases, with different postulated mechanisms.

Case reports

Patient 1

A 53 year old woman presented with a tendency to fall to the left. She did not experience hearing difficulties or tinnitus. Clinical examination was unremarkable other than increased sway on Romberg. Pure tone audiometry was normal other than bilaterally mildly elevated thresholds of 30 dBHL at 8 kHz. However left sided ipsi- and contra-lateral stapedial reflexes were elevated, and auditory brain-stem evoked responses, while normal on the right, showed increased latency of wave V on the left. Serial MRI scans demonstrated an enlarging left vestibular schwannoma. Trans-labyrinthine resection of the tumour was complicated by a left cerebellar infarct and hydrocephalus, and subsequently the patient continued to experience imbalance. Two years post-operatively, direct questioning about tinnitus led to the patient describing tonal tinnitus in the left ear on looking to the left, in which up-gaze increased the pitch, while down-gaze lowered the pitch. Notably she said “I feel I could play a tune with my eyes”.

Patient 2

A 32 year old man presented with visual instability and a tendency to fall forward and to the left provoked by loud sounds such as
the telephone ringing in his left ear. His auditory symptoms included being able to hear his heartbeats, bone taps, and footsteps. Additionally, he complained of a soft low pitched sound in his left ear “rather like moving a hard-pressed finger across a clean, wet china dinner plate” when he moved his eyes. These symptoms could be reduced if the patient tensed his abdominal muscles. Pure tone audiometry showed normal air conduction hearing thresholds bilaterally other than a mild elevation of 35 dBHL at 0.25 kHz on the left. Bone conduction hearing levels were normal, perhaps even supra-normal, with thresholds of -10 dBHL at 0.5 and 1 kHz bilaterally, giving rise to an “air-bone gap” at these frequencies. Clinical examination and three-dimensional video oculography demonstrated left beating torsional nystagmus provoked by the patient humming, and CT scanning of the petrous temporal bones revealed bilateral dehiscence of the superior semicircular canals (fig 1).

Discussion

Patient 1 has gaze-evoked tinnitus, a phenomenon first described in 1982 that was initially thought to be rare, but subsequently reported to be surprisingly common (prevalence 19–36%) in one study of patients post vesitubular schwannoma resection. It has also been described in patients with cerebellar pontine angle meningioma, meningeval metastases of malignant melanoma, and sudden senseineural hearing loss. It may develop months post-operatively, and is usually heard in, and caused by moving the eyes towards, the diseased ear. The exact mechanism is not known, but it has been postulated that neural plasticity mechanisms activated by unilateral deafferentation result in cross-talk between neural elements controlling eye movements and the central auditory system. Indeed, functional imaging studies of patients with gaze-evoked tinnitus have shown anomalous activation of the auditory lateral pons and auditory cortex, enhanced by failure of cross-modality inhibitory mechanisms.

Patient 2 has Tullio phenomenon, a condition in which sound and/or pressure stimulates the vestibular system. These patients often complain of abnormal auditory sensations such as “hearing footsteps vibrating through the body”, and finding the noise of chewing loud enough to make understanding of conversations at mealtimes difficult. Supra-normal bone conduction thresholds, or so-called “conductive hyperacusis”, has been reported in other patients with Tullio phenomenon, and dehiscence of the superior semi-circular canals is thought to be the commonest associated pathology. It is postulated that the dehiscence may act as an alternative lower impedance pathway for sound energy, enabling these patients to hear the movements of their eyelashes within the bony sockets, these sounds being conducted through the skull. It is interesting to note that although our patient had dehiscence of both superior semi-circular canals, he was only symptomatic on the left side. This could be explained by the Tullio phenomenon being multi-factorial in nature, and additional factors such as trauma or bone remoulding need to be present as well as the dehiscence before the clinical features become manifest.

Figure 1 Transverse computerised tomography image showing bilateral dehiscence of the superior semi-circular canals (indicated by arrows).

Transient compulsive hyperphagia in a patient with a thalamic infarct

Eating disorders are associated with various psychiatric and neurological diseases. Pathological eating behaviour ranges from reduced to excessive appetite, dysregulation of hunger and satiation signals, and odd food preferences. Hyperphagia and anorexia are reported in lesions (mostly tumours) involving the ventromedial hypothalamus. Moreover, eating disorders also occur in temporal lobe tumours, temporal lobe epilepsy, and advanced states of degenerative disease with neuronal loss in the medial temporal lobe. Hyperphagia is part of the Kluver-Bucy syndrome which occurs in patients with bilateral mesial temporal lesions.

We report a patient in whom compulsive hyperphagia was associated with a medial thalamic ischaemic stroke.

CASE REPORT

A 52 year old man complained of diploria, dizziness, vertigo, decrease of consciousness, memory impairment, and hyperphagia. These symptoms occurred abruptly while he was painting the gate in his garden.

The diploria and vertigo disappeared in about 15 minutes, while hyperphagia and memory impairment lasted for about 24 hours and completely disappeared the following day on awakening. Instead, amnesia concerning the event is still present.

The decrease of consciousness consisted of slight hypsersomnia (the patient could easily be awaked by auditory and verbal stimulation) and was present only at the onset, while memory impairment was noted only later. The patient’s wife reported that he kept repeating the same questions to her, and that he would try to eat the garden (e.g. vegetables and garden flowers), touching and breaking them as if they were made of a “wet china dinner plate”. The patient was completely unaware of these symptoms, which were reported only by his wife.

Regarding the hyperphagia, his wife reported that the patient was eating continuously all the food he found in the refrigerator and in the kitchen. Apart from the fact that he was eating continuously all day long, when it was time for his lunch and evening meal, he always felt hungry and hungry and his main concern was food, and his attention could not be diverted during his meals.

The following day his wife took him to the hospital. Neurological examination on admission revealed only retrograde amnesia about the events that had occurred in the previous 24 hours, along with fatuous behaviour. The medical history was not significant. Cranial computed tomography and extracranial Doppler ultrasonography were normal. Days later, brain magnetic resonance imaging (MRI) revealed an ischaemic lesion involving the medial portion of the left thalamus in the territory of the tuberoinfundibular artery (fig 1). MRI-angiography of extracranial and intracranial cerebral arteries was normal.

A transthoracic echocardiogram was normal, while a transoesophageal echocardiogram revealed an atrial septal aneurysm without a patent foramen ovale. Conventional vascular risk factors (hypertension, diabetes, hypercholesterolaemia, and smoking) were absent. Routine laboratory studies including coagulation profiles were normal.

During the hospital admission, the patient’s clinical condition progressively improved and he was discharged eight days later without any neurological symptoms.

Two weeks later he was submitted to a neuropsychological test battery to assess reasoning (Raven PM47), short term memory (verbal and spatial span), learning (paired associate and Corsi spatial learning), attention (visual search), and frontal executive functions (Nelson card sorting test, trial making B, category, and literal fluency). Anxiety and depression were investigated by the state-trait anxiety inventory and the Beck depression inventory. Results were within the normal range (<1 SD) for all the tests.

COMMENT

The anatomical substrates of eating disorders are conventionally the basalganglia and the cortico-limbic areas. In our patient compulsive hyperphagia was associated with the characteristic features of medial thalamic ischaemia. The patient presented with signs and symptoms of the so called “top of the basilar
Thalamo-perforating arteries usually arise from the posterior cerebral artery and supply branches of the posterior cerebral artery. Ischaemic lesion involves the medial thalamus (B) in the territory of the thalamo-perforating artery. A visual deficit (diplopia and down gaze palsy) is easily explained by bilateral involvement of the midline thalamus (A) from the posterior cerebral artery. (B) Axial view, T2 weighted (3800/120/2). A visual deficit (diplopia and down gaze palsy) is easily explained by bilateral involvement of the midline thalamus (A) from the posterior cerebral artery. (B) Axial view, T2 weighted (3800/120/2).
handwriting was large and legible. She was able to walk with a Zimmer-frame, but had a wide based shuffling gait compatible with a diagnosis of small vessel cerebrovascular disease.

Following that period she became depressed and withdrawn. Paroxetine did not help but the reintroduction of Madopar, in a dose of 62.5 mg three times daily, helped to alleviate the depression. After one year of follow up she remained mobile with help. She had not developed tremor, extrapyramidal rigidity, or significant bradykinesia. Her appetite and alertness continued to be good. She refused any further reduction in the dose of L-dopa.

**COMMENT**

Despite its high prevalence, IPD is often a challenging diagnosis. Up to 25% of patients considered to have this condition by a neurologist may have an alternative diagnosis. In the community, the diagnosis may be wrong in nearly 50% of cases. Where there is difficulty in making a diagnosis, a trial of L-dopa is often useful. However, it is possible that L-dopa dependency can occur even in patients without IPD. They can develop withdrawal symptoms of muscular aching and stiffness, which superficially resemble worsening parkinsonism and obviously respond well to L-dopa, giving the impression of a helpful treatment. In our patient’s case, larger and larger doses of L-dopa were prescribed over many years, leading to physical and psychiatric effects compatible with “hedonistic homeostatic dysregulation.” She became profoundly disabled as a result of L-dopa dependence, the manifestations of which were much worse than the symptoms with which she had initially presented.

The psychiatric effects of L-dopa dependence are well documented, including severe depression after withdrawal. However, the characteristic severe muscle pain suffered by our patient has not been reported before. We speculate that long term L-dopa treatment causes changes in the expression of central dopamine receptors such that withdrawal leads to unpleasant symptoms, even in people without Parkinson’s disease. A similar mechanism may underlie the development of “dopaminergic malignant syndrome”.

It is our suspicion that there may be other patients without IPD who are dependent on L-dopa. It is important that L-dopa is not considered a benign medication, and trials of treatment with this agent should be carefully supervised. Any patient taking L-dopa in large doses without dyskinesias should have the diagnosis reconsidered. Any patient with IPD in whom muscular pain is a prominent symptom, especially associated with weight loss and psychiatric problems, should have their use of L-dopa investigated. Finally, patients with L-dopa addiction, both with and without IPD, represent a great challenge in management. The prognosis is recognised to be poor. In our patient’s case, Madopar was withdrawn only with her informed cooperation and that of her husband, who had given her drug treatment for many years. Other patients simply refuse to comply with drug changes and may even change specialists to secure an L-dopa supply. The successful outcome in this case is probably the exception rather than the rule.

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doi: 10.1136/jnnp.2003.029041

Competing interests: none declared

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J Neurol Neurosurg Psychiatry 2004 75: 1363-1364
doi: 10.1136/jnnp.2003.030577

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