References

1. Ilan DI, Tejwani N, Keschner M, Leibman M. Quadriceps tendon rupture. J Am Ac Orthop Surg. 2003;11:192—200.
2. Ares-Rodriguez O, Castellet Feliu E, Teixidor Serra J, Villar Casares M. Bilateral spontaneous quadricipital tendon rupture in a kidney transplantation patient. Med Clini (Barc). 2007;128:676—7.
3. Govindu R, Ammar H, George V. Bilateral quadriceps tendon ruptura. J Clin Rheumatol. 2019;25:63—6.
4. Benameur H, Chaves C, Sautet A, Feron JM, Cambon-Binder A. Spontaneous bilateral quadriceps tendon ruptura revealing a parathyroid carcinoma. Joint Bone Spine. 2018;85:131—2.
5. Wu W, Wang C, Ruan J, Wang H, Huang Y, Zheng W, et al. Simultaneous spontaneous bilateral quadriceps tendon rupture with secondary hyperparathyroidism in a patient receiving hemodialysis: a case report. Medicine (Baltimore). 2019;98:e14809.
6. Lodha S, Pal R, Bhadada SK. Spontaneous simultaneous bilateral quadriceps tendon rupture associated with severe vitamin D deficiency. Clin Endocrinol (Oxf). 2019;91:580—2.
7. Meester S, Lee S. Spontaneous bilateral quadriceps tendon ruptura. Am J Emerg Med. 2018;36:1123e5—7.
8. Berrigan W, Geer R, Jelnick JS, Davis JE, Bunning R. Visual diagnosis: quadriceps tendon rupture. J Emerg Med. 2018;55:563—4.
9. Hak DJ, Sanchez A, Trobish P. Quadriceps tendon injuries. Orthopedics. 2010;33:40—6.
10. Vemuri VN, Venkatesh M, Kada V, Chakkalakkoombil SV. Spontaneous bilateral quadriceps tendon rupture in a patient with renal failures. BMJ Case Rep. 2018, bcr2017223191.
11. Ciriello V, Gudipati S, Tosounidis T, Soucacos PN, Giannoudis PV. Clinical outcomes after repair of quadriceps tendon rupture: a systematic review. Injury. 2012;43:1931—8.

L. González Martín[a,*], M.J. Abenza Abildua[a], M.L. Almarcha Menargues[a], P. Martínez Brandulas[b]

[a] *Sección de Neurología, Hospital Universitario Infanta Sofía, Madrid, Spain*
[b] *Servicio de Rehabilitación, Hospital Universitario Infanta Sofía, Madrid, Spain*

* Corresponding author.
E-mail address: lgonzalezmartin@salud.madrid.org (L. González Martín).

2173-5808/

Refractory status epilepticus due to vitamin B_6 deficit in a Parkinson's disease patient in treatment with levodopa/carbidopa intestinal gel☆

Estatus epiléptico refractario por déficit de vitamina B6 en paciente con enfermedad de Parkinson e infusión intestinal de levodopa/carbidopa

Dear Editor:

Continuous infusion of levodopa-carbidopa intestinal gel (LCIG) is an effective treatment for patients with advanced Parkinson's disease (PD) presenting motor fluctuations.[1] B-vitamin deficiency is a relatively frequent complication, typically manifesting as anaemia and/or subacute/chronic axonal neuropathy.[2] We present a case of refractory status epilepticus, which is an exceptional complication in patients with PD receiving LCIG.[3]

Clinical case

The patient was a 77-year-old man with advanced PD who had been treated with LCIG since the age of 74 (morning dose of 5 mL, continuous dose of 4.2 mL/h, and an extra dose of 3 mL). He had no relevant medical history except for significant dysphagia that had led to several hospital admissions due to pneumonia. Until that moment, no signs of neuropathy, B_9 or B_{12} deficiency, or increased homocysteine levels had been detected in follow-up visits. Vitamin B_6 level determination is not routinely performed at our centre, but may be requested from an external laboratory if deficiency is suspected.

During a hospitalisation due to pneumonia, the patient was assessed by the neurology department due to episodes suggestive of epileptic seizures. He reported feeling agitated and anxious, with short-lasting generalised muscle stiffness and no loss of consciousness. Blood analysis revealed high levels of acute-phase reactants, normocytic normochromic anaemia, and low transaminase levels (ALT/GPT, 2 U/L [normal range, 0-40]; AST/GOT, 8 U/L [normal range, 0-37]). An EEG revealed diffuse slowing with no epileptiform activity; the brain MRI yielded normal findings. The patient's symptoms were finally interpreted as non-motor off symptoms, and we decided to progressively withdraw treatment with levetiracetam (750 mg/day), beginning during admission.

One month later, when the patient was still receiving levetiracetam, he was admitted once more due to pneumonia and episodes suggestive of secondarily generalised focal seizures. During seizures, he showed disconnection from

☆ Please cite this article as: Baviera-Muñoz R, Buigues-Lafuente A, Campins-Romeu M, Garcés-Sánchez M, Martinez-Torres I. Estatus epiléptico refractario por déficit de vitamina B6 en paciente con enfermedad de Parkinson e infusión intestinal de levodopa/carbidopa. Neurología. 2022;37:608—609.

the environment and head version followed by generalised tonic-clonic movements. We also observed palpebral and generalised myoclonia during admission. The EEG revealed focal sharp waves in the left frontotemporal area, progressing to generalised spike-wave activity. We adjusted the antiepileptic treatment, increasing the dose of levetiracetam and consecutively adding lacosamide, phenytoin, and valproic acid, achieving no clinical improvement. Furthermore, cerebrospinal fluid analysis results were normal. A recent brain MRI scan performed after onset of the episodes revealed no alterations, and therefore no further imaging study was requested during this admission. Vitamin B_6 determination yielded levels below the detectable limit (< 3.50 g/L [normal range, 5-50 g/L]). Vitamin B_{12} level was 906 pg/mL (normal range, 191-663 pg/mL) and homocysteine level amounted to 108.5 mol/L (normal range, 2-17 mol/L). Despite supplementation with pyridoxine, the patient died due to torpid progression of the pneumonia and the advanced deterioration of his general state of health; status epilepticus had shown no improvement.

Discussion

Metabolism of levodopa demands vitamins B_6, B_9, and B_{12} and increases the levels of homocysteine.[4] The levodopa equivalent dose is higher in patients carrying a duopa pump than in those receiving oral dopaminergic treatment, with the first group being more susceptible to complications. Such other factors as malnutrition or malabsorption may favour vitamin deficiencies in these patients.[5]

Vitamin B_6 deficiency is a known cause of refractory epilepsy in newborns. Although rare in adults, some cases have been described in multimorbid patients with severe malnutrition.[5,6] Alcohol abuse, liver disease, pregnancy, and treatment with isoniazid may also contribute to this deficiency. The literature only includes one case of status epilepticus in a patient with PD treated with LCIG.[3] In this case, seizures started soon after onset of LCIG treatment. The patient presented focal seizures with loss of consciousness. Antiepileptic drugs did not achieve a clinical improvement, but supplementation with pyridoxine was more successful.

Although several causes may have contributed to the development of status epilepticus in our patient, it is unquestionable that pyridoxine deficiency is a predisposing factor. Pyridoxine acts as a cofactor for hepatic transaminases, and therefore vitamin B_6 deficiency is reflected in the decreased activity of ALT/GPT and, to a lesser extent, AST/GPT.[7,8] Identification of low transaminase levels may have avoided the delay in diagnosis and treatment onset in our patient.

In status epilepticus due to vitamin B_6 deficiency, supplementation is usually effective in seizure control.[3,5,8] However, early treatment onset is essential to avoid treatment resistance. Therefore, although exceptional, epilepsy due to vitamin B_6 deficiency should be considered as a potential complication of treatment with LCIG.

Conflicts of interest

The authors have no conflicts of interest to declare.

References

1. Slevin JT, Fernández HH, Zadikoff C, Hall C, Eaton S, Dubow J, et al. Long-term safety and maintenance of efficacy of levodopa-carbidopa intestinal gel: an open-label extension of the double-blind pivotal study in advanced Parkinson's disease patients. J Parkinsons Dis. 2015;5:165—74.
2. Merola A, Rosso M, Romagnolo A, Comi C, Fasano A, Zibetti M, et al. Peripheral neuropathy associated with levodopa-carbidopa intestinal infusion: a long-term prospective assessment. Eur J Neurol. 2016;23:501—9.
3. Skodda S, Müller T. Refractory epileptic seizures due to vitamin B6 deficiency in a patient with Parkinson's disease under duodopa® therapy. J Neural Transm. 2013;120:315—8.
4. Mars H. Levodopa, carbidopa and pyridoxine in Parkinson's Disease. Arch Neurol. 1974;30:444—7.
5. Tong Y. Seizures caused by pyridoxine (vitamin B6) deficiency in adults: a case report and literature review. Intractable Rare Dis Res. 2014;3:52—6.
6. Dave HN, Eugene Ramsay R, Khan F, Sabharwal V, Irland M. Pyridoxine deficiency in adult patients with status epilepticus. Epilepsy Behav. 2015;52 Pt A:154—8.
7. Cheney MC, Curry DM, Beaton GH. Blood transaminases activities in vitamin B6 deficiency: specificity and sensitivity. Can J Physiol Pharmacol. 1965;43:579—89.
8. Ono K, Ono T, Matsumata T. The pathogenesis of decreased aspartate aminotransferase and alanine aminotransferase in the plasma of hemodialysis patients: the role of vitamin B6 deficiency. Clin Nephrol. 1995;43:405—8.

R. Baviera-Muñoz[a,b,*], A. Buigues-Lafuente[c], M. Campins-Romeu[b], M. Garcés-Sánchez[d], I. Martinez-Torres[b]

[a] *Instituto de Investigación Sanitaria La Fe (IIS La Fe), Valencia, Spain*
[b] *Unidad de Trastornos del Movimiento, Servicio de Neurología, Hospital Universitari i Politècnic La Fe, Valencia, Spain*
[c] *Servicio de Neurofisiología, Hospital Lluís Alcanyis, Xàtiva Valencia, Spain*
[d] *Unidad de Epilepsia Refractaria, Servicio de Neurología, Hospital Universitari i Politècnic La Fe, Valencia, Spain*

* Corresponding author.
E-mail address: raquelbaviera@gmail.com
(R. Baviera-Muñoz).

2173-5808/