

$\alpha$  and  $\beta$ , that are encoded by the *PCCA* gene (13q32) and *PCCB* gene (3q21-q22), respectively. Mutations in these genes cause the disease. The genetic defect leads to the intramitochondrial accumulation of propionyl-CoA that is metabolised by secondary pathways to other metabolites. Its prevalence is of one case per 100,000 live births worldwide. It can present in the following forms: severe neonatal onset, intermittent late onset or a chronic progressive form.

Cardiac involvement is relatively frequent, and cardiomyopathy develops in one-fourth to one-third of patients with propionic acidaemia, which does not respond to supplementation with carnitine.<sup>4</sup> On the other hand, a recent prospective longitudinal study of 10 patients with propionic acidaemia<sup>5</sup> found that 70% of them had a prolonged QT interval (QTc > 440 ms), and that the interval was longer than 460 ms in 60%. The lengthening of the QT interval was unrelated to the metabolic status of the patients. It was observed both in school-aged children and adolescents, but not in infants. The same study reported that the most frequent ECG changes besides QT prolongation were repolarization abnormalities with T-wave inversion in leads V4–V6, abnormalities that we also found in the ECGs of our patient.

Although the exact underlying mechanism of the association between these two entities remains unknown, some authors have proposed that changes in heart conduction could be due to carnitine deficiency.<sup>6</sup>

From the perspective of clinical practice, this case suggests that patients with propionic acidaemia may be at greater risk of experiencing prolongation of the QT interval, so we recommend a yearly cardiovascular evaluation including a 12-lead ECG and a 24-h Holter recording in addition to the echocardiogram. If the presence of long QT syndrome were confirmed, initiation of beta-blocker therapy would be indicated to prevent ventricular arrhythmias, syncope or sudden death. It is also important that the parents and the patient are informed of the risk of using various

medicines that may lengthen the QT interval and thus promote the development of ventricular arrhythmias.

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## Contribution of serial neurophysiological studies in atypical Guillain-Barré syndrome<sup>☆</sup>



## Contribución de los estudios neurofisiológicos seriados en el síndrome de Guillain-Barré atípico

Dear Editor:

Guillain-Barré syndrome (GBS) is the most common cause of acute flaccid paralysis in children.<sup>1</sup> It is characterised

by symmetric ascending motor weakness and areflexia. GBS encompasses a group of acute immune-mediated acquired polyradiculoneuropathies that are usually preceded by gastrointestinal or respiratory infections. The most common forms are classified on the basis of neurophysiological criteria as acute inflammatory demyelinating polyradiculoneuropathy (AIDP) and acute motor axonal neuropathy (AMAN).<sup>2</sup> While both forms may be clinically indistinguishable, their prognosis can be very different. We present a case in which serial neurophysiological studies were key in the identification of a case of GBS with an atypical presentation, its classification as AMAN, and the assessment of the patient's outcome.

A male patient 7 years of age with no medical or surgical history of interest sought care in the emergency department for pain in the lumbar region and the right triceps surae accompanied by limited mobility in climbing and going down stairs lasting 11 days. We observed that the patient had difficulty walking on his toes, and the rest of the neurological examination was normal, including the deep tendon reflexes (DTRs). The findings of the lower limb X-rays were normal.

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**Figure 1** MRI axial projection of the lumbosacral spine (T1-weighted sequence), showing a tenuous contrast uptake by the roots of the cauda equina.

He was discharged with a diagnosis of functional impairment due to nonspecific pain.

A week later he developed distal weakness in all four limbs that was evinced by muscle testing. The DTRs were brisk and symmetric. A previous history of acute gastroenteritis of two days of duration two weeks before the onset of symptoms was reported.

Myelitis was suspected due to the presence of hyperreflexia and tetraparesis, leading to initiation of a short course of oral corticosteroid therapy with a mild improvement of symptoms. Cranial and spinal magnetic resonance imaging (MRI) tests were requested. While the cranial MRI showed no abnormal findings, the spinal MRI revealed gadolinium uptake by the nerve roots of the cauda equina (Fig. 1), compatible with nonspecific radiculitis.

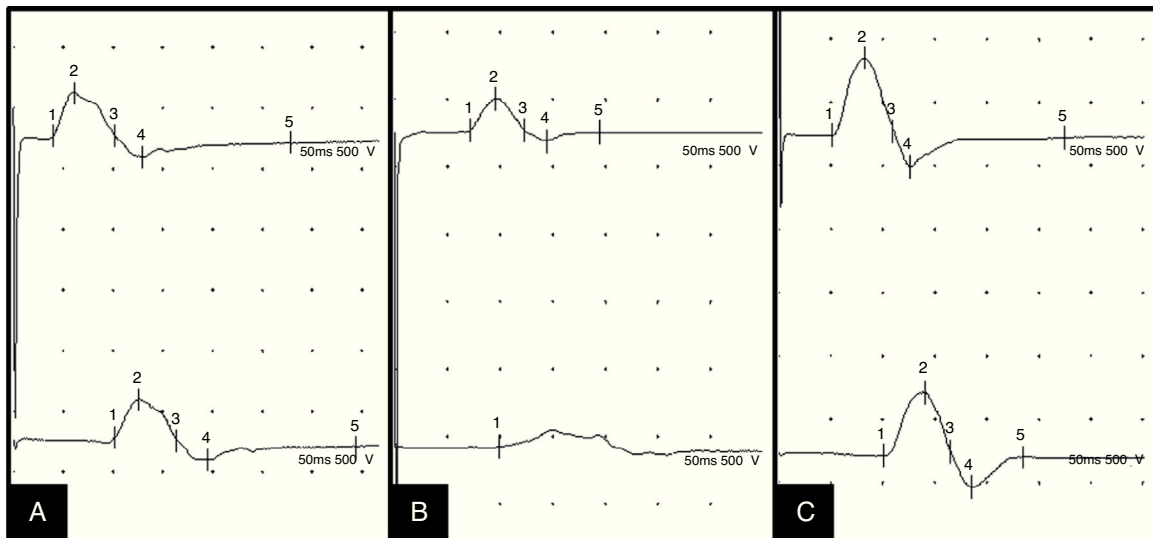
This was followed by an initial neurophysiological study of the four limbs consisting of sensory and motor neurography, F-wave latency measurement and electromyography. The sensory conduction findings were normal. All motor responses were low-amplitude (Fig. 2A) with preserved conduction velocity, associated with a significant reduction in F wave reproducibility. The findings were suggestive of a motor axonal polyradiculoneuropathy with no signs of muscle denervation.

The analysis of the cerebrospinal fluid was normal. Serology was positive for *Campylobacter jejuni*. Tests for serum antiganglioside antibodies revealed the presence of IgG antiGD1a antibodies.

Ten days after the AMAN diagnosis and having observed clinical improvement, the neurophysiological study revealed a worsening of motor parameters, with evidence of nerve conduction blocks (Fig. 2B) and signs of incipient muscle denervation.

At 20 days, with the patient remaining asymptomatic, the repeat neurophysiological study showed improvement in motor conduction, which was almost normal (Fig. 2C), and mild signs of denervation with no loss of motor units.

While universal areflexia is typically a key feature in the clinical picture of GBS, there have been reports of atypical cases that present with normal or even overactive reflexes. Kuwabara et al.<sup>3</sup> found a 33% incidence of hyperreflexia in



**Figure 2** Evolution of the findings of deep peroneal nerve motor neurography with distal stimulation at the ankle (tracings at the top) and proximal stimulation at the fibular head (tracings at the bottom): decrease in distal and proximal amplitude suggestive of axonal damage in the first study (A); motor conduction block 10 days later (B); amplitude measurements near the normal range 20 days later (C).

patients with GBS, mostly in patients with AMAN and anti-GD1a antibodies. The pathophysiological mechanism of this phenomenon could be explained by the presence of intact sensory nerves and a less severe motor axonal loss that would preserve the reflex arc,<sup>3,4</sup> combined with involvement of spinal inhibitory interneurons resulting in distal conduction disturbances.<sup>4</sup>

While the MRI findings tend to be nonspecific, studies of GBS in children<sup>5</sup> report contrast enhancement of the spinal roots in most of the cases.

Yuki<sup>6</sup> associated AMAN with axonal degeneration and transient involvement of the nodes of Ranvier. While the AMAN subtype carries a poorer functional prognosis, the presence of conduction blocks is associated with a better recovery. In the case we present here, serial neurophysiological studies evinced the reversibility of motor nerve involvement, both for distal peripheral nerves (normalisation of neurography findings after initial evidence of conduction blocks) and proximal nerves (F wave restoration). The persistence of acute signs of muscle denervation in asymptomatic patients can be attributed to the axonal degeneration characteristic of the disease and the time gap that exists between clinical and electrophysiological manifestations.

The diagnosis of GBS in children may be delayed by the nonspecific nature of the initial symptoms. Furthermore, the presence of hyperreflexia as an atypical manifestation may pose a challenge to the clinical diagnosis of GBS. In this context, neurophysiological studies acquire a greater relevance for the initial diagnosis, classification into the demyelinating subtype (AIDP) or axonal subtype (AMAN), and a better prognostic assessment of GBS.

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