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Case report

CASE REPORT

Guillain–Barré syndrome after BNT162b2 (Pfizer-BioNTec) vaccination

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Learning point for clinicians

A causal relationship between mRNA coronavirus disease 2019 (COVID-19) vaccination and Guillain–Barré syndrome (GBS) has not been established. However, because GBS can be complicated by severe respiratory failure, clinicians should consider GBS as a differential diagnosis of a patient with progressive limb weakness after mRNA COVID-19 vaccination.

Case presentation

A 65-year-old female without a prior medical history was admitted to our hospital due to progressive limb weakness and dysphagia. She received the first and second doses of the BNT162b2 mRNA coronavirus disease 2019 (COVID-19) vaccine (Pfizer-BioNTech) 24 and 2 days prior to the onset of symptoms, respectively. The patient had no preceding upper respiratory or gastrointestinal symptoms. Immediately after admission, the patient was intubated due to severe respiratory failure and transferred to the intensive care unit. Neurological examinations revealed the symmetric weakness of the four limbs, predominantly in the distal parts (Medical Research Council Grade 3 in the proximal limbs and Grade 1 in the distal limbs). All tendon reflexes were absent. There was no albuminocytologic dissociation in the cerebrospinal fluid (cell $<1/mm^3$, protein 38 mg/dl). Nerve conduction studies (NCS) were performed on hospital Day 2. Motor NCS revealed reduced amplitudes of compound muscle action potentials in each examined nerve. Distal motor latency was prolonged and motor nerve conduction velocity was reduced in the median and ulnar nerves. Sensory NCS of the sural nerve showed no abnormalities (Figure 1A). The patient was diagnosed with Guillain–Barré syndrome (GBS) and intravenous immunoglobulin (0.4 g/kg/day) was administered for 5 days. Her symptoms improved after the treatment, and she was extubated on Day 4 of the hospital stay. A follow-up NCS on hospital Day 12 revealed that the prolonged distal latency and reduced motor nerve conduction velocity were more prominent compared with those performed on admission. Sensory nerve action potentials were not elicited in the median nerve, markedly reduced in the ulnar nerve and normal in the sural nerve (Figure 1B). This pattern of sensory nerve conduction abnormality, known as abnormal median-normal sural sensory responses or sural sparing, supported the diagnosis of acute inflammatory demyelinating polyneuropathy (AIDP). All screened antiganglioside antibodies (anti-GM1, GD1a, GM2 and GQ1b) were negative. The patient received physical therapy and was discharged to a rehabilitation facility on hospital Day 29.

Discussion

GBS is a rare, immune-mediated polyradiculoneuropathy that typically results in acute, progressive sensorimotor disturbances with areflexia. GBS is a heterogenous syndrome with two common forms: AIDP and acute motor axonal neuropathy (AMAN). It was hypothesized that molecular mimicry between microbes

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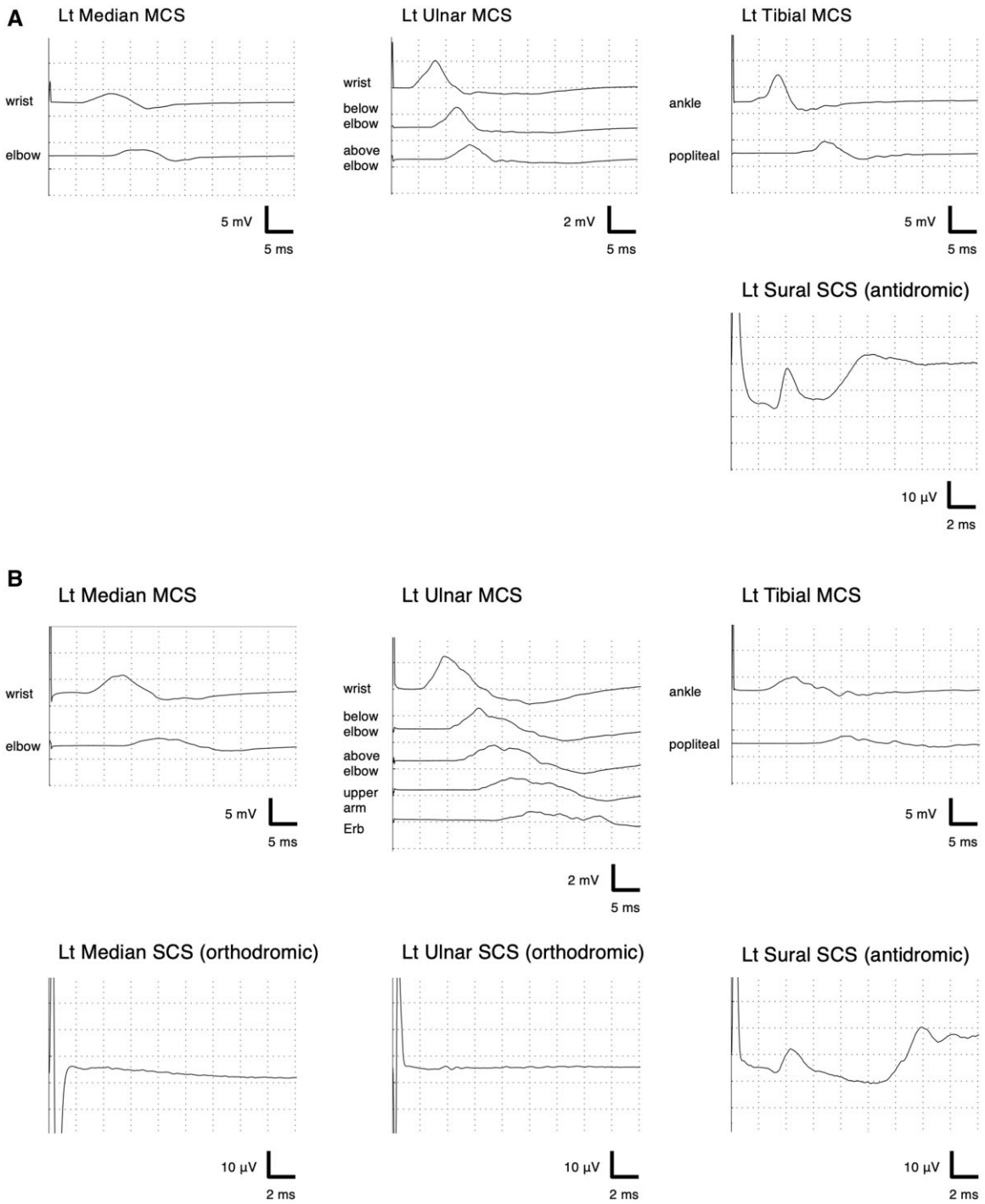

Figure 1. NCS performed on hospital Day 2 (**A**) and Day 12 (**B**). (A) Compound muscle action potentials were reduced in each examined nerve and prolonged distal motor latencies and decreased motor nerve conduction velocities (MCVs) were observed in the median and ulnar nerves. (B) Ten days later, the distal motor latency prolongation and MCV reduction progressed further in all nerves. Abnormal median-normal sural sensory responses were observed in sensory NCS.

and neural oligosaccharides causes a cross-reactive immune response toward the peripheral nerve system.[1] The association between COVID-19 vaccination and GBS remains unclear. A potentially small but statistically significant safety concern for GBS after the receipt of an adenovector (Ad26.COV2.S) vaccine was reported based on a US passive reporting system (approximately four times the background rate).[2] However, there is no convincing evidence of the association between GBS and mRNA COVID-19 vaccines, including BNT162b2.[3] To the best of our knowledge, 32 cases of GBS after receiving mRNA COVID vaccines have been reported, including the present case. The cases of GBS following BNT162b2 mRNA vaccination are mostly AIDP subtype with negative antiganglioside antibodies (13 cases in AIDP and 6 cases in AMAN), and ours is the only case of AIDP that required mechanical ventilation.[4] GBS following mRNA vaccination may be coincidental, and the benefits of the vaccination outweigh the risk of adverse events. However, it is essential to evaluate the risk of developing severe GBS requiring mechanical

ventilation, as in our case. Furthermore, surveillance and immunological studies are warranted to fully assess the significance of this association.

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Conflict of interest: None declared.

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