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Case Report

Meningoradiculitis post-COVID-19 mRNA vaccination: A case report ☆

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ABSTRACT

We present a rare case of meningoradiculitis occurring after mRNA COVID-19 vaccination.

This patient, with a history of inflammatory arthritis following rubella vaccination, presented to the emergency department 4 days after her vaccination with both central and radicular nervous system symptoms. Symptoms included pain, sensory and motor deficits in L5 roots distribution, along with signs of central irritation, such as headache, difficulty concentrating and a Babinski sign. MRI showed bilateral L5 nerve roots enhancement. Lumbar puncture showed elevated protein and IgG, and relevant serologies excluded common causes. Prednisone and physical therapy helped the patient to achieve near complete recovery nine weeks after presentation.

We concluded that this patient presented meningoradiculitis probably secondary to her vaccination in a context of possible overactive immune system. While such presentations might be rare, and do not constitute a general reason to abstain from vaccination, they must be well recognized and treated.

1. Introduction

Large-scale deployment of safe and effective vaccination against infection with SARS-CoV-2 (COVID-19) is in the process to stem the pandemic [1]. Reported side effects for these vaccines have mostly been mild [2]. We report a rare case of meningoradiculitis with post vaccination onset.

2. Case

Four days after receiving her first dose of the BNT162b2 COVID-19 vaccine [3], a 44-year-old woman presented to the emergency department (ED) with right leg pain. Relevant past medical history includes a severe inflammatory arthritis following rubella vaccination and a post-macrolide angioedema, requiring hospitalization. In both cases, she had complete recovery.

Her symptoms started with electric shock sensation, followed by hypoesthesia around the whole leg below the knee, and a distal motor deficit. Within an hour, she started feeling strong lumbar pain. After ED presentation, right leg examination revealed a Babinski sign, an epicritic hypoesthesia below the knee, and a motor deficit on plantar flexion, dorsiflexion and inversion of the foot evaluated at 3+/5. Lasègue sign was negative. The left leg, just like the rest of the physical exam, were normal. A cerebral and cervical MRI with injection, as well as routine blood work, showed normal results. Within a few hours, symptoms improved, with distal motor force at 4+/5 and hypoesthesia on the inner surface of the foot and medial foreleg as only sensitive deficit. The patient was discharged.

Later that night, she returned to the ED after feeling a 10/10 right leg pain. Neurologic examination was similar to previous one, except for the plantar response, which was indifferent, and a positive Lasègue sign. A lumbar and thoracic MRI without gadolinium injection was normal, without signs of myelitis or disc herniation. She reported a bifrontal headache and affected cognition including memory. With improvement, she was discharged again.

Six days later, she still had lumbar pain, headache and difficulty concentrating. Blood work showed negative test results for the following: Abbott kit for anti-N COVID-19 IgG antibodies, extractable nuclear

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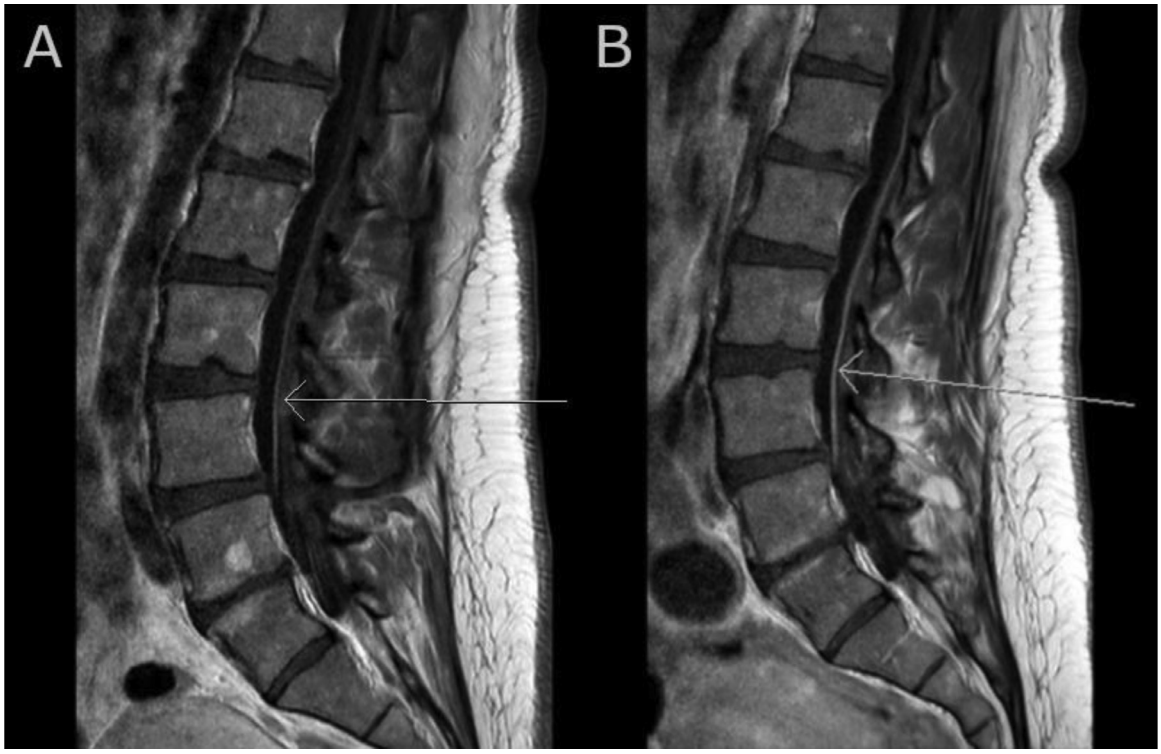

Fig. 1. Lumbar MRI.
Post contrast sagittal T1 sequence lumbar MRI showing gadolinium enhancement of (A) the left L5 root and (B) the right L5 root.

antigen antibodies (ENA) panel, as well as antibodies for syphilis, human immunodeficiency virus (HIV) and *Borrelia burgdorferi*. Metabolic testing, including glycosylated hemoglobin and thyroid stimulating hormone were normal.

On the eleventh day after presentation, a COVID-19 PCR test was completed, with a negative result.

Two weeks after presentation, cognitive and memory symptoms had resolved. She still had a headache, pain on both sides of the lower back, and epicritic hypoesthesia on the right hallux, lateral face, and plantar surface of foot. Gait was slow, with wide-based stance, and the patient reporting loss of automaticity in walking. She could walk on her toes, but not her heels. Osteotendinous reflexes were present and symmetrical. Lasègue sign was still positive on both sides. At this time, a post contrast thoracolumbar MRI showed enhancement of bilateral L5 roots (Fig. 1). Given the spontaneous partial improvement and the lack of infectious signs, the patient was prescribed 10 days of prednisone (1 mg/kg).

Electroneuromyographic study showed decreased motor response of the right peroneal fibers and minor changes on concentric needle examination, compatible with right L5 root injury.

Seventeen days after initial presentation, CSF analysis showed elevated CSF protein at 0.93 g/L and high total IgG level. Culture, PCR for COVID-19 and multiple virus panel all showed negative results, along with normal cell counts. Oligoclonal bands were absent.

The post-vaccination antibody status of the patient was performed at the New Brunswick Diagnostic Virology Reference Center (Moncton, NB). Testing performed on blood samples collected at days 14 and 21 post-vaccination allowed us to draw conclusions on antibody status. At day 14, the sample was positive for anti-S IgM, but negative for anti-S IgG. The sample collected at day 21 was positive for anti-S IgG.

Physiotherapy was also started to aid recovery.

Nine weeks after presentation, this patient has shown a near complete recovery.

3. Discussion

Given the symptoms, L5 roots enhancement on MRI, as well as exclusion of other causes, we hypothesize that this patient suffered a meningoradiculitis secondary to an immune reaction following her vaccination. Elevated levels of IgG in the CSF suggest the presence of autoantibodies that could have contributed to the development of meningoradiculitis. Autoantibodies have been associated with meningoradiculitis in previous studies [4,5]. However, the antigen or antigens in this case remains elusive and will need further investigation. Furthermore, some additional findings have to be taken into considerations, such as the integrity of the blood-brain barrier, which allowed the passage of IgG into the CSF, and the previous hypersensitivity reaction to rubella vaccination. These observations could be attributed to an overactive immune system.

Considering this patient's history of reaction to a vaccine in the past, as well as the possible neurological complications of infection to SARS-CoV-2 [6], we do not believe this case report should serve as evidence that this vaccine is unsafe for the general population. We have, however, preferred to issue a contraindication to the second dose of the vaccine for this specific patient. It remains important to consider this possibility in patients with similar symptoms.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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