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Brief report

Subacute monomelic radiculoplexus neuropathy following Comirnaty© (Pfizer-BioNTech COVID-19) vaccination: A case report

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1. Introduction

The SARS-CoV-2 pandemic has been the main issue in public health and medicine since the end of 2019. The vaccination campaign that started in December 2020 is one of the most efficient ways to limit the transmission of the disease and decrease the death rate. These vaccines stimulate the immune system and result in the production of antibodies directed against SARS-CoV-2. However, in a minority of cases, autoimmune adverse events have been described following COVID-19 vaccination. Here we present the case of a patient presenting with monomelic subacute radiculoplexus neuropathy 10 days after receiving a first dose of Comirnaty© (Pfizer-BioNTech COVID-19) vaccine.

2. Case report

A 48-year-old man was admitted to our neurological unit for evaluation of sensory-motor deficit of the lower right limb.

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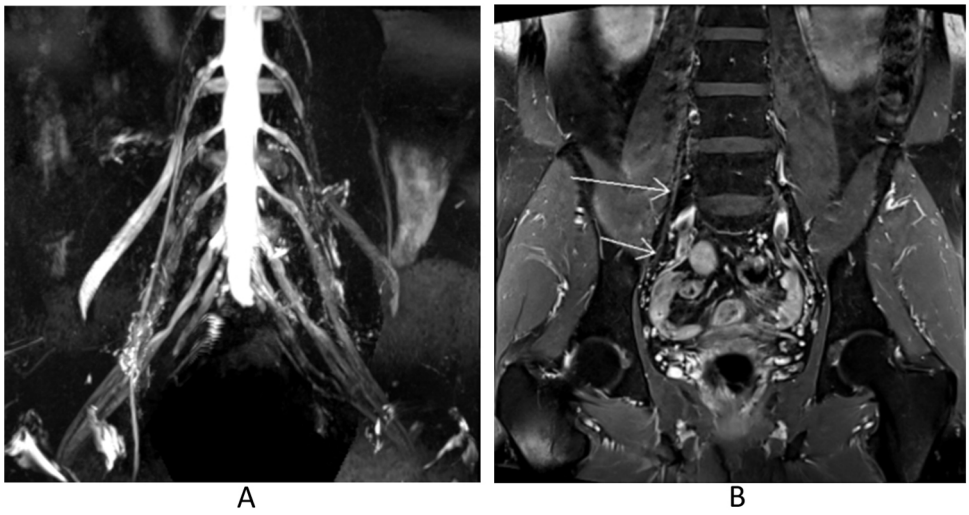

Fig. 1 – MRI of the lumbosacral plexus, coronal STIR (A) and T1 after gadolinium-injection (B), showed a bifocal involvement of both the right obturator nerve and the right femoral nerve associated with a discrete enhancement of those nerves after gadolinium-injection.

This patient had a history of obstructive sleep apnea syndrome treated with mandibular advancement orthotic. He had no history of diabetes. He doesn't take any medication. Moreover, he presented with a benign SARS-CoV2 infection in March 2020 and received a first injection of Comirnaty© (Pfizer-BioNTech COVID-19 vaccine) on January 20th, 2021.

On January 26th, 2021, the patient experienced a sudden onset of paresthesia in the anterior part of his lower right limb. The symptoms rapidly worsened throughout the day, with anesthesia starting at mid-thigh and extending to the right ankle. These deficits were then followed by neuropathic pain of the right lower limb, for which the patient was put on Pregabalin therapy by his general practitioner and a hospitalization in neurology was programmed. The patient had difficulty walking with weakness of the right lower limb.

On February 11th, 2021, the patient received a second dose of Comirnaty© vaccine.

On April 13th, the patient is hospitalized in the Neurology department. Sensory symptoms and difficulty walking persisted since January 2021. Clinical examination showed a motor deficit of the right quadriceps and psoas (motor score: 4/5). Marked hypoesthesia was noted, on the lateral portion of the lower right limb, without any abnormality of the foot's sensibility. Furthermore, an abolition of the right patellar reflex was noted. There was no ataxia or proprioceptive deficit, and the rest of the neurological examination was normal. Both Norris score (79/81) and Overall Neuropathy Limitations Scale (ONLS) score (upper limb: 0/5; lower limb 2/7) were performed.

Standard blood tests (complete blood count, serum electrolytes, liver and renal function, CRP), infectious (HIV, HBV, HCV, Lyme, HTLV1 and HTLV2 serology, SARS-Cov-2 RT-PCR) and autoimmune workups (with anti-ganglioside antibody research) did not find any abnormality. A SARS-CoV-2 serology assay was performed, using a Cobas 6000© (Roche) electrochemiluminescence reagent kit: both total anti-nucleocapsid IgG and anti-protein S IgG were positive.

Electromyoneurography of the lower limbs was performed on April 13th, and decreased amplitudes were found when assessing the right femoral nerve (motor amplitutde 0,5 mV) and right superficial fibular nerve (sensitive amplitude 3 μV, sensitive conduction velocity 35 m/s). The right saphenous nerve was not performed. A neurogenic aspect was also found when assessing the right vastus medialis and vastus lateralis muscle with electromyography: rest activity in the right vastus lateralis; low recruitment at voluntary contraction for both muscles. The rest of this exam did not find any significant abnormality.

Cerebral spinal fluid analysis showed an albuminocytological dissociation: no cellular elements were found and a moderate proteinorachya of 0.65 g/L (normal value less than 0.45 g/L) was identified. Furthermore, no SARS-CoV-2 anti-nucleocapsid IgG were found in the CSF but high-levels of anti-Spike IgG were present.

Magnetic Resonance Imaging (MRI) of the lumbosacral plexus identified a bifocal involvement of both the right obturator nerve and the right femoral nerve associated with a discrete enhancement of those nerves after gadolinium-injection (Fig. 1). Furthermore, no compression was found on computed tomography (CT) imaging.

Overall, the clinical, biological, radiological and electromyographic findings are in favor of a monomelic subacute lumbosacral radiculoplexus neuropathy.

Because of the suspected dysimmune origin, intravenous immunoglobulins therapy was started (2 g/kg over 5 days) the April 22nd. The improvement of both sensitive and motor symptoms was immediate and the patient received in total two courses of intravenous immunoglobulins before recovering fully without any sequelae.

3. Discussion

The patient's history with subacute right lower limb dysesthesia, then pain, motor weakness and patellar reflex loss is consistent with a lower limb Neuralgic Amyotrophia also called Bruns Garland syndrome. This diagnosis is confirmed by the electromyographic and plexus MRI showing unilateral lumbosacral neuropathy.

Clinical and para-clinical examinations showed no other cause of subacute monomelic neuropathy apart from SARS-Cov-2 vaccination. Indeed, the intrinsic drug causality assessment (chronologic and semiologic criteria) doesn't rule out the post-vaccination hypothesis (diagnosis of exclusion), which is reinforced by the high anti-Spike IgG levels in CSF. The very high serum concentration of anti-Spike antibodies (post-Covid or post-vaccine infection) could lead to a passive diffusion of these antibodies in the cerebrospinal fluid. Nevertheless, the absence of anti-nucleocapsid antibodies in the CSF despite their high level in blood constitutes an additional argument for the vaccination causality.

In the area of peripheral neuropathies, side effects of vaccines include Guillain-Barré syndrome (GBS) and Neuralgic Amyotrophia (NA) which corresponds to Parsonage-Turner syndrome for upper limbs and Bruns and Garland syndrome for lower limbs.

GBS is an acute polyradiculoneuritis characterized by progressive ascending paralysis of variable severity, potentially associated with sensory or dysautonomic symptoms [1]. Many infectious agents can trigger GBS. Surprisingly, the risk of GBS does not seem to be higher after SARS-CoV-2 infection [2]. GBS can also occur after specific vaccinations [3], such as the rabies vaccine [4] or the influenza A (H1N1) vaccine [5] and SARS-cov-2 [6].

The absence of abrupt and major pain in the patient of our case is atypical for a NA, nevertheless the distribution limited to one limb and the duration of the onset of symptoms are not compatible with GBS. A similar case of lumbosacral radiculoplexus neuropathy have been published on February 2022 [7]. Similarly, Parsonage-Turner syndrome post SARS-CoV-2 was also described [8,9].

The mechanism of this lumbosacral NA, like in GBS, is thought to be molecular mimicry: the stimulation of the immune system by an infection or a vaccination could result in the production of antibodies directed against the myelin sheath of the peripheral nerves, resulting in demyelination and/or axonal injury [10].

Since November 2020, 4 Covid vaccines have shown efficacy in phase 3 clinical trials and generalized vaccination seems necessary in order to control the SARS-CoV-2 pandemic.

Since the beginning of the vaccination campaign, a few cases of NA and GBS have been described after SARS-CoV-2 vaccination [11,12]. However, a direct causal link between the vaccination and the neurological phenomenon is difficult to establish and a temporal coincidence cannot be excluded [13]. The search in the WHO global pharmacovigilance database (Vigibase) currently finds (date of the request: on January 31st, 2023) 7346 cases (345 in France) of ''Guillain Barre syndrome/acute polyradiculoneuritis'' (according to MedDRA classification = the Medical Dictionary for Regulatory Activities) associated with COVID-19 vaccines, among which 3531 cases (48.1%) associated with the tozinameran (=Comirnaty®). The lower limit of the information component 95% credibility interval ($IC_{0.25}$), an indicator value for disproportionate Bayesian reporting comparing observed and expected values to find signals for associations between drugs and adverse events [14], of this association (tozinameran + acute polyradiculoneuritis) is significantly positive ($IC_{0.25} = 1.4$).

Nevertheless, the reporting frequency of acute inflammatory neuropathies with SARS-CoV-2 vaccines of different technologies seems similar to that of other viral vaccines, and neither patient sex nor age were risk factors [15].

4. Conclusion

Here we present a case of subacute lumbosacral NA, following a Pfizer SARS-Cov-2 vaccine in a 48-year-old patient. No triggering factor was found apart from this vaccination. The patient fully recovered after treatment with intravenous immunoglobulins. Although the vaccine seems to have been the triggering factor, the causality cannot be affirmed. Furthermore, it is important to note that this case report does not call into question the effectiveness or benefice risk balance of SARS-CoV-2 vaccination.

Disclosure of interest

The authors declare that they have no competing interest.

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The supplied data came from a variety of sources. The likelihood of a causal relationship was not the same in all reports. The information does not represent the opinion of the World Health Organization.

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