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Case report

CASE REPORT

Neuralgic amyotrophy following COVID-19 mRNA vaccination

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Learning points for clinicians

Neuralgic amyotrophy is commonly preceded by an antecedent event such as infection, surgery and less commonly vaccinations. COVID-19 mRNA vaccines (BNT162b2 and mRNA-1273) may be, albeit rare, a trigger of neuralgic amyotrophy. All patients recovered considerably, further reiterating that the benefits of mRNA vaccines outweigh adverse events.

Case description

Patient 1

A 50-year-old male presented with acute onset right upper limb pain followed by weakness and numbness of the arm and lateral forearm 25 days after the first dose of the BNT162b2 vaccine (ipsilateral to the injection site). Clinical examination, corroborated by MRI (Figure 1A and B), indicated predominant upper and middle trunk involvement of the brachial plexus. Nerve conduction study (NCS) and electromyography (EMG) performed 10 and 31 days from symptom onset were normal. He improved with corticosteroid upon review at 7 weeks.

Patient 2

A 44-year-old male developed acute onset neck and posterior shoulder pain, followed by a right medial forearm and hand numbness, as well as hand weakness, 4 days after the second dose of BNT162b2 vaccine (32 days after the first dose, contralateral to the injection site). Clinical examination, corroborated by NCS and EMG performed 15 and 42 days from onset, showed predominant lower trunk involvement of the brachial plexus. MRI brachial plexus findings are shown in Figure 1C and D. He did not receive corticosteroid and made significant improvement upon review at 8 weeks.

Patient 3

A 58-year-old male developed acute onset shoulder and left upper limb pain, followed by predominantly distal hand weakness and numbness 7 days after the second dose of mRNA-1273 vaccine (35 days after the first dose, ipsilateral to the injection site). Clinical examination, corroborated by NCS and EMG performed 35 days from onset, as well as MRI, showed predominant

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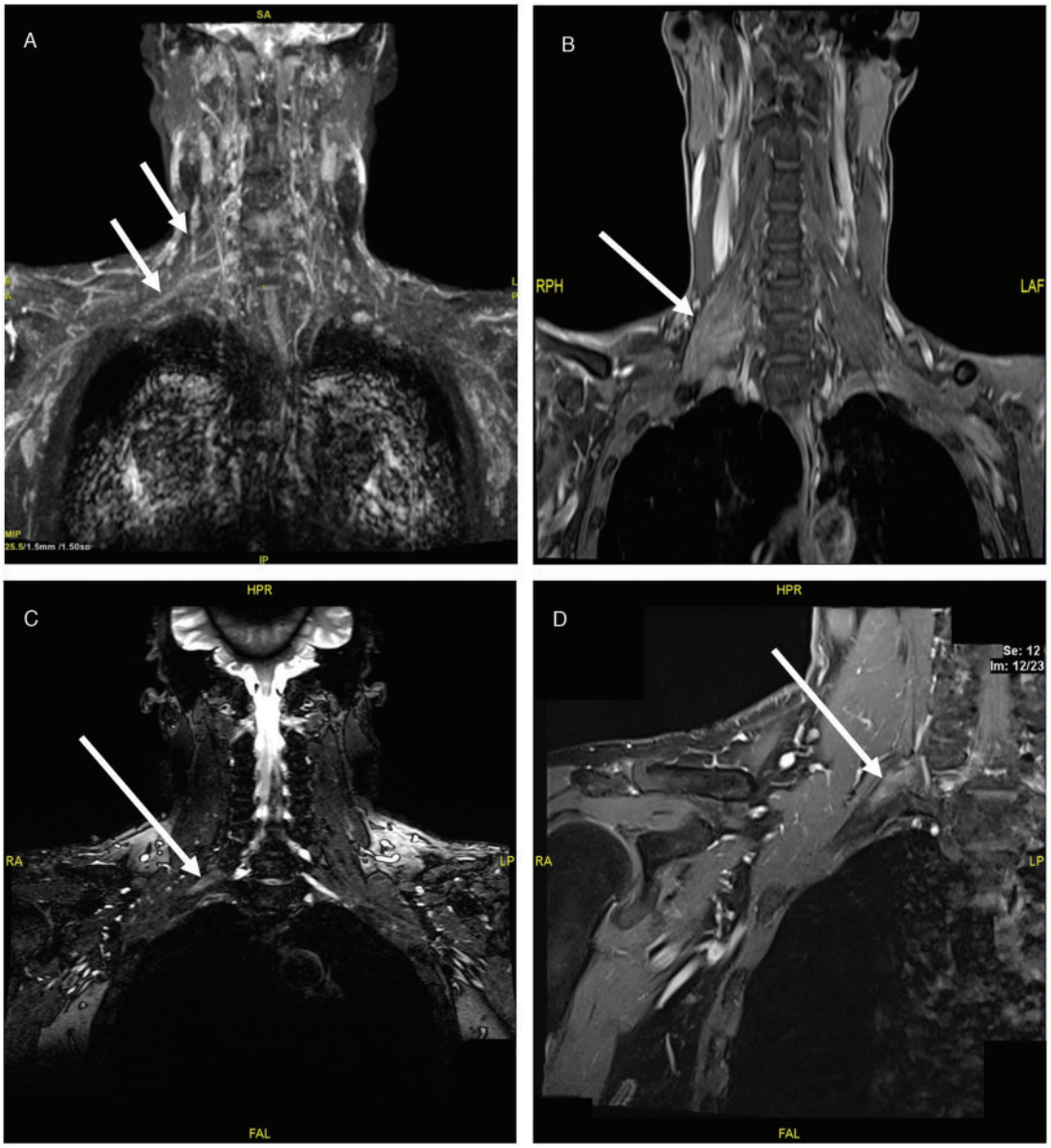

Figure 1. Radiological features of neuralgic amyotrophy. MRI brachial plexus (Patient 1) shows patchy oedema and enhancement of the right brachial plexus (trunks and divisions) (**A**, arrows). Patchy oedema and enhancement of the right scalene muscles (**B**, arrow) suggestive of subacute denervation is seen; MRI brachial plexus (Patient 2) shows mild oedema (**C**, arrow) and enhancement (**D**, arrow) of the right posterior scalene muscle, suggestive of subacute denervation. No mass is seen. (A) Coronal short tau inversion recovery (STIR), (B) Coronal post-contrast T1-weighted (C) Coronal T2-weighted Turbo Inversion Recovery Magnitude (TIRM) with fat saturation, (D) Coronal post-contrast T1-weighted with fat saturation.

lower trunk involvement of the brachial plexus. He improved with corticosteroid when reviewed at 5 weeks.

Patients 1 and 3 had negative SARS-CoV-2 polymerase chain reaction (PCR) tests, while this was not done for Patient 2. None had clinical or laboratory evidence of antecedent infections (e.g. respiratory and hepatitis), other triggers of neuralgic amyotrophy (NA) or family history suggestive of hereditary NA. MRI cervical spine was either normal (Patient 1) or showed multilevel spondylosis with mild nerve impingement (Patients 2 and 3) which did not account for their clinical presentations.

Discussion

Neuralgic amyotrophy (also known as brachial neuritis or Parsonage-Turner syndrome) is commonly preceded by an antecedent event such as infection (including SARS-CoV-2 and hepatitis E), surgery and less commonly vaccinations.[1,2] Two cases have been reported after BNT162b2 and none after mRNA-1273 vaccines.[3,4] We expand on this and report the first case associated with the mRNA-1273 vaccine. All patients fulfilled commonly adopted criteria[5] for NA (excluding family history). Despite the close temporal relationship to vaccines, we cannot be certain of causality from our small observational series. However, a possible association between NA and mRNA vaccines may be extrapolated by:

1. Biological plausibility. Although rare, vaccination is a well-characterized trigger for NA. Van Alfen and van Engelen[1] reported only five out of 246 cases linked to vaccines. Our patients had no other triggers.

2. Latency. In a series of 246 cases, the majority occurred 1–7 days after the antecedent event; specifically, 65.3% of cases that followed infection occurred in this time interval and 10.2% after 2 weeks.[1] Two of our patients developed NA within a week of the second dose while the other occurred 25 days after the first dose. The timing of neurological symptoms post-vaccination possibly correlates with temporal development of neutralizing antibodies after mRNA vaccination and may account for inflammation of the brachial plexus.

Considering an incidence of 2–3/100 000/year,[1] three cases of NA after vaccinating approximately 3.9 million persons in Singapore from 30 December 2020–9 July 2021, suggest a rare occurrence as with other vaccines.[1] Data from United States Vaccine Adverse Event Reporting System corroborate our observation.[6] It is noteworthy that all our patients recovered considerably, further reiterating that the benefits of mRNA vaccines outweigh adverse events.

Funding

None declared.

Ethics approval

The study was approved by the Singapore Health Services institutional review board (CIRB 2020/2410). Waiver of consent was granted.

Conflict of interest. None declared.

Data availability

All data relevant to the study are included in the article.

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