

Functional neurological disorder after vaccination: a balanced approach informed by history

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Reports, incorporating video footage, of neurological symptoms such as paralysis and seizures as a complication of SARS-CoV-2 vaccination are circulating on social media and have caught the attention of the professional community.¹ It is an urgent task to determine whether these are coincidental disease, potential pathophysiological complications of vaccine (such as Guillain Barre Syndrome) or rather constitute 'immunisation stress-related responses'.²

What are immunisation stress-related responses?

Immunisation stress-related responses (ISRR) have been observed in different cultures, particularly in children and adolescents. Their occurrence is influenced by societal factors such as coverage of vaccination programmes in the media. Two basic sets of symptoms have been distinguished:³

1. Dizziness, headache, fainting; resolving within 24 hours; often in close-knit groups.
2. Shaking, twitching, difficulties walking; lasting weeks to months.

Both reactions can become contagious, through direct or social media contact, and then conceptualised as examples of 'mass sociogenic illness' (MSI). The ease with which ISRR can spread through direct or virtual social contacts may be related to the undercurrent of vaccination

hesitancy that is present to a varying degree during most vaccination campaigns.⁴ The link between ISRR and HPV vaccination in teenage girls seems to be particularly strong, with functional symptoms occurring in clusters after HPV vaccination programmes in different countries, including Brazil, Columbia, Denmark and Japan.³ These events had a dramatic impact on HPV vaccination rates in some countries, increasing long-term risk of cervical cancer. This experience shows that misinterpretation of reactions to vaccination can have serious public health consequences. Although the short-lived type of ISRR might sometimes be difficult to distinguish from the common side effects reported after vaccination, the presentations with prominent motor symptoms can be positively diagnosed as functional neurological disorders (FND) on the basis of signs of internal inconsistency. In fact, the term ISRR itself may be simplistic in that it suggests a unitary cause (stress) whereas multiple mechanisms may be at play, including physiological fear reactions, disordered interoception and psychological processes of prediction and expectation.

What do we know about the history of ISRR?

The history of ISRR goes back at least to the First World War, which was a period of very intense vaccination activities (first against typhoid, and then against the Spanish flu, albeit with mixed bacterial vaccines). In 1920, Sir Frederick

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Walker Mott, neuropathologist and shell shock specialist at the Maudsley Hospital in South London, reported a case of ‘hysterical paralysis’ in a soldier who was vaccinated in March 1915 and lost control of both legs within 15 minutes.⁵ He was discharged from the army and treated in various hospitals without success. Mott reported that he cured him with psychological methods within a week. Several other case reports of post-vaccination neurological symptoms with chronic course reported at the time suggest a functional origin.

We have also discovered two such cases in the records of the National Hospital for Neurology and Neurosurgery (NH) at Queen Square, London, UK. The first patient, a 41-year-old Private, was treated at the NH in March 1918. His first functional seizure had occurred in April 1917 while he was on parade, shortly after his inoculation. He continued to have seizures while he was serving in Italy. During examination at the NH, his legs were in a state of constant tremor and there was some weakness and contraction of antagonistic muscles, indicating a functional movement disorder. The second patient, a 20-year-old Private who was admitted to the NH in July 1918, had been suffering from functional seizures for 14 months. The seizures started while he was deployed in France, immediately after his inoculation for typhoid, and recurred at irregular intervals. He also developed a generalised functional tremor. Neither patient improved much during hospital treatment (Queen Square records, Batten, 1918, Taylor, 1918, QS Archives, London, UK). Similar cases were also identified on the German side, in the records of the psychiatric department of the Charité hospital in Berlin.⁶

We can see many parallels between these reactions to vaccination a century ago and today. It is recognised that both physical and psychological stress can contribute to FND, and feelings of uncertainty, insecurity, isolation and violation of bodily integrity may have compounded the common physical reactions to vaccination in the First World War soldiers and may indeed have a similar effect in the more recent cases of ISRR.

How should we approach functional reactions to vaccination clinically?

The first clinical case reports of FND precipitated by the administration of a SARS CoV-2 vaccine are starting to emerge.⁷ One problem is that patients might inadvertently interpret a diagnosis of ISRR or FND as an accusation that they are imagining or feigning their symptoms, leading to acrimony that will not help pro-vaccine messaging. Much research over the last decade has identified potential mechanisms for FND, whereby a combination of errors of neural prediction leading to alteration in motor control and agency and internal amorphous sensations, such as one might get after a vaccination, could lead to actions that are perceived as involuntary. Such a more encompassing formulation may help reassure the individual patient. An early positive diagnosis of FND is acceptable to patients and clinicians and paramount for the treatment of the individual patient, which needs to start early to prevent a chronic course. Both neurology and psychiatry play an important role in the delivery of such early treatment, which, based on the available case series, seems to be very effective.⁸

What are the implications for current vaccination programmes?

It is important to increase awareness that FND is a possible explanation for neurological symptoms after vaccination not only to facilitate early treatment but also to prevent the occurrence of ISRR clusters, which could potentially form through the contagious use of social media.³ Providing accurate information about vaccination risk is one of the key elements of the current public health agenda. Using the right language is another. Some people experiencing functional reactions will deny any role of stress, and it is important for the therapeutic process to find an explanatory model that satisfies both the clinician and the patient. **1**

Data availability

All case records can be studied at the Queen Square Library and Archives at University College London and at the Archives of the History of Medicine department of the Charité in Berlin.

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