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COVID-19

Functional neurological disorder after COVID-19 vaccination

Tommaso Ercoli[1] · Laura Lutzoni[2] · Gianni Orofino[2] · Antonella Muroni[2] · Giovanni Defazio[1,2]

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Dear Editor,

Functional neurological disorder (FND) is characterized by symptoms such as paralysis, sensory disturbances, and seizures that can be identified as related to alterations in functioning of brain networks rather than disorders of brain structures. The diagnosis of FND is based on the demonstration of incongruence with a known clinical pattern and/or inconsistency over time and may be supported by the presence of positive signs (e.g., Hoover's sign in functional leg weakness) [1]. Psychological stressors such as stressful life events, physical trauma (e.g., infections and adverse drug reaction), and medical comorbidities (e.g., other neurological diseases and pain) have been associated with the development of FND [2, 3].

As the COVID-19 vaccination program is currently ongoing worldwide and some videos circulated on social media about neurological adverse events following administration of the vaccine, a *JAMA Neurology Viewpoint* and a press release from the *FND Society* (https://www.fndsociety.org/UserFiles/file/FNDSSocietyPressReleaseCOVIDVaccines.pdf) discussed the possibility of FND developing after vaccination and reassured public opinion about the safety of the COVID-19 vaccine [4]. Although FND can be sometimes diagnosed from videos with good accuracy, we here report the first description of FND after the COVID-19 vaccine as evaluated by a team of neurologists.

In the middle of February 2021, a 41-year-old man received the first jab of vaccine against COVID-19. Two episodes of anaphylactic shock were the only remarkable events in his past medical history. After a few minutes from the injection, he reported bilateral facial paralysis with difficulty to blink and move the facial muscles properly. Within 40 min, all the symptoms resolved spontaneously. Three weeks later, a few minutes after the second jab, he complained of swollen tongue and respiratory impairment, which was quickly resolved by corticosteroid therapy. In the meantime, he developed right-sided weakness, at the same side of the injection, lasting for about 40 min. A couple of weeks later, he suddenly manifested left-sided facial hypoesthesia, and due to the persistency of symptom, he was admitted to our ward. Neurological examination revealed midline splitting of sensory deficit in the face with tacto-dolorific hypoesthesia. Neurological examination was otherwise unrevealing. Head CT and brain MRI were normal, as well as carotid artery Doppler ultrasonography. Two weeks later, sensory disturbance resolved, and the neurological examination was normal.

To our knowledge, this is the first full description of a FND case associated to COVID-19 vaccine. We assessed at the bedside only the sensory loss with a clear edge on the facial midline, which is a sign with a good positive predictive value for FND, especially when thalamic lesions have been excluded [5]. We did not evaluate the other symptoms reported immediately after the jabs, but their features and course seemed to confirm the FND diagnosis. Indeed, acute and serious neurological adverse event after vaccine is thankfully rare, and bilateral facial palsy and transient weakness are likely to be transient ischemic attack mimics. Overall, the patients suffered from a variety of neurological symptoms in the last two months, confirming inconsistency over time.

Current hypothesis highlights the importance of attention and beliefs/expectation in the pathophysiology and phenomenology of FND [6]. Abnormal expectations about illness may be generated by a range of predisposing factors related to beliefs on and personal experience of illness. These may include physical illness in the patient him- or herself, exposure to illness in the family [7] or while in a medical or paramedical job, health scares in the media or within colleagues, or myriad other sociocultural means. Abnormal beliefs about illness may also be a source of increased attention towards

✉ Tommaso Ercoli
ercolitommaso@me.com

[1] Department of Medical Sciences and Public Health, Institute of Neurology, University of Cagliari, Cagliari, Italy

[2] Institute of Neurology, Azienda Ospedaliero Universitaria Di Cagliari, 09124 Cagliari, Italy

symptoms. It is notable that a physical precipitating event is commonly reported close to the onset of FND [2], which may also provide an explanation as to why particular FND develops. In our patient, the stressful conditions associated to the pandemic [8], together with other predisposing factors, might have contributed to both increased attention towards body signals and abnormal expectations/belief about symptoms, while the content of the abnormal prior expectation might have arisen from vaccination-linked injury [4].

This case highlights the need to prompt diagnose FND in order to avoid misleading and dangerous opinion related to neurological side effects of the vaccines. It's important to recognize FND symptoms and to reassure public opinion that these are not neuro-toxic effects of the vaccine.

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Declarations

Ethical approval The authors confirm that the approval of an institutional review board was not required for this work.

Consent to participate and for publication The patient has given written and informed consent for publication. We also confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this work is consistent with those guidelines.

Conflict of interest The authors declare no competing interests.

References

1. Espay AJ, Aybek S, Carson A, Edwards MJ, Goldstein LH, Hallett M, LaFaver K, LaFrance WC, Lang AE, Nicholson T, Nielsen G, Reuber M, Voon V, Stone J, Morgante F (2018) Current concepts in diagnosis and treatment of functional neurological disorders. JAMA Neurol 75:1132–1141. https://doi.org/10.1001/jamaneurol.2018.1264
2. Stone J, Carson A, Aditya H, Prescott R, Zaubi M, Warlow C, Sharpe M (2009) The role of physical injury in motor and sensory conversion symptoms: a systematic and narrative review. J Psychosom Res 66:383–390. https://doi.org/10.1016/j.jpsychores.2008.07.010
3. Tinazzi M, Geroin C, Erro R, Marcuzzo E, Cuoco S, Ceravolo R, Mazzucchi S, Pilotto A, Padovani A, Romito LM, Eleopra R, Zappia M, Nicoletti A, Dallocchio C, Arbasino C, Bono F, Pascarella A, Demartini B, Gambini O, Modugno N, Olivola E, Bonanni L, Antelmi E, Zanolin E, Albanese A, Ferrazzano G, Micco R, Lopiano L, Calandra-Buonaura G, Petracca M, Esposito M, Pisani A, Manganotti P, Stocchi F, Coletti Moja M, Antonini A, Ercoli T, Morgante F (2021) Functional motor disorders associated with other neurological diseases: beyond the boundaries of "organic" neurology. Eur J Neurol 1–7. https://doi.org/10.1111/ene.14674
4. Kim DD, Kung CS, Perez DL (2021) Helping the public understand adverse events associated with COVID-19 vaccinations. JAMA Neurol 365:1160–1161. https://doi.org/10.1001/jamaneurol.2021.1042
5. Stone J, Vermeulen M (2016) Functional sensory symptoms, Handb Clin Neurol 139:271–281. https://doi.org/10.1016/B978-0-12-801772-2.00024-2
6. Edwards MJ, Adams RA, Brown H, Pareés I, Friston KJ (2012) A Bayesian account of "hysteria." Brain 135:3495–3512. https://doi.org/10.1093/brain/aws129
7. Pellicciari R, Superbo M, Gigante AF, Livrea P, Defazio G (2014) Disease modeling in functional movement disorders. Parkinsonism Relat Disord 20:1287–1289. https://doi.org/10.1016/j.parkreldis.2014.09.017
8. Wang C, Pan R, Wan X, Tan Y, Xu L, McIntyre RS, Choo FN, Tran B, Ho R, Sharma VK, Ho C (2020) A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. Brain Behav Immun 87:40–48. https://doi.org/10.1016/j.bbi.2020.04.028