

Anti-NMDA receptor encephalitis after Tdap-IPV booster vaccination: cause or coincidence?

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Dear Sirs,

Anti-NMDA receptor encephalitis is a recently described autoimmune disorder mediated by antibodies to the NR1 subunit of the *N*-methyl-D-aspartate receptor. It was first recognized as a paraneoplastic syndrome in young women with ovarian teratoma [1]. Further studies have shown that about 40% of the patients with anti-NMDA receptor encephalitis do not have a clinically detectable tumor, and men and children are also affected [2]. The mechanisms triggering the disorder, especially in patients without an associated neoplasm are unknown. The high incidence of prodromal viral-like symptoms suggests a possible infection triggering the autoimmune response [3].

We report about a 15-year-old female patient who was diagnosed with anti-NMDA receptor encephalitis after receiving a booster vaccination against tetanus/diphtheria/pertussis and polio (Tdap-IPV). Within the first 24 h after the injection she developed a low-grade fever and general fatigue. During the following weeks, her family observed an unusual need for sleep. Psychiatric symptoms became apparent 5 weeks after the immunization and included disorganized thinking and hallucinations. Within a few days she became increasingly agitated with orofacial dyskinesia, opisthotonic posturing, and choreic movements of the upper extremity. She grew unresponsive to verbal commands and required intensive care treatment due to

autonomic instability. The unique pattern of clinical symptoms led to the consideration of anti-NMDA receptor encephalitis, which was confirmed by the detection of anti-NMDAR antibodies in plasma and cerebrospinal fluid. Other possible causes of encephalopathy including intoxication, infectious and metabolic diseases were ruled out; repetitive brain scans showed no abnormalities. After confirming the diagnosis, an extensive tumor search was performed without any proof of malignancy; biopsy of a prominent ovarian cyst revealed no teratoma.

The onset of prodromal symptoms shortly after the immunization is intriguing and suggests the vaccination as a possible trigger of anti-NMDA receptor encephalitis. Neurological adverse events including autoimmune disorders have been discussed in literature for many years; a definite causal association between vaccination and disease was seldom established. For example, the 1976 swine influenza vaccine was associated with an increased frequency of Guillain-Barre Syndrome (GBS) [4]. A recent study about the safety of Tdap vaccination in adolescents revealed no increased risk of neurological adverse events [5], even though rare cases of GBS have been reported. To our knowledge, this is the first possible case of vaccination-associated anti-NMDA receptor encephalitis. Therefore, not only infectious agents and tumor antigens but also vaccines should be considered as a possible trigger of immune response in this recently described disorder.

Conflict of interest None.

References

1. Dalmau J, Gleichmann AJ et al (2008) Anti-NMDA-receptor encephalitis: case series and analysis of the effect of antibodies. *Lancet Neurol* 7(12):1091–1098

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2. Vincent A, Bien CG (2008) Anti-NMDA-receptor encephalitis: a cause of psychiatric, seizure, and movement disorders in young adults. *Lancet Neurol* 7(12):1074–1075
3. Florance NR, Davis RL et al (2009) Anti-N-methyl-D-aspartate receptor (NMDAR) encephalitis in children and adolescents. *Ann Neurol* 66(1):11–18
4. Toplak N, Avcin T (2009) Influenza and autoimmunity. Contemporary challenges in autoimmunity. *Ann N Y Acad Sci* 1173:619–626
5. Klein NP, Hansen J et al (2010) Post-marketing safety evaluation of a tetanus toxoid, reduced Diphtheria toxoid and 3-component acellular pertussis vaccine administered to a cohort of Adolescents in a United States Health Maintenance Organization. *Pediatr Infect Dis J* 29(7):613–617