Hyposmia after vaccination against tick-borne encephalitis – case story

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Introduction:
During last several years the number of vaccination against infectious diseases increased. Therefore, it is expected to meet new adverse effects of this kind of prevention. In a case story we report a patient with hyposmia after receiving tick-borne encephalitis (TBE) vaccine.

Case report:
Woman, 59 years old, came to our department due to loss of smell after vaccination against tick-borne encephalitis. The vaccine was applied two weeks ago. She reported olfactory decrease first day after the vaccination. Other side effect symptoms of the vaccination were present as well – headache and tiredness. Regular ENT examination was performed including rhinendoscopy and smell testing (OMT-Odourized Markers Test and Sniffin’ Sticks test). Patient underwent regular examination at neurology and infectology. X-ray of paranasal sinuses and MRI of head were performed. Antibody (IgG and IgM) against tick-borne encephalitis virus were investigated. Smell testing was performed 2nd, 7th week and 18th months later (see Time axis).

Results:
There was no pathology found at ENT and neurological examination. Smell testing proved hyposmia in both tests (OMT 8 points, Sniffin’ Sticks TDI 23.25 points). Serological analysis of antibody against tick-borne encephalitis was negative and X-ray and MRI did not show any possible cause of smell loss. No systemic treatment was prescribed. 7th week and 18th months later patient reported slight improvement of sense of smell. This was not proved by olfactometry (OMT 9 and 8 points, Sniffin’ Sticks TDI 24.25 and 25.25 points).

Discussion:
It is known that olfactory loss can be a consequence of tick-borne encephalitis. This was described in 1952 by Russian authors (Shapoval and Popova, 1952). The olfaction was measured using method introduced by Elsberg et al. (1936). Anosmia was presented in 23% of patients after tick-borne encephalitis.

As an adverse effect of vaccination anosmia was described by Serbian authors in a patient after receiving vaccination against influenza (Fiser et Borotski, 1979). In their case report live vaccine was administered intranasally.

Our case report describes hyposmia in a patient after receiving vaccination against TBE. This points at a possible neuritis of the first cranial nerve. Considering neuritis after TBE vaccination, there are several reports in the literature. Scholz and Wiethölter (1989) described neuritis of gravity muscles of the legs and feet in a case report. Unspecific symptoms were presented the same day of vaccination, third day after vaccination and other symptoms emerged. In this patient antibodies were absent (ELISA performed 21st day after vaccination) as well as in our case. Resolution of the symptoms was 6 weeks after vaccination. In another case report, Sander et al. (1994) described plexus neuropathy after TBE vaccination. Weakness and pain of the leg emerged second day after vaccination. This was followed by paresthesia of both lower limbs muscles. Again IgG and IgM antibodies (ELISA) against TBE were negative. In this case, total resolution of symptoms was described. In both papers, authors presume pathophysiological mechanism based on autoimmune process upon exposure to two antigens at the same time. Scholz and Wiethölter (1989) presume, that one antigen had to be homologous with fragments of damaged structure of nerves. Second antigen had to be structurally different, for example part of bacterial cell, which caused cell dependent immune response. This second antigen stimulated an independent immune response.

Our case can not only be seen as a report of unusual case of adverse effect of vaccination, but it can support an idea of immunological processes in olfactory loss. For instance, postviral olfactory loss is attributed to respiratory viruses. The pathophysiological mechanism is usually explained by damage at the level of the epithelium and receptor cells (Tamagishi et al., 1988), or in central processing pathways such as the olfactory bulb (Mohammed et al., 1990). Moreover, some of the patients with olfactory loss post upper respiratory tract infection report repeated deterioration of olfaction with gradual recovery of the sense of smell. Further, close relationships of olfactory and immune system were suggested by Strous and Shoenfeld (2006). Our report points at an important influence of immunological processes in olfactory system.

Conclusion:
We present a patient with hyposmia after vaccination against tick-borne encephalitis. The question remains, whether this was caused by vaccine itself or this was coincidence of other etiology (postviral). Nevertheless, smell deterioration should be considered as a possible adverse effect of vaccination against tick-borne encephalitis.

Picture 1: Perfumed markers used in Odourized Markers Test

Picture 2: Sniffin’ Sticks test; threshold left, identification right

Literature: