TBE NEWS

TBE VACCINE BOOSTER INTERVALS: ARE THREE OR FIVE YEARS REALLY NECESSARY?

Background

Compared to neighboring Austria, vaccination coverage was relatively low in Switzerland – only about 8% with a complete primary immunization for those aged at least 16 years and living in endemic regions according to a survey carried out in 2005-07. One of the factors contributing to the relatively low TBE vaccine acceptance is the need/ recommendations for frequent booster vaccinations. A primary vaccinations course consists of three injections (for both the vaccines FSME-Immun and Encepur). The first booster is recommended three years after completion of the primary immunization followed by subsequent boosters after three or five years depending on the age of the vaccinee. In 2004/05, some published serological evaluations indicated that antibody titers (measured by ELISA) mostly persists longer than five years, and in 2006, the Swiss Federal Office of Public Health (FOPH) changed its recommendations by extending the booster interval to 10 years. Now it has been evaluated if the change in the booster recommendations has led to more vaccine breakthroughs or not.

Results

As a result of the new recommendations in 2006, the annual TBE vaccine sales increased from less than 140,000 in and before 2005 to more than 600,000 in the 2006-08 period. By 2018, TBE vaccination coverage has increased to 42% overall for ≥ 1 dose. In the retrospective analysis discussed here, case definition for TBE included not only probable and confirmed cases, but also possible cases. Vaccine breakthrough was defined as TBE notification in a patient with at least three TBE vaccine injections.

Among 193 TBE patients who had ever received at least one vaccine dose, 103 (53.4%) reported a complete primary immunization with three or more doses and these patients met the criterion for vaccine breakthrough. There was no clear trend in the proportion of breakthroughs over the 5-year periods: 1.3% in 2000-04, 4.7% in 2005-09, 7.4% in 2010-14 and 2.0% in 2015-19.

During the 2010-19 period with the 10-year booster strategy, 23 individuals developed TBE within the initial three years after the last booster dose and 38 in the following seven years. That means, that the annual breakthrough rate was 7.7 cases per year during the first three years and 5.4 cases in the following seven years. In the entire 2000-19 period, there was no gradual increase in vaccine breakthroughs. There was also no evidence for an increased risk in the older population. The yearly breakthrough rate in those at least 50 years of age was 6.0 in the first three years after the last booster dose and 2.9 in the subsequent seven years. For those under 60 years of age, the data were 3.7 both for the first three and for the subsequent seven years, and for those aged 60 years or older, the data were 4.0 and 1.7, respectively.

Discussion

The data presented here show no increased risk for vaccine breakthrough after prolongation of the TBE vaccine interval from 3/5 years to 10 years. If there was a significant problem with this strategy, the annual breakthrough rate would rise in the 3-7 years-group after the last booster compared 1-3 years after the last injection.

The data suggest that protection against TBE may not only depend on seropersistance of antibodies (which decline over time), but also on immune memory and boostability by natural infection. Although immunogenicity of TBE vaccines is higher in younger vaccinees, no increased risk for vaccine breakthroughs could be detected in older people. Thus, there is no need to change the 10-year booster strategy in Switzerland.

Further studies are needed to assess for how many years after the last TBE vaccine dose the risk for breakthroughs does not increase and to assess the optimal timing of the fourth dose (first booster) after primary immunization.

Literature

Schmidt et al.

Tick-borne encephalitis (TBE) in Switzerland: does the prolongation of vaccine booster intervals result in an increased risk of breakthroughs?

J. Travel Med. 2021, in press: doi.org/10.1093/jtm/taab158

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