



## EUROPEAN CLINICAL MULTICENTER STUDY ABOUT TBE

### Background

TBE is a tick transmitted infection of the central nervous system affecting many European countries. The severity of TBE is broad from asymptomatic or very mild disease (mostly in young individuals) to various forms of encephalitis and even death (mostly in elderly). This happens despite the available TBE vaccines being highly effective and having an acceptable safety profile.

The international network “European genetics study of tick-borne encephalitis” (EU-TICK-BO, founded in 2013) investigates host genetic associations with susceptibility and severity of TBE. A clinical study has been carried out using a uniform patient case record (CRF) and which used the ECDC case definition for TBE. Patients were prospectively included from 2014 to 2017 and retrospectively collected starting from 2010.

### Results

A total of 555 patients were recruited in six highly endemic countries (420 prospectively and 135 retrospectively) ranging from 11 months to 88 years of age. 144 patients (25.9%) had comorbidities, of which 95 (17.1%) had a cardiovascular disease and a few percent had other pre-existing comorbidities. 16 patients (2.9%) had TBE despite being vaccinated – seven were vaccinated as recommended, six had no complete vaccination and three patients had their last booster overrun.

Most patients had a biphasic course of disease (65.1%). A clinical diagnosis was assigned in 553 of 555 patients. 37.3% had meningitis (M), 43.4% had moderate meningoencephalitis (ME mod), 5.8% had severe meningoencephalitis (ME sev), 2.7% had meningomyelitis (MM), 8.3% had meningoencephalomyelitis with moderate encephalitis (MEM), and 2.3% had meningoencephalomyelitis with severe

encephalitis. In total, 10.1% of patients had paresis of extremities. Spinal involvement was observed, e.g., disturbance of sensibility (n=20), bladder dysfunction (n=20), pain in extremities (n=17), respiratory paresis (n=9), and rectal dysfunction (n=9).

Patients with M were younger than patients with ME. At discharge, patients with M had higher rates of complete recovery than patients with ME or MEM, and patients with ME had higher rates of recovery than patients with MEM. When patients were discharged, 39% had a complete recovery, 59% had an incomplete recovery – 93% of patients had headache, 47% had decreased concentration, 31% had tremor, 22% had ataxia, and 16% had paresis of extremities. A total of 1% (n=5) of the patients died.

### Discussion

As shown before in other studies, this study confirmed higher age as a risk factor for severe disease. Older age groups had a higher risk of meningoencephalitis and meningoencephalomyelitis, and pre-existing comorbidities were identified as risk factors for severe TBE. More than half of the patients were discharged with incomplete recovery and a high proportion had no expectation of complete recovery (27%) according to the clinician’s assessment. Paresis of extremities was the major factor for loss of life quality and attributes to the high burden of disease. In this study, a relatively high proportion of patients with TBE despite vaccination was observed in children and adolescents (9 of 16 vaccine breakthroughs were in patients younger than 20 years of age).

The results of this study underline that TBE is a severe disease with a large proportion of patients with incomplete recovery.



## Literature

Kohlmaier et al.

Clinical characteristics of patients with tick-borne encephalitis (TBE): A European multicentre study from 2010 to 2017

*Microorganisms*. 2021; 9(7):1420. doi: 10.3390/microorganisms9071420

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