

TBE – Increased risk and virus prevalence

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„Well into the twentieth century, vector-borne diseases were the cause of some of the most important public health problems in Europe - TBE is the most important and widespread of the arboviruses transmitted by ticks in Europe“ (WHO, 2004).

TBE is assessed completely differently in the various European countries, in the Far East and in Asia. It does not occur on the Iberian Peninsula, in the Benelux States, in the UK and in Ireland. It is only marginally important in Italy, Greece, Norway, and Denmark (except Bornholm), of some importance in Croatia, Sweden, Finland and in Slovakia. On the other hand, TBE is an important issue in Austria, Germany, Poland and Hungary. Dramatic effects of TBE can be observed in Russia, Lithuania, Estonia and in particular in Latvia. TBE also occurs in the North of China and on the Japanese island Hokkaido. 10,000 – 12,000 clinical cases are reported annually in Europe.

Between 1974 and 2003 TBE incidence (number of clinical cases/100,000 inhabitants) in most of the European countries has increased (average of 10 European “TBE-countries” was 411 %). Increased incidence rates of 249 % in the Czech and 238 % in the Slovak Republic, 574 % in Germany, 683 % in Poland, and 1033 % in Lithuania were recorded. Many factors, such as climate change, biological (ecological) and non-biological factors have influence on the dynamics of TBE epidemiology. Also, higher awareness, advanced diagnostics, international travel, political and social changes must be considered.

New risk areas of TBE have developed in Norway and Sweden, were newly discovered in North Mongolia (*I. scapularis*) and the number of risk areas has increased in Germany.

It is easy to control TBE as safe and efficient immunogenic vaccines have been available for decades. The precondition for a successful, sensible and scientifically well-founded application of TBE vaccines is the identification and monitoring of risk areas. Traditionally, the classification of risk areas is done based on the recording of autochthonous cases of the disease with known sites of exposure. For about 10 years the epidemiological characterisation has also been done by virus detection in free-living ticks using molecular biological techniques.

We were able to show that in TBE risk areas in Germany the average virus prevalence in unengorged ticks is 0.5 – 2 % and does not exceed peak values of 5 %. The virus prevalence rates in field collected unengorged adult ticks in other countries, i.e. in Latvia, is higher than in Germany. The mean annual virus prevalence in *Ixodes ricinus* in Latvia was 6.9% and in *I. persulcatus* 15.5 %. We were able to demonstrate that the prevalence of tick-borne encephalitis virus in human engorged ticks was significantly higher than in unengorged, free-living *I. ricinus* of the same area. The estimated overall prevalence rate of all tested ticks combined was 8.77 (6.45-11.57)%. Peak values were measured in two districts in Bavaria with 20.6 % and with 18.3 %.

If one compares the overall sample value of virus prevalence recorded for engorged and unengorged ticks then in our studies the prevalence in engorged ticks is 21.3 times higher. It can be stated, that to remove engorged ticks as soon as possible considerably reduces the incidence rate of TBE.

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