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Abstract (poster session)

**Co-infection with *Borrelia burgdorferi* and tick-borne encephalitis virus in humans, ticks and tick cells - analysis of clinical cases, literature and experimental possibilities**

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**Objectives:** *Borrelia burgdorferi* s.l. (Bb) and tick-borne encephalitis virus (TBEV) are both transmitted in central and eastern Europe by the same tick, *Ixodes ricinus*. An individual tick can be infected simultaneously with both pathogens, and therefore a patient could be infected simultaneously with Bb and TBEV. This should be taken into account in the diagnosis of patients who suffer from meningoencephalitis and who live in or have visited tick-endemic regions, because the treatments of these two infectious diseases differ, and co-infection may intensify the clinical course of both diseases. We aimed to determine the incidence of simultaneous infection in patients, influence on clinical picture, and to explore the use of tick cells coinfecting in vitro with Bb and an arbovirus to test whether the pathogens act synergistically or antagonistically in the vector. **Methods:** We examined our clinical records concerning influence of co-infection with Bb and TBEV on patients hospitalized in our department. Additionally we analyzed the literature concerning prevalence of multiple pathogen species in *I. ricinus* ticks in Poland. Moreover, we used a model system to study co-infection with Bb and the arbovirus Semliki Forest virus (SFV) in *Ixodes* spp. cell lines. **Results:** Between 1993 and 2008 in eastern Poland we observed that, out of 687 patients with TBE, 116 (16%) were coinfecting with Bb. Among them 13 (2%) were diagnosed with neuroborreliosis. The clinical picture and results of cerebrospinal fluid examination differed between TBE patients with and without coinfection. Coinfection of *I. ricinus* ticks with different pathogens is quite common. In Poland, the prevalence of *I. ricinus* ticks co-infected with at least two pathogens varies from 0.1% to 8.3%. In preliminary experiments we found that the presence of Bb spirochaetes in tick cell lines tended to enhance short-term replication in vitro of SFV RNA, while the presence of the virus had no effect on spirochaete DNA replication. **Conclusion:** We propose that not only clinical observation, but also experimental research may be useful to discover more about coinfection with Bb and TBE virus in humans and ticks. Very little is known about the influence of multiple infections on either the tick life cycle or the coinfecting pathogens reactions. Tick cell lines offer the possibility to study in vitro the effect of coinfection with multiple pathogens on ticks at the cellular and molecular level.