Case report: Tick-borne encephalitis in two Dutch travellers returning from Austria, Netherlands, July and August 2011

C Reusken (Chantal.Reusken@RIVM.nl)[1], J Reimerink[1], C Verduin[2], L Sabbe[3], N Cleton[1], M Koopmans[1]
1. Netherlands Centre for Infectious Disease Control, National Institute for Public Health and the Environment, Bilthoven, the Netherlands
2. Stichting PAMM, Laboratory for Pathology and Medical Microbiology, Veldhoven, the Netherlands and St. Anna Hospital, Geldrop, the Netherlands
3. Laboratory for Medical Microbiology and Immunology, Admiral De Ruyter Hospital, Goes, the Netherlands

Citation style for this article:
Reusken C, Reimerink J, Verduin C, Sabbe L, Cleton N, Koopmans M. Case report: Tick-borne encephalitis in two Dutch travellers returning from Austria, Netherlands, July and August 2011.
Euro Surveill. 2011;16(44):pii=20003. Available online: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20003

Article published on 3 November 2011

Tick-borne encephalitis (TBE) is not endemic in the Netherlands and diagnostics are seldom requested. Here, we report about the rare event of TBE in two Dutch travellers returning from Austria in July and August 2011. This report serves to create awareness among physicians to consider travel-related TBE in their differential diagnosis of patients with neurological disease returning from TBE virus endemic regions and to promote awareness among professionals advising travellers.

In the Netherlands, tick-borne encephalitis virus (TBEV) is not endemic. Diagnostic requests for TBEV are not common, and, between 2006 and 2011, these averaged 17 per year (range 9–25) for the laboratory of the Netherlands Centre for Infectious Disease Control, which is one of the two laboratories in the Netherlands that perform TBEV diagnostics. Diagnosed imported tick-borne encephalitis (TBE) is also very rare in the Netherlands. A positive anamnesis for a stay in a TBEV endemic area (incubation period of typically 7–14 days) and a tick bite are epidemiological parameters that should lead to undertake a confirmative diagnosis based on positive TBEV IgM and IgG responses. Based on these criteria, in the five-year period from 2006 to 2010, only one person was diagnosed as an acute TBEV case based on IgM and IgG seroconversion (data not shown). The following report describes two cases of tick-borne encephalitis in travellers returning to the Netherlands in the summer of 2011.

Case reports

Case 1. In mid-July 2011 a Dutch woman in her late fifties presented to the general practitioner emergency post. After a few days of dizziness, non-productive cough and fear of noise, she had, on the day of admission, an acute fever (39 °C) accompanied with severe headache and muscle pain. Muscle weakness, nausea and vertigo were also present. The weeks before she had made an extensive camping trip in Austria (Prems, Pongau, Imst), followed by two days in the Black Forest (Germany), where she detected a tick on her right buttock. The patient indicated that the tick probably had been present for days. The tick was removed 17 days before admission to the hospital. On clinical examination no neurological abnormalities were detected. On the right buttock there was a red induration of 1 cm in diameter on the location of the tick bite. During the ten days of admission, headache and muscle pain were the main complaints. Serology for borreliosis was negative. Potential infection with TBEV was suspected in an early phase based on the clinical picture (fever and headache) in combination with the registration of a tick-bite and the recent leisure activities in Austria, where TBE is endemic. Serology, using an enzyme-linked immunosorbent assay (Immunozyme FSME IgM and IgG, Progen, Heidelberg, Germany) on a serum sample taken four days upon onset of disease showed high titres of TBEV specific IgM and IgG antibodies, indicative of an active TBEV infection. The patient recovered gradually. One month later she only had some insignificant headache and hypersensitivity to noise.

Case 2. At the end of August, a Dutch man in his early forties was admitted to the hospital with a severe headache, fever and fatigue. He also complained about impaired hearing and blurred vision. He had returned from holidays in Austria (Carinthia) 16 days prior to admission. In Austria, the patient had been bitten by a tick in the neck. About a week later the man got fever and severe headaches. He received antibiotic treatment (amoxicillin/clavulanic acid) in Austria and showed recovery. Upon his return in the Netherlands a few days later his headache and fever returned and became more severe. Based on travel history, fever and headache, meningoencephalitis was suspected as differential diagnosis. Cerebrospinal fluid (CSF) and serum

were sampled. CSF analysis showed 62 leucocytes per µL (norm: < 5 leucocytes per µL) with a dominance of monocytes (56 per µL (norm: 15–45%). CSF total protein was 909 mg/L (norm: 150–500 mg/L). Herpes simplex virus, varicella zoster virus, enterovirus and parechovirus PCR on CSF were negative. Serology for Lyme disease was negative as well. Initial treatment consisted of ceftriaxone and aciclovir. Infection with TBEV was suspected based on the leisure activities in Austria and the nature and severity of the symptoms. Antibody testing on CSF was positive for TBEV IgG but not for IgM. His serum showed high titres of TBEV specific IgM and IgG antibodies, indicative of a recent TBEV infection. Subsequently, aciclovir and cefriaxone were stopped. The patient recovered slowly. However, seven weeks after his admission to the hospital he still suffers of headache, severe fatigue, hearing impairment, blurred vision and memory problems.

Background

TBEV is the causative agent of TBE, the most important viral tick-borne disease in Europe [1]. The virus is transmitted to humans through bites of infected ticks within minutes of the tick bite. Transmission through consumption of raw milk from infected dairy cattle has also been described. Human-to-human transmission does not occur [1,2-4]. The occurrence of most human cases coincides with the occurrence of questing ticks, roughly from May to November.

The TBEV species comprises three distinct genetic lineages; the European (TBEV-Eu), Far-Eastern (TBEV-FE) and Siberian (TBEV-Sib) subtypes [5]. TBEV-Eu has been isolated in Europe, TBEV-Sib in the Urals, Siberia and far-eastern Russia, and TBEV-FE in far-eastern Russia, Japan and China. Co-circulation of different subtypes has been recorded for Finland, Latvia, Lithuania and Estonia [1,2-4]. The severity of disease with TBEV aetiology varies depending on the causative subtype.

Germany and Austria are endemic countries for TBEV with low incidence (less than one case per 100,000 inhabitants). However the incidence and virus circulation in Germany varies considerably between regions, with non-endemic areas in the north, but in the south defined TBE risk areas in Baden-Württemberg, Bavaria, Hesse, Thuringia and Rhineland-Palatinate [6]. In Austria, the incidence is low due to the high vaccination coverage (88%) but the circulation of TBEV is high [7].

Discussion

The two confirmed tick-borne encephalitis cases reported here were related to travel to Austria, although infection in the Black Forest in Baden-Württemberg Germany cannot be excluded for case 1. They coincide with an increased circulation of TBEV elsewhere in Europe in 2011 probably as a consequence of favourable weather conditions for both increased tick densities and human exposure [8].

The number of leisure trips from the Netherlands to Austria in the summer season has been stable for the period 2006–2010 and accumulates to an average of 470,000 trips per year. Yearly, 5.8 million overnight stays are spend by Dutchmen in Austria in trips lasting more than eight days in the summer season and 0.6 million overnight stays while travelling through [9]. It has been estimated that an unvaccinated tourist spending four weeks in a highly endemic region in Austria has a risk of contracting TBE of one per 10,000 man-months of exposure [10].

Applying this figure to the total number of overnight stays of Dutchmen in Austria during the summer season, one could conclude that clinical TBE cases are likely to be underdiagnosed in the Netherlands, namely three diagnosed cases of acute TBE in the period 2006–2011 versus a roughly estimated yearly incidence of 20 cases. However such estimations are complicated by the fact that TBE incidence is the result of complex interactions between several risk factors including the level of circulation in provinces visited (which vary considerably in endemic countries) and the outdoor recreational behaviour.

An estimated 2,800 TBE cases were prevented in Austria in the period 2000–2006 through vaccination but Austria remains a high-risk area for unvaccinated tourists, and an increase in disease incidence in unvaccinated individuals has been observed [11,12].

The case descriptions in this report highlight the importance of considering TBE as a travel disease which should be taken into account when travelling to endemic areas in Europe in general. An inventory by the European Network for Imported Viral Diseases (ENIVD), for the period between 2004 and 2009, identified the Baltic states, Slovenia and the Czech Republic, as countries with high risk areas (yearly incidence of more than five cases per 100,000 inhabitants). Russia, Switzerland, Sweden and Slovakia showed yearly incidences over one while the incidences in Austria, Germany, Hungary, Poland, Norway and Finland were rather low (under one per 100,000). Recent years show an overall geographic expansion in all directions of TBEV in Europe [7]. Interestingly, in September 2011 Sweden reported record numbers of TBE patients for 2011 [8].

In the period 2006–2009 the number of trips from the Netherlands to European countries with high risk areas accumulated to 9.3 million and a mere 10.6 million trips when countries with a lower public health impact of TBEV are considered [9]. This underlines the necessity of an increased awareness for TBEV-related risks among physicians, professionals advising travellers and travellers. Outdoor activities in forest areas with dense undergrowth are related to an increased risk for TBEV infection [1,2-4]. TBEV is partly preventable by wearing trousers, long sleeves and tick-repellents [10]. Early removal of ticks does not prevent disease [1]. The

most effective measure is vaccination. The Scientific Working Group of Tick-borne encephalitis stresses the importance of raising awareness in non-endemic regions for travel-related TBE and recommends tick-borne encephalitis virus vaccination for Europeans travelling to areas of TBEV risk [12,13]. Whether vaccination of travellers is cost-effective remains to be seen, but as a minimum, travellers to TBEV endemic areas should be educated about the health risks and the possible preventive measures.

Acknowledgments

Annemarie van den Brandt and Marjan Kuijer are acknowledged for excellent technical assistance.

References

1. Lindquist L, Vapalahti O. Tick-borne encephalitis. Lancet. 2008;371(9627):1861-71.
2. Mansfield KL, Johnson N, Phipps LP, Stephenson JR, Fooks AR, Solomon T. Tick-borne encephalitis virus - a review of an emerging zoonosis. J Gen Virol. 2009;90(Pt 8):1781-94.
3. Petri E, Gniel D, Zent O. Tick-borne encephalitis (TBE) trends in epidemiology and current and future management. Travel Med Infect Dis. 2010;8(4):233-45.
4. Charrel RN, Attoui H, Butenko AM, Clegg JC, Deubel V, Frolova TV, et al. Tick-borne virus diseases of human interest in Europe. Clin Microbiol Infect. 2004;10(12):1040-55.
5. Ecker M, Allison SL, Meixner T, Heinz FX. Sequence analysis and genetic classification of tick-borne encephalitis viruses from Europe and Asia. J Gen Virol. 1999;80(Pt 1):179-85.
6. Robert Koch-Institut (RKI). FSME: Risikogebiete in Deutschland (Stand: April 2011) [TBE: Risk Areas in Germany (Situation: April 2011)]. Epid Bull 2011;17:133-48. German.
7. Donoso Mantke O, Escadafal C, Niedrig M, Pfeffer M, On Behalf Of The Working Group For Tick-Borne Encephalitis Virus C. Tick-borne encephalitis in Europe, 2007 to 2009. Euro Surveill. 2011;16(39):pii=19976. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19976
8. Lundkvist A, Wallensten A, Vene S, Hjertqvist M. Tick-borne encephalitis increasing in Sweden, 2011. Euro Surveill. 2011:16(39) :pii=19981. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19981
9. Statistics Netherlands (CBS). Vakanties van Nederlanders 2010 [The Dutch on holiday, 2010]. Report G-72.The Hague: CBS;. 2011. Dutch. [Accessed 17 Oct. 2011]. Available from: http://www.cbs.nl/NR/rdonlyres/1506BE8C-D52D-4CCC-B2E4-2A57955158B7/0/2010g72pub.pdf
10. Rendi-Wagner P. Risk and prevention of tick-borne encephalitis in travellers. J Travel Med. 2004;11(5):307-12.
11. Heinz FX, Holzmann H, Essl A, Kundi M. Field effectiveness of vaccination against tick-borne encephalitis. Vaccine. 2007;25(43):7559-67.
12. Walder G, Falkensammer B, Hein FX, Holzmann H, Dierich MP, Würzner R. Tick-borne encephalitis in the Tyrol (Austria): changes in incidence and endemicity 2000-2006. Int J Med Microbiol. 2008;298 Suppl 1:88-93.
13. Kunze U; ISW TBE. Conference report of the 9th meeting of the International Scientific Working Group of Tick Borne Encephalitis (ISW TBE). Tick Borne Encephalitis: from epidemiology to current vaccination recommendations. Vaccine. 2007;25(50):8350-1.