

Hantavirus Infection in Istanbul, Turkey

To the Editor: More than 20 serotypes of hantavirus have been identified, and 11 infect humans. Puumala virus (PUUV), Dobrava virus (DOBV), and Seoul virus cause different forms of hemorrhagic renal syndrome (1,2). DOBV is endemic to Turkey and countries in the Balkan region. Approximately 10,000–12,000 cases of infection with PUUV and DOBV occur in European Russia each year (3). Initial case reports identified a hantavirus epidemic (laboratory confirmed) in February 2009 that involved 12 persons in Bartın and Zonguldak in western Turkey near the Black Sea. The hantavirus responsible for this epidemic was a PUUV subtype (4). We report a man infected with DOBV in Turkey who died 2 days after admission to an intensive care unit (ICU).

The patient was a 22-year-old man who lived near Istanbul, Turkey. He was admitted to the Silivri State Hospital in March 2010 because of fatigue, diffuse pain, nausea, and vomiting. Approximately 2 hours after admission, ecchymotic rashes developed on his upper extremities and spread to other areas. His general condition worsened, and 15 hours later, he was transferred to the ICU of the Emergency Service of Gulhane Military Medical Academy Haydarpaşa Training Hospital. His medical history did not include exposure to rodents or any travel.

At admission to the ICU, his general condition was poor, and his speech was garbled and incoherent. He had a body temperature of 37.2°C, a pulse of 140 beats/min, an arterial blood pressure of 90/60 mm Hg, diffuse hemorrhagic foci, and a disseminated ecchymotic rash. Laboratory test results showed the following: 13,200 leukocytes/mm³, 92% polymorphonuclear leukocytes, hemoglobin 11.6 mg/dL,

385,000 platelets/mm³, alanine aminotransferase 62 IU/mL, aspartate aminotransferase 170 IU/mL, creatine phosphokinase 2,115 IU/L, lactate dehydrogenase 1,109 IU/L, urea 65 mg/dL, creatinine 3.78 mg/dL, prothrombin time 24.8 s, activated partial thromboplastin time 116.3 s, potassium 2.9 mEq/L, C-reactive protein 326 mg/dL, and erythrocyte sedimentation rate 132 mm/h.

Subsequently, urinary output decreased and respiratory functions worsened. He then lost consciousness and was subjected to mechanic ventilation. Lumbar puncture was not performed because of risk for bleeding (high international normalized ratio values for blood coagulation and thrombocytopenia). Cranial computed tomographic scan did not show any pathologic changes. Treatment with ceftriaxone, 4 g/day intravenously, was initiated, and the dose was adjusted according to creatinine clearance because of suspected meningococemia. A single dose of prednisolone, 80 mg intravenously, was given concomitantly. Bacterial growth was not observed in cultures of urine and blood samples.

The Hanta Profile 1 EUROLINE Test (Euroimmun, Luebeck, Germany) was used to detect immunoglobulin (Ig) G and IgM against 3 hantavirus serotypes (PUUV, DOBV, and Hantaan virus). Results of a hantavirus IgM immunoblot test were positive for DOBV. The QIAamp viral RNA Mini Extraction Kit (QIAGEN, Hilden, Germany) was used for extraction of viral RNA. PUUV and DOBV RNA in serum and urine samples were investigated by using an in-house real-time PCR (Rotorgene; QIAGEN). DOBV RNA was detected in urine samples by PCR (Table).

Meningococemia, acute hemorrhagic fever, and Crimean-Congo hemorrhagic fever were considered in the differential diagnosis for the patient. Other diseases were excluded by biochemical, serologic, and microbiologic test results. Hantavirus infection was diagnosed in this patient on the basis of criteria recommended by the European Network for Diagnostics of Imported Viral Diseases (5). On the second day of treatment, the patient died of cardiopulmonary arrest.

The patient had worked as a security guard in a new prison located in an area that had contained oak and hornbeam forests. DOBV is carried by rodents (*Apodemus flavicollis*), and the habitat of this rodent in Europe is open oak or beech forest. In a field study performed in rural areas of Turkey near the Black Sea and Aegean Sea, hantavirus was detected in *Microtus spp. voles* (6). In another study performed in regions near the Aegean Sea, DOBV was detected in 7 (3.5%) of 200 patients with acute or chronic renal failure (7). However, information about specific regions in Turkey in which hantavirus is endemic is limited.

Hantavirus infections, which were first identified in northwestern Turkey in 2009 and subsequently in Istanbul, should be considered in the diagnosis of patients who have fever and bleeding. Because of recent emergence of hantavirus in Turkey, areas to which this virus is endemic and where risk for infection is highest have not been identified. Therefore, all inhabitants at high risk for infection (forest workers, military personnel, farmers, persons living in or near a forest, persons handling wood) should be informed about this risk.

Table. Detection of Dobrava virus in 22-year-old patient, Turkey*

Test	Hantavirus immunoblot		Real-time PCR			
	IgM	IgG	Serum		Urine	
			DOBV	PUUV	DOBV	PUUV
Result	Pos	Neg	Neg	Neg	Pos	Neg

*Ig, immunoglobulin; DOBV, Dobrava virus; PUUV, Puumala virus; pos, positive; neg, negative.

**Oral Oncul, Yunus Atalay,
Yalcin Onem, Vedat Turhan, Ali
Acar, Yavuz Uyar,
Dilek Y. Caglayik, Sezai Ozkan,
and Levent Gorenek**

Author affiliations: Gulhane Military Medical Academy Haydarpaşa Training Hospital, Istanbul, Turkey (O. Oncul, Y. Atalay, Y. Onem, V. Turhan, A. Acar, S. Ozkan, L. Gorenek); and Refik Saydam National Public Health Agency, Ankara, Turkey (Y. Uyar, D.Y. Caglayik)

DOI: 10.3201/eid1702.100663

References

1. Tang YW, Li YL, Ye KL, Xu ZY, Ruo SL, Fisher-Hoch SP, et al. Distribution of hantavirus serotypes Hantaan and Seoul causing hemorrhagic fever with renal syndrome and identification by hemagglutination inhibition assay. *J Clin Microbiol*. 1991;29:1924–7.
2. Khan AS, Ksiazek TG, Peters CJ. Hantavirus pulmonary syndrome. *Lancet*. 1996;347:739–41. DOI: 10.1016/S0140-6736(96)90082-3
3. Klempa B, Tkachenko EA, Dzagurova TK, Yunicheva YV, Morozov VG, Okulova NM, et al. Hemorrhagic fever with renal syndrome caused by 2 lineages of Dobrava hantavirus, Russia. *Emerg Infect Dis*. 2008;14:617–25. DOI: 10.3201/eid1404.071310
4. Ertek M, Buzgan T; Refik Saydam National Public Health Agency; Ministry of Health, Ankara, Turkey. An outbreak caused by hantavirus in the Black Sea region of Turkey, January–May 2009. *Euro Surveill* 2009;14: pii:19214.
5. European Network for Diagnostics of Imported Viral Diseases (ENIVD) diagnosis criteria [cited 2010 Sep 22]. http://www.enivd.de/FS/fs_encdiseases.htm
6. Laakkonen J, Kallio-Kokko H, Oktem MA, Blasdel K, Plyusnina A, Niemimaa J, et al. Serological survey for viral pathogens in Turkish rodents. *J Wildl Dis*. 2006;42:672–6.
7. Oktem MA. Hantavirus and tick-borne encephalitis infections [in Turkish]. *Ankerm Derg*. 2009;23(Suppl 2):245–8.

Address for correspondence: Vedat Turhan, Department of Infectious Diseases and Clinical Microbiology, Gulhane Military Medical Academy Haydarpaşa Training Hospital, Uskudar, Istanbul 34668, Turkey; email: vedatturhan@yahoo.com

Maternal–Fetal Transmission of *Cryptococcus gattii* in Harbor Porpoise

To the Editor: We report maternal–fetal transmission of *Cryptococcus gattii* and death in a wild porpoise. *Cryptococcus neoformans* and *C. gattii* are 2 environmental, encapsulated yeasts that cause invasive, potentially life-threatening infections in humans and animals (1). *C. neoformans* causes disease in immunocompromised hosts, and *C. gattii* is also pathogenic in immunocompetent hosts (2). Since 1999, cryptococcosis caused by *C. gattii* has appeared on southern Vancouver Island (British Columbia, Canada) and nearby surrounding areas (2,3). Spread beyond Vancouver Island has been documented along the Pacific Northwest Coast, but the mechanism remains undetermined (4).

A pregnant, dead, stranded, harbor porpoise (*Phocoena phocoena*) was reported on February 22, 2007, on western Whidbey Island, in Puget Sound, Washington State (48.2833°N, 122.7283°W). The carcass was iced and necropsy was performed on February 24. Sampled tissues from the adult and fetus were divided: half fixed in 10% formalin for histopathologic analysis, and half frozen for ancillary studies.

For histologic analysis, tissues were embedded in paraffin, sectioned to 3–5 µm, and stained with hematoxylin and eosin. Selected sections were stained with mucicarmine. The adult porpoise (length 177 cm, weight ≈57.7 kg) was in poor condition (reduced blubber layer). Both lungs were exposed, extensively scavenged, firm, and nodular; a sectioned surface exuded clear to slightly opaque gelatinous to mucinous discharge. Mediastinal lymph nodes were grossly enlarged, multinodular, and firm with large numbers of yeasts visible by microscopy (online Appendix Figure, panel A,

www.cdc.gov/EID/content/17/2/302-appF.htm). The first stomach chamber contained two 3.5 cm × 2.5 cm raised, centrally umbilicated ulcers and several embedded anisakid nematodes. The uterus was gravid in the right horn with a mid-term fetus. No other gross lesions were identified. Microscopically, the lung lesions correlated with granulomatous to pyogranulomatous infiltrates, often with a myriad of yeasts.

The male fetus (length 30 cm, weight 2.4 kg), was examined separately at a different facility than the dam. It appeared grossly normal externally and was at a gestation of ≈5–6 months. Mediastinal lymph nodes had mild granulomatous inflammation and contained numerous yeasts morphologically consistent with *Cryptococcus* spp. (online Appendix Figure, panel B). The lymph nodes were partially replaced with intracellular and extracellular mulilobulated yeast aggregates (length 8–20 µm) with pale eosinophilic central regions and a thin refractile wall peripherally bound by a 5-µm nonstaining capsule. Around the periphery of these aggregates, there were small numbers of macrophages and lymphocytes and fewer neutrophils. Specific staining showed a prominent mucicarmine capsule consistent with *Cryptococcus* spp.

Yeasts were found in the amniotic fluid and interspersed within the chorioallantoic villi and submucosal vasculature of the placenta. Mild multifocal nonsuppurative myocarditis was detected. However, no yeasts were seen in inflamed areas. There were no overt lesions in the remaining organs.

Maternal and fetal tissues were cultured for fungi, and diagnosis was based on Gram stain (budding yeast-like cells), India ink stain (positive for encapsulated cells), hydrolysis of urea (positive), and final confirmation by using API 20C Aux V3.0 (bioMérieux, Marcy l’Étoile, France). Canavanine-glycine-bromthymol blue agar was used to differentiate between *C. gattii*