Presence of antibodies to Hantavirus in rat and human populations of Djibouti

G. Rodier1, A. K. Soliman1, J. Bouloumie1 and D. Kremer1
1US Naval Medical Research Unit No.3, Cairo, Egypt; 2International Health Program, University of Maryland School of Medicine, Baltimore, Maryland, USA; 3Djibouti Ministry of Health, Republic of Djibouti

The diagnosis of human haemorrhagic fever with renal syndrome (HFRS) has not been recorded in the Horn of Africa. Since the identification of a virus as agent of HFRS (LEEDS et al., 1978), several serotypes of this virus have been described as members of a new genus of viruses, Hantavirus, within the family Bunyaviridae (LEEDS et al., 1986). Several human cases of HFRS have been reported in Central Africa (COULAUD et al., 1987).

To assess the potential threat of human disease from Hantavirus infection in the Horn of Africa, rats were captured and studied in the city of Djibouti during October 1991. Rodents and other small mammals were live-trapped indoors and outdoors from several regions of the city, anaesthetized, and specifically identified. Sera from blood collected by cardiac puncture were preserved by freezing at -80°C and then tested at US Naval Medical Research Unit No.3 (NAMRU-3) by immunofluorescent antibody (IFA) assay.

Antigen spot slides prepared from E-6 Vero cells infected with the Hantaan serotype of Korean haemorrhagic fever (KHF) virus were used for testing sera for Hantaan antibody. Sera were diluted 1:10, 1:20, 1:40 and 1:80 in phosphate-buffered saline; then, for each dilution, one drop was placed on the ringed antigen area of the slides. Slides were incubated at 37°C for 30 min, then rinsed in distilled water and dried. Affinity-purified anti-species immunoglobulin G (Ig G) conjugated with fluorescein isothiocyanate (K & P Laboratories, Rockville, Maryland, USA) was diluted at 1:30 and a drop was placed on each of the ringed antigen areas. Slides were incubated at 37°C in a moist chamber for another 10 min, washed as before, mounted with buffered glycerol (pH 8.6) and examined with a fluorescence microscope at 400-600 magnification. For a sample diluted 1:40, bright apple green colour associated with antigen positivity was observed. Positive and negative control sera were included with each test.

One hundred and seventy-three small mammals were captured, with 57.8% from the port area and 42.2% from inland areas. The overall Hantaan virus positivity rate was 5.2%. All 49 Rattus rattus, 9 Crocidura somalica (shrews), and 7 Mus musculus sera were negative for Hantavirus antibodies. Only 9 of the 108 R. norvegicus sera were positive for antibodies to Hantavirus (prevalence 8.3%) (Table). All Hantavirus reactive sera (from 1:10 to 1:80 dilution) were from R. norvegicus caught in the port area. There was no statistically significant association between Hantaan positivity and sex, age (adult or young), or indoor or outdoor collection.

In order to assess the prevalence of Hantavirus infection in the human population of Djibouti, 212 human sera were tested. These sera had been collected in May 1991 from Djiboutian military personnel enrolled by consecutive sampling, without selection criteria, at the local military clinic during a human immunodeficiency virus survey. The mean age was 33.2 years (range 20-54 years). Thirty-six of 212 human sera (16%) were reactive for IgG to Hantavirus at 1:10 dilution, but only 7 (3.3%) were considered positive (reactive at dilutions ≥1:40). There was no statistically significant association between location of work or residence and antibodies to Hantavirus. In particular, naval personnel working frequently in the port area did not show a higher prevalence of Hantavirus infection (Table).

The association between rat seropositivity and the port area contrasts with the absence of correlation among the indigenous human population. This underlines the difficulty in estimating the epidemiology of Hantavirus infections. A definite association between R. norvegicus and Seoul virus, a Hantavirus member known to cause moderate to severe disease in human, has been previously described (CHIHWISI et al., 1987).

The absence of reports of human cases of HFRS in Djibouti suggests either the predominance of asymptomatic infections or that symptoms of infection such as mild febrile illness are confused with febrile diseases such as malaria. Another hypothesis is the presence of a non-pathogenic Hantaan-related virus, as already suggested elsewhere in Africa (GONZALES et al., 1984, 1989), that is possibly not related with the virus in the rat population.

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**Author(s):**
Rodier, G., Soliman, A.K., Bouloumie, J. and Kremer, D.

**Performing Organization Name(s) and Address(es):**
U.S. Naval Medical Research Unit No. 3
PSC 452, Box 5000
FPO AE 09835-0007

**Sponsoring/Monitoring Agency Name(s) and Address(es):**
Naval Medical Research and Development Command, National Naval Medical Center
Building 1, Tower 12
Bethesda, MD 20889-5044

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