

Treatment of West Nile Virus Encephalitis with Intravenous Immunoglobulin

To the Editor: West Nile virus is endemic in Israel. The overwhelming majority of infections are mild and asymptomatic, but there have been periodic symptomatic outbreaks (1). In August 2000, an epidemic of West Nile virus broke out in Israel, with >260 confirmed cases and 20 deaths by the end of September 2000. Hitherto, the only treatment for this condition has been supportive with no proven *in vivo* specific therapy, although ribavirin has shown promise in *in vitro* studies (2). We report an apparent dramatic response to intravenous immunoglobulin in an immunosuppressed patient and suggest that this was the result of specific antibodies in the Israeli immunoglobulin used.

A 70-year-old woman was admitted to the hospital because of fever and vomiting of 24 hours' duration. She had a 12-year history of chronic lymphatic leukemia (Rai stage II) but was not on treatment. A routine outpatient assessment 1 week earlier had shown no unexpected findings.

On physical examination the patient appeared generally well, with temperature 39.0°C, regular pulse 100/minute, and blood pressure 130/70. Apart from splenomegaly 2-3 cm below the costal margin, there were no abnormal physical signs, including lymphadenopathy. Chest X ray results were normal. Hb was 12 g/dL, Hct 32%, mean corpuscular volume 84, leukocyte count 280x10⁹/L (90% lymphocytes, 13% neutrophils, and 10% monocytes), platelets 280x10⁹/L, Coombs negative. Her biochemical profile was entirely within the normal range. Blood and urine cultures were negative. Immunoglobulin G (IgG) was 14.5 g/L, IgM 2.6 g/L, and IgA 2.6 g/L.

Forty-eight hours after admission, dysarthria with episodes of impaired consciousness developed. After a further 24 hours, she was in deep coma (Glasgow Coma Scale, 6). Empiric treatment for presumed central nervous system infection was begun with ceftriaxone, ampicillin, acyclovir, and amphotericin B. Results of cranial computerized tomography were normal. A lumbar puncture was performed and showed clear cerebrospinal fluid (CSF) at normal pressure. CSF protein was 1.04 g/L, glucose 2.4 mmol/L, and leukocyte count 162/mm³ (90% mononuclear cells). Gram stain was negative, as were bacterial culture, cryptococcal antigen, and results of a polymerase chain reaction test for herpes viruses. IgM antibodies against West Nile virus were positive in both serum and CSF.

With the definite diagnosis of West Nile encephalitis, all antimicrobial treatment was stopped. Because of the chronic lymphatic leukemia and presumed immunosuppression, we decided to give intravenous immunoglobulin (Omr-IgG-am, Omrix Biopharmaceutical Ltd, Tel Hashomer, Israel), 0.4 g/kg, as has been recommended for this condition (3). The patient's neurologic condition remained unchanged (Glasgow coma scale, 5-6) for the next 2 days but then began to improve. Over the subsequent 5 days, her level of consciousness returned to normal.

In light of this apparently dramatic response to treatment with intravenous immunoglobulin, we examined several batches of pooled immunoglobulin from different sources for antibodies to West Nile virus. Intravenous

immunoglobulin preparations from donors in Israel, such as our patient received, contained high titers (1:1,600) of such antibodies, while those from the USA had no detectable antibody. We suggest that the use of such antibody-containing immunoglobulin may provide a specific and effective treatment for serious cases of West Nile virus infections, and therefore that formal trials of its use should be carried out.

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Nipah Virus Infection Among Military Personnel Involved in Pig Culling during an Outbreak of Encephalitis in Malaysia, 1998–1999

To the Editor: An outbreak of severe encephalitis affecting 265 patients, 104 (40%) of whom died, occurred during 1998-1999 in Malaysia. It was linked to a new paramyxovirus, Nipah virus, which infects pigs, humans, dogs, and cats (1-4). Nipah virus is most closely related to Hendra virus (4), which was discovered in Australia in 1994 during an outbreak of severe respiratory disease among horses and humans (5-9). Most patients in Malaysia were pig farmers, and human infection was linked to exposure to pigs (10). An operation to cull the approximately 1 million pigs on farms in the outbreak-affected areas was carried out, primarily by 1,638 military personnel. After two soldiers involved in culling became ill with Nipah encephalitis, we conducted a cross-sectional survey of military personnel participating in culling activities in the outbreak-affected states of Malaysia (Negeri Sembilan and Selangor) to assess the prevalence of Nipah infection.

The survey was conducted approximately 2-4 weeks after the end of all culling activities to control the outbreak. All military personnel, enlisted and officers, who had been assigned to culling duty in the states of Negeri Sembilan and Selangor were invited to participate, regardless of specific job assignment. Study teams visited the military bases in each state and administered a survey asking about illness, specific exposures and activities during culling, use