

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 $280 \times 10^9/L$ (90% lymphocytes, 13% neutrophils, and 10% monocytes), platelets $280 \times 10^9/L$, 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 $162/mm^3$ (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.

Acknowledgment

We thank Ella Mendelson, Director of the Central Virology Laboratory, Ministry of Health of Israel, for the measurements of West Nile virus antibody.

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