LAB NEWS

From the Department of Laboratory Medicine - Yale-New Haven Hospital Medical Center

Vol. 14 (2) Clinical Virology Laboratory Newsletter April 2005

West Nile Virus IgM Capture and IgG ELISAs Available at YNHH

West Nile virus (WNV) is an arthropod-transmitted flavivirus, closely related to dengue, yellow fever, Japanese encephalitis, St. Louis encephalitis and tick-borne encephalitis viruses. WNV was first isolated in 1937 in the Nile district of Uganda, and a mild dengue-like illness, with fever, malaise, lymphadenopathy and rash, was thought to be the only manifestation. In the 1950s, a benign meningitis was noted. However, a major change in virulence was evident with epidemics in 1996, and an outbreak in Israel in 2000 showed high rates of encephalitis. In 1999, WNV was introduced into the western hemisphere via New York City, and since then, a neurovirulent strain of WNV has spread across North and South America, establishing natural cycles in a wide variety of mosquitoes and birds.

Birds are the main reservoir of WNV in nature and infection is transmitted by mosquito bite. In temperate and subtropical zones, most human infections with WNV occur in summer or early fall, but in tropical areas, incidence is greatest in rainy season. Humans generally do not develop high-level viremia and thus are dead-end hosts. However, transmission of WNV through blood transfusion, organ transplantation and breastfeeding has been reported.

Clinical Disease. It is estimated that 1 in 5 infected persons develops fever, and 1 in 150 develops meningitis or encephalitis. With encephalitis, seizures are relatively rare, but flaccid paralysis occurs in about 10%. An age of greater than 70 years appears to be the main risk factor for severe meningo-encephalitis and death.

Treatment: The standard treatment is supportive care only. High-titered WNV IVIG has been helpful in anecdotal reports. Interferon alpha and several experimental drugs have activity in vitro and a vaccine is in development (1).

Laboratory diagnosis: Detection of IgM antibody is considered the most sensitive test (2). IgM is usually detected in CSF 3-5 days into clinical illness; serum IgM appears 3 days later; and IgG appears about 5 days after IgM. WNV can be detected earlier in infection by PCR or culture, but once clinical illness develops, PCR is generally less sensitive than antibody methods.

Diagnostic Pitfalls: IgM may not be detectable in early CSF or serum samples. Serologic cross-reaction with other flaviviruses, and less frequently with bunyaviruses, enteroviruses, and CMV, can occur.

Samples: Submit 0.5 mL CSF and/or 1.0 mL serum.

Test method: IgM antibody capture ELISA, and IgG direct ELISA by Focus Technologies (2).

Test Availability: Tests are performed in Virology once or twice a week, Monday-Friday, depending on test volume and seasonal activity. <u>All positive IgM results must be confirmed by CT State Laboratory.</u>

References

1. Johnson RT et al. West Nile Virus: Pathogenesis and therapeutic options. NIH Conference. Ann Intern Med 140:545-553, 2004.
2. Prince HE et al. Utility of Focus Technologies West Nile Virus immunoglobulin M capture enzyme-linked immunosorbent assay for testing cerebrospinal fluid. J Clin Microbiol 42:12-15, 2004.

Clinical Virology Laboratory, Department of Laboratory Medicine, YNHH

Results of Respiratory Virus Testing, 2004-2005 Winter Season

Virus	October	November	December	January	February	March	Total Positive
RSV	4	43	180	203	139	80	**649**
Influenza A	1	4	99	374	214	50	**742**
Influenza B	0	2	0	16	67	140	**225**
Parainfluenza 1-3	8	13	19	21	20	22	**103**
Adenovirus	1	11	10	5	5	11	**43**
Total No. (%) positive	14 (3%)	73 (12%)	308 (27%)	620 (33%)	445 (28%)	300 (23%)	**1760 (25%)**
Total tested[a]	428	629	1132	1907	1586	1312	6994
HMPV[b] No. (%) positive	0	0	2 (9.1%)	0 (0%)	2 (11.1%)	10 (37%)	**14 (15.7%)**
Total tested	N/A	N/A	22	22	18	27	89

a, Respiratory DFA detects RSV, influenza A and B, parainfluenza types 1-3, adenovirus
b, HMPV (human metapneumovirus) is detected by real-time TaqMan RT-PCR.

Note:
1. As seen above, HMPV infections typically increase in frequency as RSV activity declines.
2. Respiratory virus activity has also been higher than usual in March due to a surge in influenza type B infections.

Questions or comments:
Call or email Marie L. Landry, M.D., Laboratory Director, at 688-3475 (marie.landry@yale.edu),
or David Ferguson, Laboratory Manager, Clinical Virology Laboratory at 688-3524.