

West Nile Fever

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Abstract: *West Nile virus (WNV) is a mosquito - borne flavivirus causing a spectrum of illness in humans, ranging from asymptomatic infection to severe neuroinvasive disease. This article reviews the etiology, epidemiology, clinical manifestations, diagnosis, management, prevention and public health control measures for WNV fever. WNV is primarily transmitted by infected mosquitoes, but rare human - to - human transmission can occur. Early diagnosis and supportive care are crucial for managing severe cases. Preventive measures focus on mosquito bite avoidance through repellents, protective clothing and habitat modification. Public health strategies include surveillance, vector control, and blood donation screening.*

Keywords: West Nile, WNV, Flavivirus

1. Introduction

West Nile virus (WNV) first appeared on the North American continent in August 1999. Within eight weeks, it led to 62 reported cases of encephalitis and seven deaths in New York City and surrounding areas. Before the initial human cases of viral encephalitis were reported, there was an epizootic with high mortality rates in birds, particularly crows (*Corvus brachyrhynchos*), and horses. An intense investigation by veterinarians, driven by media attention after the human outbreak, revealed that encephalitis was the common cause of the avian deaths. The WNV was identified through reverse transcriptase - polymerase chain reaction testing and viral genomic sequencing. Testing on human serum and tissue samples confirmed WNV as the etiological agent (Fine and Layton, 2001). The introduction of WNV to North America remains unknown, but the abundance of amplifying hosts and mosquito vectors facilitated its rapid spread to the Pacific coast of the United States. It is now likely a permanent resident in the U. S., causing significant morbidity and mortality.

2. Literature Review

West Nile fever, an illness caused by the West Nile virus (WNV), poses significant health risks worldwide. The disease can lead to a spectrum of clinical manifestations, from mild febrile illness to severe neuroinvasive disease. This article consolidates current research on the etiology, clinical outcomes and management strategies for West Nile fever, with an emphasis on fever management and preventive measures.

Definition

West Nile fever is a disease caused by the West Nile Virus (WNV), a flavivirus related to the viruses causing St. Louis encephalitis, Japanese encephalitis and yellow fever. It affects humans, horses and several bird species. Most infected individuals exhibit few symptoms, but some develop severe neurological illnesses, which can be fatal.

Epidemiology

Serological surveys indicate that WNV has circulated in Europe since the 1950s, with the first recognized human outbreak occurring in 1962–1963 in the Camargue region of southern France. Subsequent cases and outbreaks have been

reported across southern, eastern, and western Europe. Temperature is a critical environmental factor affecting WNV activity in Europe, influencing mosquito breeding and virus incubation. High summer temperatures facilitate WNV dispersal and amplification. Studies have shown that temperature anomalies in July, adequate water surfaces in June, the presence of wetlands, locations under migratory bird routes, and previous WNV presence are associated with new cases.

Before the emergence of a lineage 2 strain in Hungary in 2004, sporadic cases and outbreaks in Europe were due to lineage 1 strains. Since 2008, the lineage 2 strain has spread across central Europe and the eastern Mediterranean, causing significant outbreaks in humans and animals in Greece, Hungary, and Serbia. A lineage 2 virus emerged in southern Russia in 2007 and spread to Romania and Italy by 2010. Neurovirulent WNV strains from different genetic lineages now circulate simultaneously in certain countries, such as Italy, Romania, and Turkey.

Pathogen Characteristics

WNV is an enveloped positive - stranded RNA virus in the Japanese encephalitis serocomplex (Flavivirus genus, Flaviviridae family). Eight phylogenetic lineages exist, but only lineages 1 and 2 are associated with human disease. WNV was first isolated in 1937 from a woman in the West Nile district of Uganda and is now the most widely distributed arbovirus, found in parts of North and South America, Africa, Europe, Asia, and Oceania.

Epidemiological Criteria

There must be at least one of the following epidemiological links:

- Animal to human transmission (e. g., exposure to mosquito bites in areas where WNV is endemic in horses or birds)
- Human to human transmission (e. g., vertical transmission, blood transfusion, organ transplant)

Case Classification

- **Probable Case:** Any person meeting the clinical criteria with an epidemiological link and a laboratory test for a probable case.
- **Confirmed Case:** Any person meeting laboratory criteria for case confirmation.

Incubation Period

Usually 2 - 6 days after getting bitten but can be up to 14 days.

Mode of Transmission

- Mosquitoes become infected when they feed on infected birds, subsequently transmitting the virus to humans and animals through bites.
- The virus may also be transmitted through contact with other infected animals, their blood, or other tissues.
- Rare cases of transmission through organ transplant, blood transfusions, and transplacental transmission.
- No human - to - human transmission of WNV through casual contact has been documented.

Risk Factors

Risk factors include:

- advanced age
- tumours in the brain
- high blood pressure
- blood disorders
- diabetes
- kidney diseases
- alcohol abuse
- genetic factors

Causes

West Nile is an arbovirus, or a virus from an arthropod (arthropods are a large group that includes insects). It's an RNA virus in the genus *Flavivirus*. Similar viruses cause dengue fever, yellow fever and Zika. West Nile virus is primarily spread to humans through the bite of an infected female mosquito, which acquires the virus by biting an infected bird. Crows and jays are the most common avian carriers, though at least 110 other bird species can also carry the virus. Human - to - human transmission is rare but can occur through organ transplants. The risk of WNV transmission through blood transfusions is significantly mitigated by screening protocols.

Clinical features

Asymptomatic in about 80% of cases.

Individuals must meet at least one of the following criteria:

- Intense, very painful headache
- High fever (above 103 degrees Fahrenheit or 39.5 degrees Celsius)
- Confusions
- Muscle weakness
- Nausea and vomiting
- Diarrhea
- Rash (usually concentrated around your chest and back).
- Swollen lymphnodes
- Tremors or convulsions
- Stiff neck
- Paralysis
- Coma
- Encephalitis
- Meningitis

Diagnostic evaluations

For case confirmation, at least one of the following laboratory tests must be met:

- Whole Blood, Plasma, Serum, Cerebro spinal fluid and Urine: - for genome detection

- Computer Tomography or Magnetic Resonance Imaging –to find out brain involvement
- High titre of WNV IgM, detection of WNV IgG, and confirmation by neutralization
- For a probable case, WNV - specific antibody response in serum is required.

Case Management and Treatment

Treat mild symptoms at home with over - the - counter (OTC) medications for a cold or flu.

- Antiseizure medicines for seizures.
- Supplemental oxygen or mechanical ventilation.
- Intravenous (IV) fluids
- Corticosteroids to reduce inflammation.
- NG Tube feeding

Supportive care for neuro - invasive cases involves hospitalization, intravenous fluids, and respiratory support. No specific prophylaxis or treatment exists for WNV infections. The only available treatment is supportive care.

Prevention

- Avoiding high risk times: - Stay inside when mosquitos are most active, especially early in the morning and around sunset.
- Using insect repellent: - Spray insect repellent on exposed skin or clothes before going outdoors.
- Covering the skin: - Wear lightweight clothes like long pants or a long - sleeved shirt to cover more of the body when you're outdoors
- Draining standing water: - Regularly empty and clean any areas that may collect water, such as a birdbath or clogged rain gutters, where mosquitos could breed.
- Keeping Mosquitos outside: - Keep doors and windows screened or closed to keep mosquitos from entering home.

Prognosis

In most people, their immune systems eventually fight off West Nile virus. Flu - like symptoms usually go away on their own. But if the immune system is weakened, it may be difficult to get rid of the viral infection. Nervous system damage from severe West Nile infections can be permanent, even after the virus goes away.

Complications

Less than 1% (about 1 in 150) of people infected with West Nile will get severe symptoms. The most common complications are encephalitis and meningitis.

Public Health Control Measures

To prevent WNV transmission via substances of human origin (SoHO), EU/EEA countries should implement blood donor deferral for 28 days or individual donation nucleic acid testing (ID - NAT) for donors from affected areas. Blood establishments should follow the EU preparedness plan for blood safety in affected regions, including temporarily halting blood collection, implementing NAT screening, quarantining and retesting positive blood components, enhancing post - donation information, and strengthening post - transfusion haemovigilance.

Infection Control, Personal Protection, and Prevention

Personal protective measures against mosquito bites include:

- Using mosquito bed nets, preferably insecticide - treated
- Sleeping or resting in screened or air - conditioned rooms
- Wearing clothes that cover most of the body
- Using mosquito repellent according to product instructions

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