

# West Nile Virus (WNV)

Extended version

**Classic case:** Horse w/ fever, listlessness, **acute** onset hind limb ataxia and **weakness**

**Presentation:** Usually summer months

## Horse:

- **Fever**
- Listlessness, hyper excitability
- **Hind limb ataxia and weakness**
- Hyperesthesia
- **Generalized muscle fasciculations**
- Drooping lip, tongue weakness
- Grinding teeth
- Blindness
- A diffuse encephalomyelitis

## Ruminants:

- Usually a single animal affected
- Neurologic signs, death within 1-2 days

## Geese:

- Recumbency
- Leg and wing paralysis
- Reluctant or unable to move when disturbed
- Incoordination – flip over while attempting to stand
- Torticollis and opisthotonos

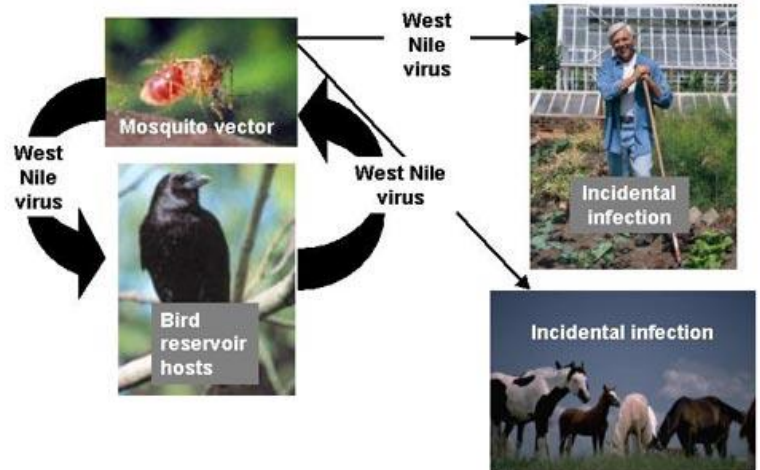
## Dogs and cats:

- Often asymptomatic
- Rarely
  - Fever, depression
  - Muscle weakness
  - Seizures, paralysis
  - Myocarditis
- Consider WNV in animals w/ neurologic and cardiac signs

## Wildlife:

- **Birds- Commonly found dead**
- Gray squirrels
  - Lethargy, paw biting, vocalization
  - Ataxia, circling, encephalitis, myocarditis

## West Nile Virus Transmission Cycle



**BIRDS are the reservoir**

**People and horses are INCIDENTAL** hosts for WNV

Image courtesy US Centers for Disease Control & Prevention (CDC)



The mosquito is a vector for WNV

Image courtesy CDC

## DDX:

Rabies, EHV-1, EPM, EEE, WEE, VEE, botulism

WNV infection is one of the equine encephalitis-causing viruses (EEE, VEE, WEE, WNV).

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## Test(s) of choice:

- Mammals
  - CSF – mononuclear pleocytosis and elevated protein
  - IgM capture ELISA on serum and CSF
  - Microtiter virus neutralization test on serum and CSF
  - Plaque neutralization test on serum and CSF
  - **RT-PCR for virus detection on CNS tissue is gold standard**
- Geese
  - Tissues for isolating virus – brain, spleen, kidneys
    - Homogenates are inoculated into the brain of newborn mice, embryonated eggs or Vero and mosquito cell line cultures
  - RT-PCR can also be performed
- **REPORTABLE DISEASE**

## Rx of choice:

Supportive care

- Hyperesthesia- NSAIDs
- Muscle fasciculations – ataractics
- Slings

## Prognosis:

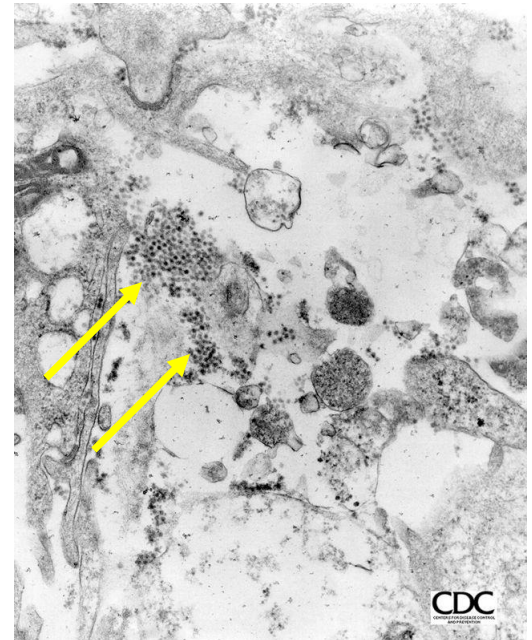
### Horse:

- Guarded – about 60% survive,
- But only 30% recover fully after 6 months
- May relapse
- **Better prognosis if**
  - > five years of age
  - Can stand with little weakness
  - History of previous vaccination

**Geese:** Mortality is 20-60%

## Prevention:

- Mosquito protection and control
- Vaccination esp. in endemic areas



*Electron micrograph of West Nile Virus isolated from brain tissue from a crow found in New York. Image courtesy CDC*



*Brain of a flamingo with West Nile Virus encephalitis note the hemorrhages. Image courtesy CDC / Tracey McNamara, DVM, DACVP*



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## Pearls:

- Multiple **cases of acute deaths in birds can herald an outbreak in other hosts**
- WNV – Flavivirus
- Reservoir – wild birds
- Vector – mosquitoes – esp *Culex spp*, although it has been isolated from ticks
- **Chickens** are can be infected naturally and develop antibodies
  - but **do not show clinical signs**.
  - Chickens are often used as **sentinels to detect the presence of WNV**
- 1<sup>st</sup> human and animal cases in US seen in 1999, New York City, (discovered in 1937, Uganda)
  - **WNV first detected by Bronx zoo veterinarian**, Dr. Tracey McNamara
  - 2012 a bad year for WNV in US -Over 1590 human cases, highest recorded since 1999
  - Human cases divided into “neuro-invasive” (bad) and “non-neuro-invasive”

**Refs:** A Practical Guide to Canine and Feline Neurology, Dewey, 2<sup>nd</sup> ed. p 178,  
Vet Neuroanatomy & Clinical Neurology, de Lahunta & Glass, 3rd ed. p 126, 289, 304, 341-342, 425, 491,  
Large Animal Neurology, Mayhew, 2<sup>nd</sup> ed. p243-245,  
Merck Vet Manual, 10<sup>th</sup> ed (online): West Nile Virus in poultry, Equine encephalomyelitis  
Ludwig and McNamera, et al. *An outbreak of West Nile Virus in a New York City captive wildlife population*,  
Am. J. Trop. Med. Hyg., 67(1), 2002, pp. 67–75

## My Notes: