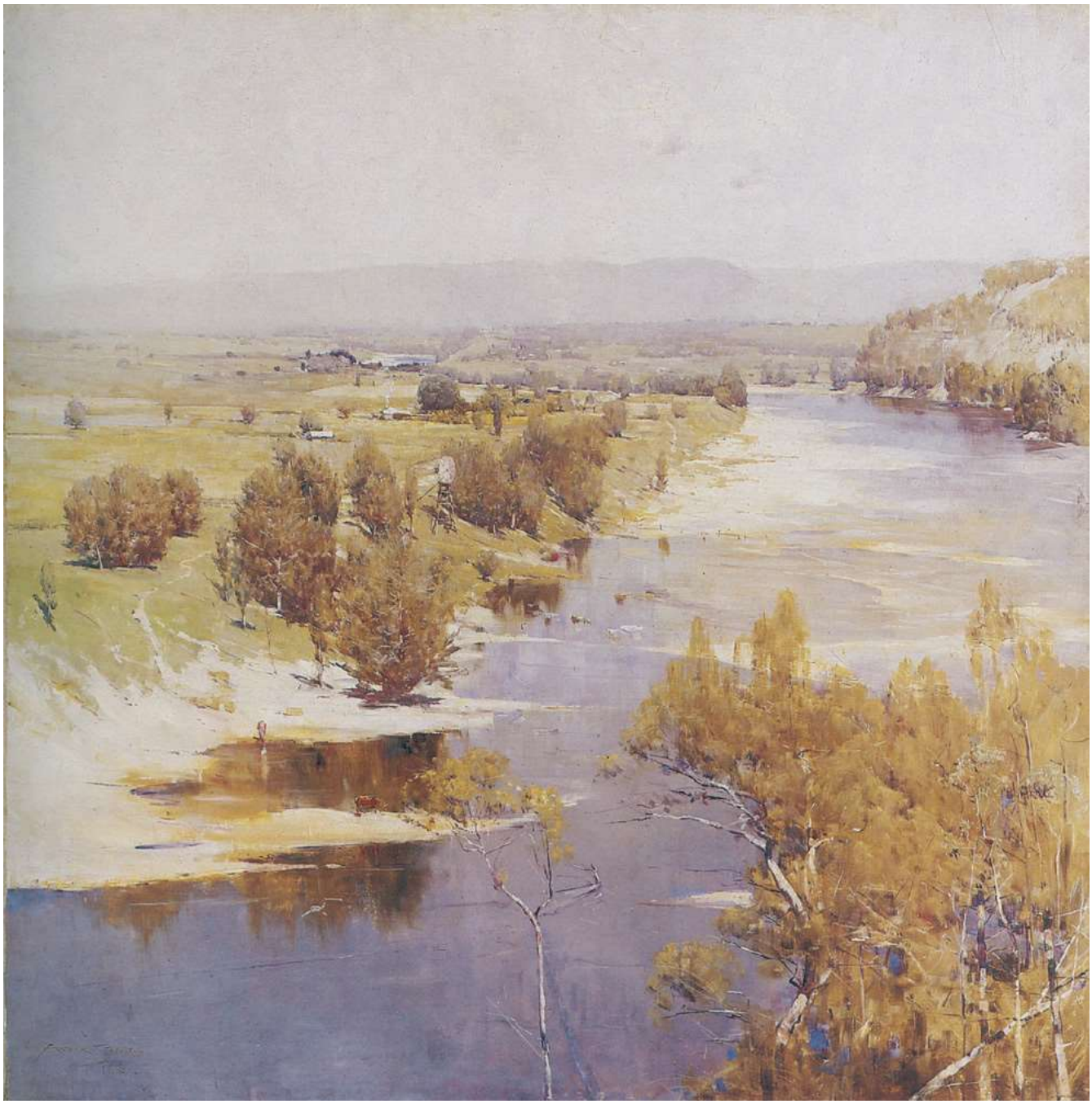
THE NORTHERN HOSPITAL

MURRAY VALLEY ENCEPHALITIS



"The Purple Noon's Transparent Might", oil on canvas, Arthur Streeton 1896, National Gallery of Victoria.

"The glory of the river and plain spread before me… Far below were the tops of river-oaks, and water like the blue of a black opal. The brightness of noon, the power of deep blue, the flies, and the temperature now 108 degrees, wrought me to a pitch of excitement… the atmosphere 10 degrees higher than my own temperature crept round my face like a flame; and it seemed like working in a fiery trance. I paused and found that in two hours two thirds of my canvas was covered with paint, I had stamped my big impression upon it, I had made my picture".

Arthur Streeton, (1867-1943).

MURRAY VALLEY ENCEPHALITIS

Introduction

Murray Valley Encephalitis, (MVE) was first isolated from patients who died from encephalitis in the Murray Valley in Victoria and South Australia in 1951.

It is caused by a flavivirus and has the capacity to cause severe human disease, with encephalitis being the most serious clinical manifestation.

A diagnosis of MVE virus encephalitis should be considered in any patient who presents with encephalitis and who has been in the Murray Valley area within the incubation period of the disease.

The disease may also be acquired at any time in northern parts of Australia or Papua New Guinea.

Pathology

Organism

- **Murray Valley encephalitis virus** is an arbovirus.
- Arboviruses are viruses which are spread by the bite of arthropods, particularly mosquitoes. These viruses are divided into alphaviruses and flaviviruses.
- Murray Valley encephalitis virus is a flavivirus.

Epidemiology

MVE virus is endemic in northern Australia and Papua New Guinea where sporadic cases or small outbreaks of MVE virus encephalitis occur every few years usually at the end of the wet season.

Seven outbreaks of MVE virus encephalitis have occurred at irregular intervals in southeastern Australia since 1917. The last of these was in 1974.

During these times there was heavy rainfall leading to widespread flooding which promoted large increases in water bird and vector mosquito populations. The MVE virus numbers were amplified in the bird-mosquito-bird cycle and humans became infected when bitten by mosquitoes carrying the virus.

MVE virus encephalitis seems to occur in people who receive large numbers of mosquito bites during a single exposure.

There are two theories as to how the MVE virus appears and causes outbreaks of MVE virus encephalitis in **southeastern Australia** and both may be correct.

The first one postulates that the virus is carried from northern parts of Australia by birds migrating south in search of food after heavy rainfall down the southeastern parts of the continent. This occurs in repeated mosquito-bird-mosquito amplification cycles.

The other suggests that the virus persists during inter-epidemic periods in cryptic foci along the **Murray River** (hence the name) and the MVE virus only amplifies and becomes evident when weather conditions are conducive to massive local mosquito and bird multiplication.

Transmission

- Arboviruses are spread by the bite of arthropods, particularly mosquitoes.
- The primary mosquito vector during epidemics is Culex annulirostris.
- Other mosquitoes such as Culex australicus and some Aedes and Ochlerotatus species may be involved in other aspects of MVE virus ecology.

Incubation Period

- The incubation period is around 7-28 days.

Reservoir

The primary hosts in Victoria of MVE virus during years of high virus activity are water birds.

The most commonly infected species include:

- Ardeiformes (herons), particularly the Rufous night-heron
- Pelicaniformes (cormorants/ darters)

Period of Communicability

- There is no evidence of person to person transmission of MVE virus.

Susceptibility and Resistance

- Infection with MVE virus confers lifelong immunity.

Clinical Features

A diagnosis of MVEV encephalitis should be considered in any patient who presents with encephalitis and who has been in the Murray Valley area within the incubation period of the disease. The disease may also be acquired at any time in northern parts of Australia or Papua New Guinea.

Infection with Murray Valley encephalitis virus may manifest clinically as:

- Asymptomatic disease
- Non-encephalitic illness
- Encephalitic illness

Asymptomatic disease:

Subclinical infection is common.

Serological studies show that only one person in about every 800 of those infected with MVE virus will develop clinical disease.

Non-encephalitic illness:

It may cause a mild influenza type illness with non-specific "constitutional" symptoms such as:

- Fever
- Headache
- Nausea and vomiting.
- Myalgias
- A non-specific rash may be seen

Encephalitic illness:

In a *small percentage* of all people who are infected, mild disease may be a prodrome to disease progression and involvement of the central nervous system.

This can result in:

- Meningitis of variable severity.
- Encephalitis of variable severity.
    - ♥ Clinical signs of brain dysfunction such as drowsiness, confusion, fitting, weakness or ataxia indicate the onset of encephalitis.

Of those presenting with encephalitis in Victoria in the 1974 epidemic, approximately:

- One third died
- One third were left with residual brain damage
- One third recovered completely.

Investigations

Infection is confirmed by:

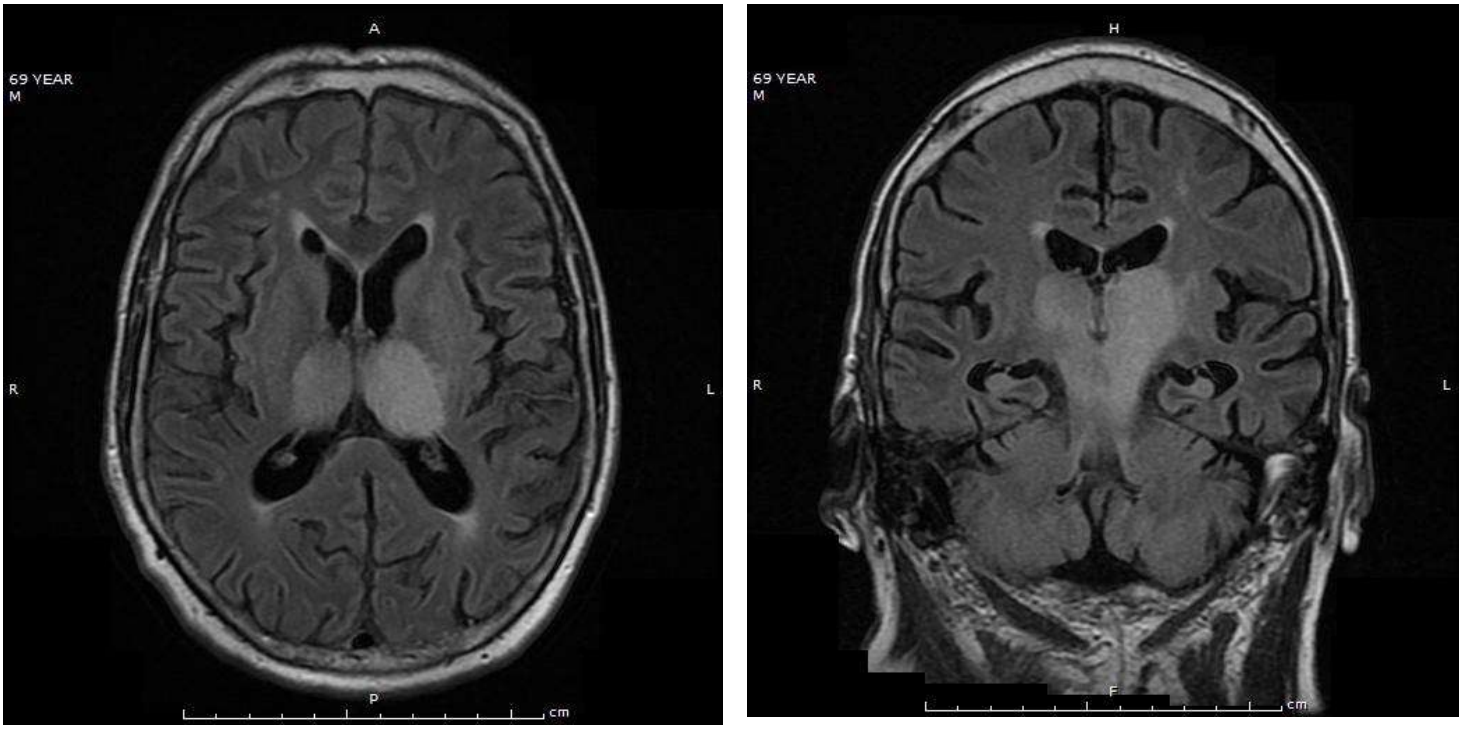
1. Serology:
    - IgG:
        - ♥ For a significant rise in titre over 10-14 days.
    - IgM:
        - ♥ MVEV-specific
2. PCR:
    - Respiratory swabs:
        - ♥ In specific viral transport medium.
    - CSF

EEG

This may show abnormalities typical of encephalitis

CT scan/ MRI scan

These may show abnormalities suggestive of encephalitis.



MRI T2 Cerebral Flare views of a 69 year old male who died from Murray Valley Encephalitis. The axial view shows typical features of an encephalitis with bright bilateral thalamic enhancement. The coronal view shows the bilateral enhancement extending into the brainstem. These changes are highly characteristic of an encephalitis, (but are not specifically diagnostic of Murray Valley Encephalitis).

Management

Management is supportive.

1. IV fluid rehydration
2. Correction of electrolyte disturbances
3. Analgesia:
    - IV paracetamol is a useful option.
4. Mechanical ventilation and other intensive supportive measures for severe cases of encephalitis may be required.
5. Acyclovir:
    - In the first instance a definitive diagnosis of MVE will not be possible.

- Acyclovir should be given empirically for presumed encephalitis to cover the possibility of herpes simplex virus infection.

Vaccine

- There is no preventative vaccine available.

Notification

- Murray Valley encephalitis is a Group A disease and must be notified immediately by telephone **(1300651160)** or fax followed by online or written notification within five days.

School exclusion

- School exclusion is not necessary

References

1. The Blue Book Website, April 2011.

Dr J. Hayes
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