

## Ross River & Barmah Forest Viruses

Both Ross River (RR) and Barmah Forest (BF) disease are caused by viruses which are transmitted to humans through the bite of mosquitoes.

Ross River Fever is on the Australian Department of Health and Ageing's list of notifiable diseases.

RRV



<http://www.herbalistics.com.au/plantblog/?p=84>

BFV



<http://www.moavenandpartners.com/doctors/information/form/barmah-forest-virus.shtml>

Ross River Virus (RRV) is Australia's most common and widespread mosquito-borne pathogen. Also known as Epidemic Polyarthrits, it can cause debilitating polyarthrits, rash, fever, and constitutional symptoms.

The virus is endemic to Australia, Papua New Guinea, Fiji, Samoa, the Cook Islands, New Caledonia and several other islands in the South Pacific.

The number of cases has averaged >5,000 per annum during 1991-1997. The virus appears to be endemic in most rural areas, and there has been an increasing incidence near major cities. BF disease is less common, but the number of cases appears to be increasing annually, with several outbreaks occurring during the 1990's.

## **Incidence and epidemiology**

For most of Australia, peak incidence of the two diseases is through the summer and autumn months, particularly from January through to March, the "wet season", when the mosquito vectors are most abundant.

Most notifications are from Queensland, tropical Western Australia and the Northern Territory. However, in southwestern Australia and eastern Victoria, RR activity often begins in the spring months and peaks in early summer.

The disease is more characteristic of rural and regional areas. Localities close to saltmarshes, wetlands, waterways and farms with irrigation systems are most productive for mosquito populations and hence tend to result in the highest number of human cases of disease. Outbreaks occur when local conditions of rainfall, tides and temperature promote vector abundance.

## **Transmission**

RR and BF viruses have been isolated from many mosquito species, indicating wide susceptibility among mosquitoes. In inland regions the major vector is *Culex annulirostris* which breeds in freshwater habitats, especially in irrigated areas. Along coastal regions saltmarsh mosquitoes represent the major threat, including *Aedes (Ochlerotatus) vigilax* and *Ae. camptorhynchus* in northern and southern coastal regions respectively. There is some evidence that 'floodwater' *Aedes* species such as *Ae. normanensis* play an important role in transmission in inland regions following heavy rains or floods, and *Coquillettidia linealis* is a secondary vector in areas with established wetlands. In the domestic urban situation there is evidence to suggest that *Ae. notoscriptus* may be a vector, while *Cx. quinquefasciatus* is not.

Ross River virus infection cannot be spread from human to human.

Serological studies and laboratory investigations have indicated that native mammals, most likely kangaroos and wallabies, are natural hosts for RR virus but little is known about the hosts of Barmah Forest virus.

RR virus transmission from human to mosquito to human (thus occurring without the involvement of an animal) has been proposed, and there is now little doubt that such a cycle involving only humans and mosquitoes occurs during periods of intense virus activity.

## **Symptoms**

Symptoms of the disease may vary widely in severity, but major indicators are arthralgia, arthritis, fever, and rash. The incubation period is 7–9 days. Human infection with RR virus or BF virus may result in the clinical condition known as polyarthritis. The effects range from: a symptom-less condition; through a transient rash and mild illness with fever; to polyarthritis affecting chiefly the ankles, fingers, knees, and wrists, but other joints may be affected. The disease is not fatal. For RR virus symptoms become evident from 3-21 days (average 9 days) after infection, and mild cases may recover in less than one month but many persist for months to years. Recent studies have indicated that the rash may be more florid with BF virus infections but that the arthritic symptoms are greater with RR virus infection. Infection is most common in adult aged 25–44 years old, with males and females equally affected, whilst symptoms are rare in children.

Less common manifestations include splenomegaly, hematuria and glomerulonephritis. Headache, neck stiffness, and photophobia may occur. There have been three case reports suggesting meningitis or encephalitis.

Reports from the 1980s and 1990s suggested RRV infection was associated with arthralgia, fatigue and depression lasting for years.[3] More recent prospective studies have reported a steady improvement in symptoms over the first few months, with 15-66% of patients having ongoing arthralgia at 3 months. Arthralgias have resolved in the majority by 5–7 months. The incidence of chronic fatigue is 12% at 6 months and 9% at 12 months, similar

to Epstein-Barr virus and Q fever. The only significant predictor of the likelihood of developing chronic symptoms is the severity of the acute illness itself. In those with the most persisting symptoms (12 months or more), comorbid rheumatologic conditions and/or depression are frequently observed.

Barmah Forest virus causes inflammation and joint pain and has similar symptoms to Ross River virus infection, but usually lasts for a shorter duration.

Approximately 30 per cent of people infected with the virus will develop symptoms three to 11 days after being infected with others developing symptoms up to 21 days after the exposure.

### **Diagnosis and Treatment**

A variety of blood tests are used to demonstrate the presence of specific antibodies to RR and BF virus. Blood samples should be taken during the acute and convalescent phases of the illness and a four-fold rise in antibody levels will confirm the clinical diagnosis.

Specific therapies do not exist to treat the diseases, rather it is the symptoms that are alleviated. This includes various analgesics to reduce the pain and fevers and anti-inflammatory agents for the arthritic symptoms.

Your doctor will advise on treatment for joint and muscle pains. A combination of plenty of rest, and gentle exercise are important to keep joints moving and to prevent overtiredness but medication may sometimes be necessary.

Cases of long illness can be distressing. Often when people experience long term severe tiredness, they may feel depressed.

## History

In 1928, an outbreak of acute febrile arthritis was recorded in Narrandera and Hay in New South Wales, Australia. In 1943, several outbreaks of arthralgia and arthritis were described in the Northern Territory, Queensland and the Schouten Islands, off the northern coast of Papua New Guinea. The name epidemic polyarthritis was coined for this disease. In 1956, an epidemic occurred in the Murray Valley which was compared to "acute viral polyarthritis" caused by Chikungunya virus. The Australian disease seemed to progress in milder fashion. In 1956, serological testing suggested an unknown new species of alphavirus (group A arbovirus) was the likely culprit.

In 1959, a new alphavirus was identified in mosquito (*Ochlerotatus vigilax*) samples trapped near Ross River, near Townsville, Queensland, Australia. Further serological testing showed that patients who had suffered "epidemic polyarthritis" in Queensland had antibodies to the virus. The new virus was named Ross River virus, and the disease Ross River fever.

The virus itself was first isolated in 1972 using suckling mice. It was found that RRV isolated from human serum could kill mice. However, the serum containing the virus that was used had come from an Aboriginal boy from Edward River, North Queensland. The child had a fever and a rash but no arthritis making the link between RRV and Ross River fever less than concrete.

However, RRV was later isolated in humans following a series of epidemic polyarthritis outbreaks in Fiji, Samoa and the Cook Islands during 1979. RRV was isolated in an Australian patient suffering from Ross River fever in 1985.

In 2010, the Ross River Virus was found to have made its way to the Aundh area in Pune, India and spread to other parts of the city. A tourist to Australia probably returned infected with the virus. The RRV infection is characterized by very high fever, pain in the joints, loss of appetite and weakness. Hydration

by sufficient fluid intake is recommended to ensure that the fever does not rise to very dangerous levels. It is recommended that a doctor be consulted immediately as regular paracetamol gives only temporary reprieve from the fever.

## **Prevention**

The best prevention is to take precautions against being bitten by mosquitos:

- avoid being outside during times of heavy infestation of mosquitoes eg. early evenings in the warmer months
- use insect repellents and wear protective, light coloured clothing
- screen living and sleeping areas
- Ensure that your accommodation has flyscreens properly fitted to windows and external doors.
- Reduce the number of potential mosquito breeding habitats around your home by ensuring no stagnant water is present. Containers holding water should be emptied and washed regularly.

## **Control**

Mosquito eradication programs are the most effective way to control spread of Ross River virus. Health officers from most local councils and state health departments work together to develop and implement mosquito eradication programs.

## **Sources**

- <http://medical-dictionary.thefreedictionary.com/Ross+River+Virus>
- [http://access.health.qld.gov.au/hid/InfectionsandParasites/ViralInfections/barmahForestVirus\\_fs.asp](http://access.health.qld.gov.au/hid/InfectionsandParasites/ViralInfections/barmahForestVirus_fs.asp)

- Kay B.H., and J.G. Aaskov. "Ross River Virus (Epidemic Polyarthritits)". In *The Arboviruses: Epidemiology and Ecology (Vol. IV)*, edited by T.P. Monath. Boca Raton, FL: CRC Press, 1989, pp. 93-112.
- Harley, D., A. Sleight, S. Ritchie. "Ross River Virus Transmission, Infection, and Disease: A Cross-disciplinary Review. " *Clinical Microbiology Reviews* 14 (October 2001): 909-932.
- Harley, D., S. Ritchie, C. Bain, and A. Sleight. "Risks for Ross River Virus Disease in Tropical Australia." *International Journal of Epidemiology* (January 26 2005): 1-8.
- Flexman, J., D. Smith, J. Mackenzie, J. Fraser, S. Bass, L. Hueston, et al. "A Comparison of the Diseases Caused by Ross River Virus and Barmah Forest Virus." *Medical Journal of Australia* 169 (August 1998):159-163.
- Hills, S. "Ross River Virus and Barmah Forest Virus Infection." *Australian Family Physician* 25 (December 1996):1822-1824.
- "Ross River Virus Infection-Fact Sheet" *Australian Government-Department of Health and Ageing*
- <http://www.health.gov.au/internet/wcms/Publishing.nsf/Content/health-arbovirus-pdf-fsrossriver.htm>.
- Queensland Health - A heathier you
- Heymann, D., ed. 2004. *Control of Communicable Diseases Manual*, 18th edition. Washington, DC: American Public Health Association.