CASE REPORT

ROSS RIVER VIRUS DISEASE PRESENTING WITH HEMATURIA

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Ross River virus (RRV) disease, also known as epidemic polyarthritis, is endemic in tropical northern Australia with seasonal variation dependent on rainfall (Doherty *et al,* 1977; Tai *et al,* 1990). RRV has also been reported to be widespread in the southwestern Pacific (Tesh *et al,* 1975; Fraser, 1986). The causative agent is a mosquito-borne alphavirus. Recent serological data suggests that over 15% of Darwin (Northern Territory, Australia) residents have been exposed to RRV, as have 42% of Aboriginal residents of rural East Arnhemland (Tai *et al,* 1990). RRV disease usually manifests as a combination of symptoms including skin rash (60%), fatigue (> 50%), acute and/or chronic polyarthralgia/polyarthritis, and fever (20%) (Fraser, 1986). We describe the first case of documented RRV infection presenting with macroscopic hematuria.

A 28 year old caravan park groundsman (in an area with high densities of *Culex annulirostris* and *Aedes vigilax* mosquitos) developed a generalized pruritic macular rash over the trunk and all four limbs, including small vesicles on the palms and soles. One day later he experienced polyarthralgia with pain in his right wrist, proximal interphalangeal joints and metacarpophalangeal joints, with subsequent involvement of both shoulders, elbows, knees and ankles. He was admitted to Royal Darwin Hospital on the fourth day having passed cola colored urine associated with bilateral loin and groin pains and strangury. He had lived in Darwin for six years with no overseas travel. There was no past history of renal calculi or other significant illness, and family history was unremarkable. On examination, he was afebrile with erythematous macules on his trunk and limbs, and several small non-palpable purpuric lesions on the feet. Blood pressure was 150/80. In both ankles there was slight swelling and warmth with restriction of movement.

Urine was macroscopically blood stained and dipstick analysis showed 0.3 g/l proteinuria and 3+ hematuria. Fresh urine microscopy showed < 10 white cells/mm^3 and > 100 red cells/mm^3. The majority were dysmorphic suggesting glomerular origin. Hyaline casts and scanty fine granular casts were also present. There was no growth on urine cultures. Renal function tests were normal with a urea of 5.3 mmol/l and creatinine of 88 umol/l. Erythrocyte sedimentation rate was elevated at 30 mm/hour. Hemoglobin was 152 g/l, white cell count 8.4 × 10^9/l (with normal differential count) and platelets 189 × 10^9/l. Liver function tests were normal and an autoantibody screen was negative. RRV serology (shown in Table 1) confirmed acute RRV disease. Hepatitis B sAg, Hepatitis B core IgM, dengue serology and RPR were negative. Anti-Streptolysin O and Anti DNAse B titers remained within normal limits on serial testing. Complement component C3 and C4 concentrations were normal.

On the sixth day of his illness he again complained of severe bilateral loin pain radiating to the groins, requiring parenteral narcotic analgesia. Urine microscopy again showed hematuria and 24 hour collections revealed no stones. A renal ultrasound and intravenous pyelogram were both normal. The episode was attributed to clot colic.

During his admission both blood pressure and renal function tests remained normal. Proteinuria

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Table 1

Ross River virus serology.

Days after onset of illness	2	15	63	90
ELISA total antibody grade*	1	3	3	2
ELISA IgM titer +	1:400	1:400	1:100	1:100
ELISA IgA titer +	>1:400	>1:400	1:200	1:200
HI total immunoglobulin titer #	1:20	1:80	1:80	1:80
HI IgM #	positive	not tested	not tested	not tested

ELISA - enzyme linked immunosorbent assay
HI - hemagglutination inhibition

* ELISA Ig readings divided into five arbitrary grades (Tai *et al,* 1990). Grades 0 and 1 are considered negative; Grades 2, 3 and 4 are positive.

\+ titers $\geq$ 1:100 considered positive.

\# Hemagglutination inhibition assays performed by State Health Laboratory Services, Health Department of Western Australia.

disappeared by day seven and microscopic hematuria by day nine. Subsequent urine microscopies were normal. His rash had faded by the eighth day. Lethargy and polyarthralgia persisted for ten weeks, but eventually fully resolved.

The skin and joint manifestations seen in this case have been well documented in Ross River virus disease (Fraser, 1986). The presence of specific IgM and the fourfold rise in IgG confirmed the diagnosis of RRV disease in our case. It has recently been shown that IgA antibodies may be a better marker of acute RRV infection than IgM antibodies, being more short lived (Carter *et al,* 1987). We did not however document a more rapid fall in specific IgA in this case.

The glomerular hematuria with hyaline and granular casts occurring during the acute phase of the illness was suggestive but not conclusive of acute glomerulonephritis. A renal biopsy was not thought to be clinically justifiable. Biopsy proven glomerulonephritis in the acute phase of RRV disease has been documented only once (Fraser *et al,* 1988), when the only abnormalities were transient microscopic hematuria and proteinuria (peaking at 8 red cells/mm^3 and 0.9 g protein/day) with slight impairment of creatinine clearance. No casts were detected. RRV was also possibly implicated in eight cases of biopsy-proven segmental necrotising glomerulonephritis (Davies *et al,* 1982). As in our case, five of the patients in that series had hematuria and loin pain on presentation. Urine microscopy also revealed microscopic hematuria with granular and hyaline casts. However, the chronic renal disease seen in half of the patients in that series has not otherwise been observed with RRV, and serology was not adequate to establish a definite causal role for the virus.

Further clinical surveillance and serological surveys are necessary to determine the current distribution of RRV in the Asia/Pacific region [including possible spread west of Weber's line (Tesh *et al,* 1975)], the spectrum of disease and possible chronic sequelae. The possibility that RRV or other arboviruses may contribute to the significantly increased incidence of chronic renal disease seen in Aboriginal communities in tropical Australia (Pugsley, 1989) also needs consideration.

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