Swimming after meningitis

Claire Wilson MSc FRCS Veronica Kennedy FRCS Dafydd Stephens FRCP Jonathan Arthur MSc

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Vestibular impairments arising from meningitis can be hazardous in circumstances of impaired vision and proprioception, such as swimming.

CASE HISTORIES

Case 1
A woman of 63 had had bacterial meningitis in childhood, treated with intramuscular streptomycin. The sequelae included severe bilateral sensorineural hearing loss and poor balance, particularly when walking in the dark. Notably, she had been unable to learn to ride a bicycle. On two occasions, at ages 40 and 45 years, she had attempted to learn to swim, without success despite many lessons. At one point, when a frustrated swimming instructor had dragged her into the water to ‘prove she could swim’, she had become disoriented and unable to right herself in the water. Only during consultation to improve her hearing 18 years later did the reason for this become apparent. She proved to have bilateral vestibular hypofunction, and static posturography was grossly abnormal.

Case 2
Pneumococcal meningitis in a previously fit woman aged 30 resulted in weakness in her right leg, a dead right ear and a moderate to profound mixed hearing loss in her left ear, as well as impaired balance. She was warned of the possible risk of swimming and particularly advised never to swim unaccompanied. Subsequently, however, she found she was able to swim very well. 14 months later, while playing ball with her daughter in the shallow end of a swimming pool she jumped backwards, falling into the water. She immediately became disoriented and found she was unable to right herself, eventually coming to the surface. Vestibular testing demonstrated bilateral hypofunction, and static posturography was abnormal.

COMMENT
The maintenance of balance in man relies upon visual, vestibular and proprioceptive inputs which are integrated in the central nervous system with activity from other centres. With adequate visual and proprioceptive inputs, vestibular dysfunction can go unnoticed. However, in circumstances of reduced or conflicting inputs from the other two sensory modalities, the vestibular impairment can become evident with potentially devastating consequences. On this basis, swimming tests have been developed to evaluate the vestibular system in animal models. 1

Auditory and vestibular dysfunction secondary to meningitis has been well documented. 2,3 In most reported cases, vestibular impairment results from damage to the peripheral vestibular system. However, meningitis can also lead to central vestibular impairment. Streptomycin, which was used in case 1, is another well-known cause of vestibular disturbance. 4

Box 1 outlines the clinical features of vestibular impairment. Previous reports have called for vestibular testing on all children post-meningitis. 5,6 Current guidelines in the UK advise that all children should have a hearing test within four weeks of discharge, 7 but vestibular assessment is not routine. Survivors of meningitis (and, if children, their parents) need to know about the potential long-term dangers, particularly of swimming.

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Box 1 Features of vestibular dysfunction

- Delayed motor milestones in childhood
- Difficulty learning to ride a bicycle or to skate
- Impaired balance when visual and proprioceptive input reduced (e.g. swimming)
- Poor balance in the dark (e.g. in cinemas, theatres)
- Poor balance in circumstances of conflicting input (e.g. looking over a bridge, escalators)
- Poor balance when walking on uneven surfaces

Welsh Hearing Institute, University of Wales College of Medicine, Heath Park, Cardiff CF14 4XX, Wales, UK
Correspondence to: Dr C Wilson
E-mail: stephensd@cardiff.ac.uk
Spontaneous and permanent resolution of cystic adventitial disease of the popliteal artery

R Pursell MA MRCS  E P H Torrie FRCR 1
M Gibson FRCR 1  R B Galland MD FRCS

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In cystic adventitial disease, a rare cause of claudication, most patients undergo operative or radiological intervention. There is little evidence to support either approach.

CASE HISTORY
In 1991 a man aged 47 arrived at our casualty department with acute left calf pain. For the previous year he had been experiencing claudication in the left leg after walking about 500 m. Smoking was his only vascular risk factor. On examination he had a cold left foot and no pulses could be felt below the femoral artery on that side. All pulses were present in the right leg. Intravenous digital subtraction angiography showed external compression of the lumen of the left popliteal artery. The vessels in the right leg were normal. MRI (Figure 1) and CT imaging revealed a cystic swelling within the wall of the artery and cystic adventitial disease was diagnosed.

The next day, without treatment, the foot was warm and the leg was pain-free. At two weeks, claudication distance was nearly 1 km and pulses were normal in both legs. MRI (Figure 2) and CT scanning at five months, when he was still pain-free, showed spontaneous resolution of the cyst. A popliteal ultrasound scan at 10 years confirms the permanent resolution of the cyst and the patient remains symptom-free.

COMMENT
Adventitial cysts are synovial-like cysts in the adventitial layer of the artery wall. They most commonly affect the popliteal artery but have been reported also in the external iliac, brachial, radial and ulnar arteries. Occasionally they are found in association with saphenous veins in the ankle region. In all cases the diseased artery or vein overlies a joint.

The most common presentation is claudication secondary to popliteal artery stenosis or occlusion. The disease predominantly affects men in the fourth and fifth decades (a male to female ratio of 5 to 1). The aetiology is unclear and is reflected by the changing nomenclature—cystic adventitial degeneration, cystic mucoid degeneration, cystic myxomatous adventitial degeneration, subadventitial pseudocyst and cystic adventitial disease. According to the ganglion theory, adventitial cysts are formed and maintained by communication with a synovial space. The embryology theory proposes that mucin-secreting mesenchymal cells from the adjacent joint are included in the adventitia of the artery during development.

Treatment options are excision of the cyst and preservation of the artery, excision of the diseased artery with interposition grafting, CT or ultrasound guided percutaneous drainage or conservative management. Most experience is with the first two methods. In a review of 155 cases of cystic adventitial disease managed between 1954 and 1955, 3 69 were grafted and 68 treated by cyst evacuation and removal of the cyst wall. Both groups had an initial success rate of around 94% but little is known about the long-term outcomes of either. There are no controlled trial data or large single-centre series to show the superiority of any one technique. Long-term patency of vein or synthetic grafts used to bypass diseased artery has not been documented. A 10% recurrence rate has been suggested for cyst wall enucleation. There are four

Figure 1 T1 sagittal MRI, at presentation