

Small vessel disease of the subcortical white matter of the brain

WHAT IS SMALL VESSEL DISEASE?

Small, and often unrecognised, strokes involving the white matter of the frontal regions of the brain can produce a clinical syndrome of mild to moderate or severe cognitive impairment and recurrent falling due to gait and balance disturbances.

WHAT PROBLEMS DOES THE CONDITION CAUSE?

The gait disturbance associated with frontal deep white matter small vessel disease is quite characteristic. It involves short, shuffling steps on a widened base with preserved arm swing. (Normal arm swing is lost early in idiopathic Parkinson's disease and in drug-induced Parkinsonism). This gait disturbance is sometimes called frontal gait dyspraxia.

Normal walking is largely an automatic process and one can engage in other activities at the same time (e.g. conversation or admiring the scenery). With these small strokes the unconscious/automatic nature of walking is lost. The affected individual is able to compensate by conscious attention to the task.

Affected individuals often comment that walking has lost its enjoyment because so much conscious effort is required to avoid falling. If distracted, the patient's compensation strategy is degraded and falling is likely.

Patients with small vessel disease also often have abnormalities of balance and hence difficulty in maintaining upright posture. Normally, when we lose our balance, we react automatically to correct this by arm and leg movements so that we regain stability without falling. Patients with small vessel disease have very impaired "righting reflexes" so that they have difficulty avoiding falling if they are knocked off balance.

Some patients with small vessel disease have mainly gait disturbance with very little balance disturbance whilst others may have marked balance problems and very little gait disturbance.

Patients with small vessel disease may also have problems with memory and thinking. Again, this tends to present in a fairly characteristic way. Firstly, patients generally have difficulty accessing their memories ("It's on the tip of my tongue") rather than a complete loss of memory. When presented with the task of remembering 3 objects after some time the patient may not be able to spontaneously recall the objects. Given time or prompting with multiple choices the patient may then remember. Patients with extensive small vessel disease may be slowed in their thinking and responses (but give an accurate answer after a long delay). Patients may also have difficulty fully appreciating their overall situation (for example their risk of falling or the amount of help they require from friends and/or relatives). They may have difficulty with more complicated thinking tasks such as organising their household or finances.

WHAT CAUSES SMALL VESSEL DISEASE?

The risk factors for small vessel disease are ageing, smoking, hypertension, diabetes and high cholesterol. Controlling high blood pressure, cholesterol and diabetes tightly can reduce the risk of worsening problems. Even so called labile blood pressure is a significant risk factor for small vessel disease. A person with labile blood pressure may have a relatively normal blood pressure at times but very elevated pressure at other times. If possible blood pressure should be $^{130}/_{80}$ or less most of the time. Sometimes this will involve taking 2 or 3 different blood pressure lowering medicines as well as maintaining as healthy a life style as possible (exercising regularly, avoiding over weight, healthy diet with plenty of fresh fruit and vegetables).

Could it be anything else?

A similar clinical picture with shuffly gait, impaired balance reflexes and some memory and thinking problems can be seen in a condition called normal pressure hydrocephalus (which can sometimes be helped by surgery to drain off excessive cerebro-spinal fluid - shunt surgery). Less commonly a tumour in the frontal region of the brain can also cause these problems.

What can be done to help?

Patients with small vessel disease can often be helped by physiotherapy, especially if they have sufficiently good memory and understanding to be "coachable". People with these problems are often extremely fearful of falling. This may have lead to severe restriction in their activities and secondary weakness of important muscles through lack of exercise.

Generally confidence can be restored and postural righting reactions can be improved. The physiotherapist will work at training the patient to increase their stride length. In patients with poor memory or impaired understanding of their illness the role of physiotherapy may be more problematic. In this situation attempts will be made to reduce hazards predisposing to falls and injury in and around the home. Some people may agree to wearing hip protectors that reduce the risk of hip fracture by absorbing the force of a fall and diverting the force away from the hipbones.

Are there any reasons why physiotherapy won't be helpful for my relative?

Aside from memory problems there are some other factors that can stop a person from benefiting from a physiotherapy program. People with gait and balance problems associated with small vessel disease generally are able to reduce their risk of falling by taking great care and paying attention to their walking and to their environment. Many factors can prevent a person from attending carefully to the task of avoiding falling. These factors include depression, anxiety, some sedating drugs, pain or concerns about maintaining continence.

The doctor's role in assessing and helping a person with recurrent falling includes addressing these factors, which reduce a patient's ability to compensate for their balance and walking difficulties. The doctor will pay attention to reducing the risk factors causing the disorder, (see above). The doctor may also discuss investigation and treatment of osteoporosis and vitamin D deficiency (common in people who can't get out enough), which predisposes to bone fractures.

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