PERSPECTIVE


OTTAWA HOSPITAL

Silent, but preventable, perils

'Covert' strokes are a leading cause of dementia — and their incidence will rise in step with that of vascular risk factors, says **Antoine M. Hakim**.

"I can't really explain it, but I have not been right in the head for a few months. My mind is in a fog." That is how my 38-year-old patient with a history of high blood pressure and obesity described his symptoms. He had not experienced any of the symptoms of a 'mini-stroke', or transient ischaemic attack, which can result in temporary motor, sensory or speech deficits. Other than his high blood pressure and obesity, his physical and neurological examination showed nothing out of the ordinary. But something was clearly wrong: a standard test revealed a deficit in his cognitive function.

A magnetic resonance imaging (MRI) scan showed the probable cause: four 'hyperintensities' — bright signals that indicate damage — in the white matter, which coordinates communication between parts of the brain. Most neurologists would probably agree that, left untreated, this patient's mind would have continued to deteriorate, leading eventually to dementia. His cognitive difficulties were probably a result of this damage, yet he had few symptoms.

We are learning that these covert strokes are much more widespread than we thought, and that they are a major cause of dementia.

Most overt strokes are the result of a blockage in one of the arteries in the grey matter, which controls a lot of the brain's functions. But because the tissue is supplied by parallel arteries, blood can pass through the other vessels if one is blocked, thereby mitigating — although not eliminating — the impact. By contrast, the deeper insulated fibres in the white matter affected by a covert stroke are supplied by single, smaller vessels called arterioles. As a result, a blockage there results in tissue death and the loss of insulation. Although they are typically not noticed by the patient, the events do disrupt pathways that are essential for normal cognitive function. These strokes have been shown to result in cognitive deficits in rats[1], and to atrophy in the human hippocampus — a structure crucial for memory[2]. Although they have the same risk factors as overt strokes, the causes and effects are much more complex[3].

The most troubling aspect of silent strokes is how common they are. Anywhere from 8% to 28% of the population have had a covert stroke, and their incidence rises with age[4]. In 1998, roughly 9 million people in the United States had a covert stroke, compared with 770,000 who had an overt event[4]. The silent nature of these events, plus the fact that accurate diagnosis requires an MRI, makes it likely that small-vessel disease in the white matter is under-appreciated as a cause of dementia. In fact, cerebrovascular disease contributes to three-quarters of dementia cases in North America[5].

Several factors suggest that without firm action taken relatively early in life, an epidemic of dementia caused by vascular disease is likely. Dementia is a disease of ageing, and Statistics Canada, a government agency, estimates that by 2031 almost one-quarter of the country's population will be aged 65 years or older[6]. And there is a growing crisis in the prevalence of cardiovascular disease risk factors across North America — particularly in younger people — with high blood pressure, diabetes and obesity having risen dramatically over the past decades.

The brain is more sensitive than the heart to three factors: high blood pressure, obesity and a sedentary lifestyle[7]. The incidence of covert strokes is thought to increase as resting systolic blood pressure rises above 130 mmHg (ref. 8). Despite this, formal recommendations allow higher pressure in individuals who have no other risk factors, and many health-care providers are reluctant to treat high blood pressure aggressively, particularly in elderly people. These factors may be combining to increase the possibility of cognitive decline, and should induce us to reconsider both our blood-pressure targets and our management of vascular risk factors, not least because evidence suggests that reducing systolic blood pressure gradually to 130 mmHg is quite feasible[9].

WE HAVE SIGNIFICANT CONTROL OVER HOW WELL INDIVIDUALS AGE AND OVER THE PREVALENCE OF DEMENTIA.

If there is a silver lining in this story, it is the implication that we have significant control over how well individuals age and over the prevalence of dementia. But it will not be easy to do so. Small-vessel disease in the brain seems to result from prolonged exposure to risk factors, so preventing it will require early action. We must therefore urgently institute social measures that begin in schools to encourage and potentially reward healthy and active lifestyles, promoting the consumption of low-salt and low-sugar foods that are less processed, and stimulating the commitment and drive towards normal weights and blood pressures.

Such changes can have dramatic, positive results. By changing his diet from daily fast food to plant-based, Mediterranean-style meals and walking 45 minutes a day at a brisk pace, the patient described in the opening statement lost 18 kilograms and normalized both his blood pressure and cognitive function. The fog is lifting. ■

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