



STROKE ALERT

Know your first line of response.
It's a matter of life.

BY RICHARD
SUTHERLAND

Health-care professional Kathryn Herridge was accustomed to nursing stroke patients. But at age 39 she never imagined that she'd be joining them, or that her own denial that she was having a stroke would lead to delays that would place her beyond the reach of the best treatment. Yet that's exactly what happened over a 24-hour period last year.

"At work, in the afternoon," says Kathryn, "I developed the worst headache of my life." A severe or unusual headache is a major symptom of stroke. The window of opportunity to get the best treatment for stroke is three hours. Kathryn, who lives alone, did the worst thing she could have done. Instead of calling 911, she went home and fell asleep on the couch. ▶

At some time in the evening she staggered into bed, waking up with her alarm as usual in the morning. She got out of bed and felt dizzy, and fell down several times while trying to get ready for work. “Even then I was in a state of denial,” she says. When she didn’t show up for work, a colleague phoned and, hearing Kathryn slur her words, immediately called an ambulance.

Kathryn had suffered a stroke caused by a blood clot in her brain. But because about 16 hours had elapsed since the onset of symptoms, she was too late to receive clot-busting therapy, which could have lessened the damage to her brain.

She was lucky to have survived. But the left side of her body showed signs of paralysis and she had to undergo months of arduous rehab therapy. She was also left with some profound changes in her abilities. “I have a shorter attention span, a shorter memory and when I’m tired I sometimes have problems with my speech,” she says. More than a year later, she’s finally strong enough to be able to go back to work, but she will be on blood-thinning drugs for the rest of her life.

“Sometimes I ask myself, Why me?” says Kathryn. “But none of us is immortal, and I actually had significant risk factors. There was a family history of stroke on my mother’s side, I was overweight, I had high blood pressure, I was quite inactive, and I was on a birth control pill.”

BENEFITS OF EARLY DETECTION

Dr. Frank Silver, a neurologist and director of the stroke program at Toronto’s University Health Network, finds it heartbreaking when people having a stroke come in too late to receive the most effective treatment. There are drugs available today that can stop stroke in its tracks, but they must be delivered very early, ideally within three hours of the onset of stroke symptoms. After that it’s a matter of diminishing returns, which is why Silver wants all Canadians to be aware of the warning signs and symptoms of stroke and to call

STROKE FACTS

- **Stroke is the fourth leading cause of death in Canada.**
- **It is estimated that 4.1 per cent of Canadians over 65 years of age (approximately 300,000 individuals) currently live with the effects of stroke.**
- **Fewer than 50 per cent of stroke patients return to work, leaving families with caregiving responsibilities and the additional burden of lost income.**
- **Female deaths from stroke outnumber male deaths. In 2003, 8,951 Canadian women and 6,332 males died of stroke. This could be partly because women tend to have their strokes later in life, but additional reasons remain unclear – systematic, social and biological factors may be involved.**

emergency services as soon as they experience any of them (see “Stroke Warning Signs,” page 111). The introduction in 1996 of a clot-busting drug, tissue plasminogen activator (tPA), has transformed stroke treatment, says Silver. Where once there was despair, now there is hope. “In the pre-tPA days, effective stroke care was nonexistent. Stroke was an emergency, but one that we could do little about,” he says. With tPA, neurologists now have an effective treatment for the most common type of stroke. Ischemic strokes, caused by clots in the blood vessels in the brain, account for 80 per cent of all strokes. A naturally occurring clot-dissolving substance, tPA, can be administered intravenously to hasten the opening of the blood vessel that is blocked with the clot.

Silver still marvels at the effect of treatment with tPA. “With modern brain imaging, you can look at the area in the brain where the clot has formed and it’s like looking at a tree where the branches have been removed. Then you deliver the treatment and suddenly all the branches and leaves reappear,” he says. “And then, after that, to see a patient lift a previously paralyzed arm or begin to speak is very, very dramatic. Of course, it doesn’t work that well in every case, but there are some truly excellent results. And 30 per cent of the time patients improve who would not have improved without therapy.”

But tPA is not for every stroke patient. At least 20 per cent of strokes are hemorrhagic, caused by bleeding in the brain. For people with this type of stroke, tPA treatment could be a death sentence because its clot-busting effect would increase the severity of the bleeding. Effective treatment for these patients may involve using surgery to clip off a leaky blood vessel or endovascular treatment (advancing tubes and devices through the body inside the blood vessels) to obliterate the bleeding site with detachable coils. Therefore, before any treatment can be administered, a CT (brain) scan is vital to determine the type of stroke. And all of this must be done within the first few hours of the stroke.

But in difficulty there is sometimes opportunity. In 1997 the Heart and Stroke Foundation of Ontario and the province’s neurological community sat down to plan a coordinated stroke strategy.

“In partnership with the provincial government, we eventually developed a system of stroke-care delivery across the province, including regional stroke-care centres,” says Bev Powell-Linden, the manager of stroke-care delivery for the Heart and Stroke Foundation of Ontario. “Neurologists, neurosurgeons and many other stroke-care providers work as a team at these centres to provide the best possible care to patients and their ▶

STROKE: WARNING SIGNS FOR WOMEN AND MEN

Headache: A sudden severe and unusual headache can be a sign of an ongoing stroke or a type of mini-stroke – a transient ischemic attack (TIA). People who have a TIA are at high risk of developing a full-blown stroke.

Weakness: Sudden loss of strength or sudden numbness in the face, arm or leg, even if temporary.

Trouble speaking: Sudden difficulty speaking or understanding, or sudden confusion, even if temporary.

Vision problems: Blurring, even if temporary.

Dizziness: Sudden loss of balance, especially with any of the above signs. If you experience any of these symptoms, call 911 or your local emergency number immediately. (From the Heart and Stroke Foundation of Canada, www.heartandstroke.ca)

PREVENTING A STROKE

Family history, age, gender and ethnicity are all major risk factors for stroke and, unfortunately, there's not a lot you can do to modify these risks. But there are some risk factors you can modify. These include: obesity, poor diet, diabetes, smoking, high blood pressure and high cholesterol levels. Managing these conditions in partnership with your family doctor will significantly reduce your risk of stroke.

To help remove you from the stroke fast track, the Heart and Stroke Foundation is offering a unique test.

The Heart and Stroke Risk Assessment is a personalized risk profile and a customized action plan for healthy living that includes tips, tools, recipes and much more to help you reduce your risk. To take this test, visit www.heartandstroke.ca/riskassessment.

families. All paramedics and emergency personnel are trained to identify patients who are having a stroke and get them to the nearest stroke centre as fast as possible.”

After five years of innovation, evaluation and adaptation, Ontario has designated 11 hospitals as Regional Stroke Centres, 18 hospitals as District Stroke Centres and 24 clinics as Stroke Secondary Prevention Clinics. There is nothing quite like it in the world, says Silver. With regional adjustments, the Ontario model is providing the blueprint for a Canada-wide stroke-care strategy led by the Canadian Stroke Network.

“We are living in exciting times,” says Dr. Michael Hill, the director of the Calgary stroke unit. “Over the next five years we are going to see big advances in the way Canadians are treated and the type of quality care they receive.”

Hill outlines the big picture province by province:

British Columbia: the provincial government has invested \$500,000 to begin moving its “stroke charter” from planning to action.

Alberta: the province has committed \$20 million over two years to the Alberta Stroke Council.

Saskatchewan: three health regions have committed to enhance stroke services, and a provincial committee has developed a plan for moving ahead.

Manitoba: Brandon and Winnipeg are leading the way in provincial initiatives. Telemedicine is being used to bring the message to remote communities and First Nations peoples.

Quebec: an integrated stroke strategy will be unveiled later this year.

New Brunswick: a provincial stroke network has been established

● It has been estimated that of those individuals who have experienced a stroke:

➤ **20%** die within three months

➤ **29%** die within a year

➤ **25%** become dependent

➤ **46%** remain independent

along with development of an awareness package for family physicians.

Nova Scotia: the government is investing \$7 million over four years for an integrated stroke strategy and \$3 million per year thereafter.

Prince Edward Island: an integrated stroke strategy was formally launched in August 2006.

Newfoundland and Labrador: a provincial stroke strategy is in the planning stages.

While the provinces establish their stroke programs, two vital pieces of information will protect Canadians right now.

● Know the signs and symptoms of stroke and make sure your whole family knows them.

● Know your blood pressure. Uncontrolled high blood pressure is the leading cause of stroke.

PARAMEDICS RACE AGAINST TIME

At the grassroots level, the new stroke care has placed paramedics on the front line. “And that’s where we want to be,” says Jodi Dockman, a supervisor of the paramedical services in Peterborough County, Ont., an area of 4,000 square kilometres with a stroke centre at Peterborough ▶

Regional Health Centre. For some stroke patients, that can mean as much as two hours of travel from the onset of symptoms to arrival at the emergency department. “Then there’s an hour at the hospital to process the patient and provide the brain scan, so we are racing against the clock,” says Dockman. “All paramedics are now familiar with the signs and symptoms of stroke and can differentiate between stroke and stroke mimics such as hypoglycemia, substance abuse or psychiatric conditions.” Whenever possible, adds Dockman, a family member travels with the patient to provide informed consent should a patient lose consciousness. A physician can provide consent to administer tPA treatment if a family member is not available, but it is more complicated legally.

HOW TO REPAIR A BRAIN

New insights into the capacity of the stroke-damaged brain to repair itself are leading to innovative treatments. After a stroke, the brain is sometimes able to switch functions from damaged to undamaged areas. Also, areas of the brain that appear to be dead may be revivable. The key to making this happen is vigorous rehabilitation. It’s a use-it-or-lose-it situation, say rehab researchers.

Milos Popovic designs electrical devices that help replace lost function in limbs so patients can perform a greater range of movement; his research is part of an exciting new discipline known as neuroprosthetic systems. In some cases these devices may even help people regain some permanent normal function by “retraining” the nervous system, says Popovic, who works out of the Toronto Rehabilitation Institute. “Anything that we can do to give stroke survivors a degree of control over daily living would be a priceless gift,” he says.

Brain “repair” and rehabilitation are crucial to integrating survivors back into the workforce and helping them

● **Of those individuals who survive stroke:**

➤ **40%** recover with moderate to severe neurological impairment

➤ **25%** recover with minor impairment

➤ **10%** achieve complete recovery

lead productive lives, says Dr. Sandra Black, site director of the Heart and Stroke Foundation Centre for Stroke Recovery at Sunnybrook Health Sciences Centre in Toronto. At both Sunnybrook’s Centre for Stroke Recovery and the sister site at Baycrest Hospital in Toronto, patients can use virtual reality data gloves to pick up objects on a computer screen, which may help increase the range of motion in a stroke-damaged hand. At the Baycrest site, specially designed computer games and a virtual reality maze are currently being developed to help patients regain hand-eye coordination and navigation skills.

Helping stroke patients help themselves by maximizing their physical fitness is another vital part of the new frontier of stroke care and rehabilitation. Janice Eng, a professor of rehabilitation sciences at the G.F. Strong Centre in Vancouver, hands out exercise “prescriptions” to stroke patients. Treatments targeted at improving walking and balance and building strength in damaged muscle and tissue are now commonplace, thanks in large part to her efforts. “Also, raising stroke patients’ fitness through exercise significantly reduces the risk of falls, fracture, heart disease and the occurrence of a second stroke,” says Eng, whose insights are now being applied across Canada.

Most people who survive a stroke will also experience difficulty understanding or speaking (called aphasia). Speech therapy can help ▶

recover use of language or develop new ways of communicating, but it can take time, says Holly Sloan, a speech-language pathologist at the Trillium Health Centre in Mississauga, Ont. Sloan says that while some people recover their speech quickly, the amount and timing of recovery is different for everyone.

For more information about stroke rehabilitation, visit these sites.

- www.strokesurvivors.ca
- www.heartandstroke.ca
- www.medicine.mcgill.ca/strokengine/index-en.html
- www.medicine.mcgill.ca/strokengine/module_aphasia_family%2den.html ●

STROKE: THE PSYCHOLOGICAL AFTERMATH

Going through stroke recovery can be tough physically, but physicians are only now beginning to understand the mental costs. Everyone thought Candace Allman, 64, had made a magnificent recovery from her stroke. So why was she feeling so bad about herself? Candace had a stroke in March 2005. The blood clot in her brain was successfully removed and after about six weeks of rehabilitation the successful businesswoman was back in the workplace.

But then she began fighting a losing battle against waves of depression and anxiety. "I started imagining I had every disease going," says Candace. "If my blood sugar was up a bit, I would worry about diabetes. I was tense and was experiencing a great deal of anxiety relating to work and my lifestyle. And I kept having these awful moods of despair and anxiety." When her

husband became concerned that she might be considering suicide, he took her to the emergency department at Sunnybrook Health Sciences Centre in Toronto.

Candace was diagnosed with severe depression and anxiety. "I was told that having the clot on my brain had altered my brain chemistry," she explains. She spent eight weeks in the psychiatric unit at Sunnybrook, where she was treated with antidepressant drugs as well as electroconvulsive therapy.

"I have been fine ever since, although I must continue – for now – with the antidepressants," she says.

Dr. Kenneth Shulman, a professor of psychiatry at the University of Toronto, warns that stroke can be a risk factor for depression. Some estimates place the risk

of developing depression as high as 40 per cent in the first year after a stroke. "Some people might say, 'Why shouldn't someone be depressed? After all, he's just had a stroke,'" says Shulman. "But it goes beyond that. There seems to be a specific biological effect of the stroke that causes depression. Evidence suggests that strokes affecting the left side of the brain and the frontal lobe are more likely to result in depression." Shulman also says that a family history or personal history of mood disorders or depression can make post-stroke depression more likely. "On the positive side, depression can be effectively treated," says Shulman. "Know the signs and symptoms of depression and let your family doctor or other health-care professional know what you are going through. You don't have to put up with this!"