

Stroke units in Canada

Michael D. Hill

β See related article page 655

Stroke units have come of age. The MacLachlan Stroke Unit in Toronto, active from the 1970s until recently, was the first acute intensive care type of stroke unit in Canada.^{1,2} Extensively studied in Europe, stroke units have long been known to be effective in reducing morbidity and mortality, increasing the proportion of patients returning home, reducing length of stay, improving quality of life for stroke survivors and probably reducing overall costs of stroke care.³ These positive results from stroke unit care are shown during the acute stroke illness and appear to continue for at least 10 years.⁴⁻⁶

The magnitude of benefit is clinically important, with an odds of death and dependency of 0.71 (95% confidence interval [CI] 0.61–0.84) and an odds of death or needing institutional care of 0.75 (95% CI 0.65–0.87) in favour of the stroke unit. The estimated number needed to treat (NNT) to prevent 1 death or dependent outcome is 16 (estimated range 10–25).⁵ Although thrombolytic therapy for stroke within 3 hours after symptom onset has an absolute risk reduction of 12% (95% CI 7.5%–18.4%) (NNT = 8), it applies to a minority of patients with ischemic stroke (5%–10% in active Canadian centres), whereas stroke unit care appears to benefit the vast majority of patients with an acute stroke. Despite the clear benefits to patient outcomes, stroke unit care has been slow to be adopted in Canada and the United States.⁷

But what exactly is a stroke unit? Broadly, it provides multidisciplinary specialized care for patients who have had an acute stroke. In the best units, the team consists of nurses, pharmacists, social workers, medical staff, and occupational, physical and speech therapists. Although most stroke units are located in a special unit in a defined location, some hospitals use roving stroke specialist teams. The care provided by these teams results in better outcomes than care given on general medical wards, but stroke unit care is superior to it.⁸ Stroke units can vary from acute interventional units (where patients stay less than a week), to rehabilitative units (where patients are admitted 1 to 2 weeks after symptom onset for rehabilitation), to integrated stroke units (where care is combined from the acute through the rehabilitation stages). All approaches appear to benefit stroke victims.

Stephen J. Phillips and colleagues report in this issue on their experience in building and running an integrated stroke unit in Halifax (see page 655).⁹ Patients are located in one geographic location, they are cared for by a multidisciplinary

team from acute care through rehabilitation and discharge, and the quality-assurance loop is closed with regular team meetings, regular reviews of morbidity and mortality and an annual review of data collected in their stroke registry. Although most patients in Halifax spend their entire stay in the stroke unit, about 25% are discharged to a long-term rehabilitation unit (Stephen J. Phillips: personal communication, 2002).

The authors' evaluation of the Halifax program by comparing outcomes before and after the stroke unit existed incorporates bias owing to local and global changes in stroke care over time. However, in the real world, this practical evaluation provides common sense evidence that the program is working and is effective. As would be expected from previous research cited above, the results reported by Phillips and colleagues show a reduction in length of stay, a measurable improvement in function while in the stroke unit and positive feedback from patients indicating satisfaction with the delivery of care.

However, we must not forget that thrombolytic therapy for acute stroke was introduced during this evaluation period. The Halifax stroke team provided thrombolysis to 7.6% of stroke patients (21.8% of those who arrived within 3 hours after symptom onset, the window for thrombolysis). Could their good results simply be due to the use of this new and proven treatment for some types of patients with acute stroke? The exclusion of patients who received thrombolytic therapy did not change their findings of reduced length of stay and reduced incidence of deep venous thrombosis (Stephen J. Phillips: personal communication, 2002).

Because the acute provision of thrombolysis requires tremendous organization and rapidly available expertise (in minutes), the development of a stroke team to provide that expertise is essential. The overall organization of stroke care centred on the stroke unit facilitates this development. Per capita, the Halifax team led all Canadian sites in the provision of thrombolysis to stroke patients from 1999 through June 2001.¹⁰

Stroke care now requires rapid assessment and triage in the acute phase to implement thrombolysis. Timing is critical — every 10 minutes' delay in treatment substantially reduces the chance of a good outcome.¹¹ Acute stroke treatment in Canada is currently provided in large part by neurologists, but it could be administered equally as well by trained emergency physicians and internists. However, implementing a stroke thrombolysis program makes little

sense without concurrently developing a complementary stroke unit.

What does it take to organize a stroke unit? First, it requires a champion committed to team-based care and a geographic locale to set up shop. Team building, data collection and closure of the quality-assurance loop with that data must be integrated into usual care. Such a champion needs training in stroke medicine, an issue that is now being tackled by the Canadian Stroke Network (a Networks of Centres of Excellence program) and by funding agencies such as the Heart and Stroke Foundation. Second, stroke unit organization requires the administrative understanding that, under most circumstances, it is both a revenue-neutral re-engineering of existing resources and ultimately cheaper than the current scattered way we look after stroke patients.

Although the stroke unit is a simple concept, an informal poll of stroke physicians across Canada reveals that stroke units are not evident in more than a handful of centres. Given the current rhetoric about cost overruns and the potential for savings, it is remarkable and somewhat ironic that stroke units are not ubiquitous. The Halifax Acute Stroke Unit is unparalleled in Canada as a shining example of the integrated stroke unit. Without exception, every major hospital in Canada ought to have a stroke unit modelled after the evidence and adjusted to local circumstances. The health care system needs it, and stroke patients deserve it. So, let's get on with it.

Dr. Hill is Assistant Professor, Calgary Stroke Program, Department of Clinical Neurosciences, University of Calgary, Calgary, Alta.

Competing interests: None declared.

Acknowledgement: Dr. Hill's work is supported in part by grants from the Heart and Stroke Foundation of Alberta/NWT/NU and the Canadian Institutes of Health Research.

References

1. Norris JW, Hachinski VC. Intensive care management of stroke patients. *Stroke* 1976;7:573-7.
2. Norris JW, Hachinski V. Approaches to the problem. In: Hachinski V, Norris JW, editors. *The acute stroke*. Toronto: FA Davis Company; 1985. p. 13-26.
3. Indredavik B, Bakke F, Slørdahl SA, Rokseth R, Håheim LL. Stroke unit treatment improves long-term quality of life: a randomized controlled trial. *Stroke* 1998;29:895-9.
4. Indredavik B, Bakke F, Slørdahl SA, Rokseth R, Håheim LL. Stroke unit treatment. 10-year follow-up. *Stroke* 1999;30:1524-7.
5. Stroke Unit Trialists' Collaboration. Collaborative systematic review of the randomised trials of organised inpatient (stroke unit) care after stroke. *BMJ* 1997;314:1151-9.
6. Stroke Unit Trialists' Collaboration. How do stroke units improve patient outcomes? A collaborative systematic review of the randomized trials. *Stroke* 1997;28:2139-44.
7. Barnett HJ, Buchan AM. The imperative to develop dedicated stroke centers. *JAMA* 2000;283:3125-6.
8. Evans A, Harraf F, Donaldson N, Kalra L. Randomized controlled study of stroke unit care versus stroke team care in different stroke subtypes. *Stroke* 2002;33:449-55.
9. Phillips SJ, Eskes GA, Gubitz GJ, on behalf of the Queen Elizabeth II Health Sciences Centre Acute Stroke Team. Description and evaluation of an acute stroke unit. *CMAJ* 2002;167(6):655-60.
10. Hill MD, Buchan AM. Methodology for the Canadian Activase for Stroke Effectiveness Study (CASES). CASES Investigators. *Can J Neurol Sci* 2001;28:232-8.
11. Marler JR, Tilley BC, Lu M, Brott TG, Lyden PC, Grotta JC, et al. Early stroke treatment associated with better outcome: the NINDS rt-PA stroke study. *Neurology* 2000;55:1649-55.

Correspondence to: Dr. Michael D. Hill, Department of Clinical Neurosciences, University of Calgary, Rm. 1242A, Foothills Hospital, 1403-29 St. NW, Calgary AB T2N 2T9; tel 403 944-8065; fax 403 283-2270; michael.hill@calgaryhealthregion.ca

CMAJ Essay Prize - Deadline: Dec. 15, 2002

CMAJ is offering a single open-category prize of \$1000 for the best piece of writing submitted to the 2002 CMAJ Essay Prize contest. We welcome entries from physicians, students, residents and nonphysicians. We are looking for reflective essays of up to 2000 words on topics of interest to a general medical readership.

The winner will be selected by a committee appointed from CMAJ's Editorial Board. The judges will make their decision on the basis of originality of thought and quality of writing. The winning manuscript must be suitable for publication in CMAJ. All papers submitted will be considered for publication. The journal reserves the right not to award a prize. Prospective entrants are encouraged to read the description of the selection of winners for the 2000 Essay Prize in our June 26, 2001, issue (available at www.cma.ca/cgi/content/full/164/13/1859).

Authors should submit their papers with a cover letter stating that they would like their manuscript to be considered for the 2002 CMAJ Essay Prize. We welcome submissions by mail (CMAJ, 1867 Alta Vista Drive, Ottawa ON K1G 3Y6), fax (613 565-5471) or email (pubs@cma.ca) until the deadline of Dec. 15, 2002.

