



Clinical Issues in Hypertension

Canadian Coalition for High Blood Pressure Prevention and Control

Coalition Canadienne pour la Prévention et le Contrôle de l'Hypertension Artérielle

Primary Care: Management of Stroke

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Despite substantial advances in diagnosis, treatment and prevention, stroke continues to have a major effect on the health and well-being of the public.¹ Stroke remains the third most common cause of death in Canada.² Of those who survive, many are unable to completely regain lost function, which reduces their quality of life and increases the burden on the health-care system, the social services system and their families. Stroke costs Canadians billions of dollars each year.³ From 1940 to 1980, the incidence of stroke steadily declined, but, unfortunately, this decline levelled off in recent years.⁴ Stroke, a common and very neglected problem, requires urgent attention. With an aging population, it is very likely we may begin to see an increase in the incidence of this disease in the coming years.

A systems approach to the management of stroke recognizes the impact that each compo-

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ment of the system has on the other parts.⁵ The stroke system requires the following:

- Enhancing prevention (lifestyles, secondary and tertiary);
- Rapid recognition of the onset of signs and symptoms;
- Rapid activation of the emergency medical services (EMS) system;
- Transportation and pre-hospital management;
- Hospital care (emergency and acute);
- Rehabilitation (hospital and community); and
- Linking these back into prevention.⁵

Early recognition and prompt response to a stroke by the public, as well as health-care practitioners, will decrease morbidity and mortality due to stroke.⁶

Prevention

There is a common misperception that nothing can be done about stroke, but it can be prevented with the modification of risk factors and recognition of the warning signs of impending stroke.⁷ Over the last five decades, significant understanding of the etiology of stroke has led to the identification of risk factors. Because of the high cost of stroke, effective management and prevention therapies are highly cost-effective.¹ It appears the greatest potential gains in reducing stroke will come from the prevention and control of high blood pressure (BP).¹ Three elements critical to the implementation of successful stroke prevention are the following:

- Enhancing personal health practices;
- Using policy and legislation to create supportive environments; and
- Making changes to the health-care system to promote preventive strategies at both population and clinically based levels.⁷

Primary-care providers have always intuitively understood the value of prevention.



The most promising role for prevention in current medical practice may lie in changing the personal health behaviours of patients long before clinical disease develops.

Faced daily with the difficult and often unsuccessful task of treating advanced stages of disease, primary-care providers have often looked for opportunities for early intervention in the course of disease, or even before the disease develops.⁷

The most promising role for prevention in current medical practice may lie in changing the personal health behaviours of patients long before clinical disease develops. Barriers to the enhancement of prevention within primary-care lie with inadequate reimbursement for pre-



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Table 1

A Comprehensive Approach to the Management of Stroke: A Checklist

Review of Risk Factors for Stroke

- Hypertension
- Atrial fibrillation
- Carotid stenosis
- Diabetes
- Diet (cholesterol)
- Lack of exercise/Physical activity
- Hyperthermia or an elevated temperature
- Smoking
- Transient ischemic attack
- Previous stroke

Patient Assessment

- History
- Physical examination
- Rule out atrial fibrillation
- Primary prevention
- Review the understanding of risk factors, signs and symptoms and appropriate actions with patient

Lifestyle and Risk Factor Management Interventions

- Hypertension — treated and controlled
- Atrial fibrillation — treated and controlled
- Becoming smoke-free — facilitated and supported
- Exercise — increased physical activity encouraged
- Hyperlipidemia — treated and controlled
- Transient ischemic attacks — treated and controlled
- Previous stroke — treated and controlled

Consider Referral to a Neurologist

Surgical Interventions Considered for Select Individuals

- Endarterectomy
- Stent placement

Adapted from: Broderick JP, Phillips SJ, Whisnant JP, et al: Incidence rates of stroke in the eighties: the end of the decline in stroke? *Stroke* 1989;20(5):577-82.

ventive services, fragmentation of health-care delivery, and insufficient time with individuals to deliver the range of preventive services that are recommended.⁶

The prevention of stroke is an essential part of the overall Canadian strategy to respond to this important health issue.⁵ Some preventive strategies (*i.e.*, the promotion of healthy behaviours) will be directed at the population as a whole.⁵ Other strategies will be directed at various subgroups in the population who have specific risk factors.^{5,8}

Research has identified several factors associated with an increased risk of stroke.⁸ As mentioned earlier, high BP is the most critical risk factor for stroke, and the risk of stroke rises directly with both systolic and diastolic BP.^{1,8} Both active and passive smoking have been associated with an increased risk of hemorrhagic and ischemic stroke.^{1,8} The effects of smoking, however, can be reduced such that the risk of stroke approaches normal levels after a person is smoke-free for five years.⁸

The following conditions predispose an individual to stroke:

- Chronic atrial fibrillation;
- Diabetes;
- Carotid stenosis;



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Temperature is now deemed a significant, independent risk factor for stroke, as well as a contributing risk factor to the other risk factors for stroke (*i.e.*, hypertension, cigarette smoking, atrial fibrillation, diabetes, TIAs).

- Previous transient ischemic attack (TIA); and
- Previous stroke.

In addition, temperature is an important variable in determining the amount of neural damage resulting from a stroke.⁹ Clinically, temperature is now deemed a significant, independent risk factor for stroke, as well as a contributing risk factor to the other risk factors for stroke (*i.e.*, hypertension, cigarette smoking, atrial fibrillation, diabetes, TIAs). Therapeutically, the implementation of mild hypothermia (34 C to 36 C) to stroke and head trauma patients is being advocated as beneficial.⁹

The checklist prepared for patient management of ischemic stroke by J. Weinberger was modified as a “reminder” for primary-care providers of the considerations that need to be

taken into account to optimize preventive practice (Table 1).⁷ This reduces the risk of having the first stroke or recurrence of stroke.

Management

A key aspect in facilitating successful outcomes following a stroke is provision of therapies, which minimize neural damage. Early management of stroke depends strongly on recognition of the event by the individual, family members, or bystanders.¹⁰ The American Heart Association algorithm for suspected stroke provides a comprehensive approach to the management of stroke, starting with the community.¹⁰

In order to achieve standardized care for the treatment of stroke, a stroke-care system will need to be established so that patients, no matter where they live, can:

- Be seen quickly;
- Transported to the nearest facility with a computed tomography (CT) scanner; and
- Upon completion of the scan, can receive urgent consideration for thrombolytic therapy and admission to a stroke unit.⁵

In pre-hospital and emergency care, individuals presenting with the symptomatology of a suspected stroke must receive urgent medical attention. Individuals who present with an acute stroke are very unstable during the initial 24 to 72 hours. A number of potential complications may occur within hours of the onset of symptoms and may adversely effect prognosis and create delays in discharge from hospital.



The eventual size of cerebral infarction and the extent of recovery from stroke may depend on how these issues are managed in the early hours after the acute stroke. The most obvious means to monitor these potentially complicating factors is through the following:

- Routine measurement of temperature; BP, pulse rate and respiration;
- Checking blood sugar;
- Obtaining a 12-lead electrocardiogram;
- Facilitating continuous monitoring of cardiac rhythm;
- Determining the level of consciousness; and
- Determining the level of stroke severity in individuals presenting with a suspected stroke.¹⁰

After the onset of an acute stroke, patients are medically unstable. Several aspects of this instability can result in complications and potentially increase neural destruction. Most patients experience a transient increase in BP in the acute phase of stroke. Fever and/or hyperglycemia may also be present, which adversely affects prognosis. If these parameters are not handled appropriately, stroke prognosis may be adversely affected.

With the publishing of the landmark article, in December of 1995, entitled, "Tissue Plasminogen Activator For Acute Ischemic Stroke," disease management of stroke was no longer a dream.^{1,6} This article demonstrated that when used to treat patients presenting with an ischemic stroke, recombinant tissue plasminogen activator (rtPA) improved outcomes within three hours, raising the level of awareness regarding stroke. Therefore, it was felt it would only be a matter of time before rtPA was approved for the indication of stroke by the Food and Drug Administration (FDA) in the U.S. In June of 1996, the FDA approved the indication of stroke for the use of rtPA. In

March of 1999 rtPA was approved for use in Canada by the Health Protection Branch, Health Canada, with some riders. As a result, carefully selected patients with acute ischemic stroke have the potential to receive fibrinolytic therapy.¹⁰ Patients, however, must have no contraindications to rtPA and the drug must be administered within three hours of the onset of stroke symptoms. The contraindications, as stated in the Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care, are:¹⁰

- Evidence of intracranial hemorrhage on pre-treatment evaluation;
- Suspicion of subarachnoid hemorrhage on pre-treatment evaluation;
- Recent (within three months) intracranial or intraspinal surgery, serious head trauma, or previous stroke;
- History of intracranial hemorrhage;
- Uncontrolled hypertension at time of treatment;
- Seizure at stroke;
- Active internal bleeding;
- Intracranial neoplasm;
- Arteriovenous malformation;
- Aneurysm; and
- Known bleeding diathesis, including, but not limited to, the following:

- Current use of oral anticoagulants (*i.e.*, warfarin sodium), an international normalized ratio of > 1.7, or a prothrombin time of > 15 seconds;

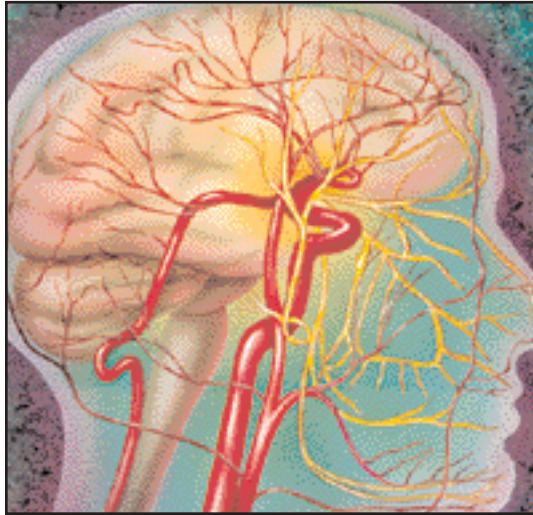
- Administration of heparin within 48 hours preceding the onset of stroke and an elevated activated partial thromboplastin time at presentation; and

- A platelet count of < 100,000/mm³.

Improved survival and better functional prognosis has been documented as a result of care being delivered in acute stroke units



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Individuals who suffer an acute stroke or a TIA have a higher risk of stroke recurrence.

where, in all likelihood, a comprehensive approach ensures all appropriate investigations are done, individuals are evaluated by various members of the interdisciplinary team (physical therapy, occupational therapy, speech language pathology, rehabilitation, *etc*) and proper discharge plans are initiated on the first day following the event.⁵

Individuals who suffer an acute stroke or a TIA have a higher risk of stroke recurrence. A number of conditions, including the presence of stroke risk factors, the degree of carotid stenosis and the presence of cardiac disease, may influence the risk of subsequent stroke. With proper attention to risk factors, medical management and surgical management of the underlying conditions leading to the acute event, the risk of a stroke can be decreased. The use of tissue plasminogen activator (t-PA) has been shown to improve the long-term outcome

and, in some cases, completely reverses the effects of the stroke.⁵

Conclusions

Once a stroke occurs, a person must receive care from a well-qualified team within the first three hours to minimize morbidity and risk of death. The response to a stroke is usually initiated by the individual, family members, friends, or bystanders of the person affected. It is critical that everyone is able to recognize the signs and symptoms of a stroke and what to do if the signs and symptoms occur. Public and professional education will be critical in addressing the gap that exists between recognizing the signs and symptoms of a stroke and, subsequently, taking appropriate actions, whether that be in the community or within the health-care system. 

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