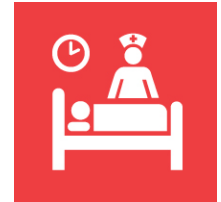




ACUTE STROKE UNIT ORIENTATION

2023

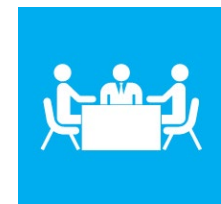
MODULE 8: MONITORING VASCULAR RISK FACTORS AND SECONDARY STROKE PREVENTION



Learning Objectives

Upon completion of this module, nurses will be able to:

- Identify key aspects of primary and secondary stroke prevention
- Explain the role of the secondary prevention clinic
- Be aware of the signs of stroke and outline common stroke mimics
- Understand transient ischemic attack
- Explain modifiable and non-modifiable risk factors
- Identify best practices for carotid stenosis interventions
- Identify commonly prescribed medications for stroke and stroke prevention
- Describe the important aspects of hypertension and hyperglycemia monitoring
- Be aware of the risk for recurrent stroke
- Explain cardiac compromise



The content in this chapter has been adapted from the *2017 Canadian Stroke Best Practice Recommendations: Secondary Prevention of Stroke* [Secondary Prevention of Stroke](#)

8.1 Stroke Prevention

Primary stroke prevention

Primary stroke prevention encompasses both a population based and/ or individual based approach to disease prevention. The aim is to prevent the occurrence of the disorder by targeting otherwise healthy individuals. It is typically implemented in the primary care setting with health care providers who are skilled at discussing heart conditions, stroke and vascular cognitive impairment and reducing risk. Primary prevention areas of focus include lifestyle (diet, physical activity, excessive alcohol and tobacco use, stress reduction) along with screening and management of medical risk factors such as hypertension, dyslipidemia, diabetes, and atrial fibrillation. At a population-based level, primary prevention efforts by health-related organizations such as, Heart and Stroke, Thrombosis Canada, Hypertension Canada, Diabetes Canada, Health Canada tend to focus on policy, regulations, and public awareness campaigns.

Secondary stroke prevention

Secondary stroke prevention is an individually-based clinical approach to reduce the risk of recurrent vascular events, in an individual who:

- (I) is at high risk of stroke due to underlying medical conditions or risk factors (Coutts & Wein, 2014)
- (II) has already experienced a stroke or transient ischemic attack (TIA), angina, myocardial infarction, heart failure, heart rhythm abnormalities, structural heart disease, vascular cognitive impairment or peripheral vascular disease.

Why Secondary stroke prevention?

- Risk of stroke recurrence is as high as 25% in first two years or as high as 15 times greater than for general population over the first year;
- Risk of recurrent stroke after TIA is reported at 4.7% within 90 days (Shahjouei et al, 2020)- “this risk is front loaded with 3.8% of recurrent strokes occurring within the first two days following initial symptom onset” (pg 22 CSBPR)
- Up to 40 % of survivors of a stroke or TIA will have a stroke within 5 years; another stroke can potentially reverse the benefits of stroke rehabilitation (Teasell & Madady, 2014)
- Timely initiation of secondary prevention medical therapy and carotid endarterectomy has been shown to significantly reduce the risk of major stroke after an initial TIA or non-disabling stroke.

Role of Secondary Stroke Prevention: Services and Clinics

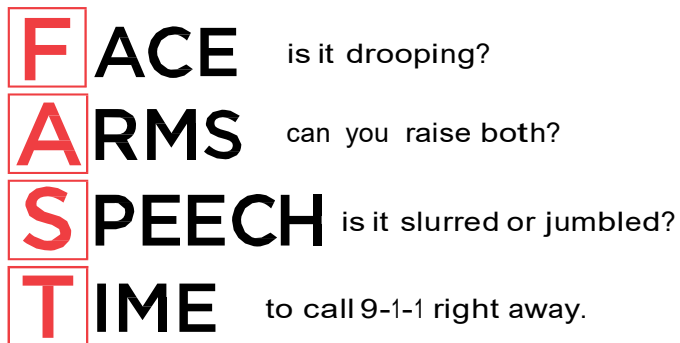
Secondary Stroke Prevention Clinics and services:

- Provide early access to specialized stroke prevention services (assessment and diagnostics) is fundamental to stroke prevention.
- Deliver an integrated comprehensive approach to primary and secondary stroke prevention
- Comprised of interdisciplinary team of stroke experts that provide specialized assessment and treatment to ensure timely access to diagnostic testing, interventions, patient/family education, follow up with primary care and community services (Gladstone et al, 2020).

8.2 Stroke Recognition

The FAST campaign initiated by the Heart and Stroke Foundation (2014) was designed to educate the public about the signs and symptoms of Stroke.

LEARN THE SIGNS OF STROKE



ACT **F A S T**
BECAUSE THE QUICKER YOU ACT, THE MORE OF THE
PERSON YOU SAVE.

© Heart and Stroke Foundation of Canada, 2014

Health Care providers need to learn and recognize the signs and symptoms of stroke in their patients, in order to, improve emergency response time in the rehabilitation setting. It is important to know what immediate steps should be taken in your practice setting when new onset stroke signs and symptoms are identified.

As per the RNAO Best Practice Guidelines program (2011, p6), nurses in all practice settings should recognize the **new onset of the signs and symptoms of stroke as a medical emergency**, in order to, expediate access to time dependent stroke therapy, because “time is brain”.

Weakness- development of new numbness or weakness in the face, arm or leg. The nurse can assess the patient by having them squeeze the nurse’s hands or raise their arms or legs, and by checking if there is a sudden facial droop on one side of the face. Trouble speaking – sudden difficulty speaking, understanding speech or directions, or sudden confusion. The nurse can give the patient a simple command to assess whether or not they can follow it, and check if the patient’s speech is suddenly garbled or incoherent. Vision problems- sudden development of visual difficulties (i.e. double vision, visual field cuts etc.). The nurse can test this by holding up fingers on their hand and having the patient say how many fingers they are holding up. Difficulty with this task may indicate double vision. Alternatively, the nurse can have the patient look straight at the nurse’s nose and then have them follow a finger with their eyes without turning their head. The nurse moves their finger from center to left slowly and asks the patient when they can no longer see it, then does the same on the right side. Difficulty with this task may indicate a visual field cut.

Headache- a sudden severe or unusual headache, which may indicate a hemorrhagic bleed. An elevated blood pressure with headache may indicate hypertensive infarct. The nurse should assess blood pressure, determine onset, assess pain level, etc. Dizziness- sudden development of dizziness

and/or falling or loss of balance with any of the above signs could indicate a stroke. The nurse should determine onset and inquire regarding activity related to dizziness (e.g. walking versus rising).

The important key to remember is a sudden onset of symptoms. A patient may indicate that they have had weakness for days or weeks; this does not necessarily indicate a stroke.

8.3 Stroke Mimics

A stroke mimic can be defined as a diagnosis that has similar symptoms as, and can sometimes be confused with, a stroke. “A study of stroke diagnosis reported that 19% of patients that were diagnosed as an acute ischemic stroke clinically by neurologists were in fact found not to be a stroke after a CT scan was conducted”, (Jausch & Stettler, 2015)

Nurses and health care professionals should know their patient’s health history and comorbidities. An easy mnemonic for identifying stroke mimics is HEMI (Jausch & Stettler, 2015).

H- Hypoglycemia

- May produce stroke like symptoms such as hemiplegia and aphasia, it is the most easily detected stroke mimic for nurses to check
- Characterized by a reduction in plasma glucose concentration that may induce symptoms or signs such as altered mental status, and/or slurred speech

E- Epilepsy or Seizure

- A neurological dysfunction that results in sudden change in behavior, sensory perception or motor activity
- A seizure can mimic the motor loss of stroke, especially in the post ictal phase, nurse should assess if the patient has a history of epilepsy or seizures
- Seizures can also be a complication of a hemorrhagic or an ischemic stroke related to scar tissue
- Todd’s paralysis is a temporary paralysis or weakness that infrequently occurs after seizures, particularly partial seizures (Huff, 2014)

M- Hemiplegic Migraine

- Hemiplegic migraine is a subvariant of a migraine, which is characterized by unilateral hemiparesis, that outlasts the headache
- It is important to check if the patient has a history of migraine headaches. It is difficult to diagnose especially with first presentations and it is usually diagnosed with recurrent presentations (Huff, 2014)

I- Intracranial tumor or Infection

- Examples such as meningitis, encephalitis, or abscess can be present with stroke like symptoms (Jausch & Stettler, 2015)

Nurses should be aware of the following:

- Patient’s history for any of the above conditions and treat accordingly, as ordered
- Check blood glucose levels and if sugars are low, treat with glucose bolus, as per hospital

policy

- Check patient's blood pressure for hypertension, or possibly hypotension
- Give medications as ordered by physician, to manage any stroke mimics, or comorbidities

8.4 Transient Ischemic Attack

TIA is defined as a transient episode of neurologic dysfunction caused by focal brain, spinal cord, or retinal ischemia, without acute infarction (Easton et al., 2009; Sacco et al, 2013). Response to a TIA should be treated as a potential medical emergency.

Symptoms of a TIA may include:

- Unilateral motor weakness affecting the face, arm or leg
- Speech (e.g., dysarthria) or language (e.g., aphasia) difficulties
- Visual disturbance (e.g., amaurosis fugax, hemianopsia or diplopia)
- Unilateral sensory disturbance (e.g., paresthesia's) affecting the face, arm or leg
- Vertigo and/or ataxia symptoms, depending on which arterial supply is compromised

Transient ischemic attack symptoms fully resolve within 24 hours (usually within one hour). If symptoms persist beyond 24hrs it is considered a stroke, not a TIA. A TIA event is a serious warning of a potential future stroke event. Of note, 20% of individuals who present with TIA will go on to experience a subsequent more severe stroke (NEJM 2016; Goldstein, 2011).

Minor Stroke:

A minor ischemic stroke (mild or non-disabling stroke) refers to a brain infarct that is typically small and associated with mild severity of clinical deficits or disability and may not require hospitalization. Individuals presenting with TIA or minor non-disabling stroke should follow similar clinical assessment, diagnosis and management processes.

Ischemic Stroke:

An ischemic stroke is an episode of neurological dysfunction caused by focal cerebral, spinal or retinal cell death attributable to ischemia (blockage of an artery or vein), based on pathological, imaging or other objective (clinical) evidence of cerebral, spinal cord, or retinal focal ischemic injury based on symptoms persisting > 24hrs or until death, or until other etiologies have been excluded (Sacco et al, 2013).

Cerebral Venous Sinus Thrombosis Stroke (CVST): A cerebral venous sinus thrombosis stroke is an infarction or hemorrhage in the brain, spinal cord, or retina because of thrombosis or a cerebral venous structure. Symptoms or signs caused by reversible edema without infarction or hemorrhage do not qualify as stroke (Sacco et al, 2013)

8.5 Cardiovascular Disease Management and Stroke Risk Factors

It is important that nurses help patients and their families to understand the risk factors that caused their stroke and to manage the risk factors to prevent recurrent stroke. The combined effect of multiple risk factors can increase the risk of another stroke or vascular event.

Metabolic syndrome is a group of risk factors that occur together, including high blood pressure, high blood sugar levels, excess body fat around the waist and abnormal cholesterol levels. A patient with these combined risk factors is at greater risk.

It is important as a healthcare provider to be aware of the risk factors associated with stroke.

Non-modifiable	Modifiable	Lifestyle & Behavioral
<ul style="list-style-type: none"> • Age • Race • Family History • Indigenous, African and South Asian Heritage 	<ul style="list-style-type: none"> • Hypertension • Dyslipidemia (high cholesterol) • Diabetes • Heart disease • Atherosclerosis • Atrial fibrillation • Sleep apnea • Vascular cognitive impairment • Pre-eclampsia 	<ul style="list-style-type: none"> • Nutrition/Diet • Obesity • Smoking • Alcohol consumption and/or illicit drug/ Substance use • Sedentary lifestyle • Stress • Birth Control and Hormone Replacement Therapy (HRT)

*The more risk factors one has, the greater their risk of a stroke or TIA. Of note, up to 80% of strokes are **preventable** and most risk factors are **modifiable**.*

(Stroke Awareness Foundation, n.d.)

Non-modifiable stroke risk factors

These factors include those over which a patient has no control:

- Age - stroke can occur at any age, but after age 55 the risk of stroke doubles in each successive decade
- Gender - after menopause, stroke is more prevalent in women; otherwise, stroke is more prevalent in men
- Race and/or ethnicity - stroke is more prevalent in Aboriginal People and Canadians of African, Hispanic, Japanese and Chinese descent
- Family history - increased risk of stroke if there is a first degree relative with a history of stroke or heart disease prior to the age of 55
- Previous TIA or stroke

A stroke risk profile that includes non-modifiable risk factors can be balanced out or offset by effective management of risk factors that are modifiable

Modifiable risk factors

Modifiable risk factors are those which a patient has some control, or factors they can modify, in order to, reduce the risk of stroke with medical supervision/management:

- Hypertension
- Obstructive sleep apnea
- Diabetes
- Use of oral contraceptive and hormone replacement therapy
- Hyperlipidemia
- Cardiac disease
- Atrial fibrillation

Through self-management (and with medical support, if needed):

- Diet
- Excessive alcohol consumption
- Sodium intake
- Smoking
- Substance Use
- Physical activity
- Obesity



8.6 Lifestyle and Risk Factor Assessment and Management

A person at risk of stroke and/or a patient who has had a stroke should be assessed for vascular disease risk factors and lifestyle management issues.

The patient should receive information and counselling about possible strategies to modify their lifestyle and risk factors. Referrals to appropriate specialists should be made where required to provide more comprehensive assessment and structured programs to manage risk factors.



In stroke prevention, the nurse plays a significant role by teaching the patient about their risk factors and what they can change to try and prevent a first or secondary stroke.

Healthy balanced diet

- In accordance with Canada's Food Guide to Healthy Eating (Health Canada, 2021)
- High in fruits, vegetables, low-fat dairy products, dietary and soluble fiber, whole grains and protein from plant sources
- Low in saturated fat, cholesterol (less than 200 mg/day) and sodium

The nurse or healthcare professional can counsel and educate the stroke survivor about dietary eating patterns that have been associated with reduced the risk of ischemic stroke (Larsson et al, 2016). Two common approaches include: (I) following a Mediterranean-type diet, which is high in vegetables, fruits, whole grains, nuts and olive oil (Coutts & Wein, 2014); and DASH (Dietary Approaches to Stop Hypertension) diet which is recommended for patients with high blood pressure (Teasell & Madady, 2014).

Sodium Intake

- High dietary sodium intake is associated with elevated blood pressure
- Limit sodium intake from all sources, according to the amount considered adequate by age
- Adequate sodium intake for most adults is 2000 mg per day (CHEP, 2015)

Simply getting rid of the salt shaker is not enough! Research suggests that reducing sodium intake to the recommended levels could lower the incidence of stroke and cardiac disease, as

well as have a significant impact on reducing blood pressure. Current average daily sodium intake is well beyond the upper limit. This above average intake is largely due to eating processed foods. The patient should become familiar with reading nutrition labels to help to make healthy food choices and reduce sodium in

Exercise

- Daily moderate exercise (brisk walking, jogging, cycling, swimming)
- Risk of all-cause mortality and major cardiovascular disease can be reduced significantly among persons engaged in high levels of moderate intense physical activity (>750 minutes per week) and moderate amounts (150 to 750 minutes per week) compared to those who engage in low levels (less than 150 minutes per week)
- A weekly accumulation of 150 minutes of moderate-vigorous activity in a minimum of 10-minute segments

Most stroke survivors should be encouraged to start a regular exercise program. An exercise program supervised by a healthcare professional is recommended for high risk patients (e.g., those at risk of falls, co-morbid conditions such as cardiac disease). Benefits of physical activity include better lipid values (especially high-density lipoprotein [HDL] and triglycerides [TG]), better blood glucose control, lower blood pressure, more energy, lower stress level, weight control, and an improved immune system.

Weight

- Maintain goal of a body mass index (BMI) of 18.5 to 24.9 kg/m² (BMI is weight divided by height squared); overweight defined as a BMI between 25-30; obese defined as a BMI greater than 30 (Coutts & Wein, 2014)
- Maintain goal of a waist circumference: men less than 102 cm, women less than 88 cm. Waist circumference is an index of the absolute amount of abdominal fat (Coutts & Wein, 2014)

Alcohol consumption

- Recommendations include two or fewer standard drinks per day:
 - for men, the maximum recommended drinking limit is three drinks/day to a weekly maximum of 15
 - for non-pregnant women, the maximum recommended drinking limit is two drinks/day to a weekly maximum of 10 (CCSA, 2013)
- A standard drink is 5 oz of wine, 12 oz of beer or 1.5 oz of spirits (CCSA, 2013)

Heavy and/or binge drinking (more than four drinks per day for men and three drinks per day for women) have been associated with an increased risk of stroke (CCSA, 2013).

Oral contraceptives and hormone replacement therapy

The risks and the benefits of using estrogen-containing oral contraceptives or hormone replacement therapy in the presence of stroke should be discussed with a patient. Alternative medical management should be considered in a patient who is taking estrogen-containing oral contraceptives or hormone replacement therapy in the

presence of stroke and/or TIA (Coutts, & Wein, 2014). Evidence shows that hormone replacement therapy and high or low dose estrogen-containing oral contraceptives increase the risk of ischemic stroke (Coutts & Wein, 2014)

Blood Pressure Management

- Elevated blood pressure is the single most important risk factor for stroke
- Blood pressure should be checked at each encounter with the healthcare system
- Canadian Hypertension Education Program (CHEP) guidelines should be followed for a comprehensive treatment plan that includes identification of other risk factors, lifestyle modification, pharmacotherapy and ongoing monitoring

Population	Recommended Treatment Target
General Population under age 80 (primary prevention of first stroke)	Less than 140/90 mmHg
Individuals under age 80 who have had a stroke/TIA	Less than 140/90 mmHg
Individuals under age 80 with diabetes	Less than 130/80 mmHg
Individuals under age 80 with non-diabetic chronic kidney disease	Less than 140/90 mmHg
Individuals over age 80	Less than 150*/NA *Individualized according to each person's unique risk factor profile

(2020 Hypertension Canada Guidelines for Adults and Children)

Note:

*Patients with an automated office measured resting elevated blood pressure (systolic greater than 135 mm Hg and /or diastolic greater than 85 mm Hg) should undergo thorough assessment for the diagnosis of Hypertension (pg 47, CSBPR).

Blood pressure increases with age. “Approximately one in five adult Canadian, with blood pressure in the range of 130-139/85-89 mm Hg are considered pre hypertensive by some and up to 60% will go on to develop hypertension within four years. Among individuals who are 55yrs or older with normal blood pressure, 90% will go on to develop hypertension if they live to an average age. Every 1 mm Hg increase in blood pressure increases the risk of poor late life cognitive function by approximately one percent.” (pg 48, CSBPR)

Hypertension is the single most important modifiable risk factor for stroke (Coutts & Wein, 2014, section 3.0).

Common medication categories for hypertension include:

- Thiazide-like diuretic such as Hydrochlorothiazide and Indapamide
- Angiotensin Converting Enzyme Inhibitor (ACEI) such as Ramipril and Perindopril
- Angiotensin II Receptor Blocker (ARB) such as Diovan or Avapro
- Long-acting Calcium channel Blocker (CCB) such as Cardizem and Norvasc
- Beta-Blocker such as Metoprolol or Atenolol

These medications have all been shown to reduce recurrent stroke and other vascular events. Most patients with stroke or TIA will benefit from treatment with a blood pressure lowering agent, regardless of the presence of hypertension.

Lipid management

- Fasting lipid levels (total cholesterol, total triglycerides [TG], low-density lipoprotein [LDL] cholesterol, high-density lipoprotein [HDL] cholesterol) should be measured on all patients presenting with stroke or TIA.
- Ischemic stroke patients should be treated to achieve a target of LDL less than 1.8mmol/L is recommended; treatment includes pharmacotherapy and aggressive lifestyle modification, including dietary guidelines.
- Statin therapy is not routinely indicated for stroke prevention in the instance of intracerebral hemorrhage but may be considered on an individualized basis when the overall risk-factor profile includes co-existing pro-thrombotic factors. (Coutts & Wein, 2014, section 4)

Dyslipidemia is a modifiable risk factor for atherosclerosis; screening is imperative, in order to, identify risk and institute appropriate therapy for both primary and secondary prevention of coronary artery disease (CAD), peripheral artery disease, and stroke (Adams, 2009). It is very important to implement the healthy lifestyle modifications outlined earlier to lower overall risk of stroke.

Pharmacological treatment of dyslipidemia

Statin agents should be prescribed for most patients who have had an ischemic stroke or transient ischemic attack to achieve current recommended lipid levels.

Statin agents include Atorvastatin (Lipitor), Rosuvastatin (Crestor) and Simvastatin (Zocor) and Ezetimibe may be considered for additional LDL lowering (section 4.2, pg. 54 CSBPR). Their possible effects include the following:

- Anti-inflammatory properties may help stabilize the lining of blood vessels
- May help relax blood vessels thus contributing to lower blood pressure
- May have a blood thinning effect thus reducing the risk of blood clots

Diabetes management

According to the Canadian Diabetes Association Clinical Practice Guidelines Expert Committee (2013), the recommended targets for glycemic control are:

- Glycated Hemoglobin (A1C) equal to or less than 7.0 %
- Fasting Plasma Glucose equal to 4.0-7.0 mmol
- 2-hour Plasma Glucose equal to 5.0-10.0 mmol or 5.0-8.0 mmol if A1C targets are not being achieved

Diabetes is a major, independent risk factor for stroke and most adults with type 1 or 2 diabetes should be considered at high risk for vascular disease. Diabetes increases the risk of ischemic stroke more than

hemorrhagic stroke. Many patients may exhibit metabolic syndrome and additional risk factors such as hypertension and/or hyper dyslipidemia, which further increases the risk of TIA/stroke.

Reducing risk factors to target levels is essential, and involves a multi-issue approach including lifestyle modifications, tight glycemic control, antiplatelet drugs (aspirin), control of lipid levels and blood pressure control (Coutts & Wein, 2014, section 5)

8.7 Commonly Prescribed Medications for Stroke and Stroke Prevention

Antiplatelet therapy

- All patients with ischemic stroke or transient ischemic attack should be prescribed **antiplatelet therapy for secondary prevention of recurrent stroke** unless there is an indication for anticoagulation. Antiplatelet agents are considered a fundamental component of secondary stroke prevention.
- For all patients with acute ischemic stroke or transient ischemic attack not already on an antiplatelet agent should be treated with at least 160 mg of Acetylsalicylic acid immediately as a **onetime loading dose** after brain imaging has excluded intracranial hemorrhage (section 6.1, pg. 67 CSBPR)
- Antiplatelet therapy should be started as soon as possible after brain imaging has ruled out hemorrhage **within 24 hrs. of symptom onset**.
- For adult patients on aspirin (ASA), the usual **maintenance dosage** is 81 mg/day, unless other indications are present which may suggest a higher dose is required.
- Dual antiplatelet therapy (combination of ASA and clopidogrel) greater than 21 days following a transient ischemic attack or minor stroke, is **NOT recommended**, unless there is a specific indication (Section 6.21)
- For long term secondary stroke prevention, ASA 80-325 mg, clopidogrel (Plavix) 75 mg or combined ASA 25 mg and extended release dipyridamole (Aggrenox) 25mg/200 mg BID may be used depending on the clinical circumstances (e.g., cardiac stent).
- For patients with embolic stroke of undetermined source, and no known atrial fibrillation, anticoagulant therapy is **not currently recommended** over low dose ASA for secondary stroke prevention.

(pg. 67, Section 6 CSBPR 7th ed 2020)

Antithrombotic therapy for atrial fibrillation

- Atrial fibrillation is a significant risk factor for stroke and should be aggressively managed to reduce the risk of cerebrovascular events.
- All patients with suspected TIA or ischemic stroke should undergo a 12-lead

electrocardiogram (ECG) to assess for atrial fibrillation, myocardial infarction or structural heart disease (pg. 74, Section 7 CSBPR).

- For patients aged 65 years or older, with ischemic stroke or TIA, routine pulse palpation is recommended to screen for undiagnosed atrial fibrillation.

Oral Anti-Coagulation (OAC)

- Most patients with Ischemic stroke or TIA and atrial fibrillation should receive an oral anticoagulant therapy for secondary stroke prevention.
- For most patients requiring anticoagulants for atrial fibrillation, a direct oral anticoagulant (DOAC) such as apixaban, dabigatran, edoxaban, or rivaroxaban for secondary stroke prevention in preference over warfarin (Section 7.2 b, pg. 75, CSBPR)
- Patients with atrial fibrillation who also have a mechanical heart valve must be placed on warfarin according to the best practice guidelines.
- Patients with atrial fibrillation who are already well controlled on warfarin with a stable international normalized ratio (INR) (70 % of the time as per documented INR) may continue on warfarin.
- Medication adherence should be continually assessed and reinforced for patients on all oral anticoagulants at each follow up visit.
- For patients on DOAC therapy, avoid inappropriate under-dosing as it is associated with increased stroke risk.

(Coutts & Wein, 2014, section 7)

OAC	Dosage
Dabigatran (Pradaxa)	<ul style="list-style-type: none"> • 150 mg twice daily • 110 mg is recommended for patients age 80 or over or those at risk of bleeding
Rivaroxaban (Xarelto)	<ul style="list-style-type: none"> • 20 mg once daily • 15 mg daily if creatinine clearance 30-49
Apixaban (Eliquis)	<ul style="list-style-type: none"> • 5 mg twice daily • 2.5 mg twice daily in presence of two or more of the following: age 80 years, weight 60 kg or less, creatinine equal to or greater than 133
Edoxabam	<ul style="list-style-type: none"> • 60 mg per day • Decrease to 30 mg per day if weight 60kg or less and moderate renal impairment
Warfarin (Coumadin)	<ul style="list-style-type: none"> • Initial dose 2.5 to 10 mg daily • Maintenance dose dépendent on INR. Target INR for non-valvular atrial fibrillation is 2.5 (range 2-3) • Target INR for atrial fibrillation in presence of hearty valve disease, including the presence of a mechanical valve is 3 (range 2.5-3.5)

8.8 Carotid Intervention

Carotid endarterectomy is beneficial for stroke prevention in appropriate patients. It is a surgical procedure that removes atherosclerotic plaque from the common carotid and proximal internal carotid artery to prevent thromboembolic stroke. Carotid stenosis may be classified as symptomatic or asymptomatic. Carotid stenosis is symptomatic if associated with a Symptomatic Event (ipsilateral carotid territory cerebral or retinal ischemic event (ischemic stroke, transient ischemic attack, transient monocular blindness, or retinal artery occlusion) within the preceding six months. Carotid disease may result in symptoms of either a TIA and/or stroke. In asymptomatic carotid artery disease, even though there may be a significant amount of atherosclerotic build-up, it is not enough to obstruct blood flow that would result in symptoms (The University of Chicago Medical Center, n.d.; Coutts & Wein, 2014).

Symptomatic carotid stenosis

Revascularization vs. Endarterectomy

If revascularization is being considered for carotid stenosis based only on carotid ultrasound then CTA or contrast enhanced MRA is recommended to confirm the degree of stenosis and guide surgical decision making.

Indications for carotid revascularization

- Patients with TIA or nondisabling stroke and ipsilateral 50-99 % internal carotid artery stenosis (measured by two concordant non-invasive imaging modalities such as dopplers, computed tomography angiography [CTA] or magnetic resonance angiography [MRA]) should be evaluated without delay, by a *Physician* with stroke expertise (e.g., neurosurgeon, vascular surgeon).
- Selected patients should be offered carotid endarterectomy as soon as possible following the qualifying event
- Carotid endarterectomy is contraindicated for patients with mild (less than 50%) stenosis.
- Carotid endarterectomy may be recommended for selected patients with moderate (50-69 %) symptomatic stenosis and should be evaluated by a *Physician* with expertise in stroke management.

Asymptomatic carotid stenosis

- Carotid endarterectomy may be considered for selected patients who are asymptomatic or remotely symptomatic (over 3 months) with 60-99% carotid stenosis. These patients should be evaluated by a *Physician* with expertise in stroke management.
- Carotid stenting may be considered for patients who are not candidates for surgery due to technical, anatomic or medical reasons. (Coutts & Wein, 2014, section 8

8.9 Sleep Apnea

Sleep apnea screening and management

Sleep disorders are an under-recognized problem that can increase risk of initial or recurrent stroke. Obstructive Sleep Apnea (OSA) is emerging as an independent stroke risk factor, and as a condition that arises as a result of a stroke. It is a modifiable stroke risk factor. OSA is more common in individuals who have experienced a stroke or TIA as compared to the general population (Coutts & Wein, 2014, section 10). Patients with post-stroke sleep apnea often demonstrate atypical signs of sleep apnea. Monitor for potential symptoms that indicate OSA, which include both typical and atypical signs. Typical signs:

- Excessive daytime sleepiness
- Choking and/or gasping during sleep
- Very loud snoring
- Recurrent awakening from sleep (i.e., fragmented sleep or difficulty sleeping)
- Waking with dry mouth and/or sore throat
- Waking with a headache
- Difficulty concentrating and/or poor memory
- Irritability and/or depression
- Erectile dysfunction in men

(Fleet ham et al, 2006; The Lung Association, 2012)

Atypical signs:

- Recurrent stroke
- Increased frequency of nocturia or snoring
- Treatment resistant hypertension
- Presence of atrial fibrillation

It is recommended that nurses monitor for symptoms of sleep disturbance and, if present, screen for obstructive sleep apnea using a standardized tool (e.g., questionnaire). A patient who has a positive result on a standardized screening questionnaire should be referred to a specialist for a more detailed assessment and diagnosis. Stroke prevention and medical management of confirmed sleep apnea can include the following:

- Vascular risk factor treatment and management (as outlined in this module)
- First line therapies, as determined by the patient's need and risk factor profile (e.g., avoidance of hypnotic and/or sedative medications, alcohol)
- Positional therapy (e.g., position the patient to sleep on the side instead of on the back)
- Weight loss

8.10 Smoking Cessation

- Smoking status should be identified, assessed and documented
- Clear, non-judgmental, patient-specific advice regarding the importance of smoking cessation should be provided
- A combination of pharmacotherapy and behavioral therapy is recommended
- For inpatients who are current smokers, protocols for the management of withdrawal symptoms during hospitalization should be followed
- Smoking cessation in teens and young adults is considered a priority (Coutts & Wein, 2014)
- Healthcare professionals can follow the 5 A's Model for Treating Tobacco Use and Dependence:

ASK about tobacco use	<ul style="list-style-type: none"> • Identify and document tobacco use status for every patient at every visit.
ADVISE to quit	<ul style="list-style-type: none"> • In a clear strong and personalized manner, urge every tobacco user to quit.
ASSESS willingness to make a quit attempt	<ul style="list-style-type: none"> • Is the tobacco user willing to make quit attempt at this time?
ASSIST in quit attempt	<ul style="list-style-type: none"> • For the patient willing to make a quit attempt, offer medication and provide or refer for counselling or additional treatment to help the patient quit. • For patients unwilling to quit at the time, provide interventions designed to increase future quit attempt.
ARRANGE follow-up	<ul style="list-style-type: none"> • For the patient willing to make a quit attempt, arrange for follow-up contacts, beginning within the first week after the quit date. • For patients unwilling to make a quit attempt at the time, address tobacco dependence and willingness to quit at the next visit.

(RNAO, 2007, p.23)

Smoking contributes to more than 37,000 deaths a year in Canada, of which almost 11,000 are heart disease and stroke-related (29% of all smoking-related deaths are heart

disease and stroke-related) (HSF, 2015). Smoking doubles the risk of ischemic stroke and is associated with a two- to four-fold increase in hemorrhagic stroke (Goldstein et al., 2011). A female patient who smokes and takes oral contraceptives or estrogen-based hormone replacement therapy is at an increased risk of initial or recurrent stroke. A large proportion of current Canadian smokers have been shown to be willing to make a quit attempt. Nurses have an important role in assisting individuals to quit smoking with even brief interventions proving effective in prompting quit attempts

Smoking cessation interventions include:

- Pharmacotherapy Nicotine Replacement Therapy (NRT) to assist in the transition from smoking to abstinence by decreasing withdrawal symptoms and motivation to smoke (Stead, Perera, Ballen, Mant, & Lancaster, 2009). Examples include patch, gum, inhaler, lozenges and/or nasal spray
- Nicotine Receptor Partial Agonists (Varenicline – Champix)
- Bupropion Sustained Release (SR) (antidepressant)
- Counselling and accompanying resources:
 - ***You Can Quit: One Step at a Time*** (Canadian Cancer Society, 2020)
 - ***Help Someone Quit: One Step at a Time*** (Canadian Cancer Society, 2020)
- Smoker’s helpline (Canadian Cancer Society, 2007) www.smokershelpline.ca

Withdrawal symptoms include initially anger, impatience, restlessness, difficulty concentrating, insomnia, increased appetite, and anxiety and depressed mood. Symptoms can begin a few hours after last cigarette and peak 2-3 days later and continue over a period 2-3 weeks (American Psychiatric Association, 2013).

8.11 TIA Management

The following can be used with medical supervision and/or management:

- Anticoagulant therapy to prevent the formation of blood clots in patients with heart disease atrial fibrillation (Coumadin or enteric coated aspirin {ECASA} if Coumadin contraindicated)
- Antiplatelet therapy to decrease further development of thrombi (ECASA, Plavix, Aggrenox)
- Antihypertensive therapy to control systolic blood pressure to reduce the risk of cerebrovascular events
- Lipid management to prevent the formation of atherosclerotic plaque
- Obstructive sleep apnea management, which can include C-PAP, dental appliance, positioning therapy and/or lifestyle management
- Lifestyle modifications including management of hypertension, hyperlipidemia, and diabetes, low fat and/or low salt diet, increased physical activity, smoking cessation, medication compliance, etc

Self-management can reduce the risk of a second stroke by 80%. Preventative measures outlined below aimed at reducing risk factors will not only prevent strokes but also other chronic diseases that share similar risk factors.



- Eating a healthy diet
- Monitoring sodium intake
- Increasing physical activity
- Maintaining a healthy body weight
- Avoiding excessive alcohol consumption
- Stopping smoking
- Recording and reporting blood pressure to *Physician* if out of target range
- Keeping diabetes under control
- Taking medications as prescribed

It is important for stroke survivors to understand how their medications can prevent the incidence of recurrent stroke and that it may be necessary to continue to take them even after they feel well. Consider having your patient participate in a self-medication program prior to discharge if this is available at your rehabilitation organization.

What can you change in your everyday practice to apply this knowledge and help the patient to be more aware of their stroke risk factors?

Stroke is highly preventable. If patients understood this better, would they try and make positive changes in their lifestyle?



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ACUTE STROKE UNIT ORIENTATION

2023

MODULE 8: MONITORING VASCULAR RISK FACTORS AND SECONDARY STROKE PREVENTION

Name: _____ Date: _____

1. The purpose of the *Secondary Stroke Prevention Clinic* is to:
 - a. Provide rapid specialist consult for patients with suspected transient ischemic attack (TIA) and minor, non-disabling stroke
 - b. Facilitate timely investigations to determine etiology
 - c. Support access to timely carotid intervention when indicated
 - d. Counsel on risk reduction, lifestyle modification
 - e. All of the above
2. _____ is the most significant modifiable risk factor for stroke. (Choose one to fill in blank)
 - a. Diabetes
 - b. High LDL
 - c. Hypertension
 - d. Alcoholism

Quiz

- You may use the resource as a reference to answer these questions.
- Submit your completed quiz to the Nurse Clinician or designate for marking.

3. In non-diabetic individuals, the Canadian Hypertension Education Program (Hypertension Canada 2017) states to treat to a target blood pressure of
 - a. Less than 120/80 mmHg
 - b. less than 130/80 mmHg
 - c. less than 140/90 mmHg
 - d. less than 145/90 mmHg

4. *Statins* act as the first line agents in the treatment of dyslipidemia. Possible effects include:
 - a. Anti-inflammatory properties that may help to stabilize the lining of the blood vessels
 - b. Statins may help relax blood vessels thus contributing to lower blood pressure
 - c. Statins may have a blood thinning effect thus reducing the risk of blood clots
 - d. All of the above

TRUE/FALSE Questions

(CIRCLE the correct letter)

- T** **F** 1. All patients with ischemic stroke or transient ischemic attack should be prescribed antiplatelet therapy for secondary prevention of recurrent stroke unless there is an indication for anticoagulation.
- T** **F** 2. Medication management in stroke prevention usually involves a combination of medications, often including an antihypertensive, a statin and an antithrombotic.
- T** **F** 3. Carotid endarterectomy or stenting is appropriate for all patients with 50-99% stenosis.
- T** **F** 4. An accumulation of 150 minutes of brisk walking or other dynamic exercise in a minimum of 10 minute segments for 5 to 7 days a week is recommended to reduce stroke risk.
- T** **F** 5. Smoking doubles the risk for ischemic stroke.
- T** **F** 6. One reason a patient with atrial fibrillation may not be prescribed a novel/direct oral anticoagulant (i.e., dabigatran, rivaroxaban, apixaban, edoxaban) is the presence of a mechanical heart valve.

SCORE: _____ / 10

Stroke Unit/Medical Unit Nurse Clinician/Designate

SIGNATURE



MODULE 8: MONITORING VASCULAR RISK FACTORS AND SECONDARY STROKE PREVENTION

ACUTE STROKE UNIT ORIENTATION Quiz Answers

1. e. All of the above
2. c. Hypertension
3. d. less than 140/90 mmHg
4. d. All of the above

TRUE/FALSE Questions

1. True
2. True
3. False
4. True
5. True
6. True