Clovis de Oliveira Guedes, MD
clovisoguedes@gmail.com

42 – Primary and Secondary Prevention of Stroke in Primary Health Care

Clovis de Oliveira Guedes – Neurologist of Hospital 9 de Julho
Fernanda de Barros Correia Cavalcanti – Pathologist and General Practitioner – professor at Nove de Julho University

Ischaemic and haemorrhagic strokes are highly prevalent in adult population and the causes directly related to them, respectively, is atherosclerosis (and its possible complication – thromboembolism) and hypertensive peaks. Therefore, the prevention of the risk factors for these conditions are the aim of the primary and secondary stroke prevention.

Most of these risk factors are modifiable. As much as 90% of first strokes, and more than half of recurrent strokes could be secondary prevented with optimal risk factor control. The risk of stroke is particularly increased in patients with two or more risk factors. General practitioners play a key role in the control of those risk factors.

It is possible to control hypertension, diabetes mellitus and high cholesterol. In addition, lifestyle modification, including smoking cessation, engaging in regular physical activity, maintaining a normal weight, adhering to a healthy diet and limiting alcohol intake have a great impact on it.

Hypertension is the single most important modifiable risk factor for both haemorrhagic and ischaemic stroke. Hypertension increases likelihood of subclinical or silent stroke, which elevates risk of vascular dementia and recurrent stroke. Every 10mmHg reduction in blood pressure is associated with a 33% lowering of stroke risk in primary prevention.

It is advisable to maintain the blood pressure lower than130/80 mm Hg as the optimal blood pressure for the proposal of stroke prevention. Guidelines support using any antihypertensive agent, like angiotensin converting enzyme inhibitors (ACE-I), with or without diuretics.

Diabetes mellitus increases approximately twice the risk of ischaemic stroke compared with those patients without diabetes. It is a risk factor for a particularly recurrent, lacunar, stroke. The glycaemic control should aim for HbA1c of less than 7%, using diet, exercise, and medications such as oral hypoglycaemic drugs and insulin.

Dyslipidaemia. LDL-cholesterol level lowering is the primary goal of dyslipidaemia management following stroke, primarily through use of statins. The LDL goal is less than 100 mg/dL or 50% reduction in LDL-cholesterol level from baseline.

The choice of statin should take into account patient tolerance (some side effects as myalgia and liver dysfunction are sometimes prohibitive to its use) and costs.

Rosuvastatin and atorvastatin are considered the most potent (possibly achieving

more than 50% LDL cholesterol level lowering). Although not a primary goal, the raise of HDL-cholesterol to levels higher than 40 mg/dL can be beneficial and niacin may be a reasonable treatment option in stroke prevention.

Cigarette smoking is associated with an increased risk for all stroke subtypes and has a strong, dose-response relationship for both ischaemic stroke and subarachnoid haemorrhage. The relative risk of stroke in women to men smokers is 3.1:2.3. Cigarette smoking cessation is one of the most powerful lifestyle change to reduce stroke risk and can be achieved, beyond counselling, with first line medications such as nicotine replacement (gum or patch). Drug treatments also include bupropion and varenicline.

Physical inactivity increases the risk of cardiovascular disease, including stroke. The AHA (American Heart Association, 2015) recommends, for overall cardiovascular health, at least 30 minutes of moderate activity 5 days a week or 25 minutes of vigorous activity 3 days a week. The same recommendation though, advises for lowering blood pressure and cholesterol an average of 40 minutes of moderate- to vigorous-intensity aerobic activity 3 to 4 times per week. It is known that increasing amounts of physical activity (like doubling the minimum defined), are associated with additional risk reductions, although the shape of the dose-response curve is not well defined

Diet reduction in sodium intake (limiting to 1,5 to 2,0 mg per day) can lower the blood pressure in some hypertensive patients. DASH and Mediterranean diets are both associated with lower risk of stroke. The Dietary Approaches to Stop Hypertension (DASH) diet encourages high fruit and vegetable, low-fat dairy, low animal protein, and high plant protein intake. The Mediterranean diet encourages fresh fruits and vegetables, fish, legumes, white meat instead of red meat, and wine.

Alcohol Consumption and ischaemic stroke risk has a debated J-shaped curve with the lowest relative risk for ischaemic stroke in the light drinking group (less than one drink or one to two drinks per day) compared with abstainers. The concern about alcohol abuse should discourage abstainers to start drink alcohol,   On the other hand, heavy drinking is associated with an increased risk of stroke, and those who drink excessively should be advised to moderate their intake.

Obesity (body mass index [BMI] ≥30 kg/m2) has a relative risk (RR) for ischaemic stroke of 1.64, while overweight (BMI 25 kg/m2 to 29.9 kg/m2) has a RR of 1,22 compared to healthy subjects (BMI < 25 kg/m2).
The aim to prevent vascular events is maintenance of BMI within 18.5 kg/m2 to 25 kg/m2.

Medication adherence is a significant problem and has implications for long-term outcomes. Adherence to antihypertensive medications, after stroke, is close to 90% in the first year but declines to approximately 75% two years later. General practitioners play a key role to maintain adherence to the treatment.

Metabolic syndrome, a condition related to insulin resistance, is defined as three or more of the following factors: elevated triglyceride level, low HDL-cholesterol (HDL-C) level, elevated fasting glucose level, high blood pressure, and high waist circumference or abdominal obesity. Metabolic syndrome is not clearly established as an independent stroke risk factor. It is important to treat the underlying causes such as obesity and physical inactivity, counselling for lifestyle modification (diet, exercise, and weight loss) and appropriate treatment for individual components of the metabolic syndrome, particularly hypertension and dyslipidaemia.

Hyperhomocysteinaemia has also been consistently associated with atherosclerotic disease. It is reasonable to treat hyperhomocysteinaemia with vitamin B6, vitamin B12, and folic acid replacement in patients with atherosclerotic ischaemic stroke.

Obstructive Sleep Apnoea. The relationship between obstructive sleep apnoea (OSA) and stroke is complex. OSA can indirectly contribute to an increase in risk factors of stroke. Screening for OSA among stroke patients and its treatment seem appropriate.

Secondary prevention. After an ischaemic stroke (non-cardioembolic) or TIA or lacunar (small vessel occlusive), except absolute of relative contraindicated, all patients should be treated with an antiplatelet agent. Aspirin (100 mg daily), clopidogrel (75 mg daily), and the combination of aspirin-extended-release dipyridamole (25 mg/200 mg twice a day) are all acceptable options.

Atrial fibrillation is the most common cause of cardio embolic stroke. Additional conditions potentially associated with an increased stroke risk include a history of myocardial infarction, left ventricular dysfunction, heart valve disease, left ventricular thrombus, atrial septal defects, and complex atheroma in the ascending aorta or proximal arch. We can use the new oral anticoagulant drugs (dabigatran, rivaroxaban and apixaban) to prevent stroke in patients with atrial fibrillation without valvular disease and warfarin for those with valvular disease. When using warfarin, it is important to control the prothrombin time initially once a week and keep the international normalized ratio (INR) between 2 - 3.

Cervical internal carotid artery stenosis ≥70% in patients with symptomatic disease, can be treated with revascularization, either with endarterectomy or stenting, with increasing benefits.

The acute stroke can be treated with thrombolytics (r-TPA) with better outcome and recover of disabilities. It is essential that the patient should be driven to hospital as fast as possible, up to 4.5 hours of the event, within the thrombolysis' window. Therefore, recognition of initial stroke's symptoms is important. The role of primary physician is essential in the process of public awareness of these symptoms.

Inherited thrombophilias are hypercoagulable states that includes a number of disorders: protein C deficiency, protein S deficiency, antithrombin deficiency, activated protein C resistance, factor V Leiden as a cause of activated protein C resistance, prothrombin G20210A mutation, methylenetetrahydrofolate reductase (MTHFR) mutations associated with hyperhomocysteinaemia. It is important to suspect and to investigate thrombophilias in cases of young patients with stroke.

Transient ischaemic attack (TIA) is caused by a clot; the only difference between a stroke and TIA is that with TIA the blockage is temporary, causing no permanent injury to the brain. About 1 in 3 people who have a transient ischaemic attack will eventually have a stroke, with about half occurring within a year after the transient ischaemic attack. It is a "warning stroke", a great opportunity to take steps to prevent irreversible deficits. TIA should be treated with all available risk reduction strategies discussed here.

Take Home Message

- The most important risk factor, that can be relatively easily treated, is high blood pressure.
- Encouraging to quit smoking will reduce the risk of stroke and several other diseases
- Advise physical activity as a therapy for prevention of various diseases and improve quality of life.
- Explain the importance of a healthy diet to control risk factors such as hypertension, diabetes, hypercholesterolaemia, obesity and metabolic syndrome.
- Remember that atrial fibrillation is the most common cause of embolic stroke, which can be prevented by anticoagulation.

Original Abstract

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