Singapore Med J 2019; 60(12): 616-620
https://doi.org/10.11622/smedj.2019158

CME ARTICLE

Long-term complications of stroke and secondary prevention: an overview for primary care physicians

Shakil Ahmed Chohan[1], MBBS, FRCP, *Prasanna Kappaganthu Venkatesh*[2], MBBS, FEBPRM, *Choon How How*[3,4], MMed, FCFP

Nancy noticed that her father, after discharge from hospital following a stroke, complained of pain on the affected side. He was quieter and not his usual self. She spoke to the stroke nurse and was informed that her father was on appropriate medications to prevent a recurrent stroke. The nurse suggested that Nancy should consult her family physician to rule out other causes for his condition. Nancy came to you, their family physician, to seek advice on what to do next. She admitted to being stressed and said that she hoped you could relieve her father's pain and help with his mood.

WHAT IS STROKE?

A stroke occurs when there is a blockage in the blood supply to the brain, or when a blood vessel in the brain ruptures and bleeds. When that happens, part of the brain cannot get the blood (and oxygen) it needs, and brain cells die. Symptoms of a stroke show up in the body parts that are controlled by the damaged areas of the brain.

HOW RELEVANT IS THIS TO MY PRACTICE?

Strokes are common, and the annual incidence in the general population is increasing despite a decline in mortality from stroke. Every year, 15 million people throughout the world suffer a stroke, and five million are left significantly disabled. In 2017, 7,741 stroke patients were admitted to Singapore public hospitals (about 21 per day). From 2008 to 2017, there was an overall increase in the crude incidence rate of stroke, from 187.9 to 229.6 per 100,000 population. In 2017, there were 759 deaths due to stroke, an increase from 698 in 2008.[1] It is the third commonest cause of death in developed nations and the leading cause of adult disability worldwide. A recent publication from the Global Burden of Diseases, Injuries and Risk Factors study forecasted that stroke will continue to be one of the top three causes of death worldwide in 2040.[2]

WHAT CAN I DO IN MY PRACTICE?

Management guidelines and recommendations for the patient with stroke remain largely focused on the acute in-hospital phase, emphasising medical diagnosis and treatment, including intensive rehabilitation. The focus is very much on improving survivorship.

The immediate consequences of stroke during this acute phase are well recognised. But for many stroke survivors and their families, the acute stroke is the beginning of their ongoing struggle with physical impairment and subsequent disability. With time, the immediate clinical consequences of the stroke are complicated by a variety of lesser-known medical, musculoskeletal and psychosocial difficulties.[3] The primary care physician plays an important role in optimising chronic disease control and in managing and minimising any complications.

Optimising clinical risk for stroke recurrence

Prior stroke is a significant risk factor for the development of further strokes.[4,5] Patients who have had a stroke are four times more likely to have another stroke than matched controls.[6] Secondary preventative measures including antithrombotic therapy,[7] treatment of hypertension[8-11] and diabetes mellitus,[12] reduction of elevated low-density lipoprotein (LDL) cholesterol and triglyceride levels,[13] anticoagulation for atrial fibrillation (AF), and cessation of smoking[14] can reduce recurrence rates (Box 1).

Late medical complications of stroke

Scant attention has been paid to the long-term consequences and complications (i.e. medical, musculoskeletal and psychosocial complications) resulting from a stroke. These are summarised in Box 2. Late medical complications of stroke occur weeks to months after discharge from hospital. Some stroke survivors go on to develop these complications years after the acute stroke. The primary care physician is regularly called upon to deal with these problems but is often hampered by lack of resources.

Post-stroke seizures

Seizures occur in 5%–9% of all stroke survivors.[15-18] Most seizures occur within the first year of stroke. It is unusual to develop seizures more than two years after stroke onset. Seizures are more common in haemorrhagic stroke, total anterior circulation stroke and stroke involving the cortex. They should be treated with conventional anticonvulsants.[19] Prophylactic anticonvulsant medications are unnecessary in patients with uncomplicated strokes and no previous history of seizures.

[1]Department of Geriatric Medicine, [2]Department of Rehabilitation Medicine, [3]Care and Health Integration, Changi General Hospital, [4]Family Medicine Academic Clinical Programme, SingHealth Duke-NUS Academic Medical Centre, Singapore

Correspondence: Dr Chohan Shakil Ahmed, Consultant, Department of Geriatric Medicine, Changi General Hospital, 2 Simei Street 3, Singapore 529889. chohan.shakil.ahmed@singhealth.com.sg

Box 1. Secondary prevention targets for stroke:

• Hypertension	Most guidelines recommend a target blood pressure < 130/80 mmHg. No head-to-head trial comparing different classes of antihypertensive, i.e. showing that one class is better than another.
• Hyperlipidaemia	Treat with maximal tolerated statins to aim for 50% reduction from baseline low-density lipoprotein cholesterol levels or a target of < 1.8 mmol/L. No head-to-head trial comparing different statins.
• Diabetes mellitus	Aim for levels of glycated haemoglobin < 7%.
• Antiplatelet therapy	Aspirin remains the drug of choice in acute stroke. For long-term prevention in people with ischaemic stroke or transient ischaemic attack, clopidogrel 75 mg daily should be the standard antithrombotic therapy.
• Antithrombotic for atrial fibrillation	Direct oral anticoagulants/warfarin depending on patient comorbidities.

Urinary incontinence

Following stroke, patients often experience variable degrees of urinary frequency, urgency or incontinence due to neurogenic bladder, leading to incomplete bladder emptying. The exact mechanism of urinary incontinence after a stroke is unclear. 25% of stroke patients have urinary incontinence at discharge and 15% are still incontinent at one year.[20] Urinary incontinence 30 days after a stroke is associated with almost four times the one-year mortality of continent stroke survivors. Management includes exclusion of exacerbating/precipitating features, particularly urinary tract infection, drugs (e.g. diuretics) and faecal impaction. Anticholinergic medications, such as oxybutynin chloride, can be used to reduce urgency and frequency. An external catheter (urosheath) in men or diapers in women is an acceptable means of managing incontinent patients. Intermittent catheterisation is also an option in patients with urine retention. An indwelling catheter, because of its associated complications, should be used only as a last resort to manage persistent incontinence. In cases where a regular, socially acceptable voiding pattern cannot be established, a consultation with a urologist may be necessary.

Bowel incontinence

New-onset faecal incontinence after stroke is very common, occurring at an incidence of 56% acutely, 30% at 7–10 days and 11% at three months.[21] Older patients, women and those with severe strokes are most at risk. The impact of faecal incontinence is always devastating; viewed as a social taboo, it may result in poor self-image, depression, carer stress and reduced rehabilitation participation. A comprehensive assessment requires bowel history, medication review, diet/fluid intake, mobility, current bowel movement status, abdominal exam and rectal exam (by a trained person). Management aids include skin care, pads, faecal collectors and anal plugs. Bowel programmes such as daily codeine phosphate with twice weekly enemas have resulted in 75% of nursing home patients achieving bowel continence.[22]

Box 2. Long-term complications of stroke:

Late medical complications	
• Post-stroke seizures	Treat with conventional anticonvulsants. Seizure advice: general safety advisory, driving and operating machinery.
• Urinary incontinence	Exclude exacerbating/precipitating risk factors. Consider oxybutynin in selected patients and indwelling catheter as a last resort.
• Bowel incontinence	Review of medications, improving diet/fluid intake, using drugs such as codeine phosphate with twice weekly enema or loperamide to reduce frequency of incontinence.
• Cognitive impairment	Control of risk factors to prevent recurrence. Physical and cognitive stimulation.
Musculoskeletal complications	
• Spasticity and hypertonicity	Physiotherapy, splinting, positioning of limbs. Systemic drugs include baclofen, tizanidine, dantrolene, diazepam, and botulinum toxin in selected cases.
• Hemiplegic shoulder pain	Proper handling and positioning, refer to physiotherapy, simple analgesic, transcutaneous electrical nerve stimulation in selected patients.
• Wrist and hand flexion	Physiotherapy (both active and passive), splints (ready-made splints or custom made).
Psychosocial complications	
• Post-stroke depression	Selective serotonin reuptake inhibitors (SSRIs) are commonly used. Psychological counselling is helpful but often underused.
• Emotional lability (pseudobulbar affect)	Therapeutic trial of antidepressants, especially SSRIs.
• Mood/emotional changes	Stroke and caregivers support groups may be helpful, e.g. the Singapore National Stroke Association (www.snsa.org.sg) provides education and support for stroke patients and their family in community.

Use of loperamide 2 mg up to three times a day, according to symptoms, can be a last resort.

Cognitive impairment

Cerebrovascular disease is increasingly recognised as a common cause of cognitive impairment and dementia in later life. Vascular dementia is the second most common cause of dementia after Alzheimer's disease. About 10% of patients develop cognitive impairment after the initial stroke and about 30% at the end of one year. Risk factors for developing dementia include advanced age, previous stroke, lacunar infarction, diabetes mellitus and left hemisphere stroke. By preventing stroke, we can help to reduce the risk of vascular dementia in our patients.

Musculoskeletal complications of stroke

Musculoskeletal problems following a stroke invariably involve the hemiplegic side and may not become apparent until weeks to months have passed. Stroke patients often complain bitterly about the pain associated with these complications.

Spasticity and hypertonicity

Symptoms relating to spasticity are present in up to 60% of stroke patients. Spasticity is excessive, inappropriate and involuntary muscle activity resulting in stiffness, loss of movement and pain. At worst, it produces a fixed deformity known as a contracture and can lead to development of pressure sores. Conservative treatment of contractures consists of physiotherapy (passive range of motion exercises), splinting and proper positioning of limbs.[23] Pharmacological treatment of spasticity in stroke patients consists of systemic and local agents. Drug treatment should generally not be used in isolation but in combination with physiotherapy and positioning/active splinting. Systemic agents for spasticity include baclofen, tizanidine, dantrolene and diazepam.[24-26] Focal treatment of spasticity with botulinum toxin is effective for a selected group of patients. Unlike systemic antispasticity drugs, which are non-selective and commonly associated with generalised weakness and functional loss, botulinum toxin is targeted therapy. Surgical treatment is rarely used but may be a last resort to enable proper seating and fitting for orthoses or enable appropriate hygiene. Examples include adductor tenotomies or obturator neurectomies.

Hemiplegic shoulder pain

Hemiplegic shoulder pain (HSP) is common (9%–40% of hemiplegic stroke cases) and typically occurs 2–3 months after stroke onset.[27] HSP can be classified into four types: (a) joint pain caused by a misaligned joint producing sharp pain on movement (active or passive); (b) overactive or spastic muscle pain (i.e. deep pulling pain on movement; (c) diffuse pain from altered sensation due to stroke (i.e. constant ache around the shoulder); and (d) reflex sympathetic dystrophy diffusely involving the whole limb and shoulder. HSP can be prevented by attention to handling and position, especially in those with flaccid arms early in stroke recovery. Drug therapy may require only simple analgesics or specific anti-spasticity medication such as baclofen. Local steroid joint injections may be helpful for adhesive capsulitis.[28] Transcutaneous electrical nerve stimulation (i.e. TENS) may relieve pain to enable passive movement around the joint and improve functional range for purposes of dressing and hygiene. Referral to a physiotherapist for shoulder mobilisation followed by a home programme, performed either by the patient or family, is the treatment of choice.

Wrist and hand flexion

Wrist and hand flexion contractures develop in the hemiplegic wrist and hand. A fixed flexion contracture of the hand interferes with restoration of hand function. It can be painful and often unsightly. Prevention with regular range of motion exercises and positional splints is the key to management. Splints should maintain a gentle stretch on flexor muscles, keep the wrist in 20°–30° of extension and should not increase spasticity.

Psychosocial complications of stroke

Psychosocial complications of debilitating stroke, which are very common, almost inevitably have a profound impact on the patient as well as their immediate circle of family and friends.

Post-stroke depression

Depression is extremely common after stroke, and the diagnosis is frequently missed.[29-31] Treatment can have a dramatic effect on recovery and quality of life. Up to 70% of stroke patients experience low mood after stroke and 25%–30% show significant post-stroke depression.[32] Depression is not predicted by the stroke subtype or lesion site but is particularly common in the aphasic patient. There are many different assessment tools and scales, including the Geriatric Depression Scale, Hamilton Depression Rating Scale and Patient Health Questionnaire-9. The Visual Analogue Self-Esteem Scale can be helpful to assess mood in some aphasic patients. Prompt identification and treatment improves outcome. Nonpharmacological therapy, including counselling, is helpful but often underused.

Most classes of antidepressants appear to be safe for post-stroke patients. Selective serotonin reuptake inhibitors (SSRIs) are commonly used.[33] If possible, drug treatment should be in conjunction with psychological therapy or counselling. Referral to a psychiatrist can be considered in resistant cases.

Emotional lability

Emotional lability describes excessive crying and/or laughing to trivial or no obvious stimuli in the absence of depression, and is also known as pseudobulbar affect, most common after bilateral anterior frontal cortical lesions or subcortical disease leading to white matter tract disruption and bilateral frontal cortical disconnection. Crying alone can be mistaken for depression, although it can coexist with depression. There is some evidence that emotional lability can be treated with SSRIs, and a therapeutic trial is often worth trying for a couple of months but should be stopped if no benefit is seen. A Cochrane review concluded that there was some evidence that antidepressants helped but no particular drug or drug class was superior.[33]

Mood/emotional changes

Emotions such as frustration, anxiety, anger, apathy and lack of motivation may be hard to control, especially right after a stroke. Some changes are a result of the actual injury and chemical changes to the brain caused by the stroke. Others are a normal reaction to the challenges, fears and frustrations that one may feel in trying to deal with effects of the stroke. Often, acknowledging these feelings when talking about the effect of the stroke helps stroke survivors to deal with these emotions.

CONCLUSION

In conclusion, many stroke victims develop a variety of medical, musculoskeletal and psychosocial complications months to years after a stroke. These complications can add to the original disability imposed by the stroke. The primary care physician, who is in an ideal position to deal with these complications, is often called upon to do so. Because stroke is a common disorder, primary care physicians can help their stroke patients by understanding the potential complications that can arise following a cerebrovascular event.

TAKE HOME MESSAGES

1. Stroke is the third commonest cause of death in developed nations and leading cause of adult disability worldwide.
2. Patients who had a stroke are four times more likely to have another stroke, and preventative measures, including antithrombotic therapy, treatment of hypertension and diabetes mellitus, elevated LDL cholesterol and triglycerides levels, anticoagulation for AF, and cessation of smoking, can reduce stroke recurrence rates.
3. The late complications of stroke can be grouped into medical, musculoskeletal and psychosocial domains.
4. Attention to bowel and bladder problems can lead to significant improvements in the patient's life.
5. Measures such as analgesia, positioning/splinting of limbs and referral for physiotherapy can reduce complications and improve participation in rehabilitation and outcomes.
6. Screening and appropriate early treatment of post-stroke depression and mood disorders are known to improve participation in rehabilitation and chance of recovery.
7. The Singapore National Stroke Association provides education and support for stroke patients and their family in community.

You recognised that Nancy's father had developed late complications of stroke: painful hemiplegic shoulder with post-stroke depression. You started him on regular analgesia and antidepressants, and made a referral for physiotherapy. He started attending outpatient physiotherapy once a week. On review a month later, his pain was much better, he was participating in rehabilitation and his mood had improved. Nancy was very happy with her father's progress and thanked you for your good care.

ABSTRACT Despite a decline in mortality from stroke, the annual incidence in the general population is increasing. For many stroke survivors and their families, the acute stroke is the beginning of an ongoing struggle with physical impairment and subsequent disability. Over time, the immediate clinical consequences of the stroke are complicated by a variety of lesser-known medical, musculoskeletal and psychosocial difficulties. The primary care physician is best positioned to optimise chronic disease control, reduce risk and manage complications of stroke. Early screening and appropriate management is key. Instituting secondary prevention and attention to bowel and bladder problems can help reduce medical complications and re-admissions, while adequate analgesia, positioning/splinting of limbs and physiotherapy can lessen discomfort and preventable suffering. Primary care physicians can identify and treat post-stroke mood issues and involve psychological counselling for patients and caregivers. Adequate education and support may restore the independence of patients with stroke or minimise any resultant dependency.

Keywords: complications, primary care, psychosocial, rehabilitation, stroke

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SINGAPORE MEDICAL COUNCIL CATEGORY 3B CME PROGRAMME

(Code SMJ 201912B)

		True	False
1.	Stroke is the third commonest cause of death in developed nations and is predicted to remain as one of the top three causes of death worldwide in 2040.	☐	☐
2.	In 2017, 7,741 stroke patients were admitted to Singapore public hospitals (about 21 per day) with 759 deaths.	☐	☐
3.	Secondary stroke preventative measures include antithrombotic therapy, treatment of hypertension and diabetes mellitus, reduction of elevated cholesterol and triglyceride levels, anticoagulation for those with atrial fibrillation, and cessation of smoking.	☐	☐
4.	Seizure as a complication after stroke can occur in one of 20 stroke survivors, with most occurring after two years of the index stroke.	☐	☐
5.	Prophylactic anticonvulsant medication for the first six months is recommended for all patients with an ischaemic stroke.	☐	☐
6.	Following stroke, 25% of patients experience urinary incontinence at discharge and 15% are still incontinent at one year.	☐	☐
7.	Clinical management of urinary incontinence includes treating or optimising underlying reasons, particularly urinary tract infection, drugs and faecal impaction.	☐	☐
8.	An indwelling catheter should be the last option for persistent incontinence after considering anticholinergic medications, an external catheter in men or diapers in women, and intermittent catheterisation.	☐	☐
9.	New-onset faecal incontinence after stroke is not common, occurring at an incidence of less than 15% of patients acutely, 5% at 7–10 days and 3% at three months.	☐	☐
10.	The impact of faecal incontinence is always devastating, including poor self-image, depression, carer stress and reduced rehabilitation participation.	☐	☐
11.	Advice and management of faecal incontinence should include a pharmacological bowel programme and non-pharmacological skin care, pads, faecal collectors or anal plugs.	☐	☐
12.	By preventing stroke, we can help to reduce the risk of vascular dementia in our patients.	☐	☐
13.	Stroke patients often complain about the pain associated with musculoskeletal problems (e.g. spasticity), which may develop weeks to months later.	☐	☐
14.	Symptoms related to spasticity are present in up to 20% of stroke patients.	☐	☐
15.	Focal treatment of spasticity with botulinum toxin is non-selective and commonly associated with generalised weakness and functional loss.	☐	☐
16.	Hemiplegic shoulder pain is common and typically occurs within 2–3 weeks after a stroke with hemiplegia.	☐	☐
17.	Hemiplegic shoulder pain can be classified into four types: joint pain caused by a misaligned joint producing sharp pain on movement; overactive or spastic muscle pain; diffuse pain from altered sensation due to stroke; and reflex sympathetic dystrophy.	☐	☐
18.	Less than 20% of stroke patients experience low mood after stroke, and only 10% show significant post-stroke depression.	☐	☐
19.	Emotional lability, or pseudobulbar affect, presents with excessive crying and/or laughing in response to trivial or no obvious stimuli in the absence of depression.	☐	☐
20.	Acknowledging the emotional changes (e.g. anxiety and anger) might help stroke survivors to deal with these emotions.	☐	☐

Doctor's particulars:

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