



Stroke rehabilitation intervention in the short and long term

Stroke rehabilitation delivered by specialist multidisciplinary teams should be available early and delivered intensively to improve outcomes in suitable patients. GPs may be confronted with ongoing problems such as increasing limb spasticity and the effects of cognitive and emotional sequelae after stroke.

JOHN OLVER

MB BS, MD, FAFRM(RACP)

FRANCES WISE

MB BS, PHD, FAFRM(RACP)

Professor Olver is a Rehabilitation Physician and holds the Victor Smorgon Chair of Rehabilitation Medicine in the Department of Medicine at Monash University and Epworth Healthcare, and is also Chairman of the Clinical Institute of Rehabilitation, Psychiatry and Pain Management, Epworth Healthcare, Melbourne. Dr Wise is a Senior Rehabilitation Physician at the Epworth Monash Rehabilitation Medicine Unit, Melbourne, and the Cardiac Rehabilitation Unit, Caulfield Hospital, Melbourne, Vic.

Each year about 48,000 Australians are affected by stroke, with 50% of patients being over the age of 75 years. About one-third of these patients will have ongoing disability and loss of function for which they will need continuing support. Up to 45% of Australians who have a stroke will be transferred to a stroke rehabilitation unit for inpatient therapy.¹

It is likely that the ageing population in Australia will increase pressure on acute and community-based rehabilitation resources in the future.

Rehabilitation and the team approach

Rehabilitation medicine is a medical specialty concerned with the diagnosis, evaluation and treatment of persons with limited function following an acute illness such as a stroke. It emphasises maximal restoration of the physical, psychological, social and vocational functions of the person, the maintenance of health and the prevention of secondary complications of disability.

Rehabilitation after stroke is usually delivered

IN SUMMARY

- Stroke affects about 48,000 Australians each year, with 50% of patients being over the age of 75 years and 45% being referred for rehabilitation.
- Early and intensive rehabilitation in specialist stroke rehabilitation units with multidisciplinary therapy teams has been shown to improve functional outcome.
- Poststroke spasticity should be treated aggressively to reduce the likelihood of joint contractures, pain and loss of mobility in the arms or legs.
- The GP will have an ongoing role in risk factor modification and in managing long-term problems. Assistance can be sought in the longer term from stroke support agencies or the rehabilitation team.

by an interdisciplinary team that typically consists of a:

- rehabilitation physician
- nurse
- dietitian
- physiotherapist – manages the physical consequences of stroke, which may include problems with movement and speed of movement in paretic limbs, spasticity or problems with balance and co-ordination
- occupational therapist – focuses on treating the effects of physical and cognitive problems on day to day function including personal, domestic and community activities of daily living
- speech pathologist – assesses language functions (Figure), treating dysarthria and receptive and expressive dysphasias, as well as broader communication functions such as conversational skills, comprehension and expression in all areas, including reading and writing
- neuropsychologist – performs cognitive assessment that includes memory, concentration, speed of thinking, planning and problem-solving, and monitors the patient's behaviour and emotional response to the stroke
- social worker.

Therapy is co-ordinated to achieve the patient goals of maximising physical, psychological, social and vocational functions, during inpatient, outpatient and community-based treatment.

Physical deficits, such as an inability to walk safely, often lead to a referral for inpatient care. Patients, however, must have the cognitive ability and physical endurance to participate in the learning processes, which are an essential part of a rehabilitation therapy program, and manage at least three hours of therapy a day. The length of a rehabilitation program (in both the inpatient and outpatient phases) can vary widely, but one study identified that after a mild stroke the best functional outcome is reached at eight weeks, after a moderate stroke at 13 weeks and after a severe stroke at 17 weeks.²

In the rehabilitation process, the treating rehabilitation team aims to:

- aid the restoration, at least in part, of patients' lost or impaired function and facilitate increased activity and participation in their

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Figure. A speech pathologist working on sentence formation with a patient who has had a stroke.

previous lifestyle

- teach patients new ways of coping with residual disability as the recovery process plateaus
- educate patients and their families about stroke and risk factor modification.

Recovery from stroke and indicators of outcome

Longitudinal studies have shown that early recovery in the first weeks after a stroke is likely to reflect the resolution of oedema, regained function in noninfarcted penumbral tissue, resolution of diaschisis (loss of function and electrical activity in an area remote from the lesion but neuronally connected to it), and recovery of neurotransmission in spared tissue near and remote from the infarct. This spontaneous neurological recovery can be influenced by early rehabilitation therapies.

Later recovery at longer than three months is more reliant on learning adaptive responses, which are a focus of therapy programs at this time. One study examined 101 patients with their first stroke in the middle cerebral artery territory, a middle cerebral artery stroke.³ At 16 weeks after stroke, eight measures of motor recovery, visuospatial ability, walking and arm dexterity were taken. These measures were combined in a regression model with time from stroke and other variables such as age, gender and type or hemisphere of stroke. Time elapsed from the stroke explained 25% of upper-limb changes, and 33% of lower-limb changes, and overall spontaneous recovery

accounted for 16% of improvements in body function over the first six to 10 weeks after the stroke. The results suggested that observed progress after three months is strongly dependent on learning adaption strategies.

In the acute setting, patients who have had a stroke are assessed for their suitability to successfully participate in a rehabilitation program. Early accurate prediction of outcome enables the setting of realistic and obtainable goals and facilitates good early discharge planning, anticipating the need for community supports or home modifications.

In an evidence-based literature study of prognostic indicators of outcome after stroke, 26 papers were identified that met the inclusion criteria and reviewed a total of 7850 patients.⁴ Urinary incontinence was the only prognostic indicator of poor outcome found in three studies with level A evidence. Other factors with level A evidence were:

- initial disability in activities of daily living and ambulation
- older age
- severe paresis or paralysis
- impaired swallowing
- apraxia and visuospatial problems
- complications of ischaemic stroke, such as oedema and bleeding.

In most studies a lack of social supports is also cited as a poor prognostic indicator.

Early rehabilitation after stroke

Early commencement of rehabilitation is generally acknowledged to be of significant benefit to stroke survivors. The ongoing A Very Early Rehabilitation Trial (AVERT) is reporting that early rehabilitation is safe and that it may reduce symptoms of depression in the first week after stroke.⁵ A Taiwanese study evaluated outcomes in 154 patients after stroke and also showed that early and intensive rehabilitation is associated with better functional outcomes at discharge from inpatient rehabilitation.⁶

An important component of early rehabilitation after stroke is mobilisation. It reduces the morbidity from complications of prolonged immobilisation such as chest infections, urinary tract infections, deep vein thrombosis, shoulder pain, joint contracture and pressure areas. Pressure areas are usually located over bony prominences, such as the coccyx, hips, sacrum and heels. Each of these complications can add to the inpatient length of stay while recovery occurs and can decrease an individual's ability to actively participate in rehabilitation therapy.

In Australia, a patient who has had a stroke will stay in an acute stroke unit for an average of one to two weeks. Then, if appropriate, the patient will be referred for inpatient rehabilitation where the average length of stay will be between two and four weeks. Outpatient and community-based programs may then follow (typically for up to 12 weeks) but the availability of such programs can vary widely between regions and, in particular, between city and rural locations.

Following discharge from rehabilitation programs, problems can emerge for which patients will seek advice from their GP. Some inpatient units can offer short readmissions with targeted longer-term outcomes. Most rehabilitation units in the cities and some in regional areas have outpatient assessment teams or therapy in the home programs that can organise reassessment of the patient and further treatment for emerging problems.

Poststroke spasticity - a longer-term problem

Poststroke spasticity can cause increasing difficulties for patients in the months after a stroke. The GP may be the first doctor consulted about the problem. This condition, characterised by overactivity in muscles, can manifest to the patient as increased stiffness and resistance to movement in the affected arm or leg, which can lead to a loss of function in that limb. Patients can also experience

muscle spasms and, if untreated, post-stroke spasticity can lead to joint contracture. Prolonged spasticity in muscles with a reduction of movement can lead to muscle weakness.

The mainstay of treatment for patients with poststroke spasticity is physiotherapy where the aim is to stretch the affected muscles, strengthen both the affected and antagonist muscles, and retrain normal patterns of movement. Early referral to a physiotherapist may help avoid the longer-term problems of joint contracture with consequent loss of mobility and function in limbs. Where spasticity is more severe, physiotherapy treatment may also include splinting of affected limbs and serial casting to increase the range of movement of contracted joints.

Oral medications such as baclofen and dantrolene sodium are usually not helpful in treating focal spasticity and can cause unwanted side effects such as generalised weakness.

There is now good evidence that the pharmacological agent botulinum toxin A can reduce spasticity in muscles.⁷ After stroke, much of the spasticity is focal in nature and there is emerging evidence for functional gain after the injection of botulinum toxin A into the affected muscles. This treatment should be considered as an adjunct to physiotherapy treatment protocols and patients should ideally be referred to multidisciplinary 'spasticity clinics' for management of their spasticity.

Depression after stroke

Depression is said to occur in up to 40% of patients in the first six months to one year after stroke.⁸ Depression is more likely to occur in patients with a past history of depression, in those with a damaged left frontal lobe or in patients lacking a social support network. Depression can significantly interfere with a patient's ability to participate in rehabilitation therapies and can lead to less favourable functional outcomes. Treatment often involves the

use of antidepressant medication. Selective serotonin reuptake inhibitors have a good profile of effectiveness, safety and tolerability in patients with poststroke depression and are, therefore, used as first-line drugs in the treatment of these patients.⁹ In cases where adjustment to ongoing disability is a predominant issue, referral for clinical psychological counselling can also be helpful.

Emerging interventions

Newer treatment modalities in stroke rehabilitation continue to be developed. Some developments involve changes in physiotherapy approaches, with mixed results. For example, a motor relearning program (with a greater focus on task-oriented strategies) was evaluated in Norway and compared with Bobath therapy (focused on improving posture and movement to enable better functioning)

in 61 patients after stroke.¹⁰ The group using motor relearning had a reduced hospital stay, better physical outcomes and appeared to confirm efficacy of the concept of a task-specific repetitive approach. However, at four years after stroke there was no functional difference between the two groups, and the authors emphasised the importance of longer-term physical training.

Other recent developments in treating patients affected by the consequences of stroke involve new technologies. However, the benefits are again variable. For example, there is now increasing availability of robotic equipment for paretic upper and lower limbs, which aim for early mobilisation and functional improvement by mechanically based repetition of movement patterns. A Cochrane review has found the evidence for functional improvement after body

weight-supported treadmill training to be inconclusive with no statistically significant difference between treadmill training and other interventions.¹¹ In people walking independently, it may increase walking speed. There are limited data to support benefit in those not walking at the start of treatment.

Another emerging therapy that is being evaluated in rehabilitation is repetitive transcranial magnetic stimulation (rTMS). rTMS may be applied at low frequency (1 Hz) over the unaffected hemisphere in order to restore inhibition, or at high frequency (>5 Hz) over the affected hemisphere in order to reactivate hypoactive regions. Limited studies have shown functional recovery was obtained in patients with poststroke motor deficit, visual neglect or aphasia. Further evidence is required to evaluate its longer-term benefits.

Electrical stimulation has been used by physiotherapists in the rehabilitation of patients with hemiparetic limbs and by speech pathologists in patients with Bell's palsy. However, the use of electrical stimulation for facial palsy after stroke is still controversial and an emerging area for research.

Many patients with persisting deficits ask their medical practitioners about stem cell therapies but as yet there is no convincing evidence for neuronal replacement after stroke.

Common information needs of stroke patients and their families

The most common issues that patients and relatives wanted to know about after stroke include:¹²

- risk factors and causes of stroke
- availability of local services and support groups
- financial advice
- guidance on driving and transport
- medication and secondary prevention
- understanding of an agreed care plan
- advice on return to work and leisure activities
- discussion of sexual issues.

Some of these issues can remain outstanding after rehabilitation intervention and may need to be addressed by the GP. The effects of ongoing cognitive problems or emotional problems such as poststroke depression can have a large impact on patients and their families in the longer term.

Organisations in Australia such as the National Stroke Foundation have information packages, fact sheets and other information resources available, or the patient can be referred back to the local rehabilitation team to source ongoing help in these areas. For example, social workers can assist patients with ongoing financial issues such as applying for disability support pensions or help with accommodation and respite options. Occupational therapists can perform driving assessments and advise the patient

regarding any car modifications required. They are also involved in helping patients with plans for return to work. The psychologist can help both patients and their families with adjustment difficulties in the longer term after stroke.

Conclusion

Stroke rehabilitation in specialised stroke units, and involving multidisciplinary teams, has been shown to improve patients' functional outcomes. Not all patients have the cognitive ability or physical endurance after stroke to actively participate in rehabilitation therapies and improve their level of independence.

Ongoing physical problems such as poststroke spasticity and cognitive and emotional problems can continue to have an impact on an individual's function over time and may be the presenting problem in a general practice consultation. Referral to stroke support agencies or back to the rehabilitation team who initially treated the patient may assist the GP in the management of these long-term issues. Robotics and transcranial magnetic stimulation are examples of emerging therapies that hopefully will improve outcome after stroke in future. **MT**

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