



Stroke Network

Southwestern Ontario

Serving Erie St. Clair and South West LHINs

Stroke Rehabilitation Unit Orientation

2021

Module 2: Stroke Rehabilitation Management

Learning Objectives

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

- Understand the rehabilitation philosophy
- Describe stroke unit best practice care
- Outline composition and roles of the interprofessional stroke team
- Describe essential practices in stroke rehabilitation programming
- Be aware of common assessment tools
- Understand post-stroke complications, their assessment and treatment

Please refer to the following content when reading this module:

1. Canadian Stroke Best Practice Recommendations, Rehabilitation
<https://www.strokebestpractices.ca/recommendations/stroke-rehabilitation>





Rehabilitation Philosophy

According to the World Health Organization, rehabilitation is a process aimed at enabling people with disabilities to obtain and maintain their optimal physical, sensory, intellectual, psychological and social functional levels through the provision of the tools they need to attain independence and self-determination (World Health Organization, n.d.).

Individuals who have experienced a stroke may require rehabilitative care as a result of the deficits acquired from their stroke. It incorporates a broad range of interventions that address one or more of medical and/or clinical care needs, therapeutic needs, and/or psychosocial needs.

The outcome of rehabilitative care will include maintenance or sustaining of functionality, restoration of functionality and/or development of adaptive capacity (Rehabilitative Care Alliance, 2014).

Stroke Rehabilitation Unit Care

A geographically defined stroke unit and specialized team provide the best care according to research evidence (Lindsay, Suddes, Gubitz, Bayley, & Phillips, 2013).

The benefits of specialized stroke unit care are substantial. As compared to general rehabilitation units, coordinated and organized rehabilitation care in a stroke unit has been shown to reduce mortality and hospital length of stay and to increase functional independence and quality of life. (Hebert, D., et al., 2016)

According to the *Canadian Stroke Best Practice Recommendations (CSBPR)* (Teasell et al., 2020b), there is strong and compelling evidence in favour of admitting patients with moderate and severe stroke to a geographically defined stroke rehabilitation unit staffed by an interprofessional team. Death and disability are reduced when post-acute stroke patients receive coordinated, interprofessional evaluation and intervention on a stroke rehabilitation unit. For every 100 patients receiving organized inpatient interprofessional rehabilitation, an extra five return home in an independent state (p. 20).

Specialized staff are properly equipped and trained to provide care on the individual stroke unit. The team collaborates closely and cohesively to provide optimal rehabilitation to all patients.

Key features of a stroke rehabilitation unit include:

- Designated staff with specialized expertise in stroke and rehabilitation
- Routine involvement of the caregivers in the rehabilitation process
- Coordinated care from an interprofessional team, including meetings at least once each week
- Information provided to patients and caregivers
- Regular programs of education and training

Interprofessional Stroke Rehabilitation Team

Specialized rehabilitation teams should consist of *Physicians* (including a physiatrist or physician with expertise/core training in stroke rehabilitation), *Nurses*, *Physiotherapists*, *Occupational Therapists*, *Speech-Language Pathologists*, *Social Workers*, *Recreation Therapists*, *Dietitians*, *Pharmacists* and *Psychologists*.

It is the role of all interprofessional team members to capitalize on shared competencies to ensure that patients have consistent and optimal practice opportunities of their skills to help achieve rehabilitation goals.

Physiatrist

A *Physician* that specializes in rehabilitation and physical medicine, a medical specialty that deals with the evaluation and treatment of patients whose functional abilities have been impaired. The *Physiatrist* can help to improve a person's functional capabilities by medical treatment, monitoring progress, and organizing and integrating the stroke rehabilitation program.

Most Responsible Physician (MRP)

Some sites may have a general or family Physician who monitors the patients' general medical condition.

Physiotherapist

- Assesses and treats motor function including motor control, strength, mobility, posture, gait and balance
- Assesses and treats cardiovascular dysfunction; provides education and training in aerobic exercise
- Provides education to patient and his/her family with regards to transfers, exercises, and walking using proper equipment

Occupational Therapist

- Assesses and treats functional impairments related to changes in motor control, cognition and perception
- Teaches activities or tasks of daily living, including self-care and domestic care activities
- Prescribes wheelchair and/or adaptive devices
- Conducts home assessments to aid with discharge needs

Speech-Language Pathologist

- Assesses and treats communication issues both written and verbal, including reading and auditory comprehension
- Assesses and treats swallowing difficulties, and makes recommendations regarding safe diet texture and consistency

Dietitian

- Assesses nutritional status and requirements, and implements appropriate diet plan
- Provides education to patients challenged with swallowing difficulties, poor appetite, weight loss, obesity and diabetes

Social Worker

- Assists the patient and family in understanding rehabilitation services
- Assesses emotional and mental health of the patient, which may include screening for depression
- Provides emotional and adjustment counseling
- Assesses patient, family and community resources required to facilitate discharge planning

Recreation Therapist

- Assesses leisure interests and abilities, encouraging the use of leisure time to contribute to recovery, and helps patient to return to meaningful activities that are within his/her capabilities and interests
- Educates patient and their family regarding community programs to assist reintegration

Psychologist

- Assesses cognition to see how patient can best learn new information
- Identifies areas of strength and weakness in terms of problem-solving and decision-making and makes recommendations to the team where applicable
- Assesses mental health and treats or makes recommendations as needed

Pharmacist

- Provides consultation for matters related to drug therapy, including patient and family education

Nurse

- Is a key team member as the only discipline present around the clock with the patient
- Facilitates and coordinates the plan of care and education plan for patients admitted to the stroke rehabilitation unit, ensuring an interprofessional approach to patient-centred care
- Plays a key role in medication administration and patient education, particularly around self-management of risk factors, bowel and bladder management

Programming

The *Canadian Stroke Best Practice Recommendations* state the following related to programming (Teasell et al., 2020b):

- Therapy should include repetitive and intense use of patient-valued tasks that challenge the patient to acquire the necessary skills needed to perform functional tasks and activities (section 3)
- The team should promote the practice of skills gained in therapy into the patient's daily routine during inpatient stay (section 3)

Several factors are required to obtain maximum benefit from inpatient rehabilitation:

- Adequate intensity of therapy, including practice of skills outside of therapy time
Early, intensive rehabilitation care for patients helps to improve arm and leg motor recovery, language and communication function, which in turn improves mobility, independence in self-care and participation in leisure activities.

- Task-oriented training
It is important that the rehabilitation therapies be tailored to the tasks that need to be retrained and developed, as well as to the activities of the patient's choice and to their social roles.
- Excellent team coordination
The need for a highly-coordinated, specialized team, who meet regularly to discuss the rehabilitation goals and progress, is also vital.
- Early discharge planning
Early discharge planning, including a home assessment and caregiver training, support and education, is required to identify and remove potential barriers to discharge and facilitate efficient transition back to the community.

Rehabilitation Intensity

Earlier access to and greater intensity of rehabilitation is linked with improved functional recovery and reduced length of stay. Evidence indicates that patients who received total therapy time less than three hours per day had significantly lower total functional gain than those treated for greater than three hours per day (Wang et al., 2012).

According to the *Canadian Stroke Best Practice Recommendations*, once deemed to be medically and neurologically stable, patients should receive a recommended three hours per day of direct task-specific therapy, five days a week, delivered by the interdisciplinary stroke team; more therapy results in better outcomes.

According to the Ontario Stroke Network (2014), rehabilitation intensity is defined as: The amount of time the patient spends in individual, goal-directed rehabilitation therapy. This therapy is focused on physical, functional, cognitive, perceptual and social goals to maximize the patient's recovery over a seven day per week period. It is the time that a patient is engaged in active face to face treatment which is monitored or guided by a therapist. Practice of these skills in addition to formal therapy time is an essential role for unit staff.

Triage for admission to inpatient rehabilitation

AlphaFIM® Score		Referral Consideration
Mild	> 80	Community-based rehabilitation
Moderate	40 to 80	Inpatient rehabilitation
Severe	< 40	Admit to inpatient rehabilitation, if eligible, OR consider an alternate program (e.g., restorative care /short-term complex medical) with regular assessment for admission to inpatient rehabilitation.

AlphaFIM® is an abbreviated version (six items) of the FIM® Instrument created to assess function and disability in the acute care setting. See description of FIM® in section Common Assessment Tools.

The rehabilitation team assesses the patient's stroke-related impairments and functional status within 24 to 48 hours of admission.

Integration of the assessment process within the rehabilitation team is essential in order to provide an optimal, efficient experience for the patient (e.g., eliminates repetitive history taking and duplication of testing).



Common Assessment Tools

Comprehensive assessment of a patient's cognitive and functional status conducted within the first few days following a stroke is essential to guide the development of individualized care plans. These assessments should be conducted using a standardized approach with validated tools.

The *Canadian Stroke Best Practice Recommendations* (Teasell et al., 2020b) state that: Clinicians should consider use of standardized, valid assessment tools to evaluate the patient's stroke-related impairments, functional activity limitations, and role participation restrictions. Tools should be adapted for use in patients with communication limitations due to aphasia (section 2.2).

Functional Independence Measure® (FIM®)

This measure provides a uniform system of measurement for disability based on the International Classification of Impairment, Disabilities and Handicaps. It measures the level of a patient's disability and how much assistance is required for the individual to carry out activities of daily living. The FIM® consists of 18 items (13 motor tasks and 5 cognitive tasks) considered basic activities of daily living. When the patient is admitted to inpatient rehabilitation, completion of the FIM® is mandatory and all nurses must be certified. Nurses contribute significantly to the scoring as observers of function over a 24 hour period and have knowledge of pharmacological interventions that may affect the FIM® score.

Tasks are rated on a 7 point ordinal scale that ranges from total assistance (or complete dependence) to complete independence. Scores range from 18 (lowest) to 126 (highest), indicating level of function. Scores are rated at a minimum on admission and discharge.

Dimensions assessed include:

- Eating
- Grooming
- Bathing
- Upper body dressing
- Lower body dressing
- Toileting
- Bladder management
- Bowel management
- Bed to chair transfer
- Toilet transfer
- Shower transfer
- Locomotion (ambulatory or wheelchair-level)
- Stairs
- Cognitive comprehension
- Expression
- Social interaction
- Problem-solving
- Memory

The FIM® provides a measure of burden of care in hours that can be helpful in discussing care requirements with family.

The FIM® cognitive and motor scores, along with the patient's age, generate a Rehabilitation Patient Group (RPG) that primarily reflects severity of disability. Each RPG has a target average length of stay for inpatient rehabilitation ranging from 8 days for those with milder severity (RPG 1150) to 49 days for the most severe strokes (RPG 1100).

The following displays the target average length of stay by RPG, according to the Quality-Based Procedures: Clinical Handbook for Stroke (Acute and Postacute) (Health Quality Ontario; Ministry of Health and Long-Term Care, 2015; page 97):

Rehabilitation Patient Group (RPG)		Stroke QBP Average Target Length of Stay
Severe	1100	48.9 days
	1110	41.8 days
Moderate	1120	35.8 days
	1130	25.2 days
	1140	14.7 days
Mild	1150	7.7 days
	1160	0 days*

* if needs can be met in community

Other Assessment Tools

Berg Balance Scale is a clinical test of a person's static and dynamic balance abilities.

Boston Naming Test is a widely used neuropsychological naming tool to measure confrontational word retrieval in individuals with aphasia or other language disturbance.

Braden Scale is for predicting pressure ulcer risk. This scale includes assessment of sensory perception, moisture, activity, mobility, nutrition, friction and shear.

Chedoke-McMaster Stroke Assessment (CMSA) is used to determine the presence and severity of common physical impairments. It has six dimensions which include the recovery stage of the arm, hand, leg, foot, postural control and shoulder pain.

Montreal Cognitive Assessment (MoCA) assesses cognitive domains. It assesses short-term memory, visuospatial abilities, and executive function. Attention, concentration and working memory are evaluated as well as orientation to time and place.

Morse Fall Risk Assessment and Schmid Fall Risk Assessment are screening tools used to assess a patient's risk of falls based on prior fall history, diagnoses/medications, mobility, and mentation.

Motor-Free Visual Perception Test (MVPT) assesses a person's visual perceptual ability. It is especially useful for those who may have learning, motor or cognitive disabilities.

Oral Health Assessment Tool (OHAT) is a brief oral health status examination.

Patient Health Questionnaire - 9 (PHQ9) is a screening and diagnostic tool that can be used to identify features of depression in at-risk populations including stroke. The PHQ-2 is a shorter version of the PHQ-9 with two screening questions to assess the presence of a depressed mood and a loss of interest or pleasure in routine activities; a positive response indicates further testing is required.

STOPBANG Questionnaire is a screening tool for sleep apnea.

Timed Up and Go (TUG) is a simple test used to measure a person's mobility and requires both static and dynamic balance. It measures the time taken to rise up from a chair, walk three meters, turn around, walk back to the chair and sit back down.

Ten Meter Walk Test assesses walking speed in meters per second over a short duration.

Western Aphasia Battery (WAB) is an instrument for assessing the language function of adults, in order to discern the presence, degree and type of aphasia.

Development of an Integrated Treatment Plan

Development of an integrated rehabilitation treatment plan to achieve goals that are reasonable for an inpatient stay, and a safe and successful discharge, is essential.

The *Canadian Stroke Best Practice Recommendations* (Teasell et al., 2020) state the following: Stroke unit teams should conduct at least one formal interprofessional meeting per week to identify ongoing or new rehabilitation problems, set goals, monitor progress, and plan discharge for patients on the unit. Individualized rehabilitation plans should be regularly updated based on review of patient status (section 2.2).



Individualized Care Plan: The person with stroke, their family and caregivers should be actively engaged in development of an up-to-date care plan:

- i. The care plan should be person-centered; culturally appropriate; include person-centered goals; and defines ongoing individualized care needs.
- ii. The care plan should be reviewed with the person with stroke and updated to reflect changing needs, evolving goals, progress at each transition, when changes and/or improvements in health status occur and when the person is not progressing in recovery (Mountain et al., 2020, CSBPR Section 3.1).

Intentional rounding

Intentional rounding, sometimes known as “hourly rounding” or “comfort rounding”, is a practice that improves patient safety and experience, and reduces call bells. Research also shows it improves clinical outcomes, nursing efficiency, and staff satisfaction. Intentional rounding involves nurses carrying out regular checks on patients to ensure their fundamental care needs are met. Patients are checked every 1-2 hours for the 4 “P’s”:

Positioning – the nurse ensures the patient is comfortable and that tissue breakdown, pressure ulcers and falls are prevented. Pressure ulcer and falls risk assessment tools should be used as appropriate.

Personal needs – the nurse ensures all hygiene, comfort, toileting, dietary and hydration needs are met. Routine scheduled toileting prevents falls and improves bladder function.

Pain – the nurse ensures pain is assessed and treated, asking patients to describe their level of pain on a scale of 0 to 10 and helping in the appropriate ways.

Possessions – the nurse makes sure all necessary items are within easy reach (e.g., fresh water, Kleenex, TV remote control, telephone, and call bell) while considering individual needs and cognitive/perceptual function.

The nurse greets each patient, explains intentional rounding, completes the 4 “P’s” and answers any patient questions. They let the patient know a nurse will return within a specified time and then asks, “Is there anything else I can do for you before I leave?”

Education for Patients, Family and Caregivers

Education for people with stroke, their families and caregivers, is an integral part of stroke care that should be included as part of all healthcare encounters, and during transitions. Individualized educational needs change over time and may need reassessment and updating on an ongoing basis (CSBPR 2020).

'Timing It Right' is an education framework (Cameron & Gignac, 2008) that highlights family caregivers' changing experiences and corresponding support needs across the care continuum.

Phase	Time	Setting	Caregiver Support Needs	Caregiver Outcomes
Diagnosis	Illness onset	Acute	Information: diagnosis, prognosis, treatment options Emotional: someone to talk to Training: not required	Knowledge: survival/prognosis Reduce emotional distress
Stabilization	Illness stabilized	Acute and Rehab	Information: cause, care needs Emotional: someone to talk to Training: initial training to assist with ADL and rehab therapies	Knowledge: awareness about cause Confidence in supporting ADL
Preparation	Before going home	Acute or Rehab	Information: access to community resources Emotional: uncertainty about future Training: practice with ADL skills and rehab therapies	Knowledge: community resources Confidence, self-efficacy in supporting ADL Perceived social support
Implementation	First few months at home	Home	Information: managing care Emotional: coping, adapting Training: to manage care in the home	Self-efficacy in managing care and use of community services Perceived social support
Adaptation	After being home for some time	Home	Information: valued activities Emotional: relational changes Training: community reintegration	Participation in valued activities Psychological well being

Skills training for caregivers may increase participation and safety, clarify expectations, improve quality of life, and reduce depression and perceived burden (CSBPR 2020). With the patient's permission, family members and informal caregivers should be invited and encouraged to attend therapy sessions with the patient, and have their questions addressed. Family and informal caregivers should be taught proper patient care skills and provided with opportunities for demonstration and feedback to ensure safe care delivery for both the patient and informal caregiver (e.g., in transfers from bed to chair, feeding techniques, and positioning of the hemiplegic limb).

Virtual technology may be used to support family/caregiver participation/consultation, education and skills training especially for family unable to attend in person (remote locations or visitor restrictions).

Transition/Discharge Planning

As per the *Canadian Stroke Best Practice Recommendations* (Mountain et al., 2020), transition planning should begin as soon as possible following initiation of care and includes the coordination of all relevant support services, such as home assessments and access to ambulatory and community-based rehabilitation. A transition planning process should be established as a well-organized collaboration between health professionals, the person with stroke, their family, and caregivers. See also Health Quality Ontario's [Transitions Between Hospital and Home](#).

Discharge planning activities should include (Mountain et al., section 3.2):

- Identification of possible transition issues for the person with stroke and their family, and other needs which could potentially delay discharge
- Assessment of caregiver capacity, decision-making ability, and ability to meet the physical and psychosocial needs of the person with stroke
- Home-visits for patients being discharged to the community to identify home modifications required for access and safety
- Family meeting between the interdisciplinary team, patient, and family to set goals of care and expectations for discharge dates, and to identify potential transitional care needs and living setting
- Caregiver training specific to the current and ongoing needs of the individual patient
- Planned and goal-oriented day, overnight and weekend visits to assess readiness for discharge, to identify potential barriers to discharge, and to address psychosocial, emotional, physical, and financial needs of patients and families
- Written discharge instructions as a component of an individualized care plan that addresses the following issues as appropriate: functional ability at the time of discharge, risks and safety considerations, action plans for recovery, medications at discharge and instructions for adjustment, follow-up care, follow-up care provider contact information and information for one point of contact post-discharge
- Post-discharge follow-up plan, initiated by a designated team member, such as a case manager or stroke navigator, to ensure continuity of care that includes identification of, and communication with, key contacts and healthcare providers at the next stage of care, appointment, treatments and contact information to re-access healthcare services as required

Before being discharged, the patient and family or caregiver should be given important information and care instructions, such as:

- A list of medications, how to use them, and what they are used for
- Self-care instructions for both the patient and caregiver
- Contact information for a health care professional who can provide answers to questions
- Warning signs and symptoms to watch out for, including which signs and symptoms should prompt a call to a health care professional and/or a visit to the emergency department

- Changes to the patient’s routine when they return home, including changes to diet and physical activity
- Follow-up appointments, including location, date, time, and confirmation of bookings, or whom to call if appointments are needed but have not yet been scheduled
- Information about resources to support patients and caregivers should be shared verbally and in a written format with the patient and caregivers (e.g., via a patient-oriented discharge summary, or (PODS) before they leave the hospital. Examples of these resources include community-based services, family support services or groups, peer supporters, and respite care.

The healthline.ca is a provincial resource with local content pages that patients and providers can use to assist in discharge planning.

Self-management

Self-management refers to the ability of individuals to manage their health following a stroke to optimize rehabilitation and prevent recurrent stroke. It includes knowledge, skills, attitudes and behaviours to enhance self-efficacy for managing physical, cognitive and lifestyle changes. It involves active participation of the individual, families and caregivers and may include a plan developed collaboratively with healthcare providers.



Key topics in self-management training should include exercise, symptom management techniques, risk factor management, nutrition, fatigue and sleep management, use of medications, managing emotions of fear, anger and depression, cognitive and memory changes, training in communication with health professionals and others, and health-related problem-solving and decision-making. Please refer to the CSBPR [Education and Self-Management Checklist](#).

Self-medication program

A stroke survivor is given responsibility for the self-administration of medications, some of which will be taken chronically. The objective of this program is to teach the patient about his/her medications while still under supervision and ensure he/she is able to manage self-administration independently. A patient and their family are counselled throughout the program by nurses and a *Pharmacist*.

Community Reintegration

People with stroke should be provided with information and/or referral to community-based resources for engagement and self-management for ongoing physical, social, emotional, intellectual, leisure and spiritual activities and participation in the community.

March of Dimes Canada’s [After Stroke](#) is a personalized stroke recovery program that helps survivors and their families navigate the path forward after a stroke.



How does a rehabilitation philosophy differ from the medical model?

Can you think of a patient that you have cared for who may have benefitted more over the long-term from participating in his/her care while you assisted, guided and taught him/her, rather than having their self-care done for them?

Post-Stroke Complications



It is in the rehabilitation setting that a patient may start to experience different complications associated with stroke. These complications could include pain, seizures, depression, spasticity and deep vein thrombosis (DVT). It is important to know these complications and be able to understand what the patient is experiencing. Consult with your team's *Physiatrist*, MRP and *Pharmacist* as needed to support patient care.

Pain post-stroke

Pain post-stroke can be experienced by a patient for different reasons. Pain is any sensation in the body that causes suffering or discomfort.

Literature identifies that 23.9% of stroke survivors experience pain in the first week post-stroke and 53.3% of the survivors report pain as a post-stroke complication they experienced in the first three months and this was exclusive of shoulder pain. Post-stroke pain remains prevalent and survivors should be assessed using a validated tool for pain throughout the continuum of care (acute, rehabilitation and home) for the presence of chronic musculoskeletal and central post-stroke pain. (Registered Nurses' Association of Ontario [RNAO], 2011, p. 17).

Central post-stroke pain

- This type of pain is a neurologic condition caused by damage to the brain and/or spinal cord. There is usually no visible tissue damage noted in the area where the patient experiences the pain.
- The character of this pain may vary in different patients and can sometimes affect a large area or be restricted to a smaller more specific area.
- The pain is usually described as constant with a moderate to severe intensity, and can often be made worse by touch, movement, temperature changes and emotions. The sensation of this pain may be described as burning, aching "pins and needles", tingling or shooting types of pain.
- An individualized patient-centred approach for management of central pain syndromes should be implemented by an interdisciplinary team that includes healthcare professionals with expertise in mental health and central pain management
- Pain medications can sometimes ease some of the pain but not completely relieve the pain. or Anticonvulsants such as neurontin (gabapentin) are the first line of treatment in managing this type of pain. Tricyclic antidepressants or an SNRI may also be helpful.

(National Institute of Neurological Disorders 2011, CSBPR 2020)

Complex regional pain syndrome (shoulder hand syndrome)

- Complex regional pain syndrome (CRPS) is a chronic pain condition most often affecting one of the limbs (arms, legs, hands, or feet), usually after an injury or trauma to that limb. CRPS is believed to be caused by damage to, or malfunction of, the peripheral and central nervous systems. CRPS is characterized by prolonged or excessive pain and mild or dramatic changes in skin colour, temperature and/or swelling in the affected area.
- The key symptom is prolonged pain that may be constant and, in some people, extremely uncomfortable or severe. The pain may feel like a burning or "pins and needles" and may spread to include the entire arm or leg.
- There is often increased sensitivity in the affected area, such that even light touch or contact is painful (called allodynia). People with CRPS also experience constant or intermittent changes in temperature, skin colour, and swelling of the affected limb.

(National Institute of Neurological Disorders and Stroke, 2015)

Spasticity and high tone

Spasticity is classically defined as a velocity dependent increase of tonic stretch reflexes (muscle tone) with exaggerated tendon jerks. It can be observed in typical patterns of flexion and adduction in the upper extremity (closed fist, bent elbow) and extension and adduction in the lower extremity (straight leg with foot pointed down and in). One study reported that 39% of patients with a first-ever stroke were spastic twelve months after their stroke. Spasticity can be painful, interfere with functional recovery and hinder rehabilitation efforts (Teasell et al., 2020a).

Seizures post-stroke

The incidence of seizures following ischemic or hemorrhagic stroke is noted to be highly variable, ranging from a low of 7.7% to a high of 42.8% (Teasell et al., 2020a). At least two studies suggest a higher incidence of post-stroke seizures (15-17 %) in patients in rehabilitation units.

Seizures usually occur during the first 1 to 2 weeks following stroke. Hemorrhagic stroke patients have been found to have an almost two-fold risk of developing a seizure following stroke compared to patients with an ischemic lesion (Teasell et al., 2020a).

Falls

Many studies identify increased risk of injurious falls (e.g., hip fractures) in stroke survivors. The RNO (rev. 2017) guidelines on *Preventing Falls and Reducing Injuries from Falls* identifies screening for fall risk is supported in the research and is important in the identification of fall-prone patients.

Variables known as predictors of falls for persons with stroke include paralysis, history of previous falls, use of psychotropic medicines, and visual impairment (Nakagawa et al. 2008 and Eng et al. 2008).

Due to visuospatial neglect, proprioceptive impairments and attention deficits, persons with right-sided stroke are at increased risk of falling compared to persons with left-sided lesions (Eng et al. 2008). Systematic review identified persons with stroke are at risk for fragility fractures due to immobility, vitamin D deficiency, gender and time since stroke (Eng et al. 2008).

Deep venous thrombosis (DVT) and pulmonary embolus (PE)

Following stroke, the main risk factor for DVT is immobilization resulting in stasis of venous blood. Hyper-coagulability may also contribute in certain subsets of stroke patients.

In the absence of prophylactic treatment, 50-75% of people with dense hemiplegia will develop DVT while 9-15% will have PE, and 1-2% will be fatal.

Incidence of DVTs may be as high as 45% (many are asymptomatic) in acute phase but falls to less than 10% in subacute rehabilitation.

Peak onset of DVT is 2 to 7 days post-stroke.

When DVT causes symptoms, over 80% involve the popliteal or more proximal veins; symptomatic DVTs are rarely isolated distal (calf) DVTs.

Non-extending distal DVT rarely causes PE; proximal (knee or above) DVT often causes PE.

Odds of DVT are 17.6 times greater if bedridden or wheelchair-bound.

(Teasell et al., 2020a)

Post-stroke fatigue

Post-stroke fatigue (PSF) has been identified as an increasing problem for stroke survivors in the first year post-stroke and was judged by between 23% and 59.5% of stroke patients to be one of their worst symptoms (Ponchel et al. 2015). About 30-70% of survivors suffer from fatigue.

The Fatigue Assessment Scale (Smith et al. 2008) has been validated and can be used to measure fatigue in stroke survivors (RNAO, 2005).

Changes to cognitive processing and the presence of aphasia appear to be related to PSF (greater mental effort is required to compensate for these impairment), but inflammatory and physical deconditioning factors may be related as well (Pondel et al. 2015). In the literature, between 29% and 34% of fatigued patients are depressed. Nonetheless, fatigue was observed in 14-50% of non-depressed patients and 30% of fatigued patients did not have any anxious or depressive symptoms (Pondel et al. 2015).

RNAO Nursing Best Practice Guideline Screening for Delirium, Dementia and Depression in Older Adults (rev. 2010, Appendix I, J, K, L) identifies tools that can be considered for use by the nurse and interprofessional team to assess for depression.

Other complications addressed within other modules:

Post-stroke depression: Refer to *Module 10 Mood and Behaviour Changes*

Hemiplegic shoulder pain: Refer to *Module 9 Positioning, Transfers and Ambulation*

Dysphagia and aspiration: Refer to *Module 5 Swallowing, Nutrition and Oral Care*

Urinary tract infection: Refer to *Module 4 Continence*

Assessments for Complications Post-Stroke

Nurses in all practice settings should assess (where feasible, using a validated tool) the stroke survivor's risk for and/or presence of any of the following complications of stroke:

- Fall risk
- Fractures secondary to falls
- Bone loss secondary to immobility
- Fatigue
- Painful hemiparetic shoulder
- Pneumonia secondary to immobility and dysphagia
- Pressure ulcers
- Spasticity/contractures
- Urinary tract infection
- Venous thromboembolism

(RNAO, 2005, p. 14)



Falls

A number of falls risk screening tools are available to identify patients with risk factors who should undergo further comprehensive assessment by the interprofessional team in order to implement targeted falls prevention strategies in the individualized plan of care.

Please refer to the hospital's policies for the tool used at a specific organization (e.g., Schmid Falls Risk Assessment). Findings of any assessment should be used to initiate prevention strategies to prevent the physical and emotional consequences of falls.

Orthostatic hypotension, defined as a drop in systolic blood pressure of 20 mm Hg or more when a person assumes a standing position, is associated with falls and should be considered.

Pain

Nurses in all practice settings should assess and monitor on an ongoing basis the patient's pain severity, quality, and impact on function using a validated tool (e.g., Wong-Baker Faces Pain Rating Scale, Numeric Rating Scale, the Verbal Analogue Scale or the Verbal Rating Scale) (RNAO, 2005).

The choice of the most appropriate scale should be based on the patient's cognitive function and language, and the same scale should be used each time pain is assessed. In the stroke population, it may be necessary to use an observer behaviour checklist if consistency cannot be obtained with a self-report scale. Refer to the RNAO Nursing Best Practice Guideline Assessment and Management of Pain (RNAO, 2013) for a comprehensive description of pain assessment and management (RNAO, 2005).

- Watch for signs that may indicate that the stroke survivor is in pain
- Acknowledge the patient's pain
- Note the location and area of the pain, look for any signs of trauma or breakdown
- Ask the patient to describe the pain
- Complete a detailed pain assessment with a validated tool

DVT

If at least three from the list below are positive, there is an 85% likelihood of DVT:

- Active cancer
- Paralysis, paresis or recent plaster immobilization of lower extremity
- Recently bedridden for more than 3 days or major surgery within 4 weeks
- Localized tenderness along the distribution of the deep venous system
- Entire leg swollen
- Calf swelling is three centimetres greater than the asymptomatic side
- Pitting edema confined to the symptomatic leg
- Dilated superficial veins (non-varicose)

(Teasell et al., 2020a)



Treatments for complications post-stroke

Complication	Clinical points	Nursing monitoring and treatment
Pneumonia	<ul style="list-style-type: none"> Patients with dysarthria and/or dysphagia, significant immobility, reduced level of consciousness, poor oral hygiene are at higher risk 	<ul style="list-style-type: none"> Chest auscultation, respiratory rate, oxygen saturation monitoring and swallowing assessment Monitor for signs and symptoms of pneumonia such as increased oxygen needs, fever, change in sputum and increased respiratory rate
Seizure	<ul style="list-style-type: none"> Prophylactic antiepileptics are not recommended Consider seizures in patients with a depressed or fluctuating mental status out of keeping with the degree of brain injury 	<ul style="list-style-type: none"> Monitor for focal or generalized seizure
Falls	<ul style="list-style-type: none"> Patients with weakness, neglect, and/or lack of insight are at risk of falls 	<ul style="list-style-type: none"> Ensure appropriate safety measures and interventions in place Attempt a toileting routine and monitor for urinary retention (often falls secondary to attempts to walk to washroom)
Skin breakdown	<ul style="list-style-type: none"> Patients who are immobile are at risk of skin breakdown 	<ul style="list-style-type: none"> Mobilize early, frequent position changes If immobile consider pressure relief mattress, ensure wheelchair cushion and other strategies consistently used Promote appropriate nutrition and hydration
Pain	<ul style="list-style-type: none"> Pain is common May include musculoskeletal pain or neuropathic pain 	<ul style="list-style-type: none"> Pain assessments should be performed regularly Give pain meds as ordered as needed especially before patient is going to therapy Reassess effectiveness of the pain medications given and report back to Physician as needed Follow hemiplegic arm protocol to protect flaccid arm
Hemiplegic shoulder	<ul style="list-style-type: none"> Subluxation of hemiplegic shoulder may result in a pain syndrome and/or soft tissue damage 	<ul style="list-style-type: none"> Ensure proper positioning of hemiplegic arm to maintain neutral, supported position (e.g., use pillows in bed, a lap tray in chair, and a sling with standing)

Complication	Clinical points	Nursing monitoring and treatment
Nutritional Deficiency and Dysphagia	<ul style="list-style-type: none"> If symptoms of aspiration present (e.g., coughing after eating/drinking, etc.), keep patient NPO, use IV hydration, and find alternate routes for medications Some patients may be silent aspirators with no overt signs Consider NG feeding tube to ensure appropriate nutrition if there are ongoing swallowing concerns 	<ul style="list-style-type: none"> Bedside swallowing screen assessment should be performed by Speech Language Pathologist or nurse using a valid screening tool if needed to confirm the diet plan Patients with dysphagia and eating a modified diet or receiving enteral feeding are at risk of aspiration pneumonia
Urinary dysfunction (retention or incontinence)	<ul style="list-style-type: none"> Urinary dysfunction after stroke is common Patients with urinary incontinence may have overflow incontinence with large residual urine volumes left in the bladder Use of indwelling catheters should be avoided (unless required for close fluid balance monitoring) 	<ul style="list-style-type: none"> If patient is incontinent: do post-void bladder ultrasound volume assessments to assess for urinary retention If patient is not voiding; do bladder ultrasound to determine appropriate time to perform intermittent catheterization Consider an underlying urinary tract infection if there is complete retention Implement a bladder retraining program
Bowel dysfunction	<ul style="list-style-type: none"> Constipation and incontinence are common if patient is not able to mobilize independently Enteral feeding may cause constipation or diarrhea 	<ul style="list-style-type: none"> Implement bowel management program If patient has diarrhea, ensure elixir medication is not being given (e.g., Tylenol elixir should be changed to tablets)
Poor oral hygiene	<ul style="list-style-type: none"> Patients with difficulty performing activities of daily living may have difficulty performing oral care Results in bacterial colonization in the mouth and higher risk of aspiration pneumonia 	<ul style="list-style-type: none"> Ensure an oral care routine, even if patient is NPO

(Green, Sarro & Tymianski 2012, p. 95)



Think about how one of the above listed complications might impact the hospital stay for one of your patients and change the course of their recovery. How is the role of the nurse critical in identifying and preventing this complication?

What are you passionate or excited about in your role as a stroke rehabilitation nurse?

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