

REVIEW ARTICLE

Rehabilitation of Patients with Stroke - A Review

MA SHAKOOR^a, MS RAHMAN^b, MQH JAIGIRDAR^c, S NAHAR^d, M MOYEENUZZAMAN^e

Summary:

Stroke rehabilitation is a continuum, starting within days of onset and ending only when it no longer produces any positive effects. After a stroke, many patients regain functional independence and some patients become permanently disabled. All patients after stroke need rehabilitation treatment for proper recovery to minimize disability and to improve quality of life. There are many complications after stroke that can be prevented or treated effectively by proper rehabilitation program.

Introduction:

Stroke is a clinical syndrome characterized by rapid onset of focal neurological deficit that lasts more than 24 hours or leads to death and has a presumed vascular cause¹. Although stroke was described by Hippocrates, it is only in the last few decades that it has become the focus of academic investigation. Currently, it is the third highest cause of death (behind coronary artery disease and cancer) and the leading cause of chronic disability in adults in Australia². After a stroke, 50% to 70% of patients regain functional independence; however, 15% to 30% of patients are permanently disabled and 20% require institutional care at 3 months after onset³. In a study of the UK Oxfordshire Committee Project, the average risk of recurrence of stroke in 675 patients following their first stroke was 13% in the first year 15 times the risk in the general

Stroke rehabilitation involves a combined and coordinated use of medical, social, educational, and vocational measures for retraining individuals to reach their maximal physical, psychological, social, vocational, and avocational potential. And a multidisciplinary approach should be taken for proper rehabilitation.

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population and 4% in subsequent years⁴. In patients who survived, the risk of recurrence was 30% by 5 years⁴. This contributes the focuses on secondary prevention of stroke. Rehabilitation is derived from the Latin word “Habile” means-”to make able” and Latin prefix “Re”- means “again”. So, rehabilitation- means- to make able again. Rehabilitation is the utilization of the existing capacities of the handicapped person, by the combined and coordinated use of medical, social, educational and vocational measures to the optimum level of his functional ability.

Interestingly, more recent work suggests that the difference in mortality persists for 5 years,⁵ and even 10 years,⁶ after the acute event of stroke.

Rehabilitation is therefore one common component of all units, with key elements being a coordinated, multidisciplinary team with specific expertise in stroke, a physician with a special interest or dedication to stroke, agreed protocols for best practice and outcome audits, and educational programs for staffs, patients and carers⁷. Rehabilitation should probably begin as soon as possible after the acute event⁸. Most authorities agree that the stroke patients can start sitting up in bed even in a chair beside the bed as soon as the stroke has stabilized⁹. Program after 1 month requires a prolonged rehabilitation program with or without satisfactory results. Some of the author said that rehabilitation should begin as soon as possible after the acute event⁹.

Aims of this review:

In this article, we aim to provide an overview of the role of rehabilitation in the management of stroke to improve the quality of service for the stroke patients. For convenience, we will discuss rehabilitation sequentially.

- a. Dr. Md. Abdus Shakoor, FCPS, Assistant Professor, Department of Physical Medicine and Rehabilitation, BSMMU, Dhaka.
- b. Dr. Md. Shahidur Rahman, FCPS, Assistant Professor, Department of Physical Medicine and Rehabilitation, BSMMU, Dhaka.
- c. Dr. Md. Qamrul Hassan Jaigirdar, MD, Associate Professor, Department of Dermatology and Venerology, BSMMU, Dhaka.
- d. Dr. Shamsun Nahar, FCPS, Associate Professor, Department of Physical Medicine and Rehabilitation, BSMMU, Dhaka.
- e. Prof. Dr. Md. Moeenuzzaman, FCPS, Professor and Chairman, Department of Physical Medicine and Rehabilitation, BSMMU, Dhaka.

Address of correspondence: Dr. Md. Abdus Shakoor, Assistant Professor, Room No-129/A, Block – C, Department of Physical Medicine and Rehabilitation, Bangabandhu Sheikh Mujib Medical University, Shabag, Dhaka-1000.

Aims of rehabilitation:

The aims of rehabilitation are as follows:

to improve mobility, to ensure self transfer, to improve activities of daily living (ADL), to manage complication of stroke, to minimize the impairment, to prevent recurrence, secondary complication & deterioration, to maximize patient's participation in their social setting, to minimize patient's distress, to maximize quality of life, to minimize distress and stress of the family and/or carers, to return to his/her previous physical and mental status and to return to his/her own occupation¹⁰.

Assessment of the patients for medical rehabilitation:

For proper rehabilitation program a stroke patient should be assessed first for evaluation of the condition and a checklist should be made for management of the disabilities¹¹. It is strongly recommended that a rehabilitation assessment is undertaken within 24–48 hours of admission to a stroke unit⁷. Early evaluation of swallowing and the establishment of safe feeding is critical, as aspiration (which is silent in up to 40% of patients) may lead to pneumonia and increased mortality^{12,13}. The assessment tools can be used are: for motor deficit the Motricity Index, for hemineglect-Star cancellation, for aphasia- the Frenchay Aphasia Screening test, for brief cognitive screening the Short Orientation Memory Concentration Test and the most widely used measures of disability (activity) are- the Barthel activities of Daily Living Index & the Functional Independence Measures¹⁰.

Where rehabilitation should be provided:

Once the decision has been made to offer rehabilitation, the second question to be answered is where should it be provided? The answer is: it can be provided in specialist inpatient, outpatient or home-based services. Important factors to take into account include the dependence of the patient (the need for 24-hour nursing care or supervision usually precludes home management), and how much support is available at home. The wish of the patient and family must also always be respected; patients who live in extended families often prefer to be in the home environment. Some of the individual studies reviewed by the Cochrane Collaboration did show change: three studies suggested higher levels of patient satisfaction, and specifically reported that patients felt more involved in planning

their rehabilitation programs if they were treated at home¹⁴⁻¹⁶. In addition, one study¹⁷ reported the important finding that, carers at home developed more "stress" at 6 months, but this was detected only by one of the three tools used (the 36-item Short-form Health Status survey [SF-36]), and the difference was not present at the 12-month follow up¹⁸. Of concern in this regard is a British study that found a higher mortality rate at 3, 6 and 12 months in patients receiving home-based rehabilitation than in those admitted to a stroke unit¹⁸. However, patients in that study were transferred to home care shortly after admission to the acute hospital, whereas most Australian units provide inpatient and home-based rehabilitation sequentially².

Rehabilitation program:

Selection of patients for rehabilitation: About 20% of patients die in the first month after stroke, and more than half of the survivors will require specialist rehabilitation¹⁹. Medical instability is best managed by a longer stay in a medical ward and if the patient is assessed as unlikely to make any functional improvement, residential placement may be the best option. In the later case, close liaison with the geriatric team is essential, particularly for older patients with severe dementia. Neither of these options, of course, excludes later rehabilitation (there is some evidence, for example, that rehabilitation may still be beneficial several years after a stroke²⁰) and regular monitoring by the rehabilitation physician is often appropriate to select those patients who may require intermittent therapy to maintain or improve function. There are many complications after stroke such as bedsores, contracture, sensory deficits, spasticity, stiff shoulder, deep vein thrombosis, in-coordination, bowel & bladder dysfunction, urinary sepsis, language disorder, visual field deficits, motor deficits etc. These can be prevented and/or managed by the following ways-

Bed positioning: Bed positioning is very important for prevention of contracture and to prevent other complications of stroke. Patient's position should be in normal anatomic alignment of head, trunk and limbs⁹. Affected limb such as upper limb should be 90 degree abducted at the shoulder, elbow should be extended or 90 degree flexed and fingers should be extended. A hand roll or dorsal cockup splint can be used to prevent flexion contracture of the hand⁹. For lower limb, trochanteric

roll/support should be used to prevent external rotation of the hip. A foot board/foot splint may be used to prevent stiffness of the ankle in dorsiflexed position²¹.

Bedsore: The patient with stroke cannot change his position in bed frequently and as such decubitus ulcer may develop. Usually pressure sore develops on the skin covering the bony prominences such as greater trochanter of hips, sacrum, heel and scapula. To prevent bedsore, change of posture of the patient should be done regularly, rubber ring or refill bed (air bed/water bed) can be used. When bedsore develops, it can be managed by regular dressing, antibiotic (local and systemic) and ultraviolet ray (UVR). Good nutrition should be maintained and if necessary anemia should be corrected by blood transfusion⁹.

Contracture: Contracture often enhances spasticity and can greatly interfere with ambulation and self-care. The nursing personnel play an important role to prevent contracture by proper positioning of the more affected limbs in-bed. If contracture has already been developed, it can be treated by passive range of motion (PROM) exercises, stretching exercises and splinting⁸.

In-coordination: In-coordination associated with spasticity may be due to involvement of the cerebellar tracts. Coordination exercise, gait retraining and infrared therapy may be applied to improve the condition.

Sensory deficits: In stroke patients, there is a tendency to recognize all stimuli as pain. Reassurance and gentle handling of the patient along with physiotherapeutic measures may help to reduce the problem.

Stiff shoulder: Pain and stiffness of the shoulder is a common problem of post-stroke patients. There is often severe pain, stiffness and adduction deformity of the affected shoulder. Lack of early mobilization of the joint is the main cause for this complication⁸. Stiff shoulder can be prevented by proper mobilization and positioning of the patients. Bed positioning, gentle range of motion (ROM) exercise, ultrasound therapy (UST), transcutaneous electrical nerve stimulation (TENS) and microwave diathermy (MWD) can be used to treat this condition. Shoulder mobilizing exercise is a very popular exercise to treat stiffness of shoulder joint.

Bowel dysfunctions: Bowel incontinence, constipation and focal impaction are frequently found in stroke patients due to inadequate fluid intake, limited movement

or lack of movement and psychological disturbance. Management can be done by timed toileting schedule, increasing intake of dietary fiber and adequate fluid, stool softeners, suppositories/enemas, training in toilet transfer, communication skills and judicious use of laxatives²².

Bladder dysfunctions: After the onset of stroke, the presence of urinary incontinence may be due to confusion, communication disorder, flaccid distended bladder or incontinence involving dribbling overflow. Continuous Foley's catheterization, clean intermittent self catheterization (CISC), bladder training program, Cred's valsalva maneuver, abdominal compression, abdominal percussion and surgery may be required to treat this condition²².

ADL and self-care training: ADL and self care training should be started early when the patients are still in bed. Care for the personal hygiene, dressing and undressing to bathe and also to transfer to the toilet. Finally when the patients achieve standing balance and learn to rearrange clothing before and after using the toilet.

Home making and occupational therapy: It is very important for the female patients to work in the kitchen to manage the personal and home making work. Occupational therapist may guide and retrain the patient in this matter. The occupational therapist will visit the home of the patient and advice for modification as required for the particular patient²².

Gradual rehabilitation for mobility and transfer (Gait retraining): Mobilization should be started from the very beginning of stroke. If the patient is unconscious, passive range of motion (PROM) exercise should be given gently. But for meticulous gait training program, patient should fulfill some preconditions such as- patient should be conscious, has no postural hypotension, muscle power should be grade-3, adequate knee and hip extension should be present, sitting & standing balance should be possible, should be corrected, foot drop, patient should remember what he heard yesterday and can do today what he learnt yesterday. Gait retraining should be given gradually according to the condition of the patient. Steps of gait retraining are: 1) standing on healthy limb, 2) weight shifting to affected limb, 3) side walk, turning, gait drill, 4) parallel bar without steps, 5) parallel bar with steps, 6) crutch, four footed

cane, 7) three/ two footed cane, 8) one ended cane, one stick, 9) without any support, 10) walking on foot print (co-ordination) and 11) walking with some obstacles²².

Speech and language disorders: Approximately one-third to one-half of stroke survivors experience speech and language disorders²³. Speech therapy, functional communication treatment and melodic intonation therapy may be given to improve the condition. For aphasia verbal or non-verbal materials and techniques can be used such as pronouncing words and sentences, repetition, sentence completion, gestures, pictures and photographs¹⁰.

Psychological aspect: Psychological factors play a significant role in determining functional outcome following stroke. An important complication is post-stroke depression, with a high incidence of more than 60% noted by Robinson et al²⁴. Nearly two decades ago. More recently, depression has been shown to affect the functional outcome of a stroke, perhaps providing a reason for more aggressive treatment of depression after a stroke²⁵. Anxiety may be even more common, but prescribing anxiolytics and hypnotics is rarely of benefit to these patients, even if they have a poor sleep pattern. Antidepressant should be continued for at least 6 months if a good response has been achieved, with the treatment kept under review⁷. Many problems are situational, interpersonal which are related to family dynamics. Psychosocial counselors like Psychiatrists, Psychologists and Psychiatric social workers are needed to provide help for victims of stroke and their family⁸.

Pharmacological aspect: Acute management by pharmacological agent is usually done by Internist or Neurologist. The rehabilitation specialist also has an important role in the pharmacological treatment of spasticity, using drugs such as baclofen or dantrolene, or through nerve blocks, motor point injections or botulinum toxin injections². For prevention of stroke, some drugs can be used such as aspirin, clopidogrel, extended release dipyridamole. In a recent study it was found that clopidogrel and aspirin vs clopidogrel alone showed no additional benefit with the combination therapy²⁶.

Care giver training: The care giver or the family members should be well trained to be an active skill member of the stroke rehabilitation team. Specific mention must also be made of carers, who often bear more of the burden

than the patient. This is particularly true when there are cognitive and behavioural problems, or dementia is unmasked, and the quality of life of the patient may only improve at the cost of the carer's own. This may be offset during rehabilitation by involvement of the carer in goal setting, and educational programs and counseling². Besides this, swallowing rehabilitation, chest physical therapy / breathing exercises, psychological support, sexual rehabilitation and education program for the patients should be included in stroke rehabilitation program²³. Secondary physical injury can be avoided by proper handling of flaccid or hypertonic limbs, and precautions to prevent falls are essential, particularly in patients with non-dominant-hemisphere strokes with associated neglect (loss of the ability to respond to objects or sensory stimuli located on the side of the body affected by the stroke).

Cooperation of multidisciplinary team: Many issues need to be addressed in rehabilitation programs, whatever the environment. Rehabilitation will only be successful if the team, patient and carers cooperate to set interdisciplinary goals. Regular team and family meetings are thus mandatory. Cohesion is often aided by the appointment of a "key person", one member of the team who liaises with the family; this is also often less intimidating to family members.

Individual team members then bring their specific expertise to the rehabilitation goals. A rehabilitation physician (Physiatrist) leads the team and works closely with the nurses to deal with comorbidities. Various pain syndromes (which may include musculoskeletal trauma or complex regional pain syndrome) are common after stroke and require careful and medical assessment and management. The other members of the team should include Physiotherapists, Occupational therapists, Speech therapists, Rehabilitation nurses, a Neuropsychologist and social workers². All team members should work together to deal with important sequelae of stroke and complication of stroke.

Conclusion:

Stroke rehabilitation systems should build up throughout the country to improve patient's outcomes in the prevention, treatment and rehabilitation. Treatment must be based on the long-term principle of mobilization, proper hydration, feeding and prevention of complications. Considering all the multidimensional

need of stroke patients, treatment facilities should be provided at one stop center that is- in a “stroke rehabilitation unit”. In Bangladesh, for comprehensive and complete treatment of stroke patient, every medical institute and district hospital should have “stroke rehabilitation unit” where the patient may get the necessary treatment.

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