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Ischemic Stroke is the Third-Leading Cause of Death in India and Steps to Process of Regaining Possession and Resuscitation Therapy: A Systematic Case Review

			
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ABSTRACT

Treating an acute stroke demands a great amount of financial and human resources. Stroke is the third leading cause of death in India and western countries. The aim of this study was to find out existing information about the latest therapeutic methods in treating an acute stroke. The study was conducted as a systematic review. The results and the theoretical information can be utilized by anyone working with a patient who has had a ischemic stroke. This case study review is a quantitative study which consists of eight studies. Most of the studies concentrated on medical interventions regarding acute stroke treatment. The results indicate that therapeutic care of an acute stroke involves resuscitation therapy with basic care of the patient and close collaboration with doctors. The results also indicate that the personnel need to have a fair understanding of medical interventions in order to notice complications and possible threats for the patient. One of the most elective ways in treating a stroke is preventive work in which doctors have a major role. Clinicians should share information about the risk factors of stroke and about how to minimize one's risk of having a stroke during one's lifetime. For most stroke survivors, the pattern of spontaneous neurological recovery of motor functions follows a relatively stereotype sequence of events; in which lower extremity function recover earliest and most completely followed by upper extremity and hand function. Return of tone usually precedes return of voluntary movement, proximal control precedes distal control, and mass movement patterns or synergy pattern precedes isolated coordinated volitional motor functions.

INTRODUCTION:

Stroke is a condition with unique epidemiological profile, consisting of high incidence and mortality rates, with a large proportion of survivors experiencing a significant amount of residual disability. However, stroke may have different meanings: for patients it is “the end of the road”, for family it is “beginning of burden”, for physicians it is opportunity for “investigation and intervention”, for organizations it is “investment” and for nation it is “loss of disability adjusted life years.” The first question that the family members ask when someone suffers from a stroke is “When is he going to walk”. The degree of natural recovery after stroke is variable. However, there are two different but related ways that help the stroke survivor to improve after stroke. The first type of recovery, reduction in the extent of neurological impairment results from natural spontaneous recovery which usually account for early spontaneous improvement after stroke within first 3-6 months. This form of recovery manifests as improvement in motor control, language ability or other primary neurological functions. The underlying mechanisms include resolution of local edema, restoration of local toxins, restoration of circulation in ischemic penumbra, and recovery of partial damaged ischemic neurons. This sequence of recovery, however, can stop at any stage. The second type of recovery demonstrated in stroke survivors is the improved ability to perform daily functions in their environment, within the limitation of their physical impairment. The underlying mechanism to explain the second type of recovery is neuroplasticity. Brain plasticity is the ability of the nervous system to modify its structure and functional organization. The two most plausible forms of plasticity are, collateral sprouting of new synaptic connections and unmasking of previous latent pathways. Other mechanisms of plasticity include assumption of function by undamaged pathways, reverse ability from diastalsis, denervation supersensitivity, remyelination, and regenerative proximal sprouting of transacted neuronal axons.

How are insulin resistance, diabetes and CVD related?

Although diabetes is treatable, even when glucose levels are under control, it greatly increases the risk of heart disease and stroke. Pre-diabetes and subsequent type 2 diabetes usually result from insulin resistance. When insulin resistance or diabetes occur with other CVD risk factors (such as obesity, high blood pressure, abnormal cholesterol and high triglycerides), the risk of heart disease and stroke rises even more. Insulin resistance is associated with atherosclerosis (fatty buildups in arteries) and blood vessel disease, even

before diabetes is diagnosed. That's why it's important to prevent and control insulin resistance and diabetes. Obesity and physical inactivity are important risk factors for insulin resistance, diabetes and cardiovascular disease.

Metabolic syndrome:

People with the metabolic syndrome are at increased risk for developing diabetes and cardiovascular disease. A person has the metabolic syndrome if they have three or more of the following abnormalities:

- Waist circumference greater than 40 inches in men and 35 inches in women.
- Triglyceride level of 150 mg/dL, or higher
- HDL cholesterol level less than 40 mg/dL in men and 50 mg/dL in women
- Blood pressure of 130/85 mm Hg or higher
- Fasting glucose level of 110 mg/dL or higher.

Researchers estimate that 47 million Americans have the metabolic syndrome. Risk increases with age. Age-adjusted prevalence for adults is 23.7 percent. Mexican-Americans have the highest prevalence at 31.9 percent. If you have three or more of these conditions or have a brother, sister or parent with diabetes, you should be tested regularly for diabetes (i.e., blood Glucose level fasting and postprandial). In addition, experts recommend that all adults over age 45 should have a fasting blood glucose test every three years, and more often if they have several risk factors. According to the National Indian stroke association, the population has increased by 34 percent since 1980. Studies indicate that they have a higher rate of hemorrhagic strokes at a younger age than adult age. One study found that hemorrhagic strokes occurred more commonly in 35 years age group people. Different Prevalence of Risk Factors have for stroke when compared with other countries. For instance, they have strokes at younger ages. Diabetes is more prevalent among south India, with estimates that 30 percent of adults have the disease and as many as half do not know.

The prevalence of previously diagnosed diabetes in India wide between ages 24–74 was 2.4 times greater than other western countries. Heavy alcohol use occurs in 40 percent of men age 18–39, and the stroke Database found that 24 percent of Indians have heavy alcohol

intake compared to seventeen percent in non-Indians. Obesity is more prevalent among Indian people. The American Heart Association reports that about western countries 75 percent of American men and 72 percent of women ages 20 and older were overweight or obese and 29 percent of men and 40 percent of women were obese. The National Health and Nutrition Examination Survey reported that 65 percent of American men and 74 percent of American women did not participate in leisure time physical activity.

Rehab centers across the country are using innovative advances in rehab science. These therapies can either supplement or replacement of traditional therapy. Traditional therapy is intended to progress very slowly to prevent abnormal movement. The new therapies are aggressive, focusing on forced movement, repetition and intensity. They also rely on technological advances. “The more intensive the therapy the better,” says Dr. Robert Teasel, professor and chief of the Department of Physical Medicine and Rehabilitation at St. Joseph’s Health Care in London, Ontario. Teasel reviewed over 10000 stroke rehab trials in all over countries to states that took place from 1988 to 2017. He says that four new therapies showed better results than conventional therapy in two or more randomized controlled trials. Those therapies are constraint-induced movement therapy, biofeedback, electrical stimulation and partially supported treadmill training. These advances all await large, definitive trials to confirm the promising results from these smaller studies. All of these therapies, with the exception of constraint induced movement, are reimbursable by Medicare.

Making you move: Constraint-induced movement therapy:

Constraint-induced movement therapy (CI) forces the use of the affected side by restraining the unaffected side. With CI therapy, the therapist constrains the survivor’s unaffected arm in a sling. The survivor then uses his or her affected arm repetitively and intensively for two weeks. This therapy deals after a stroke, a survivor tries unsuccessfully to use the affected side. Their initial failure discourages them from using that side. Therapy lasted six hours a day, five days a week, for three weeks. The patient can raise her arm, hold a bottle steady in her hand and feed her/himself cookies with her left hand. “In order to use CI therapy, survivors need to be able to extend their wrists and move their arm and their fingers. Numerous small studies show CI therapy improves movement on the affected side. A June 2005 study published in *Stroke: Journal of the Indian Heart Association* also showed that brain activity actually improves with the treatment. “This finding offers hope to researchers

who believe it may be possible to stimulate or manipulate brain areas to take over lost functions, a process known as cortical reorganization

The benefits of biofeedback:

The concept of biofeedback is as simple as looking in the mirror to watch yourself move your arm or leg. It's a visual reinforcement that you are moving your limbs in a desired way. After a stroke, it is common for survivors to move their arms or legs abnormally.

Case study:

In biofeedback, a wire electrode connected to a metal plate is attached to the skin over an arm or leg muscle. When the survivor moves this muscle, an electrical signal travels from the electrode to an attached monitor, where it produces a particular image. The survivor gets reinforcement every time he or she moves the muscle and creates this image. Biofeedback gives a visual cue that the survivor is moving muscles in a desired way. After his stroke in 2005. In rehab, a therapist attached an electrode to the bicep muscle in his arm and attached the wire to a monitor. When Rocket moved that muscle, a line would move up on a graph on the monitor screen. The more he moved the bicep muscle, the higher the line climbed on the screen. Biofeedback is helpful in isolating which muscle to use when two opposing muscles are working against each other after a stroke. For example, a survivor may not be able to open his first if one muscle in his hand is working to open the hand, but an opposing muscle is overactive. After isolating which muscle needs to be relaxed in order to allow the opposing muscle to do its job, the therapist attaches an electrode to the overactive muscle. Every time that muscle relaxes, an image appears on a screen. The survivor receives visual feedback that teaches him to relax the correct muscle. Biofeedback has been used for pain management for years. There are no risks with biofeedback, it can train a survivor to open his or her hand by extending the fingers and relaxing the finger flexors and its main drawback is it's usually not helpful for learning a functional task like drinking from a cup. So, biofeedback can improve motor control but does not focus on improved functional use.

A shocking therapy: Functional electrical stimulation:

Functional electrical stimulation delivers a shock to the survivor's muscle. The shock activates nerves and makes the muscle move. Theoretically, the brain may be able to recapture and relearn this movement without the stimulation. We don't know exactly why

electrical stimulation works, just that it does. Electrodes can be placed on the wrist extensor muscles of the forearm, for example. The patient relaxes the hand, then contracts the wrist extensor muscle to cause movement. This movement triggers an electric shock to the wrist extensor muscle, which causes greater movement of the hand than the patient could make. Electrical stimulation can be used on all parts of the body, including the shoulders and legs. Chuck used electrical stimulation two to three times a day for about 30 minutes each time. As he improved, he started to use it four times a day for 30 minutes. Now he has returned to work, so he only uses it once every few months. The electric shock “can range from a mild tingling sensation to almost a burning sensation depending on the intensity I set on the unit.

A case for support: Treadmill training with partial body support:

Partially supported treadmill training helps survivors learn to walk again although neither their legs nor upper body can support them. Therapists hope this will rewire the brain, so survivors can eventually make these movements on their own. In treadmill therapy, the therapist places the survivor in a harness with their legs suspended over a treadmill. The harness eliminates the risk of falling. One therapist stands by the survivor and moves their affected leg forward on the treadmill to keep pace with the unaffected leg. A second therapist operates the treadmill. The drawback is that this training requires two therapists, making it more expensive than conventional therapy. This type of treadmill training is available at large academic centers around the country, like the Rehabilitation Institute of Chicago. Even patients who can't extend their wrists or fingers on their own can still use this orthotic. They do need some shoulder and elbow movement. Since the F.T.M. Arm Training Program works for survivors with limited movement in their hand and fingers, it can prepare survivors to qualify for constraint induced therapy. First case study using the orthotic in Mumbai. Their therapists or doctors tell them they are not making progress.

Stem Cell Implants:

Animal studies of stem cell implants have also been initiated. Since stem cells can regenerate and change into other types of cells, researchers are hoping they will stimulate other cells to grow in the brain and form new connections among cells to help restore motor function. The risk of treatment in humans and animals is that both humans and animals need an immunosuppressant to keep their bodies from rejecting cells taken from other animals. A breakthrough in research has been to remove cells from bone marrow in rats and re-inject

them in the same rats' brain cells. The rats don't reject these cells like they do foreign cell injections. Scientists hope neural growth factors and stem cell injections may be used successfully alongside physical therapy to promote recovery from stroke.

Know the warnings and signs of stroke:

- Sudden numbness or weakness of the face, arm or leg, especially on one side of the body
- Sudden trouble seeing in one or both eyes
- Sudden confusion, trouble speaking or understanding
- Sudden trouble walking, dizziness, loss of balance or coordination
- Sudden severe headache with no known cause

Rehabilitation Services Long-term rehabilitation services are important in helping heart disease and stroke patients recover as fully as possible and return to a fulfilling quality of life. Stroke patients may need speech therapy, occupational therapy, and physical therapy to help restore cognitive and physical functioning. Heart disease patients may need cardiac rehabilitation services such as exercise and strength training, nutrition and weight loss counseling, and support for smoking cessation and other lifestyle changes that can improve quality of life and help prevent another acute cardiac event. Rehabilitation services are often hospital-based but may also be offered through independent medical and rehabilitation clinics. As with many types of preventive and medical services, rehabilitation services tend to be more available and accessible in larger cities and metropolitan areas than in small towns and rural areas. Communities that lack these services locally may be able to improve access for local residents by arranging for visiting service providers to be available 1 day per week, or by coordinating transportation to rehabilitation providers in nearby cities or towns.

Nutrition and Dietetics Dietary patterns and nutritional status are both very important in the prevention and treatment of heart disease and stroke. Both macronutrients (e.g., total calories and fat consumption) and micronutrients (e.g., sodium, calcium, iron, and vitamins) have been linked to the development of high blood pressure, high cholesterol, diabetes, and obesity. Professional nutrition services are a vital link in community efforts to prevent heart disease and stroke risk factors and to manage risk conditions after they develop. Nutrition and dietetic services related to primary prevention of heart disease and stroke may include: 1)

healthy meal planning for institutions such as schools, hospitals, nursing homes, and worksites; 2) nutrition education classes offered through public health departments, schools, hospitals, community centers and senior centers; 3) professional nutrition counseling offered as an adjunct to primary medical care; 4) diet planning offered through fitness and weight-loss centers. Social Environment Handbook 20. For people who need to minimize the negative consequences of biomedical risk factors, professional nutrition services can be a critical resource. Nutritionists and registered dieticians can provide detailed nutritional assessments, weekly meal plans and specific treatment recommendations for adults with high blood pressure, high blood cholesterol, diabetes or obesity. These services may be offered through public health departments, primary care physician offices, specialist physician offices (such as cardiologists and endocrinologists), or more uncommonly, through private independent nutrition practices.

Recommendations

In patients with suspicion of acute stroke, the treatment of high blood pressure is not recommended in the extra-hospital environment, if <220 (PAS) or <120 mmHg.

(DBP) is maintained, with the exception of certain urgent situations (founded clinical suspicion of left cardiac insufficiency, acute coronary syndrome or aortic dissection). If the decision is taken to treat it, sudden and intense decreases of the BP will be avoided (more than 20% in < 24 hours).

If the BP has to be reduced, the intravenous route and when this is not possible, oral route, will preferably be used. In those cases where there is low blood pressure, the presence of another serious concomitant disease will be ruled out and it will be treated according to the etiology.

Supplementary oxygen therapy:

Hypoxemia during the acute stroke phase seems to be associated with an increase of the risk of death¹⁵, so the administration of supplementary oxygen to hypoxic patients is recommended. This is a recommended practice based on clinical experience and consensus, as there is no evidence. More controversial is the use of supplementary oxygen in nordoxepin patients with acute stroke. The increase of oxygenation of the brain tissue has been considered as a logical option in the management of acute stroke for more than 40 years⁵⁵.

The administration of norm baric oxygen (NBO) is easy to apply, non-invasive and can be used in extra-hospital environments during the initial phases of acute stroke. Studies in animals suggest that hyperoxia could slow down the cerebral infarction process and therefore increase the time frame during which reperfusion treatment can be applied^{16,15}. On other hand, the application of oxygen is not risk-free: the formation of toxic free radicals 158, a possible increase in the risk of infections and a delay in the mobilization of the patient, are some of the potential adverse effects associated with its use.

Summary of evidence

1	There is no evidence that supplementary oxygen improves mortality or disability in non-hypoxic patients with light or moderate stroke and it even seems to increase the mortality.
2	There is no evidence, either, that supplementary oxygen improves mortality.

Recommendations

A	The routine use of supplemental oxygen is not recommended in people with Suspected acute stroke.
B	Patients with suspicion of acute stroke must receive supplemental oxygen if there are clinical signs of hypoxia or to maintain an oxygen saturation of 94-98%, except in those patients with risks of hypersonic respiratory failure, In whom a saturation of 88 to 92% will be maintained.

Antiplatelet treatment:

Antiplatelets can reduce the volume of brain damage causes the ischemia, so early administration could reduce mortality and sequelae caused by the stroke, and also the risk of recurrence. Antiplatelets in the treatment of acute stroke¹². Studies were excluded from the review about treatment with antiplatelets in patients with primary intracranial hemorrhage or known subarachnoid hemorrhage, although those studies that did not appropriately differentiate ischemic or hemorrhagic stroke before the randomization, are included. It included a sample of 43,041 patients originating from 12 studies. Two of these, the CAST and the IST (administration of aspirin, started within 48 hours after the establishment of the stroke in doses of 160 to 300 mg a day), contributed to 94% of the data. The results of the

review showed that there was a significant reduction of the risk of death or dependence at the end of the follow-up in the group treated with antiplatelets (OR=0.95; 95% CI: 0.91 to 0.99). For every 1000 patients treated with aspirin, 13 negative results were avoided. Antiplatelet Agents Aspirin & Dipyridamole Clopidogrel vs. Aspirin Clopidogrel vs. Aspirin and Clopidogrel Relative risk reduction (RRR) in secondary stroke prevention 18% 20-24% 8.7% 6.4 %.

Table 1. Risk of stroke 2, 7 and 90 days after a TIA (ABCD2 risk table) ⁷³

Risk score	2 days	7 days	90 days
Low risk (0-3)	1%	1.2%	3.1%
Moderate risk (4-5)	4.1%	5.9%	9.8%
High risk (6-7)	8.1%	11.7%	17.8%

The ABCD2 scale presents a total score range from 0 to 7 for the following components or independent risk predictors⁷³:

- Age: >60 years (1 point)
- Blood pressure: SBP >140 mmHg or DBP >90 mmHg (1 point)
- Clinical features: Focal weakness (2 points) or speech alterations without focal weakness (1 point)
- Duration of symptoms: 60 minutes (2 points), 59-10 minutes (1 point)
- Diabetes mellitus: (1 point)

Ischemic strokes can be divided into two different types: transient ischemic attack (TIA) or a stroke which is caused by an embolus or thrombus. Embolus or thrombus caused strokes can be divided into five different subtypes based on the cause of the stroke (see Figure 1). The percentage indicates the proportion of a certain stroke type from all ischemic strokes.

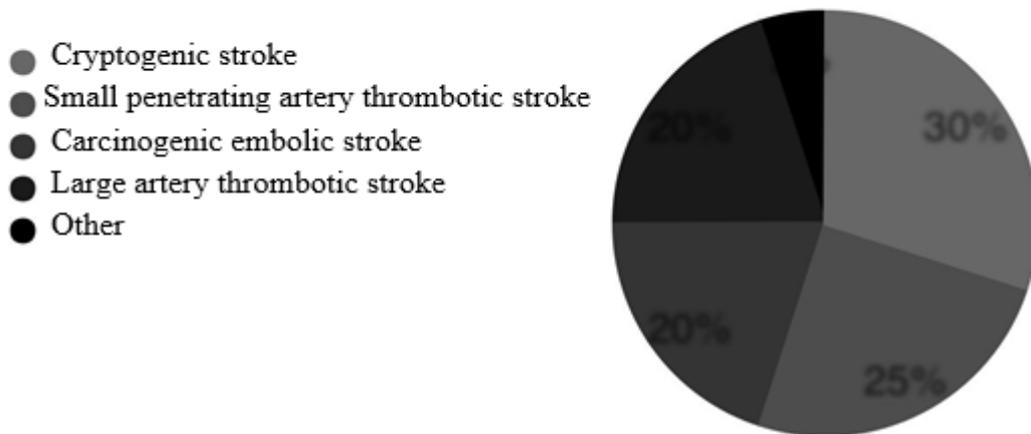


Figure 1: Ischemic stroke subtypes

However, it must be considered that the environment where the rehabilitation is provided may change throughout the rehabilitation process, depending on each patient's specific needs, without losing coordination or continuity. Most of the recovery that patients will experience takes place in the first three months after the stroke.

We have not found any other RCT focused exclusively on the treatment of anxiety in patients after a stroke. The guidelines consulted recommendation considering normal therapies (both psychological and pharmacological) in managing anxiety after a stroke. Anxiety frequently occurs concomitantly with depression, so it is considered advisable to evaluate its presence when any other form of mood alteration is detected, treating it in the normal way²⁸. The research articles had a variety of topics and they discussed acute stroke care more or less. The results show clearly that acute stroke treatment is bound to medicine quite profoundly which raises some interesting thoughts about the nursing care and nurse's role in acute stroke treatment. While acute stroke treatment is bound to medicine, the patient needs a lot of nursing care in everyday activities.

Sequelae and common complications after a stroke:

Patients who have suffered a stroke may experience a large variety of limitations and complications that may perhaps hinder their optimal recovery.

Table 2. Sequelae and common complications in the follow-up after a stroke

Sequelae and physical complications

Most frequent	Less frequent
• Total or partial motor deficits	• Sight alterations
• Sensory alterations	• Epilepsy
• Language alterations	• Central post stroke pain
• Fatigue	• Deep venous thrombosis
• Osteoporosis	• Fecal incontinent
• Shoulder pain	• Pressure ulcers
• Falls / fractures	• Urinary infections
• Spasticity	• Lung infections
• Urinary incontinence	• Constipation
• Contractions	• Dysphasia
• Hemiplegic shoulder subluxation	
• Sexual dysfunction	
	Mood alterations
Most frequent	Less frequent
• Depression	• Emotionalism
• Anxiety	
	Cognitive alterations
Most frequent	Less frequent
• Dementia	• Apraxia
• Attention deficits	• Alteration of upper executive functions
• Memory alteration	• Spatial neglect
	• Agnosia (visual and anosognosia)

Falls:

Falls, both in hospital and in the community, are normal in patients who have suffered a stroke 257-260. It is estimated that up to 73% suffer at least one fall during the first six months after discharge 204. Apart from the high incidence of falls, there is a greater loss of bone mineral density, especially in the hemiparetic side 200, so, apart from the interventions required to reduce the incidence of falls, interventions are also required to limit their consequences.

Intervention	RQ (95% CI)	RQ (95% CI)
1. Multiple component exercises (when focused on 2 or more of the following categories: strength, equilibrium, flexibility)		
2. Group exercises	0.78 (0.71 to 0.86)	0.83 (0.72 to 0.97)

CONCLUSION:

Stroke is the third leading cause of death in India and in all Western countries. The financial costs are profound and they are estimated to rise every year. Intensive is bound to medicine and the need for effective collaboration between patients and doctors is important. While this study did not fully answer the set research question it raised some questions which can be adapted to following few implications for future research. Acute stroke care will be a great challenge for the future because it has been predicted that more and more people will contract stroke during their lifetime. Ongoing research for new and more effective medical interventions and therapy for stroke study will ensure that patients will have better chances of survival and recovery from a stroke. Finally, in India, the stroke ratio highest compare with the other countries and these are the therapies should follow and treat and control maximum level of the stroke cases. In north India there has to some variations are there compare with the South and East Indian states mostly in India Mumbai and Chennai cities were raised stroke conditions as per the data followed by the Indian stroke association records. Hypertension patients are 35%, diabetes patients are 35% and dyslipidemia patients are 15% are mostly suffering with ischemic stroke. Common risk factors e.g. Diabetes and Hypertension, Lipids can be decisively blamed in only less than 50% of CVD. Especially with causative intracranial and cardioembolic causes are common in East than West India.

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