Case report

Bilateral task-oriented training and strengthening leads to improvement in gross motor functioning in patients post-ischemic stroke

: An interesting Case study

Abstract:

Background:A stroke is a medical emergency that requires immediate attention. Early intervention can prevent brain damage and other negative outcomes. An ischemic stroke occurs when a blood clot stops or narrows in a blood vessel that leads to the brain. In arteries that have been injured by plaque formation, blood clots are common (atherosclerosis). A stroke occurs when the blood flow to a part of the brain is cut off or reduced, depriving brain tissue of oxygen and nutrients.

Presentation of case: In the present case, a 63-year-old retired Zila Parishad worker came to our hospital with complaints of fever and weakness, after 6 days of medication and hospital stay, his fever subsided but he developed weakness of the right upper extremity and slurring of speech. Regular investigations were done. MRI revealed Acute Infarct in the Left Frontal Region.

Discussion: Bilateral training is proved to be effective in improvement of hand functioning in patients post stroke. This is the application of the training to both the extremity to gain improvement.

Conclusion: The patient was provided with medical, regular physiotherapy management, and speech therapy leading to improvement in his condition. He is still under regular physiotherapy for improvement in his fine motor function.

Keywords: Acute ischemic stroke, cerebrovasculardisease, rehabilitation, case report

Introduction:

A stroke occurs when blood flow to the brain is disrupted, resulting in a temporary loss of neurological function. Stroke is the fourth leading cause of death in adults and the leading cause of neurological disability (1).A major public health problem is the prevention of acute ischemic stroke. The purpose of intravenous thrombolysis and/or endovascular thrombectomy in insufficiently chosen individuals is to achieve recanalization and reperfusion of the ischemic penumbra (1).It is critical to treat ischemic stroke correctly to reduce mortality and morbidity(2).

Ischemic stroke is the most common type of stroke, accounting for around 80% of all cases. It is caused by thrombus components that result in low systemic perfusion pressures. The brain is deprived of critical oxygen and glucose, cellular metabolism is disrupted, and embolism or hypoperfusion can occur as a result of the reduced cerebral blood flow (CBF). Acute ischemic stroke (AIS) is one of the most dangerous conditions that endanger human health around the world; it causes severe disability and has a high risk of recurrence and mortality(3).Ischemic strokes are caused by thrombus, embolism, or other tissue injury and death.

Ischemic stroke has been on the rise in young adults since the 1980s, which has coincided with an increase in the prevalence of vascular risk factors and substance abuse among this age group(4).After ten years, the cumulative rate of recurrent stroke can reach 15%. In terms of survival and recurrent vascular events, patients with atherosclerosis, high-risk causes of cardioembolism, and small artery disease underlying their stroke had the worst prognosis(4).Stroke is the second leading cause of death and the third leading cause of disability in the globe. Ischemic strokes

account for 68% of all strokes globally, with hemorrhagic strokes accounting for 32%(5,6).

The **symptoms** of acute ischemic stroke are:

• Difficulty speaking and understanding

• Numbness or paralysis of the face, arm, or leg.

• Vision problems in one or both eyes.

• Headache

• Difficulty walking

Patients Information:

A 63 years old male patient, resident of Yavatmal, Maharashtra was retired from his job in the year 2015 as a worker of Zila Parishad presented to Acharya VinobhaBhave Rural Hospitalwith complaints of fever since 10/10/21 along with cough & cold, and weakness.He then consulted to doctor on the 11th and was on regular medication. On the 6th day i.e.,16/10/21,he complained of development of numbness in his right arm and had difficulty in speech, and was afebrile. The patient complained of weakness on the right side of the body but his gait was observed to be normal.He faced difficulty in performing the movements like daily hand movements, right arm along with no strength inthe wrist and was unable to hold the objects.

Clinical Findings:

The patient is conscious, cooperative, and well oriented. During a physical examination, there was no postural abnormality. There was no superficial, deep, or

cortical sensory loss. On motor examination, the tone on the right upper extremity was reduced as compared to the left side, no voluntary control was there in the right wrist. There was no tonal abnormality in the lower limbs. The range of motion of the right upper limb was reduced, while the left upper limb and both lower limbs had a normal full range of motions. The Deep tendon reflexes i.e., the biceps jerk and triceps jerk were diminished on the right side while intact on the left upper extremity. Right-hand coordination was also impaired (Finger- nose test was positive).

Clinical Diagnosis:

The patient was investigated for a routine checkup, MRI,Echo. The Echo was found to be normal.After all the investigations and the clinical findings, the patient was diagnosed with Acute Infarct in the Left Frontal Region. Age-related atrophic changes with preventricular ischemic changes were found.

Table 1: Timeline of events:

Date of visit to the hospital	**10/10/2021**
Date of start of physiotherapy	**17/10/2021**
Last date of rehabilitation	**Still ongoing**

Physiotherapy Interventions:

Physiotherapy was primarily focused on strengthening of muscles of the shoulder joint.Physiotherapy care was provided once a day, which includes passive, active-assisted, and strengthening exercises to the upper limb of the right side.Bilateral training was focused(7). The patient was given the exercises to the affected side, within the pain-free limit to the full range of motion. The patient was asked to perform

movements of the shoulder joint actively where it was possible and were assisted where there was no or less muscle power(9). The patient lived in a rural place and was illiterate.For the recovery of the wrist curls, rubber band strengtheners,wrist strengtheners improve strength and power in the wrist,forearm, and fingers(10).

Results:

The hemiplegic patients who get early rehabilitation gain early improvement in the upper extremity functioning post-stroke. This patient received a regular range of motion exercises and strength training for the upper extremity. The improvement in the gross motor function was tremendous, but the affection in fine motor function is still under rehabilitation. We are expecting to get recovery in 2-3 weeks.

Discussion:

This case study mainly focused on the improvement of hand function of patients with hemiplegia. Previous literature suggests improvement in hand function post physiotherapy, here, the focus was bilateral upper extremity training leading to improvement in fine and gross motor functions(8). Rigorous inpatient physiotherapy leads to an early return in function post-ischemic stroke.

Conclusion:

Bilateral upper extremity training leads to early improvement in gross motor function of a patient, but, the fine motor functions show late recovery. Most interventions focusing on strengthening in the early phase affects the gross motor functioning in stroke survivors.

Informed consent: A proper informed consent was taken from the patient prior.

Fig 1: POSTURE: Standing

Fig 2: POSTURE: Sitting

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