Case study

Effect of Brunnstrom movement therapy combined with Neurodevelopmental therapy on balance and mobility in a patient with acute stroke: An interesting case report

Abstract;

Stroke is the world's second leading cause of death and the third leading cause of disability. Ischemic strokes account for 68 percent of all strokes worldwide, while hemorrhagic strokes account for 32 percent.A stroke is a medical emergency that requires immediate attention. Early intervention can help to prevent brain damage and other problems. The present case report is of a 24 year male suffered with stroke on 24th July 2021. He was private employee in a hospital. He was presented with weakness of left side of the body. He was treated by using brunnstrom movement therapy and Neurodevelopmental therapy (NDT). He was treated for a period of 4 weeks. First two weeks as inpatient and last two weeks as outpatient. He was treated one hour per day, 5 days a week for 4 weeks. Modified Ashworth scale (MAS), brunnstrom recovery stages of upper limb, lower limb and trunk were taken pre and post treatment. There was tremendous improvement in both upper and lower limbs. Patient is able to walk and perform all the activities. Thus in conclusion, brunnstrom movement therapy in combination with NDT is an effective treatment strategy for early recovery of stroke patient.

Keywords:

Stroke, cerebrovascular accident, physiotherapy, brunnstrom movement therapy, Neurodevelopmental therapy, rehabilitation.

Introduction:

Stroke is becoming a major cause of early mortality and disability in low- and middle-income countries such as India, owing to changing demographics and the rising incidence of key

modifiable risk factors. As a result, emerging countries are burdened with both communicable and non-communicable diseases.The majority of stroke survivors continue to live with disability, and the costs of ongoing rehabilitation and long-term care are borne primarily by family members, putting their families in financial jeopardy (1).In low- and middle-income nations, hypertension is thought to be the leading cause of stroke, followed by hypercholesterolemia (15%) and cigarette smoking (12 percent) (2).The brain, which is the primary organ damaged by stroke, is metabolically active, requiring roughly 50ml/100g/min blood flow and a 3.5cc/100g/min oxygen metabolic rate. Brain cell activities are significantly harmed if blood flow falls below 10ml/100g/min, and neurons cannot survive for long at levels below 5ml/100g/min (3).The period following a stroke is frequently divided into parts. The Stroke Roundtable Consortium advocated designating the hyperacute phase as the first 24 hours, the acute phase as the first 7 days, the early sub-acute phase as the first 3 months, the late sub-acute phase as the months 4–6, and the chronic phase as the last 6 months (4).Stroke can induce a wide range of symptoms and signs but the most common and well-known impairment is motor impairment, which normally impairs the control of movement on one side of the body's face, arm, and leg and affects 80% of patients to variable degrees. Stroke rehabilitation focuses primarily on restoring damaged movement and function in order to lessen impairment and encourage participation in daily activities (5).

Patient features:

Patient presented with weakness of left half of the day. (Figure 1)He was not able to do any movements on his left side. On examination left shoulder and hand were in brunnstrom stage 1 going to 2. Left lower limb was in stage 2 going to 3. There were exaggerated deep tendon reflexes in left upper and lower limbs. Speech was impaired. Facial deviation was mild.

Fig 1: Patient with left hemiplegia

Patient history:

The patient is a 24-year-old man. On July 15, 2021, he suffered a stroke and became left-sided hemiplegic, rendering him paralysed on the left side for a short time before resuming full function. Later that day, he experienced complete loss of sensation in his upper and lower limbs on the left side of his body, and he approached in our tertiary care hospital for additional treatment, where he was treated for 15 days. Later he continued outpatient physiotherapy treatment for 2 more weeks.

Physiotherapy treatment:

Patient was medically stable from day 1, he was given physiotherapy based on brunnstrom and Neurodevelopmental therapy (NDT). The details of the problems and problem solving approach is given in table 1. Berg balance scale, Brunnstrom recovery stages, Gait parameters were taken both on day 1 ad on the last day of treatment. Details of the outcome measures are given in table 2.

Problem identified	Cause of the problem	Goal	Treatment strategy	Equipment used
Hypotonia		To develop tone in postural and phasic muscles	Facilitatory techniques for Postural and phasic muscles	Direct handling

Difficulty in bed mobility	Injury to the brain because of the CVA	To enhance bed mobility	NDT facilitations and brunnstrom approach	Physioballs, direct handling
Difficulty in sit to stand activity		Promote sit to stand activity	Strengthening exercises to gluteus maximus, quadriceps and tibialis anterior	Direct handling
Difficulty in standing independently		Improve standing balance	Balance training on stable and unstable surface	Soft foam pad, balance board
Difficulty in walking		Gait training with emphasis on gait parameters	NDT strategies to train gait.	Direct handling

Table 1: Depicting Problem solving approach management

Outcome Measure	Pre-Test scores	Post test scores
MAS (TA, biceps, hip adductors) Rt and Lt sides	0	Normal tone
Berg balance scale	Unable to test	49
Cadence	Unable to test	95
Stride length	Unable to test	72cm
Gait velocity	Unable to test	32sec

Table 2: Depicting the outcome measures and their pre and post treatment scores

Results and discussion: Stroke if managed early can recover completely without any residual impairments(6). In stroke rehabilitation, patient (and caregiver) participation in patient-centered interdisciplinary goal planning has been linked to increased patient motivation and engagement in therapy, as well as improved rehabilitation outcomes (7). The recovery in this patient is in line with the previous study by wagenaar etal (8). Maximum recovery in patient can be mainly attributed to the stable vitals and as the patient was

medically stable. Se were able to give functional treatment as the patient was able to receive it. We have utilized the hyperacute phase that is within one week to gain maximum recovery. This was inline with the study by fang et al (9). Early physiotherapy also helped patient for early discharge and thus overall recovery. This is in line with previous study by Thorsen etal (10).

Conclusion:

We would like conclude that early functional and goal oriented physiotherapy will help in early overall recovery, early discharge and prevent unusual complications in early stages post stroke. Thus, brunnstrom approach for assessment and initial management and NDT for functional recovery can be used effectively immediately in post stroke patients when their vital parameters are stable.

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