



Effect of Neurodevelopmental Therapy on Functional Recovery in a Patient with Subacute Stroke: An Interesting Case Report

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i60B34767

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/76660>

Case Study

Received 15 September 2021

Accepted 17 November 2021

Published 23 December 2021

ABSTRACT

Stroke is defined as a clinical illness characterised by a sudden onset of cerebral impairment that lasts more than 24 hours or results in death with no obvious explanation other than a vascular origin. Every year, around 800,000 people have a stroke, or one every 40 seconds. Strokes are caused by difficulties with the brain's blood supply: either the blood supply is cut off or a blood artery within the brain bursts, killing brain tissue. A stroke is a medical emergency that requires immediate medical attention. Present case report is of a 39-year-old male with right side weakness. Patient's right upper limb recovery stage was 1 going towards 2, and lower limb recovery stage was 2 going towards 3 on first day of assessment. Patient was treated with Neurodevelopmental therapy combined with conventional physiotherapy for a period of 8 weeks. Balance, Gait

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parameters and tone evaluated on day 1 and on last day of treatment. There was tremendous improvement in balance and gait parameters along with normalisation of tone. Thus we would like to conclude that early NDT along with conventional therapy can improve gross motor function in patients with subacute stroke.

Keywords: Stroke; subacute stroke; physiotherapy; rehabilitation; NDT; conventional physiotherapy.

1. INTRODUCTION

The clinical state of sudden onset of cerebral impairment lasting more than 24 hours or leading to death with no obvious reason other than a vascular origin is known as stroke [1]. Every year, around 800,000 people have a stroke, or one every 40 seconds. The estimated adjusted prevalence rate of stroke in rural regions is 84-262/100,000, while in urban areas it is 334-424/100,000 [2]. The most frequent type of stroke is ischemic stroke, which accounts for around 85% of all strokes. Ischemic stroke occurs when the arteries that provide blood to the brain become blocked or narrowed. Hemorrhagic strokes are caused by blood spilling or bursting through arteries in the brain [3]. Aneurysms, hypertension, trauma, blood-thinning medicines, and aneurysms can all induce ruptures. High blood pressure, aneurysms, trauma, protein deposits in blood vessel walls, being overweight or obese, Physical inactivity, chronic alcoholic or smokers are the primary risk factors for stroke [4]. Impairments in stroke depends on the area or the territory involved in brain. Tonal abnormalities, swallowing issues, urinary issues, contractures in extremities, transition issues, balance and gait abnormalities are the common impairments seen in stroke patients [5]. Physiotherapy after stroke can be given through Motor relearning program, brunnstrom movement therapy, Proprioceptive neuromuscular facilitation, Neurodevelopmental therapy (NDT) etc [6]. NDT is an approach which is historically rich, follows recent theories and emphasizes on goal oriented treatment [7]. The conventional physiotherapy focusses on recovery without involving patient and caregivers in treatment and framing of goals, in contrast NDT does involve them. The case report is in accordance with CARE guidelines [8].

2. PATIENT CHARACTERISTICS

The present case report is of a 39-year-old male working as a private employee in a company

came to our out Patient department with weakness of right half of the body. He was diagnosed with left ischaemic stroke which was confirmed by MRI. He was under alteplase, antipyretics and antihypertensives for past 5 days. He was having difficulty in sit to stand, walking, performing right upper limb activities. After obtaining the consent from the patient on examination his right upper limb shoulder and elbow brunnstrom stage of recovery 1 going to 2 and right hand was in stage 1. Right lower limb was in brunnstrom stage 2 going to 3. Trunk was weak but was able to perform lying to sitting. Static sitting stability was present. Cognitively patient was sound, he was able to eat and swallow without any issues.

2.1 Patient History

Patient was apparently normal till 27th of august 2021. On the same day early in the morning he developed weakness of right half of the body. He was immediately take to local hospital but as his condition was not stable he was rushed to our hospital. He was kept in ICU for one day later was shifted to ward. His physiotherapy started and was discharged on 7th day. Since then, he was doing basic exercises at home. After 15 days he came to our OPD for physiotherapy treatment.

2.2 Treatment Given

Treatment was focussed on Neurodevelopmental therapy (NDT). Principles of therapy like framing goals in accordance with patient, activating the base, key points of control, superficial touch for facilitation and deep for inhibition were used. Berg balance scale, Modified Ashworth scale, stride length and gait parameters were taken as outcome measures both pre and post treatment of 8 weeks. Treatment was given one hour per day, 5 days per week for 8 weeks. Treatment details are given in Table 1.

Table 1. Problem list, Goals and treatment strategies

Problem identified	Cause of the problem	Goal	Treatment strategy	Equipment used
Hypotonia in right upper limb	Injury to the brain as a consequence of the CVA. MRI report confirms involvement of left hemisphere	To facilitate tone in right upper limb	Facilitatory techniques with icing, stroking, and joint compression	Direct handling, ice.
Hypertonia in right iliopsoas and right tendoachilles		To inhibit abnormal tone in right lower limb	Facilitating controlled movements in right lower limb	Direct handling
Difficulty in upper limb functional activities		To encourage active movements	Training active assisted movements	Direct handling
Difficulty in Sit to stand activity.		Strengthening the muscles responsible for sit to stand activity	Strengthening Gluteus maximus, abductors and tibialis anterior	Direct handling
Difficulty in walking		Gait training with emphasis on gait parameters	Training gait with emphasis on strengthening and movement control	Direct handling
Balance and coordination issues		To improve balance and coordination	Static, dynamic and reactive control training of balance.	Soft foam pad, balance board, mirror, parallel bar.

Table 2. Depicting outcome measures pre and post treatment scores

Outcome measure	Pretest score	Post test score
Berg balance scale	09	48
Modified Ashworth Scale	1 in Right arm flexors 1+ in Right tendoachilles	Normal tone Normal tone
Gait Parameters		
Stride length	Not able to test	86 cm
Cadence	Not able to test	62 steps
Gait velocity	Not able to test	75 seconds

3. RESULTS AND DISCUSSION

Patient was in severe condition in the initial part of the treatment, but as the medical condition and vitals were stable the vigorous rehabilitation was possible. Patient was cooperative and following all the commands. Functional activities are a focus for physical therapist practise in stroke therapy, according to the findings of our study. That is, the bulk of the time spent in physical therapy sessions was spent doing functional activities. We used strategies which includes remediation, compensation and motor control [9]. The Royal college of physicians suggests that no approach is superior over other [10]. In the present study NDT is proved to be

effective. This study was in line with the previous study [11] which states NDT is effective. NDT is the most common method used to improve mobility of patients with ischaemic stroke [12]. The present study was in line with previous study where NDT was also proved to be beneficial in improving balance and mobility by Krukowska et al. [13]. The tremendous improvements in gait parameters was in line with the previous study by mikołajewska et al. [14]. The short term benefits received by present study shows similar results obtained in previous study by mikołajewska where gait parameters were improved in significant manner [15]. Goal oriented treatment with emphasis on function than non functional movements was the hallmark of present study

which is in line with previous study by pelicioni et al. [16] . Patient feedback was quite positive towards the treatment and was enjoying the sessions which was in accordance with the treatment goals and outcomes.

4. CONCLUSION

Thus, we would like to conclude that NDT was beneficial in managing the present case with ischaemic stroke. We can say from our report that NDT can be useful once the patient is medically stable and ready for vigorous therapeutic exercises. The emphasis should be on functional than non-functional movements and goals should be set accordingly. More high quality studies are required to generalise the effectiveness of the treatment.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

ACKNOWLEDGEMENT

Authors would like to acknowledge the patient and his caregivers for giving consent to the study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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