ORIGINAL RESEARCH PAPER

Physiotherapy

ROLE OF PHYSIOTHERAPY IN REHABILITATION OF HEMIPLEGIA AFTER TRAUMATIC BRAIN INJURY. (A CASE STUDY)

KEY WORDS: Rehabilitation, Traumatic brain injury, Hemiplegia

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ABSTRACT

AIM AND OBJECTIVES:
- To evaluate the role of physiotherapy in rehabilitation of traumatic brain injury patients.

METHODOLOGY:
A 35 years male patient suffering from single TBI (traumatic brain injury) was treated with physiotherapy rehabilitation for 5 days a week for period of 8 weeks. Clinical assessment was done both pre-and post-treatment.

RESULTS AND CONCLUSION:
After 8 weeks of treatment patients shows significant improvement in motor function, balance, gait & qualitative performance in ADL in the Traumatic Brain Injury Patients.

INTRODUCTION:

Traumatic brain injury (TBI) is defined as a blow or jolt to the head or a penetrating head injury that disrupts the function of the brain. Not all blows or jolts to the head result in a TBI. The severity of such an injury may range from mild (a brief change in mental status or consciousness) to severe (an extended period of unconsciousness or amnesia) after the injury. A TBI can result in short or long term problems with independent function. One and three-quarter million people sustain a TBI every year. The incidence of TBI is 506.4 per 100,000 population, with 43% of those hospitalized having long-term activity limitation. The incidence of brain injuries is higher for the male population than for the female population by more than 2:1. [1]

The rehabilitation needs of the brain injured persons are significantly high and increasing from year to year. The rapid industrialization and ever-increasing number of motor vehicles on roads in India during the past 25 years, coupled with poor safety regulations result in increasing numbers of injuries and deaths due to road traffic crashes .Many challenges are faced as poor pre-hospital and trauma care as well as the inadequate transport system, logistical and inadequate infrastructure delay the Neuro-rehabillitation process. [2,3]

Case Details-

A male patient of 35 years age visited to OPD of teaching institution with the OPD no-1704 for the following complaint.

Chief complaints:

Unable to do his movements of left upper and lower limb since 1 year.

Unable to walk since 1 year.
Having fear of fall while mobilizing since 1 year.

History of Present Illness-

Subject was 35 year male who is diagnosed with subarachnoid hemmhorage. Patient is apparently alright 1 year back. On 1/01/2017 while coming home from work place he met with an accident. He was not conscious that time so people gathered there took him to hospital where he undergone ct brain & MRI, which shows SAH and IV bleed with displaced fracture C1 & C2 vertebrae. That time his GCS was 3/15. He was conservatively managed there. Then he visited to our opd for further treatment.

Physical Examination Revealed Following Findings
- Attitude of the limb was neck protruded, elbow flexed with forearm pronated and finger flexed
- Tone- Increased i.e. (grade 1+) on left side.
- Reflexes- Positive Babinski sign and exaggerated deep reflexes on left side.
- VCG Grade 0 for upper limb and lower limb.
- Coordination- Affected
- Tightness- Hamstring and tendoachillis of Lt side.

Past history- no past surgical history.

Personal history:

Sleep: Sound sleep
Appetite: Normal
Bowel and bladder: Normal

Table no.1 General Examination

Pulse	100/min
Blood pressure	100/70 mmHg
Height	104 cm
Weight	10 kg
Respiratory Rate	19 /min

Higher Functions:
- Conscious (on GCS scale)
- Cooperative
- Oriented (on mini mental scale)

Assesment (pre and post):
PROTOCOL

The study was divided into two phases:-
Phase (A)- Pre Treatment Assessment-

Baseline outcome measure was balance using Berg Balance Scale, stream format and functional independence measure.

Phase (B) - Intervention Phase-

Intervention Included patient education, Stretching for the hamstring, tendoachillis, finger flexors, PNF for upper and lower limb, functional electrical muscle stimulation for shoulder, Task related training exercises and Bobath for Foot and shoulder Activation given for 1 month during this phase.

Phase (C) – Post Treatment Assessment-

Outcome measure was recorded 8 weeks after the treatment.

Treatment protocol:

The goal of physiotherapy rehabilitation consists of short term and long term goals. The short- term goal was to improve muscle tone, decrease pain, improve balance and coordination as well as the hand functions. Long term goal was to maintain the short term goals, improve gait and make the patient functionally independent. The treatment was given for 5 days a week and for 8 weeks.

First 2weeks:
- Adjunct therapy i.e Cryotherapy
- Relaxed passive movements and RIP (reflex inhibiting patterns) to normalize the tone.
- Stimulation in upper limb and lower limb
- Start with passive movements then gravity eliminated and was progress to against gravity was given to upper and lower limb of left side to relearn the movement and maintain muscle

properties.
- Stretching of hamstring, tendoachellis, biceps
- Reflex Inihibiting Pattern to reduce spasticity in upper & lower limb.
- Proprioception training of upper and lower extremity.
- Mat exercises
- Core sterngthing
- FES(Functional electrical stimulator) for shoulder

- To improve Hand function gripping exercise, spring exerciser with different resistance.

Next 3th & 4th weeks:
Now the patient have grade 1 spasticity in upper and lower limbs and achieved his sitting balance.

- Core strengthening & Sit to stand exercises.
- Strengthening exercises
- Taping for subluxed shoulder
- Then started a new protocol of NDT (Neuro Developmental techniques) because the not get the end range movement.

Next 5th and 6th weeks:
- Balance training to improve his sitting and standing balance
- Reach outs
- Swiss ball exercises
- PNF of upper and lower limb
- Task Related Exercises- One leg standing, Heel lift, walking a short distance, Stepping up and down.

Next 7th and 8th weeks:
- Gait training.
- Endurance training.

RESULT:
This study shows that there is significantly improvement in Pre to Post scores of strength, balance and gait of the patient. And improves quality of life of patient.

Reflexes and tone:

Examination	Before t/t-	After t/t
Reflexes	Exaggerated	Normal
Tone	Hypertonic	Normal

Hand Function Assesment:

Sr.no	Grasp	Before t/t	After t/t
1	Spherical	Not able	Able
2	Cylindrical	Not able	Able
3	Hook	Not able	Able

Sr no	Grip	Before t/t	After t/t
1	Pulp to pulp	Not able	Able
2	Tip to tip	Not able	Able
3	Lateral prehension	Not able	Able

Patient before and after treatment:

Before t/t **After t/t**

Gait Analysis-
- Before t/t:- Supported & Circumduction gait
  Missing components are : Hip flexion
  Knee flexion
  Dorsiflexion of foot
- After t/t :- Unsupported & Normal
  All missing components achieved.

Assesment on Scale:-

Scale	Score before t/t	Score after t/t
Berg Balance Scale-	21 out of 56	56 out of 56
Functional Independence Measure Scale-	21 out of 42	42 out of 42
Stream Format-	9 out of 70	66 out of 70

DISSCUSSION:
The present case study demonstrated a case of traumatic brain injury male patient of 35 years with spasticity, impaired balanced and totally dependent patient. The result of the study has demonstrated beneficial effect on balance, gait and physical ability on the assessment by Berg Balance Scale, STREAM format, functional independence measure. The improvement in the baseline measure achieved during the treatment phase of 8 weeks. So he was treated with physiotherapy rehabilitation, i.e in first two weeks he was treated with passive moments to improve tone, to maintain joint range motion and maintain muscle properties. RIP to break spasticity pattern and reduce tone. Mat exercises to improve trunk control. Proprioceptive training to improve his joint position sense and with that adjunct therapy is given.

In next 2 weeks he was started with Core strengthening exercises & Sit to stand exercises to improve balance. Functional electrical simulator to reduce spasticity and improve functional activity of the shoulder joint. His shoulder is subluxed as due to initial weakness in girdle muscles so tapping is given for subluxed shoulder on weekend. Also he was using arm pouch while seating and standing. Then we Progress to NDT(Neuro developmental techniques) to improve his shoulder movement and also has significant improvement in balance, gait other therapeutic exercises and overall physical improvement in patient. He was starred walking but with support or assistive device.

In 5th & 6th weeks we more focussed on his balance. Task Related Training program took into account the specificity of training principles by ensuring directly related to gait performance.[4] Task related training can be supported by plasticity following brain lesion. The PNF protocol used in this study led to improvements in coordination, motor sensation and consequently overall functional activity. PNF, used as a gradual resistance exercise .[5] For balance training swiss ball exercises, one leg standing was given.

Last 2 weeks:
After achieving his sitting balance then we progress to gait training start with parallel bar walking then progress to obstacle walking. The efficacy of the treatment was assessed by changes in clinical features before and after treatment which were both subjective and objective.

CONCLUSION:
The combine treatment improves muscle tone, balance,

coordination, motor function and gait. Thus present case study shows the efficacy of physiotherapy intervention in improving traumatic brain injury patient.

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