

*Case Report***Effect of Six Months Intensive Multidisciplinary Approach for Fifteen Months Post-Traumatic Brain Injury Patient - A Case Report**Annie Thomas¹, Nagarjuna Narayanasetti², T. S. Vasan³, Supriya. R⁴¹Assistant Professor, JSS College of Physiotherapy, JSS Hospital, Mysuru-4²Lecturer, JSS College of Physiotherapy, JSS Hospital, Mysuru-4³Professor in Neurosurgery, JSS Medical College, Mysuru⁴Clinical Supervisor, Grade 2, JSS Institute of Speech and Hearing, Mysuru-4

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ABSTRACT

Introduction: Traumatic brain injury is caused by an external physical force which may result in altered level of consciousness with or without impairment of cognitive and physical functions in individuals. It is neither congenital nor degenerative in nature. The impairments can be permanent with partial or total functional disabilities or psychosocial maladjustment. The Intensive rehabilitation with multiple health disciplinary teams can improve a certain extent of physical and cognitive aspects of brain injury patients.

Case Report: In this case report we are presenting a 19 year old boy diagnosed as diffuse axonal injury with Glasgow coma scale (GCS) Score of 4/15 (E1M2V1) at the time of incident has come to our department after 8 months with no head control, no cognitive and no voluntary attempts to do functional activity. The main objective of management is to improve mobility, communication, perception and cognitive functions with minimum period of time by working as a health team.

Conclusion: After 14 months post incident with intense rehabilitation of six months his GCS score is improved with scoring of 13/15 (E4M6V3). The improvement seen may be partly attributed to the coordinated work of the team members who meet in the case conference every two weeks to review & revise the treatment protocol. Such that common and individual goals are shared and total therapy time is managed, to incorporate all goals by team members

Key words: Traumatic brain injury, Diffused axonal injury, Glasgow coma scale, Multi disciplinary approach

INTRODUCTION

Traumatic brain injury (TBI) is caused by an external physical force which may result in altered level of consciousness with or without impairment of cognitive and physical functions in individuals. It is neither congenital nor degenerative in nature. The types of injury varies depend upon the type of force and also the amount of force that cause impact on head. Depends upon the type of injury to brain may cause damage to one functional area of brain, various areas of brain or may be all areas of

the brain. This leads to impairments range from physical, cognitive, speech and behavioral functions. ^[1] The impairments can be permanent with partial or total functional disabilities or psychosocial maladjustment.

Diffuse axonal injury is a type of TBI caused by severe shaking or rotational forces. The pathophysiology of injury describes the brain does not move as the skull moves and results in brain structures to tear. The tearing of brain structures may be extensive and cause release of neuro

chemicals to be release. This chemical release can cause additional injury to the brain structures. The tearing can cause disruption in nerve communications and chemical processes. This disturbance may result in temporary or permanent brain damage, coma or death. [2]

Traumatic brain injury has a great impact on individual life. The major to minor impact is depends upon the involvement of physical functions, sensory functions, higher mental functions like attention, learning, memory, communication skills and cognitive abilities. The Intensive rehabilitation with multiple health disciplinary teams can improve a certain extent of physical and cognitive aspects of brain injury patients. Rehabilitation of brain injury patients is a challenging as well as complex task. It includes the integrative treatment based on cognitive, behavioral, communicative, physical, sensory social and psychological functions. [3]

CASE DESCRIPTION

In this case report we are presenting a 19 year old boy diagnosed as diffuse axonal injury with GCS Score of 4/15 (E1M2V1) at the time of incident has come to our department after 8 months with no head control, no cognitive and no voluntary attempts to do functional activity. The main objective of management is to improve mobility, communication, perception and cognitive functions with minimum period of time by working as a health team. The multidisciplinary approach teams included for the rehabilitation were Neurosurgeon, Physiotherapist, Occupational therapist, Speech therapist, Psychologist, Orthotics specialist and Family members.

The intervention is designed with six months of intense rehabilitation with every two weeks of team members meeting for case discussion. The Physiotherapy evaluation has done to assess conscious level, higher mental functions, motor and functional activities. At the times of admission for rehabilitation after 8 months of post traumatic injury his GCS score was

E4M3V2. His higher mental functions altered, attention span affected with no sustainability more than 10 seconds. He was not oriented and often irritable. His Cognition, Problem solving, Judgmental functions are affected and able to occasionally understand what other speaks. His cranial nerves are impaired like loss of vision on right side, Facial and glossopharyngeal are affected and right side hypoglossal nerve.

His motor functions are lost with no neck control. The limb has got synergic patterns more on right side than left side with spasticity of 2+(Right side) and 1+(left side) in upper limbs and lower limbs. Associated reactions are more on right side compared to left .The functional activities are very much limited with drooling of saliva, no independent activities like rolling, sitting tolerance. The patient was on PEG until 7 months and later on RYLE's tube. Bowel and bladder affected (catheterized)

Multidisciplinary approach

Initial goal setting was done with all team members. Every two weeks the team meets for identifying the goal which is achieved and also for reassessing the goals which are not achieved and the need for resetting the goals on every two weeks. Spasticity was restricting the functional activities like hand activities and associated reactions are uncontrollable. So started with Baclofen 20 mg /day for first two months and later on increased to 40mg/day as the movements were not free to improve functions. The Physiotherapy Interventions initiated five days per week for six months. Initially two weeks patient tolerated treatment for 2 hours /day and it is progressed to 3 hours by end of one month. Later on from second month to six month the treatment was for 4 hours in a day with sufficient rest period between each treatment procedures. Alternate day occupational therapy for hand functions initiated from second month from 30 minutes and progressed to 45 minutes by 6 months. Speech therapy tolerated by patients was for 15 minutes initially from

first month of rehabilitation and later on progressed to one hour.

The faradic stimulation of neck muscles for 20 minutes to bilateral sternocleidomastoid muscles, trapezius to stimulate the sensory receptors of muscles as well as skin to improve the neck control. The intensity was given on the basis of visible contractions in muscles.

The tilt table was given to facilitate the sensory feedback from joints as well as to stimulate the vestibular receptors as feedback to arouse and improve the conscious level. Initially started at 30 degrees for five minutes progressed to 10 minutes 15 minute and further upto 30 minutes within three days. Later on 60 degrees of inclination with same time progression from 5 minutes to 30 minutes given. This has been progressed with 90 degrees with same time protocol. The timing protocol is given on the basis of patient tolerance, blood pressure and Spo2 monitoring. The time progression from 30 minutes to one hour has followed after three weeks. First three weeks the patient was stabilized with cervical collar, pillow and chest belts and later on the cervical collar was removed. After 6 weeks the pillow has been removed from head as he was gaining the partial neck control. In tilt table the hand reach outs initiated in 60 degrees of shoulder abduction from six weeks onwards later on by the end of 12 weeks he was able to do in 90 degrees on right side, In left side he was able to do only upto 30 degrees. The eye hand co-ordination was improving more on right side but sustainability was less, the patient was able to tolerate only upto 5-6 times.

The pelvic rotations in supine position with hip and knee flexed (stabilized at knees and ankles with hands) started at the end of six weeks for each side 5 repetitions with assistance and later progressed to 10 repetitions. By the end of six months he could do 20 repetitions independently. The intention of trunk rotations was to improve the functional

activities by facilitating the tonic reflexes of trunk and proprioceptive receptors.



Figure: 1 Tilt table for vestibular feedback

Rolling towards sides initiated from six weeks with assistance towards both right and left side. He started independent rolling towards right side and towards left with mild assistance after four months. Sitting was initiated in wheel chair with back support and cervical hard collar for 30 minutes progressed to one hour daily. By the end of second month it is progressed to 4 hours daily. Feeding, dressing, bathing was done by caregiver in this position.

Hand activities training started at the end of second month with large size objects like ball, cups. (Using bilateral then to unilateral grasp) Perceptual training started from third month by identifying touch, pictures of ADL'S and sound.

Oro-pharyngeal therapy from first month (facial stimulation, candies). Alternative communication training initiated from second week like nodding heads, opening and closing mouth. Swallowing training for liquid foods initiated.

Bilateral ankle foot orthotics applied for the patient to maintain the ankle in position and standing frames for standing activity from third month with waist belts and knee calipers.

Care givers were trained for feeding, sitting tolerance using same communications. Psychological counseling for care givers prior to the training as well as after three months was given. Patient care education for family members has done.

RESULTS

After three months of intensive rehabilitation the individual attained the conscious level of GCS-E4M5V2 and he obeys commands occasionally. The spasticity got reduced to 1+ in right upper limb and lower limb but was the same for left side. Partial neck control attained and maintains upto 2 minutes, drooling reduced. Voluntary control was gained on right side (VCG 5) more than left side. He move to sides without assistance for about 20 times in a day .He is able to reach and grasp objects for 6-8 times. His sitting tolerance improved 70% of the time to independent sitting. He started using alternate methods for communication like closing eyes and opening and closing of mouth. Able to drink fluids and started having semi solid food with small quantities.

After six months the GCS score improved with scoring of 13/15, E4M6V3. He got neck control achieved and maintains 5-10 minutes. His sitting tolerance increased to 90%.The speech improved to monosyllabic like “bye, “amma”. The voluntary control of movements improved on both sides. The attention span improved by completing simple task, oriented to place, people & recognizes the situation. He identifies objects, shapes, colors, able to chew and swallow solid foods. The cognition was improved-smiles, greets

others, Indicates when he is hungry, wanted to do toiletry activities.

DISCUSSION

In traumatic brain injury the motor functions are likely to improve first and functional aspect also improves but this may mislead as an indicator of overall recovery. In this condition the general approach improves his alternate communication skill but difficulty in understanding the complex instructions. The literatures related to TBI recovery often implies that improvement in cognition, memory and attention may happen slower compared to motor skills.

CONCLUSION

The improvement seen may be partly attributed to the coordinated work of the team members who meet in the case conference every two weeks to review & revise the treatment protocol. Such that common and individual goals are shared and total therapy time is managed, to incorporate all goals by team members

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