



Comprehensive Rehabilitation of Mihir: A Case Study of Paediatric Traumatic Brain Injury Recovery

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Introduction:

Traumatic Brain Injury (TBI) in children can result from various incidents, with pedestrian–motor vehicle accidents being one of the leading causes. This case study focuses on Mihir, an 8-year-old boy who experienced severe TBI following such an accident. Upon arrival at the pediatric trauma center, Mihir presented with a Glasgow Coma Scale (GCS) score of 2, fixed and dilated pupils, and a constellation of injuries including diffuse intracranial hemorrhage, pneumothorax, orbital fracture, and multiple contusions.

Mihir's initial state of coma necessitated immediate and intensive medical intervention, including intracranial pressure monitoring, chest tube insertion, and tracheostomy placement. Despite the severity of his injuries, the rehabilitation team initiated early interventions to optimize his recovery potential. Mihir's coma stimulation program was cautiously implemented considering his multiple injuries and medical devices.

Physical therapy played a crucial role in Mihir's rehabilitation journey, focusing initially on managing ankle plantarflexion posturing and preventing contractures. As Mihir gradually emerged from coma over two weeks, his treatment shifted towards increasing tolerance to upright positioning, enhancing motor control, and managing contractures. The utilization of the Rancho Los Amigos Scale aided in assessing his progress and planning appropriate interventions.

The transition to a pediatric rehabilitation center marked a pivotal phase in Mihir's rehabilitation. Assessment tools such as the WeeFIM and the PEDI were employed to evaluate his functional status and set rehabilitation goals. Interventions included wheelchair mobility, transfers, standing activities, and gait training. Despite evident hemiplegia and motor control deficits, Mihir's progress was notable, albeit requiring maximal assistance for certain activities.

The involvement of Mihir's parents in family conferences and education sessions was integral to ensuring continuity of care and home-based support. At discharge, Mihir demonstrated significant improvements, including wheelchair mobility, supervised transfers, and short-distance ambulation with assistive devices. However, neuropsychological testing revealed cognitive deficits, necessitating ongoing support in educational settings.

Transitioning back to school required modifications to accommodate Mihir's needs, with continued physical therapy integrated into his educational program. By four months post-injury, Mihir had made significant strides in functional independence, indicating the effectiveness of a comprehensive rehabilitation approach.

This case underscores the multidisciplinary nature of paediatric TBI rehabilitation, highlighting the importance of early intervention, family involvement, and tailored rehabilitation strategies to optimize functional outcomes.

Case Description:

Mihir is an 8-year-old boy who experienced a TBI secondary to a pedestrian–motor vehicle accident. He was unconscious at the scene of the accident and was life-flighted to the nearest pediatric trauma center. On arrival at the emergency room, he had a GCS of 2 and his pupils were fixed and dilated. Mihir was in a coma. Diagnostic studies revealed diffuse right intracranial hemorrhage, a right pneumothorax, fracture of the left orbit, and multiple contusions. An ICP monitor, chest tubes, and placement of a tracheostomy tube were required for acute management. Mihir lives at home with his parents and a 6-year-old sister in a two-story home with five steps to enter. His bedroom and bathroom are on the second floor. His past medical history is unremarkable. Mihir is a second-grade student at Jones Elementary. The brain injury rehabilitation team was consulted 3 days after admission, and Mihir was determined to be at a Rancho Los Amigos Scale Level II. The brain injury team implemented a coma stimulation program. Caution was taken implementing the program owing to his multiple injuries, monitors, and tube placements. In addition, the PT initiated an inhibitory casting program to manage his left ankle plantar flexion posturing, which was measured at 45 degrees. A resting splint was made to maintain the right ankle in a neutral position. On the basis of the PT's screening, systems review, and examination, Mihir's medical diagnosis fits in the physical therapist preferred practice

pattern 5C.4 Mihir slowly emerged from the coma over a period of 2 weeks. Subsequent treatment focused on increasing tolerance to upright on the tilt table, motor control of the neck and trunk during sitting, and contracture management. During the next 2 weeks, Mihir's medical condition stabilized, and he progressed to a Rancho Los Amigos Scale Level V. Owing to the severity of his brain injury and the presence of multiple impairments, the acute care team anticipated that Mihir would require additional care in an acute rehabilitation setting, an outpatient setting, and additional services at his school setting. His episodes of care would most likely be on the higher end of the range anticipated for preferred practice pattern 5C. As Mihir awoke, his tracheostomy was removed, and he was transferred to a paediatric rehabilitation centre. The WeeFIM and the PEDI were used to examine his status upon admission and to determine his projected goals for improvement during his stay. Inhibitory casting was continued for the left ankle plantar flexion contracture, which was now measured at 20 degrees. Mihir was given a high back wheelchair for mobility with a custom-fit modular seating system for postural control. In addition to the previous intervention strategies, Mihir also began to work on transfers from supine to sit and from the wheelchair to a mat with moderate assistance. He also engaged in standing activities and gait training. Decreased motor control and hemiplegia on the left were more evident as he increased his activity level. Mihir moved in synergistic patterns for both the upper and lower extremities. Strength on the right side of the body was fair. Balance and coordination in upright were poor, and he required maximal assistance for standing activities. As rehabilitation progressed, Mihir's condition improved and he began to follow commands consistently and showed some recall of newly learned tasks. His parents participated regularly in family conferences and family education and were instructed how to assist Mihir during tasks of functional mobility as well as how to perform prescribed exercises. At the time of discharge from rehabilitation, Mihir was able to propel himself in a regular wheel chair using the right extremities. He was able to transfer from the wheelchair to the mat with supervision and was able to walk short household distances with a forearm crutch on the right. He was still limited in his mobility by the left-sided spasticity. Mihir had been evaluated for orthotics and was to receive a left dynamic AFO. Neuropsychological testing was completed prior to discharge and revealed deficiencies in short-term memory, attention span and focus, judgment, and agility to learn new material. By 4 months after the injury, Mihir was transitioning back into his school. His school program was modified for a half-day of inclusion in his regular classroom and a half-day of specialized classroom services. Mihir would continue to receive physical therapy through the school setting. He was independent in his transfers and was ambulating with the left forearm crutch and the dynamic AFO more consistently. Mihir used the wheelchair only for community mobility.

References:

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