Case Report

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Integrated rehabilitation for a case with traumatic brain injury

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Abstract: Traumatic brain injury (TBI) is one of the leading causes of death and disability the world over. The common consequences of TBI include physical, cognitive and psychological dysfunction. This case report presents the integrated rehabilitation programme used with an individual with TBI. The case report highlights the physical, cognitive and psychological aftermath for a client with TBI and the necessity to plan and implement a holistic rehabilitation strategy in order to successfully reintegrate the individual.

Keywords: behavioural-emotional sequalae, holistic rehabilitation, neuropsychological rehabilitation, re-integration, traumatic brain injury

INTRODUCTION

Traumatic Brain Injury (TBI) is one of the leading causes of death and disability the world over. In India, the figures are set at 2 million injuries and 200,000 deaths due to TBI each year[1]. Advances in patient care have led to an increase in the number of survivors, thereby placing an increased demand on rehabilitation services[2]. In India alone, nearly 1 million individuals require rehabilitation services as a consequence of TBI every year[1]. A multi-disciplinary/holistic approach to rehabilitation has frequently been recommended[3], however, there have been few advances in this regard in India, and to the best of our knowledge, no structured holistic rehabilitation programmes are available at this point of time. The present case describes an attempt at holistic rehabilitation in a client with TBI.

CLINICAL HISTORY

The client is a 36 year old female doctor, who was pursuing a post-graduate super-specialisation course. She met with a road traffic accident approximately three years ago, while traveling in a four-wheeler that collided with a stationary truck. She sustained an injury to the head. There was a history of transient loss of consciousness, which later lapsed into altered sensorium. ENT bleed was also noted at the time of the injury, but there is no history of vomiting or seizures. The GCS score was E1 V1 M4, which is characteristic of a severe injury. CT and MRI scans of the brain revealed temporo-parietal sub-arachnoid hemorrhage in the right hemisphere, small contusion in the brain stem and diffuse axonal injury. At the time of discharge 20 days after the injury, she was conscious, ambulant, obeying simple verbal commands and speaking a few words. However, she had 3rd nerve palsy, which resulted in difficulty in making saccadic movements and keeping the eyelid open in the right eye. The client's premorbid level of intellectual functioning is estimated to be in the superior range, based on her educational and occupational history. Active pursuit of leisure activities such as music, painting, gardening and cooking was part of the premorbid personality.

She was referred for neuropsychological assessment and rehabilitation to the Neuropsychology Unit, NIMHANS, three months after the injury. A detailed neuropsychological assessment was attempted, however, some tests were not possible due to her clinical condition.

Following this, she underwent neuropsychological rehabilitation for over 70 sessions. The neuropsychological rehabilitation programme consisted of tasks for attention, reasoning, visual and verbal memory. The programme was designed to include paper-pencil tasks, computerized tasks, manual tasks, as well as tasks based in real-life scenarios. Significant improvements were noted in memory by the family members. The neuropsychological profiles at baseline and post-rehabilitation are given in Table 1. As her cognitive status improved, behavioural changes were unmasked in the form of impatience, irritability, impulsivity, excessive spending, increased volume of speech, circumstantiality, excessive food intake and

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Table 1: Comparison of scores baseline and post-retraining

DOMAIN	BASELINE 15.03.2007	POST-RETRAINING 10.12.2007	COMMENTS
Sustained attention (Digit Vigilance)	Not assessed	Time (< 3rd percentile), Errors (53rd percentile)	Visual deficits
Focussed attention (Colour Trails)	Not assessed	I (36-45th percentile), II (13-16th percentile)	Visual deficits
Divided attention (Triads)	Not assessed	67th percentile	Significant improvement
Mental speed (Digit Symbol)	6-9th percentile	15-21st percentile	Mild improvement
Motor Speed (Finger tapping)	15th percentile	R: 50-60th percentile, L: 10-15th percentile	Moderate improvement
Verbal fluency (COWA) (Animal Names)	5-10th percentile 10th percentile	60-70th percentile 20-30th percentile	Significant improvement in COWA
Design fluency	Not assessed	Free – 10th percentile, Fixed - 70-85th percentile	—
Working memory (N-Back) (Letter Number Sequencing) (Spatial Span)	< 5th percentile 9 (raw score) 70-80th percentile	1-back: 10-20th percentile, 2-back: 80-95th percpercentile 13> 95th percentile	Improved 2-back Mild improvement Mild improvement
Planning (Tower of London)	Discontinued due to impulsivity	10-95th percentile	Significant improvement maintained
Set shifting (WCST)	40-75th percentile	50-95th percentile	Significant improvement maintained
Response Inhibition (Stroop)	Not assessed	97-100th percentile	Significant improvement
Visuospatial construction (CFT)	20th percentile	40-95th percentile	Significant improvement maintained
Parietal focal signs	Absent	Absent	—
Verbal learning & memory (AVLT)	< 5th percentile	50-100th percentile	Significant improvement
Logical memory (Passage test)	Raw scores-14,13,12 and delayed recall 16	Raw scores (max score 22) – 19,19,21 & delayed recall 20	Significant improvement
Visual learning & memory (CFT)	5th percentile	30-40th percentile	Moderate improvement
Abstract reasoning	5th percentile	90th percentile	Significant improvement

consequent weight gain. This was conceptualized as difficulties in behavioural inhibition. Hence, tasks for response inhibition were also added to the programme.

For the most part of this period, the client went to her place of work everyday, and participated in the routine such as ward rounds and academic activities. She was however not allotted any cases under her care. The client later began to express frustration regarding her inability to function as she used to, about not being allotted patients under her care, and wanted to resume driving. She also became more sensitive to others' reactions to her, and began to express emotional reactions to the accident – wondering who was to blame for it, and the impact it had on her life. These were noted as improvements from her earlier apathy, and were discussed in sessions to help the client resolve such issues. She was also referred for a Psychiatry consultation and depression was ruled out.

The client continued to have physical problems which made it difficult for her to read, and to stand/walk for the most part of the day as her job required. Although she was able to describe and handle some surgical procedures and treatments for several conditions, she was unable to engage fully in her clinical routine due to her physical problems, and hence it was difficult to determine if her cognitive status would permit her to take up clinical responsibilities independently. Her institute required her to undergo a mock-examination to evaluate her knowledge of the subject post-injury. She was, however, unable to read, partly due to her visual problems, and partly due to lack of motivation. Study-skills training was initiated to help her resume studying. However, she could not take the examination and was hence unable to complete her post-graduate super-specialisation course.

She took up jobs in a few private hospitals but left owing to interpersonal problems. It appeared that her colleagues were skeptical about her abilities following the traumatic brain injury, and she herself was also

extremely sensitive to criticism and displayed poor frustration tolerance with minor incidents. There were, however, no complaints about the quality of her work either from patients or colleagues.

Friction is also frequent with family members – the family has high expectations of her, and notes that her behaviour is still lacking social nuances and therefore embarrassing to them. The client perceives them as over-critical and unable to understand her difficulties post-injury. The loss of a family member who served as a buffer in the conflicts with other members has, along with leading to more interpersonal problems within the family, also added an additional burden of grief for the client to cope with. The family members have been included from the beginning of intervention as co-therapists to improve the client's functioning, and work is ongoing with the family to reduce expectations and improve the quality of interactions. The client's grief is being dealt with in individual sessions, and she also has frequent psychiatric reviews to monitor her mood state and evaluate the need for medications.

DISCUSSION

The consequences of TBI are wide-ranging and include physical, cognitive, emotional/behavioural and interpersonal sequeale. The cost to the client in terms of daily functioning, marital/family concerns and vocational issues is tremendous. The burden on care-givers is profound, and, in many cases, enduring. A follow-up of individuals with TBI indicates that while physical problems may resolve, cognitive and emotional/behavioural problems tend to persist even ten years after the injury[4]. Cognitive and emotional/behavioural problems are also the greatest source of stress to care-givers, and to clients themselves at return to work. Most individuals with TBI are unable to return to earlier work status[4], especially those with a GCS score below 8[1]. A multi-disciplinary/holistic approach to rehabilitation has been recommended[3]. Holistic rehabilitation leads to better community integration and life satisfaction than standard neuropsychological rehabilitation[5]. However, in India there are no structured holistic rehabilitation programmes. In addition, with a large segment of the population living in rural or semi-urban areas, accessibility to such programmes, and the cost involved, are significant obstacles[1]. Several reviews have emphasized the benefits of a holistic programme over standard unimodal rehabilitation programmes[5]. The present case study also highlights the success of such a programme in the re-integration of the individual, and calls for the development of structured holistic/multidisciplinary rehabilitation programmes.

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