

# Holistic neuropsychological rehabilitation: grief management in traumatic brain injury

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## ABSTRACT

Neuropsychological rehabilitation is based on the nature and scope of neuropsychological symptoms identified through structured interviews and standardized tests. Here, the focus is to understand brain injury recovery phases and effectively deal with post injury grief-bereavement process. We wanted to test the effect of neuropsychological functioning of a bullet shot/penetrating injury case with cognitive/lobular impairment, social-emotional losses and severe grief-bereavement process. Holistic neuropsychological approach consisting of MMSE and other Indian standardized neuropsychological test battery (VAIS, BSS, Mukundan's battery, WHOQOL-BREF), cognitive retraining (basic and functional), extensive- flexible Grief-Bereavement Therapy, Supportive Psychotherapy, Family Counseling, Cognitive Behavior Therapy and Person Centered Therapy. Evidence of marked improvement in orientation, comprehension, working memory, verbal and performance ability, fronto-temporal functions and quality of life (physical, psychological, environmental and social) domains in comparison to his pre-therapy. Holistic neuropsychological rehabilitative approach improved both patient's cognitive functioning and his quality of life. However, for such generalization, extensive studies are required.

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## Introduction

### *Traumatic brain injury (TBI)*

Traumatic Brain Injuries (TBIs) are a major public health problem in India, resulting in deaths, injuries and disabilities of young and productive people of our society. The health economic losses due to India are phenomenal, though unmeasured. According to World Health Organization,<sup>1</sup> there is growing enormity of the problem of injuries across the world and the urgent need for well designed and evaluated programmes in prevention, management and rehabilitation of such cases. It commonly causes life-long impairments in physical, cognitive, behavioral and social function, but the cognitive deficits are more disabling than the residual physical deficits.<sup>2</sup> Since, recovery from TBI continues for at least 5 years after injury,<sup>2</sup> hence, neuropsychological rehabilitation plays a very important role in improving the quality of life of such cases.

Studies suggest that rehabilitation is effective using an interdisciplinary approach,<sup>2</sup> and close liaison with the patient, family and care-givers enables one to focus on retraining in activities of daily living, cognition, pain management, behavioral therapies, and pharmacological management besides family counseling. Hence, the neuropsychologists helps in them guide in providing ongoing support in the community, monitoring medical complications, behavioral, cognitive and personality issues, social re-integration, care-givers coping skills and back-to-work issues.

Research indicates that Rehabilitation programs with cognitive behavioral approaches helps in ameliorating identified executive deficits.<sup>3</sup> There are also studies showing positive results in improving the attention and performance speed.<sup>4</sup>

Apart from cognitive deficits, TBI patients also suffer from social and emotional upheavals<sup>5</sup> which generate considerable family cordial disturbance. A study of intensive neuropsychological rehabilitation of social skill showed significant reduction in the level of anxiety and aggressive behavior and improvement in consciousness of their defects. Some improvement was seen in expressing opinions and emotions, and inability to adapt to social conduct to different situations.<sup>5</sup>

Hence, the importance of holistic neuropsychological rehabilitation is considered worldwide as an important process in enhancing the overall quality of life of the patient and their care givers.

### *Importance of grief and bereavement process*

The loss of a loved one causes a broad range of grief reactions, leading to distress requiring grief counseling. Since an initial high level of distress is one of the best predictors of later distress, it can indicate that the person is at risk for a poor bereavement outcome. Hence, a proper grief and bereavement counseling can often help bring about a more effective adaptation to the loss.<sup>6</sup> The major goals of such counseling are:

1. Increasing the reality of loss
2. Helping the patient deal with emotional and behavioral pain
3. Helping the patient overcome various impediments to re-adjust after the loss, and
4. Helping the patient find the way to maintain the bond with the deceased while feeling comfortable readjustment in life.<sup>7</sup>

### **Objectives**

1. To assess the bullet shot/penetrating TBI patient for his neuropsychological deficits.

2. To plan intervention for impaired neuropsychological functions and psychosocial deficits.
3. Grief and Bereavement therapy for personal losses and emotional adjustment.

### Methods

A single case study was taken in which a 22 year old, male, right handed, urban background, professionally qualified graduate, suffered moderate penetrating injury (bullet shot), was referred for neuropsychological evaluation one month after the date of ictus when he was discharged from Jai Prakash Neuro Apex Trauma Centre, Department of Neurosurgery, AIIMS, New Delhi. This study included a holistic neuropsychological approach, which consisted of MMSE<sup>8</sup> and other extensive Indian standardized neuropsychological battery of tests: Verbal Adult Intelligence scale<sup>9</sup> (VAIS) for assessing verbal ability, Bhatia Short Scale<sup>10</sup> for assessing performance ability, lobular functioning using Mukundan's Battery,<sup>11</sup> perceptuo- motor functioning using Bender Visuo Motor Gestalt Test,<sup>9</sup> quality of life using WHO QOL-BREF.<sup>12</sup> This was followed by extensive problem and patient specific cognitive retraining modules, rigorous, extensive and flexible Grief and Bereavement Therapy, Supportive Psychotherapy, Family Counseling, Cognitive Behavior Therapy, and Person Centered Therapy for coping effectively with personal losses (losing immediate family members) and attaining emotional adjustment using therapeutic guidelines.<sup>13,7</sup>

### Results

Before cognitive retraining sessions, as shown in Table 2 a detailed neuropsychological evaluation was done for lateralization and localization of brain functions which included MMSE<sup>8</sup> where the patient scored 24/30 indicating mild impairment in orientation; Verbal Scale<sup>9</sup> where the scores are as following: (general knowledge = 106, attention and concentration = 86, working memory = 66, comprehension = 51) overall PQ = 82 and VIQ = 83 indicative of low average intellectual functioning; Alexander Pass Along test<sup>14</sup> where he scored IQ = 58 indicative of intellectual disability in practical ability (compare the above scores with an average of 90–110 IQ points<sup>15</sup>) and Mukundan's neuropsychological battery<sup>11</sup> where his frontal/ prefrontal lobe functions were found to be impaired (working memory, abstract intelligence, ideational fluency, set shifting and orbito- frontal functions), while in parietal lobe he had visuo-constructive impairment. In temporal lobe he suffered from mild impairment in visual comprehension and auditory perseveration. However, all apraxias and agnosias were intact. Moreover, his pre-rehabilitation quality of life<sup>12</sup> was assessed where his physical domain was found to be average (–0.66); while his psychological (–2.92) and environmental domains were found to be moderate- severely impaired along with severe impairment in his social domain (–3.79). He was also assessed on Depression scale (BDI: 29) which was indicative of severe depression. And hence, his neuropsychiatric treatment was ongoing simultaneously.

Based on the first neuropsychological evaluation, cognitive restructuring/retraining was started with an initial focus of improving his attention and concentration level and making the patient functionally independent. It included cognitive training modules with progressive difficulty (i.e. mathematical problems, coloring letter cancellation and grain sorting)

as well as making a significant daily activity schedule giving utmost importance to the patient convenience and the caregiver understanding. For following two weeks, the patient didn't follow the schedule and activities religiously which could be due to his reluctance to come out of the patient mode or due to his depressive symptoms. But after repetitive coaxing by the caregiver, his retraining sessions, psychiatric medication for depression, individual, family counseling and bereavement therapy<sup>7</sup> was followed. Henceforth, he started following the retaining schedules actively for 3 months. As a result of which patient showed improvement. Thereafter he maintained well, talked about his problems on his own but was still depressed about the death of his immediate family members.

After 3 months, additional challenging cognitive tasks were included, i.e. reading newspaper, making word list and recalling visual analog, medium difficulty mathematical problems, computer configuration task (frontal and temporal tasks) and increasing social interaction. All these activities continued for 7 months. A detailed neuropsychological evaluation was done to see improvement where MMSE<sup>8</sup> was 27/30 indicative of no impairment in orientation; Verbal Scale<sup>9</sup> where (general knowledge = 116, attention and concentration = 109, working memory = 101, comprehension = 77); overall PQ = 130 and VIQ = 95 indicative of average intellectual functioning; APA<sup>14</sup> IQ = 84 indicative of below average intelligence (compare the above scores with an average of 90–110 IQ points<sup>15</sup>) and Mukundan's neuropsychological battery<sup>11</sup> where his frontal/ prefrontal lobe functions were found to have improved except mild impairment in abstract thinking, while parietal lobe and temporal lobe functioning had no impairment. Moreover, his quality of life<sup>12</sup> post rehabilitation, including, physical (0.07); psychological (–0.80) and environmental domains (–0.72) were found to have no impairment while his social domain was found to have mild-moderate impairment, but was better than pre- therapy status. But he was still depressed<sup>16</sup> but moderately [BDI: 22].

After 10 months of long extensive retraining sessions, he started living independently, doing well in his job and maintaining well socially. However, after 1 year, he had a relapse where he started feeling anxious, not able to concentrate with problematic memory, replete with episodes of sadness, and not able to maintain job.

Again, a neuropsychological evaluation was done where his performance ability was found to be decreased; VIQ<sup>9</sup> = 98; PQ = 72; APA<sup>14</sup> = 97, in comparison to earlier evaluation (Tab. no.2). His working memory and abstract intelligence too were also found to be mildly impaired. However, 3 sessions of counseling over 1 month was done and the patient again retracted back to his normal independent life.

### Discussion

The basis of the intervention programme for this patient included a *holistic neuropsychological rehabilitation approach* (tailored to fulfill this patient's need). This included Basic Skill Training, Functional Skill Training (including cognitive retraining), Supportive Psychotherapy, Grief and Bereavement Therapy, Family Counseling, Cognitive Behavior Therapy, and Person Centered Therapy. The order of interventions used and their implications are discussed below:

Table 1: Guidelines for Management of Grief (Mak et al 1997)

Supportive Psychotherapy	Grief Work/Grief Counseling	Cognitive Behavioral Psychotherapy
<ul style="list-style-type: none"> <li>• Listening, accepting, allowing ventilation of emotions</li> <li>• Review implications of loss in the future.</li> <li>• Reassure, can choose when to experience pain of recollection.</li> <li>• In case grief complicated by guilt and anger, challenge these thoughts rather than negate them. E.g. "what are you going to do about that feeling?"</li> <li>• Reassure that grief is normal and not craziness.</li> <li>• Keep objects such as photographs and mementos to facilitate the expression of grief.</li> <li>• Instruct relaxation and self monitoring of hyperventilation to reduce anxiety.</li> <li>• Instill belief that bereavement has positive side as it can help to discover new identities and learn new skill.</li> <li>• Medication for only those with great depression</li> </ul>	<ul style="list-style-type: none"> <li>• Help patient accept reality.</li> <li>• Experience pain by dwelling on thoughts and memories of deceased.</li> <li>• Identify and express positive and negative feelings i.e. anger, guilt, shame, frustration and helplessness.</li> <li>• Help patient to live without deceased by assuming new roles and making effective decisions.</li> <li>• Bring grief to resolution by encouraging the bereaved to withdraw from the deceased emotionally, and re invest the emotions in a new relationship. Should not occur too soon.</li> </ul>	<ul style="list-style-type: none"> <li>• To improve self confidence.</li> <li>• Increase activities gradually</li> <li>• Replace the negative thoughts by positive and more pleasurable ones</li> <li>• Maximize social support and ensure its continuity.</li> <li>• Progressive muscular relaxation to control distress and increase sleep.</li> </ul>

Based on the evaluation outcomes, cognitive restructuring was started with an initial focus of improving his basic skill training which involves basic activities of daily living by planning activity scheduling with patient's maximum input/ and caregiver involvement, thereby emphasizing functional independence. This was followed by Functional Skills Retraining that included planned modules in the areas of deficits (refer to Table 1), which included neuro-cognitive modules: attention and concentration level, working memory, coloring, letter cancellation and grain sorting with other progressive difficulty. For the following two weeks the patient didn't follow the schedule and activities religiously, showing ineffectiveness of cognitive retraining. At that moment the underlying problem of disturbed state of mind was ascribed to loss of immediate family. It was observed that he seemed to be in constant denial stage where he was not able to accept the reality. Hence, along with retraining sessions, and grief and bereavement therapy was started.<sup>13,7</sup> He was given a rigorous supportive psychotherapy, grief counseling and cognitive behavioral psychotherapy which focused on encouraging him to vent out his emotions which were disturbing him due to which he was not able to gain confidence to adjust to reality, thereby affecting his personality. Family counseling was done on persons /family members with whom he was presently residing. Since they themselves were mourning the loss they too were not sure of their action plan to help the patient as they were uncertain to talk to him about the problem. Hence, they avoided talking about the problem. They had hidden all the photographs of the patient's family members, whom he had lost during this event. The direct grief and bereavement therapy to the patient and an indirect help from the family members helped the patient to overcome his negative thoughts as well as restlessness. By going to his house and exploring and understanding the implications of loss in the past so that he could reinvest optimistically in the future.

Moreover, the goal of grief therapy was to resolve the conflicts of separation and to facilitate the completion of the grief tasks. The patient went through the stages of grief where supportive counseling was followed.<sup>17</sup> At first it seemed he was in the stage of denial where he was not able to accept the

death of his grandparent as he was in a continuous mode of stating 'my grandparent is alive' with no mention of his parents, on which he remained silent and restless. Since he was a head injured patient; he was not able to express his feelings and emotions as his orbito- fronto functions were found to be impaired (Refer to Table 1). Therefore, with extensive sessions of sensitive exploration and optimistic probing technique (person centered therapy), he later on seemed to come to stage of intense concern where he was blank and expressionless with extreme anxiety and despair as he was always walking in the room with repetitively walking up to the washroom (inside the doctor's clinic), looking in the mirror without reporting of any reason of restlessness which was interpreted as having a confusion regarding his self- identity and social relationship which he was finding it difficult to cope with. For effective resolution of the intense concern, family counseling was given to the caregivers where they were advised to take him to the parental house, where he recollected his memories with his parents and grandparents by collecting the albums and gradually narrating the instances he spent with his deceased family members giving a way out to his repressed feelings and emotions (showing catharsis). He even tried to surf the incident on the internet to gain information about the same.

After knowing the traces of the episode, there was marked improvement in his behavior where his anxiety and restlessness seemed to have decreased. He even talked for the first time about his deceased mother stating that 'I was very close to my mother' which was interpreted as an acceptance to the reality. And gradually with extensive *holistic neuropsychological rehabilitation approach*, after a year, there was an immense improvement in his cognitive, social and emotional well-being as he was taking care of his activities of daily living (brushing, bathing, grooming etc) along with attempts to hold on the job and social relationship as he was able to communicate his distress to his female cousin with whom he was close and comfortable. A present telephonic interview with the care givers indicated that he is now in a hetero-sexual relationship showing that now he is in a position to form a relationship, reciprocate the same and can fulfill his internal urges (interpreted as a continuous dynamic social, emotional and cognitive recovery) thereby improving his quality of life (Table 2).

Table 2: Pre and Post Neuropsychological Test Results

Tests	I <sup>st</sup> Neuropsychological Evaluation			Extensive Cognitive Retraining and Grief Bereavement Therapy (Holistic Approach)	II <sup>nd</sup> Neuropsychological Evaluation (after cognitive retraining and grief bereavement therapy)	
	Functions	Score	Interpretation		Score	Interpretation
MMSE (Folstein, Folstein and McHugh, 1975)	Orientation	24/30	Mild impairment		27/30	No impairment
VAIS (Pershad and Verma, 1990)	Attention and concentration	86	Low Average		109	Average
	General knowledge	106	Average		116	Above average
	Comprehension	51	Impaired		77	Low average
	Working memory	66	Impaired		101	Average
	VIQ	83	Impaired		95	Average
BSS (Bhatia, 1955)	IQ	58	Impaired		84	Low average
	PQ	82	Impaired		130	Above average
BDI	Depression Screening	29	Severe		22	Moderate
Mukundan's Battery (Mukundan. C.R., 1996)	Frontal lobe	working memory, abstract intelligence, ideational fluency, set shifting and orbito-frontal functions	Impaired		working memory, ideational fluency, set shifting and orbito-frontal functions	Improved
	Temporal lobe-	visual comprehension and auditory perseveration	Impaired		Improved in all functions	Improved
	Parietal lobe	Intact	Intact		Improved in all functions	Improved
WHO-QOL-BREF (WHO, 2004)	Physical health • Pain and discomfort • Energy and fatigue • Sleep and rest • Dependence on medication • Mobility • Activities of daily living • Working capacity	-0.66 S.D.  -2.92 S.D.	No impairment  Moderate-severe Impairment		0.07 S.D.  -0.80 S.D.	No Impairment  No Impairment
	Psychological • Positive Feelings • Negative Feelings • Self Esteem • Thinking, Memory, Learning and Concentration • Body Image Spirituality, Religious and Personal Beliefs	-3.79 S.D.  -2.49 S.D.	Severe Impairment  Moderate-severe Impairment		-1.84 S.D.  -0.72 S.D.	Mild-Moderate Impairment  No Impairment
	Social relationships • Personal relations • Sex • Practical social support					
	Environment • Financial resources • Information and skills • Recreation and leisure • Home environment • Access to health and social care • Physical safety and security • Physical environment • Transport					

<sup>1</sup>MMSE (Mini Mental Status Examination).<sup>2</sup>VAIS (Verbal Adult Intelligence Scale).<sup>3</sup>BSS (Bhatia Shorty Scale).<sup>4</sup>WHOQOL-BREF (World Health Organization Quality Of Life- Short Version).

### Conclusions

This case highlights the importance and effectiveness of holistic neuropsychological rehabilitation in overcoming neuro-cognitive and psycho-social deficits. Hence, prompt, adequate, patient specific and *holistic neuropsychological rehabilitative approach* does not only improve the quality of life of TBI patients in the short-term, but can also prevent future development of serious physical and psychological pathologies. To confirm such claims, extensive studies are required. However, there were certain limitations in study 1) One of the major limitations of the study was the lack of certainty of whether the impairments in the neuropsychological functioning were due to depressive illness or brain damage. No brain imaging was done to rule out the same in the whole period of rehabilitation. 2) Further, whether the improvement observed are because of holistic approach or simply reduction in depressive symptoms was also not ascertained. 3) The spontaneous recovery period was also not lapsed, which to an extent, has limited the efficacy of such holistic neuropsychological rehabilitation.

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