Introduction

• For the last decade the emerging data on brain plasticity showed the possibility of more active treatment approach in elderly people with dementia (1, 2, 3, 4). The integrative treatment could potentially improve cognitive performance in patients with mild cognitive deficit and depression through 24 months of the treatment (5).

• The outcome of continuous long-term treatment (more than two years) in the non-clinical settings remains to be investigated (6, 7, 8).

• Here we present a case study of the patient during 48 months of treatment.

Subject / Methods

• The patient “E” is a male 67-years-old, right-handed, high school graduate, who came to our office with complaints of memory problems and depression. His medical history was noted to have Diffuse Atrophy, High Blood Pressure, Head Trauma with LOC after car accident.

• The patient had severe stress, related to the illness and death of his wife following the first 12 - 24 months of the treatment.

• He has been taking antidepressive medications. In our office, he was treated with Bupropion and Rivastigmine. Patient was encouraged to modify his diet and lifestyle and perform mild sensory-motor and breathing exercises and to take food supplements, multivitamins, vitamin E, alpha-tocopherol, omega-3 and coenzyme Q-10 (9).

• Neuropsychological test battery was administered at baseline, 6, 12, 24, 36, 48 months after beginning of treatment.

The following tests were used for cognitive assessment:

1. A full version of the Mini-Mental State Examination (MMSE) (10).
2. Neurobehavioral Cognitive Status Examination (Cognistat) was used along with MMSE to assess 10 cognitive domains: attention (digit span), orientation, language abilities, construction abilities, memory (four items), calculations, similarities and judgment (11).
3. Ruff 2&7 Selective Attention Test was designed to measure sustained and selective attention on trials of visual search and cancellation tasks (12).
4. Word List Memory Learning Test (WLMLT) was used to assess verbal memory. There were scores of immediate memory, learning process, and delayed recall (60 min).
5. Ruff-Light Trail Learning test (RULIT) is designed to measure visual spatial learning and memory related to right hemisphere function (13).
6. Wisconsin Card Sorting Test (WCST) was used along with MMSE to assess 10 cognitive domains: orientation, language abilities, construction abilities, memory (four items), calculations, similarities and judgment (11).

Results

On initial evaluation (Table 1), patient’s MMSE score was 29, however he had deficit in all cognitive domains: attention (Cognistat), memory (Cognistat, WLMLT and RULIT) and frontal lobe functions (Word Fluency tests, RFFT, WCST).

By the end of 48 months, there were no significant changes in MMSE (27) and Repetition, Calculation, Comprehension and Judgment (Cognistat).

Table 1: Performance on Cognitive Tests during 48 Months of Treatment

<table>
<thead>
<tr>
<th>Tests</th>
<th>Base</th>
<th>6 mo</th>
<th>12 mo</th>
<th>24 mo</th>
<th>36 mo</th>
<th>48 mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMSE</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>28</td>
<td>27</td>
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<tr>
<td>Attention</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Repetition</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>10</td>
<td>10</td>
<td>11</td>
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<tr>
<td>Calculation</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>RFFT</td>
<td>66</td>
<td>96</td>
<td>96</td>
<td>108</td>
<td>108</td>
<td>108</td>
</tr>
<tr>
<td>RULIT 5 min recall</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>WCST Total Correct</td>
<td>87</td>
<td>66</td>
<td>119</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>WCST Category</td>
<td>1</td>
<td>1</td>
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</tbody>
</table>

Attention Domain

Attention was improved during the period of 24 - 48 months of the treatment (Cognistat). There were signs of increase in detection and search speed, accompanied by decrease accuracy (2 & Selective attention test).

Memory Domain

Naming and memory (4 words) (Cognistat) increased by 24 months and remained at the same level till 48 months. Construction remained about the same for the 36 months and has increased by the end of 48 months.

On the WLMLT immediate recall decreased during all treatment period. Five minutes recall remained the same till 24 months of the treatment and increased by 36 - 48 months.

On the RULIT score, visual-spatial memory test, immediate and 60 minutes recall improved by 24 months of the treatment and remained at the same level till the 48 months. The numbers of total correct trials increased during the whole treatment period.

The numbers of complete categories on WCST test remained the same by the end of 24 months and then increased (36 - 48 months).

Executive Function Domain

On the Cognistat, performance on similarities increased by the end of 36 months and remained the same till the end of the study.

Word Fluency Test (letters and animals) showed an improvement by the end of 12 months and remained at this level till the end of the study.

Unique design (RFFT) increased by the end of 24 months and remained the same till the end of the study. Error ratio (RFFT) increased by the end of the study.

On the WCST, there was an increase in total correct and conceptual responses with decrease in total errors, perseverative responses, perseverative and non-perseverative errors.

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Frontal Lobe

Cognistat

Comprehension  5  5  5  8  6  8

RUFF 2&7

Selective Attention  5  2  4  2  2  2

Ruff-Light Trail Learning Test (RULIT) was a practical method for grading the cognitive status of patients with brain damage. The scores were assessed every 3 months.

Digestive System

Cognistat

Comprehension  5  5  5  8  6  8

RUFF 2&7

Selective Attention  5  2  4  2  2  2

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Executive Function Domain

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Discussion

The study evaluated the effect of an integrative treatment on cognitive performance in medically ill individual who suffered from depression and cognitive impairment. This 48 months treatment approach together pharmacological and non-pharmacological interventions.

The positive changes were observed in all cognitive domains, mostly in memory, frontal lobe domains. Results on all different tests were all consistent. The positive results of long term combination treatment (medications and neuropsychological rehabilitation for a period of 2 years and 10 months) in a deteriorated patient were demonstrated in a single case study. (7)

In the next few weeks we will undoubtedly learn more about the preservation and activation of cognitive functions in patients with Alzheimer’s disease. Even now, it is clear that an integrative treatment approach prevent cognitive decline in patients with depression and early dementia (6).

Conclusion

The integrative treatment of this patient with mild to moderate cognitive impairment and depression has prevented further cognitive decline and even showed improvement in different cognitive domains.

Further extensive research regarding cognitive rehabilitation for dementia patient needs to be done.

References

8. Wisconsin Card Sorting Test (WCST), computerized version was used (15).