Posted on 6 Apr 2023 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. — https://doi.org/10.22541/au.168078588.84770672/v1 — This a preprint and has not been peer reviewed. Data may be preliminary.

Rivastigmine Therapeutic Efficacy in Alzheimer's Disease and Other Conditions

Tirath Patel[1]

[1]Affiliation not available

April 6, 2023

Abstract

A 72-year-old White male complained of memory loss, trouble recalling names and events, and a regular-duty deterioration. Hypertension, type 2 diabetes, and hyperlipidemia characterized the patient's history. He never drank or used drugs. His mother had Alzheimer's, and his father had a stroke. The patient's physical examination was unremarkable except for a 20-out-of-30 Mini-Mental State Examination (MMSE) score, suggesting mild cognitive impairment. Rivastigmine 1.5 mg twice a day was started, with a four-week escalation to 6 mg twice daily. He was given a cholinesterase inhibitor and memantine to slow cognitive impairment. Treatment efficacy and side effects were extensively examined.

Introduction

Rivastigmine is a cholinesterase inhibitor that has been approved for the treatment of mild to moderate Alzheimer's disease. Alzheimer's disease is a neurodegenerative disorder characterized by a decline in cognitive function, including memory loss, language difficulties, and spatial awareness [1]. The current treatment options for Alzheimer's disease include cholinesterase inhibitors, such as rivastigmine, and N-methyl-D-aspartate (NMDA) receptor antagonists, such as memantine. Rivastigmine works by inhibiting the breakdown of acetylcholine, a neurotransmitter involved in cognitive function, by blocking the enzyme acetylcholinesterase. This results in increased levels of acetylcholine in the brain, which can improve cognitive function in patients with Alzheimer's disease [2].

Rivastigmine has been shown to be effective in improving cognitive function in patients with Alzheimer's disease, as demonstrated in multiple clinical trials. In a randomized, double-blind, placebo-controlled study of 609 patients with mild to moderate Alzheimer's disease, rivastigmine was shown to improve cognitive function and activities of daily living compared to placebo [3]. Another randomized, double-blind, placebo-controlled study of 725 patients with mild to moderate Alzheimer's disease found that rivastigmine improved cognitive function and global function compared to placebo [4].

In addition to Alzheimer's disease, rivastigmine has also been studied in other conditions characterized by a decline in cognitive function, such as Parkinson's disease dementia and Lewy body dementia. Parkinson's disease dementia is a progressive disorder characterized by a decline in cognitive function, including memory loss, language difficulties, and spatial awareness, in addition to the motor symptoms of Parkinson's disease. Lewy body dementia is a neurodegenerative disorder characterized by a decline in cognitive function, visual hallucinations, and Parkinson's disease-like motor symptoms. In both of these conditions, rivastigmine has been shown to improve cognitive function [5].

The therapeutic efficacy of rivastigmine in Alzheimer's disease and other conditions has important clinical implications. Alzheimer's disease and other neurodegenerative disorders are associated with significant morbidity and mortality, and effective treatments are needed to improve quality of life for affected individuals [6]. Rivastigmine offers a promising treatment option for improving cognitive function in patients with Alzheimer's disease and other conditions characterized by a decline in cognitive function. Further research is needed to investigate the long-term effects of rivastigmine and to explore its potential use in other neurodegenerative conditions.

Patient Information

A 72-year-old Caucasian male presented with a chief complaint of memory loss, difficulty in recalling names and events, and a decline in his ability to perform routine tasks. The patient's medical history was significant for hypertension, type 2 diabetes, and hyperlipidemia. He had no history of alcohol or illicit drug use. The patient's family history revealed that his mother had Alzheimer's disease, and his father had a stroke. The patient's physical examination was unremarkable except for a Mini-Mental State Examination (MMSE) score of 20 out of 30, indicating moderate cognitive impairment.

Diagnostic Assessment

The patient underwent a battery of cognitive tests, including the MMSE, Clinical Dementia Rating (CDR), and Alzheimer's Disease Assessment Scale-Cognitive Subscale (ADAS-Cog). The results confirmed moderate cognitive impairment, and the patient was diagnosed with probable Alzheimer's disease.

Treatment: The patient was started on rivastigmine 1.5 mg twice daily, with a gradual titration up to 6 mg twice daily over four weeks. He was also prescribed a cholinesterase inhibitor and a memantine to address the cognitive decline and prevent further cognitive deterioration. The patient was monitored closely for adverse effects and efficacy of treatment.

Follow-up

After four weeks of treatment with rivastigmine, the patient's MMSE score improved to 24 out of 30, indicating a significant improvement in cognitive function. The patient's ADAS-Cog score also showed a significant improvement, decreasing from 23 to 15. The patient reported a reduction in memory loss and an improvement in his ability to perform daily tasks. The patient did not report any significant adverse effects related to the treatment. The patient continued on rivastigmine 6 mg twice daily and memantine with close monitoring of his cognitive function and any adverse effects.

Discussion

Alzheimer's disease is a progressive neurodegenerative disorder that affects cognitive function, including memory, language, and spatial awareness. The current treatment options for Alzheimer's disease include cholinesterase inhibitors and N-methyl-D-aspartate (NMDA) receptor antagonists, such as memantine. Rivastigmine is a cholinesterase inhibitor that has been approved for the treatment of mild to moderate Alzheimer's disease [7].

Posted on 6 Apr 2023 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. — https://doi.org/10.22541/au.168078588.84770672/v1 — This a preprint and has not been peer reviewed. Data may be preliminary.

Rivastigmine works by inhibiting the breakdown of acetylcholine, a neurotransmitter involved in cognitive function, by blocking the enzyme acetylcholinesterase. This results in increased levels of acetylcholine in the brain, which can improve cognitive function in patients with Alzheimer's disease. Rivastigmine has been shown to improve cognitive function in patients with Alzheimer's disease, as demonstrated in this case report [8].

Rivastigmine has also been studied in other conditions, such as Parkinson's disease dementia and Lewy body dementia, both of which are characterized by a decline in cognitive function. Rivastigmine has been shown to improve cognitive function in these conditions as well, likely due to the similar pathophysiology of these conditions with Alzheimer's disease [9].

In conclusion, this case report highlights the therapeutic efficacy of rivastigmine in improving cognitive function in patients with Alzheimer's disease. Rivastigmine has also been shown to be effective in improving cognitive function in other conditions, such as Parkinson's disease dementia and Lewy body dementia. Further research is needed to investigate the efficacy of rivastigmine in other neurodegenerative conditions [10].

References

1. Ismail, M. F., ElMeshad, A. N., & Salem, N. A. H. (2013). Potential therapeutic effect of nanobased formulation of rivastigmine on rat model of Alzheimer's disease. *International journal of nanomedicine*, 393-406.

2. Gabelli, C. (2003). Rivastigmine: an update on therapeutic efficacy in Alzheimer's disease and other conditions. *Current medical research and opinion*, *19*(2), 69-82.

3. Kurz, A., Farlow, M., Quarg, P., & Spiegel, R. (2004). Disease stage in Alzheimer disease and treatment effects of rivastigmine. *Alzheimer Disease & Associated Disorders*, *18*(3), 123-128.

4. Birks, J. S., & Evans, J. G. (2015). Rivastigmine for Alzheimer's disease. *Cochrane Database of systematic reviews*, (4).

5. Spencer, C. M., & Noble, S. (1998). Rivastigmine: a review of its use in Alzheimer's disease. *Drugs & aging*, *13*, 391-411.

6. Adler, G., Brassen, S., Chwalek, K., Dieter, B., & Teufel, M. (2004). Prediction of treatment response to rivastigmine in Alzheimer's dementia. *Journal of Neurology, Neurosurgery & Psychiatry*, *75*(2), 292-294.

7. Farlow, M. R., Small, G. W., Quarg, P., & Krause, A. (2005). Efficacy of rivastigmine in Alzheimer's disease patients with rapid disease progression: results of a meta-analysis. *Dementia and geriatric cognitive disorders*, *20*(2-3), 192-197.

8. Emre, M., Cummings, J. L., & Lane, R. M. (2007). Rivastigmine in dementia associated with Parkinson's disease and Alzheimer's disease: similarities and differences. *Journal of Alzheimer's Disease*, *11*(4), 509-519.

9. Di Santo, S. G., Prinelli, F., Adorni, F., Caltagirone, C., & Musicco, M. (2013). A meta-analysis of the efficacy of donepezil, rivastigmine, galantamine, and memantine in relation to severity of Alzheimer's disease. *Journal of Alzheimer's Disease*, *35*(2), 349-361.

10. Auriacombe, S., Pere, J. J., Loria-Kanza, Y., & Vellas, B. (2002). Efficacy and safety of rivastigmine in patients with Alzheimer's disease who failed to benefit from treatment with donepezil. *Current Medical research and opinion*, *18*(3), 129-138.

Posted on 6 Apr 2023 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. — https://doi.org/10.22541/au.168078588.84770672/v1 — This a preprint and has not been peer reviewed. Data may be preliminary.