

Treatment of The Relapsing Remitting Form of Multiple Sclerosis with Benztropine: A Case Report

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ABSTRACT

Background: An inexpensive treatment for the relapsing remitting form of multiple sclerosis, an autoimmune disease of the central nervous system, is not available. Benztropine, a drug used to treat Parkinson's Disease, stabilizes the symptoms of experimental autoimmune encephalitis, an animal model of multiple sclerosis. This drug also stimulates the synthesis of myelin basic protein by oligodendrocyte progenitor cells. **Case Summary:** A 84-year-old female developed the relapsing remitting form of multiple sclerosis when she was 47 years old. In 2013, it was published that benztropine resulted in improvement in experimental autoimmune encephalitis, an animal model of multiple sclerosis. Since this drug is FDA approved for the treatment of Parkinson's Disease, this woman was treated with benztropine resulting in stabilization of her disease. **Conclusion:** The use of benztropine, an inexpensive drug that is FDA approved for the treatment of Parkinson's Disease, to treat the relapsing remitting form of multiple sclerosis warrants investigation.

Keywords: Relapsing Remitting Form of Multiple Sclerosis, Benztropine, Treatment

Introduction

Multiple sclerosis is an autoimmune disease of the central nervous system, in which the myelin sheath is destroyed, leading to paralysis and death. Multiple sclerosis is multifactorial, requiring the interaction of genetic, as well as, environmental factors (Azoulay-Cayla, 2000). Among the environmental factors, a viral infection has been postulated (Robinson and Steinman, 2022). Recently, it was published that the Epstein-Barr virus is the causative organism (Bjornevik *et al.*, 2022). This disease affects predominantly women (Vargas and Tyor, 2017). Interestingly, pregnancy may have a protective effect on relapses (Nguyen *et al.*, 2019). Benztropine is a FDA approved drug for treating Parkinson's Disease. This

medication also is known to stimulate the synthesis of myelin basic protein by oligodendrocyte progenitor cells. Recently, it was published that this drug significantly decreased the clinical severity of the rodents receiving this medication in experimental autoimmune encephalitis, an animal model of multiple sclerosis.

Case Presentation

Presentation

When she was 47 years old, a now 84-year-old female developed paresis of her legs, as well as, urinary frequency, symptoms of the relapsing remitting form of multiple sclerosis, a diagnosis confirmed by magnetic resonance imaging (MRI) examination. In 2013, it was published that this drug resulted in improvement of the rodents involved in experimental autoimmune encephalitis, an animal model of multiple sclerosis (Deshmukh *et al.*, 2013). Therefore, this woman was started on 0.5 mg benztropine q. i. d. Since this drug inhibits the parasympathetic nervous system, she stopped producing saliva, and within 48 hours she developed large ulcers in her mouth. Therefore, she took this drug only as often as she could tolerate, usually every 3-4 days. Her dry mouth was treated with Xylimelts. A year after starting treatment with benztropine, her clinical symptoms stabilized and a MRI examination showed no evidence of inflammatory lesions. A repeat MRI performed about 6 months ago showed no significant changes in the extensive supratentorial and infratentorial white matter lesions compatible with demyelinating disease and no new lesions or evidence of active demyelination, as well as, no significant interval parenchymal volume loss. Eighteen months ago, because the disease process seemed to have stabilized, benztropine was stopped. However, since benztropine initiates remyelination, 0.5 mg benztropine, once a week, was restarted 5 months ago and has resulted in clinical improvement (Ceres *et al.*, 2019).

Clinical Course

Since the initiation of treatment with benztropine, a subject with the relapsing remitting form of multiple sclerosis, has achieved a remarkable stabilization of her symptoms.

Investigations

A repeated MRI showed no significant changes in the extensive supratentorial and infratentorial white matter lesions compatible with demyelinating disease and no new lesions or evidence of active demyelination.

Interventions

Since it has been reported that benztropine can lead to remyelination, the drug was restarted about 5 months ago.

Outcome

Nine years after starting treatment with benztropine this patient's clinical symptoms have remained stable, indeed her urinary frequency has improved, going from once every 60 min. to once every 4-6 hrs., and has allowed surgical removal of her urinary stimulator. Thus, use of benztropine has had a positive outcome in the treatment of the relapsing remitting form of multiple sclerosis.

Discussion

Despite many years of research, no cure is currently available for relapsing remitting multiple sclerosis. However, in recent years, monoclonal antibodies have been developed that provide benefits for this disease (Krajnc *et al.*, 2022). These include natalizumab, alemtuzumab, and the anti-CD 20 antibodies all of which may have serious adverse side effects (Krajnc *et al.*, 2022). Data reported in the literature that is based mainly on animal experiments suggested that benztropine could be beneficial in the treatment of the relapsing remitting form of multiple sclerosis in humans. Therefore, this drug was used to treat a patient with this disease, and resulted in a positive outcome. The limiting factor is that this was not a formal clinical trial, and therefore, did not include a placebo control. Further, only 1 subject was treated in this manner.

Clinical Take-Home

Treatment of the relapsing remitting form of multiple sclerosis with benztropine, a drug used to treat Parkinson's Disease, could be tried since this medication is inexpensive and is not immunosuppressive.

Conclusion

Benztrapine, a FDA approved drug for the treatment of Parkinson's Disease, inhibits the progression of the disease process in relapsing remitting multiple sclerosis, as well as, inducing improvement of the clinical symptoms. This suggests that the use of this inexpensive drug to treat multiple sclerosis warrants investigation.

Ethics and Consent: None needed.

Conflict of Interest: None declared.

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