

# The Use of Citicoline in Ophthalmology: An Educational Article

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**Received date:** April 06, 2023; **Accepted date:** April 16, 2023; **Published date:** April 23, 2023

**Citation:** Aamir Al-Mosawi, (2023), The Use of Citicoline in Ophthalmology: An Educational Article, *Clinical Research and Clinical Trials*. 7(4) : DOI :10.31579/2693-4779/127

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## Abstract:

Citicoline is a safe form of the choline has been increasingly grouped with the water-soluble B vitamins. It has been increasingly used with noticeable benefits in the treatment of several pediatric and neuro-psychiatric disorders including, cerebral palsy, cognitive impairment, autism disorders, Rett syndrome, and kernicterus. The aim of this paper is to provide an overview of citicoline research progress relevant to the field of ophthalmology.

**Keywords:** Citicoline; ophthalmology; diabetic retinopathy; diabetic retinopathy; glaucoma

## Introduction

Citicoline is a safe form of the choline has been increasingly grouped with the water-soluble B vitamins. It has been increasingly used with noticeable benefits in the treatment of several pediatric and neuro-psychiatric disorders including, cerebral palsy, cognitive impairment, autism disorders, Rett syndrome, and kernicterus. [1-6]. The aim of this paper is to provide an overview of citicoline research progress relevant to the field of ophthalmology.

Campos et al (1995) reported a placebo-controlled study which was started in 1991 and included 50 patients with amblyopia treated with intramuscular citicoline 1000 mg per day for 15 days. The patients have not been treated before with occlusion or with other of anti-amblyopic treatment. Treatment was associated with marked improvement in visual acuity for the amblyopic and the non- amblyopic eye in 46 of the 50 patients (92%). The behavior was different for normal and amblyopic eyes. Treatment was not associated with side effects. [7].

Parisi et al (1999) from Italy reported a placebo study which included 40 patients with open-angle glaucoma. 25 patients were treated with intramuscular citicoline 1000 mg daily for 2 months days. The 15 placebo patients received physiologic solution. The study showed that citicoline can improve retinal and visual pathway function in patients with glaucoma [8].

Parisi (2005) reported a placebo-controlled study which included 30 patients with glaucoma. 15 patients were treated with intramuscular citicoline 1 g daily for 2 months, and 15 patients served as placebo group. The study showed that citicoline treatment was associated with marked improvement of retinal and cortical bioelectrical responses. [9].

Parisi (2008) reported a placebo-controlled study which included 26 patients non-arteritic ischaemic optic neuropathy. 14 patients were treated with oral citicoline 1600 mg daily for two months, and twelve patients served as the

placebo group. Oral citicoline treatment was associated with improved pattern-electroretinogram, visual evoked potentials and visual acuity. [10].

Ottobelli (2013) from Italy reported the use of oral citicoline solution for 24 months in 41 patients with progressive glaucoma. Treatment was associated with substantial retardation of the disease progression. [11].

Pawar et al (2014) from India reported a controlled study which showed that the use of citicoline in addition to patching in the treatment of children with amblyopia aged 4-13 years was associated with a beneficial effect. In this study, the use of citicoline for more than five months up to one year was associated a considerable improvement in visual acuity. [12].

Parisi et al (2015) from Italy reported the use of citicoline eye drops to improve retinal function and visual pathways neural conduction in patients with open angle glaucoma. The use of citicoline eye drops was associated with improvement in retinal bioelectrical responses and bioelectrical activity of the visual cortex.[13].

Mao and colleagues (2016) reported an experimental study which showed that citicoline can help in retarding myopia progression in guinea pigs. [14].

Cinar et al (2019) reported a controlled study which showed that the use of citicoline eye drops three times daily for one month after LASIK was associated with a beneficial effect on the recovery of corneal sensitivity suggesting that citicoline has an important role in speeding up corneal re-innervation. [15].

Parravano et al (2020) from Italy reported that the use of citicoline plus vitamin B<sub>12</sub> eye drops for three years in patients with type 1 diabetes who had mild diabetic retinopathy was associated with reduction or stabilization of rate of neuroretinal degeneration, functional impairment, and microvascular damage.[16].

Rossetti et al (2020) from Italy reported a placebo-controlled, multicenter 3-year trial to study the effect of adding citicoline eye drops to intraocular pressure-lowering treatment on the progression of mild to moderate open-angle glaucoma. The study showed that citicoline eye drops had a beneficial effect on the progression of glaucoma. [17].

Fogagnolo et al (2020) from Italy reported a placebo-controlled study which included 30 patients with diabetic neuropathy. Twenty patients were treated with citicoline plus vitamin B12 eye drops 3 times a day for one and half year, while ten patients served as the placebo group. Treatment was associated with improved morphology and corneal nerve's function suggesting that citicoline has a regenerative effect on the corneal nerves.[18].

Parisi et al (2021) from Italy reported a placebo-controlled study which showed that the use of citicoline plus vitamin B<sub>12</sub> eye drops in diabetic patients (Type-1) who had mild non-proliferative diabetic retinopathy for three years was associated with improvement in macular bioelectrical responses on mfERG recordings.[19].

## Conclusion

Citicoline is a safe agent that has the potential to have promising therapeutic applications in a variety of ophthalmological disorders including amblyopia, glaucoma, non-arteritic ischemic optic neuropathy, and diabetic retinopathy.

**Conflict of Interest:** None

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DOI: [10.31579/2693-4779/127](https://doi.org/10.31579/2693-4779/127)

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