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RESEARCH ARTICLE

CLINICAL STUDY TO EVALUATE ROLE OF ATROPINE (0.01%) IN THE MANAGEMENT OF CHILDHOOD MYOPIA

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ABSTRACT

Background: Myopia is the most important cause of preventable blindness in children in the developing countries. There is a rapid increase in the prevalence of childhood myopia, in Asian countries, with about 80-90% of school leavers are affected by myopia. Atropine is an alkaloid extracted from the plant "deadly nightshade" (atropine belladonna) and is a non selective muscaranic antagonist. Atropine is found to block accommodation and reduces the effects of excessive accommodation on the progression of myopia. The aim of this study was to evaluate the efficacy and safety of low dose atropine (0.01%) in children with myopia. **Methods:** Study was conducted on 100 children attending the OPD at the Upgraded Department of Ophthalmology, GMC Jammu, for a period of 1 year. **Results:** The baseline mean spherical equivalent of the spectacle power was -4.4+/-3.8D and the baseline axial length was 24.19+/-0.7mm as measured by contact A Scan. And the mean age of the atropine group was 7.1+/-3.6 years. **Conclusion:** The myopic progression is effectively reduced by using atropine (0.01%) drops in children between 6-12 years of age. Besides, good eye care habits, enhancement of time outdoors and limited near work should not be overlooked.

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INTRODUCTION

Myopia is the most important cause of preventable blindness in children in the developing countries (Congdon, 2003). It has been known for 2000 years and was first described by the Greeks. The prevalence of myopia in the United States rose from 25% to 42% between 1971 and 1999 (Vitale, 2009). In Asian countries, there is a rapid increase in the prevalence of childhood myopia, and about 80-90% of school leavers are affected by myopia (Morgan, 2012). The WHO recently defined "high myopia" as -5 Dioptre (D) or greater, which is associated with increased risk of blindness. The eyes with high myopia that develop degenerative changes in the macula, optic nerve and peripheral retina are considered as having pathologic myopia and are at a very high risk of developing potentially blinding complications as retinal detachment, myopic choroidal neovascularisation (CNV), myopic macular degeneration. Atropine is an alkaloid extracted from the plant "deadly nightshade" (atropine belladonna) and is a non selective muscaranic antagonist.

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First ever study on the use of atropine for controlling the progression of myopia was done in 1979 by Bedrossian using 1% atropine eye ointment once at night for 1 year (Bedrossian, 1979) Initially it was believed that atropine prevents progression of myopia through its cycloplegic action exerted on ciliary muscles and thereby causing changes in the accommodation. However Wallman documented that atropine blocks accommodation and reduces the effects of excessive accommodation on the progression of myopia. Atropine 0.01% is found to have minimal side effects compared to 0.1% and 0.5% (Audrey, 2012) The aim of this study was therefore to evaluate the efficacy and safety of low dose atropine (0.01%) in children with myopia.

MATERIALS AND METHODS

This study was conducted from January 2017 to January 2018 on 100 children (Selected randomly) attending Eye OPD in the upgraded department of Ophthalmology. The atropine 1% eye drops were mixed with lubricating eye drops and atropine 0.01% eye drops were reconstituted by taking 0.1ml of atropine (1%) eye drops and injecting it in 10ml of lubricating eye drops.

The parents were informed to put these drops regularly once a day in the evening. Cycloplegic refraction, Autorefractin and post mydriatic test long with axial length measurement were done followed at 2 weeks, 4 months, 8 months and 12 months. The children were also evaluated for adverse effects (tolerability).

Inclusion Criteria: Children attending primary school (6- 12 yrs) with refractive error of > -0.5 D and <-10.0 D sph and cylindrical error of <-1.50 D.

Exclusion Criteria

- Absence of Amblyopia
- No history of prior or current treatment for myopia progression
- Astigmatism >_ 1.5D
- Allergy to atropine
- Systemic diseases associated with myopia as Marfan's syndrome

Approval of the Institutional Ethical Committee was obtained and the data generated throught this study was analyzed by using paired t test, on MS Excel 2010 software.

RESULTS

The mean age of the atropine group was 7.1+/-3.6 years. (Figure 1) The baseline mean spherical equivalent of the spectacle power was -4.4+/-3.8D and the baseline axial length was 24.19+/-0.7mm as measured by contact A Scan. (Table 1)

Table 1. Evaluation of adverse effects, Spectacle power and baseline axial length.

	Adverse effects	Best corrected VA	Axial Length
2 weeks	Mild irritation in 5 patients	-4.8+/- 4.1	24.44+/-0.8
4months	Mild in 5 patients	-5.2+/-3.6	24.66+/-0.8
8months	Nil	-5.4+/-4.0	24.88+/-0.8
12months	Nil	-5.6+/-4.0	25.64+/-0.8

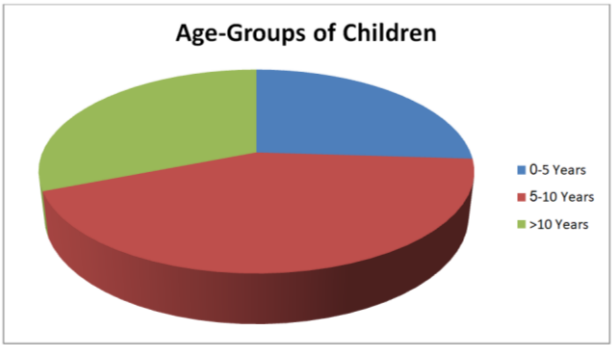

Figure 1. Distribution of Subjects according to age

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DISCUSSION

Atropine at low concentration has been shown to be safe and effective in slowing myopia progression in children. However myopic rebound after atropine was stopped was seen in one study by Audrey eta al, and was greater in eyes that received 0.5% and 0.1% atopne eye drops (Audrey, 2014). Atropine 0.01% eye drops can be reconstituted and are well tolerated. The axial length increase is reduced and the myopic progression is also effectively reduced by using these drops in children between 6-12 years of age. However for optimal results, the motivation of parents and children is important. On top of atropine, good eye care habits, enhancement of time outdoors and limited near work should not be overlooked.

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