



Original Article

Authenticity of Glasses Prescribed after Cycloplegic Refraction as Verified by Post Mydriatic Test (PMT).

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Purpose: To find out the best way of correcting refractive errors between cycloplegic and post-mydriatic test and also to confirm authenticity of the latter.

Method: This was a cross sectional study to evaluate the authenticity of glasses prescribed after cycloplegic refraction as verified by Post Mydriatic Test (PMT). The study was conducted on 30 patients having refractive error with range of 5 to 15 years of age. Visual acuity of patient was taken by using log Mar Chart. Refraction was done with retinoscopy by cycloplegic refraction on patients. After few days patient was recalled for post mydriatic test to find authenticity of glasses prescribed after cycloplegic refraction. This study was conducted in September to November, 2017.

Results: This study includes a total of 30 patients (comprising both right and left eyes). Out of 30 Patients 51.72% (16) were male and 48.28% (14) were females. Mean value, standard deviation (SD) and the 95% confidence interval (CI), for the total sample of cycloplegic refraction as verified by post mydriatic test were studied. Non-statistically significant differences in the cycloplegic refraction and post mydriatic refraction were found among the study groups ($p > 0.05$, Paired Sample Test). Non-significant relationship was also found between glasses prescribed after cycloplegic refraction and verified after few days by post mydriatic test.

Conclusion: This study concludes that there is no significant relationship between visual factors related to cycloplegic refraction and refraction after post mydriatic test. There is no improvement in vision after post mydriatic test and just a tonus allowance effect is cancelled. The authenticity of glasses prescribed to patient using cycloplegic refraction prescription is the same as verified by post mydriatic test refraction.

Keywords: Cycloplegic refraction, post mydriatic test



Introduction

High refractive error (for example, anisometropia, astigmatism and hyperopia) in premature childhood can cause amblyopia. There is evidence that amblyopia can be controlled if children at risk receive optical correction at an early age.¹⁻³ Thus, it may be precious to identify and correct children for high refractive error as soon as possible.⁴ The importance of early observation and treatment of ocular diseases and visual impairment in young children lies in the fact that 30% of India's population becomes blind before the age of 20 years.⁵ The refracting power of the eye results from the static power of the eye and the accommodative power of the eye (the variable force of accommodation that changes the path of light rays by causing the ciliary body to alter the curvature of the lens). The total increase in plus power that accommodation induces is called as, the amplitude of accommodation. In humans the ciliary body contains muscarinic receptors in the parasympathetically innervated smooth muscle fibers. The existence of adrenoceptors has also been described.⁶

Cycloplegic refraction (CF) is an authentic procedure of obtaining an accurate refraction. Cycloplegia is essential for the proper detection of refractive error in patients with refractive or accommodative esotropia, pseudo myopia, latent hyperopia and anisometropia. Cycloplegic refraction is indicated in infants, toddlers, preschools children, non-communicative patients and uncooperative patients. Cycloplegic drugs are used in cycloplegic refraction which induce full paralysis of the ciliary muscle or paralysis of accommodation and dilate the pupil. These are used for retinoscopic refraction, when the observer suspects that accommodation is unusually active and will hinder the exact retinoscopy. Such a circumstance is encountered in young children and hypermetropes. When retinoscopy is carried out after instilling cycloplegic drugs (cycloplentolate, atropine etc) it is called as wet retinoscopy. There are several cycloplegic drops regularly used in practice and they are as follows; tropicamide, cyclopentolate, homatropine, phenylephrine and atropine. Mostly children are refracted by using atropine and/or cyclopentolate.⁷

Cycloplegia hinders the accommodative power of the eye by stopping the activity of the ciliary muscle, allowing the static or objective refractive error of the eye to be

measured. The best way to get paralysis of accommodation is to use cycloplegic drugs. Cycloplegic drugs are also known as anticholinergic because they block the muscarinic effect of acetylcholine. This effect hinders cholinergic stimulation of the iris sphincter and ciliary muscle, which effect in mydriasis and cycloplegia.⁸ Cycloplegia helps to uncover the latent element in hypermetropes and relaxes accommodative spasm in myopes thereby decreasing under-correction in hyperopes and overcorrection in myopes.⁹ Most investigators recommended that cycloplegic refraction is authentic to correct Ametropia in children.¹⁰ Cycloplegic and subjective refraction remain the gold standard for calculating the refractive status in children. However, cycloplegia is restricted by the time needed to achieve full cycloplegia, its association with patient disturb, inconvenience, and extra cost.¹¹⁻¹⁴

Sufficient cycloplegia in pigmented races often requires multiple topical application of cyclopentolate, homatropine or atropine eye drops.¹⁵ Although it is agreed that cycloplegia is compulsory for refraction in children, in spite the attendant side effects (such as prolonged problems in near work, photophobia and other systemic adverse effects) and increase in the patient waiting time, same is not true for post mydriatic test (PMT).¹⁶

It has been noted that PMT merely increases the cost of eyecare, does not offer any significant advantage over prescription of glasses right after cycloplegic refraction, and causes unnecessary delay and inconvenience to the patient. Therefore, the traditional practice of doing routine PMT for every patient might not be necessary.¹⁷

Materials and Methods

It was a cross-sectional study involving the use of structured Proforma and informed consent signed from patient to evaluate the authenticity of glasses prescribed after cycloplegic refraction as verified by Post Mydriatic Test (PMT). The study was conducted on 30 patients having refractive error with range of 5 to 15 years of age. Visual acuity of patient was taken by using log Mar Chart. Refraction was done with retinoscopy by cycloplegia of all patients. After few days patient was recalled for post mydriatic test to find authenticity of glasses prescribed after cycloplegic refraction. Date was entered and analyzed using the SPSS 20.0 software.

The results were analyzed and tabulated using the same software.

Results

Table 1: Paired Sample Statistic

		Mean	N	SD	SE
Pair 1	RE_Cyclo_Ref_Sv	-0.6638	29	5.20228	0.96604
	RE_PMT_Sv	-0.8103	29	3.77294	0.70062
Pair 2	RE_Cyclo_Ref_Cv	-0.2273	22	1.56012	0.33262
	RE_PMT_Cv	-0.2614	22	1.37251	0.29262
Pair 3	RE_Cyclo_Ref_Axis	115.00	22	59.7415	12.7369
	RE_PMT_Axis	115.00	22	59.7415	12.7369
Pair 4	LE_Cyclo_Ref_Sv	-0.2328	29	4.8352	0.89787
	LE_PMT_Sv	-0.5	29	3.54751	0.65876
Pair 5	LE_Cyclo_Ref_Cv	-0.2955	22	1.37935	0.29408
	LE_PMT_Cv	-0.2614	22	1.19642	0.25508
Pair 6	LE_Cyclo_Ref_Axis	122.955	22	43.9875	9.37817
	LE_PMT_Axis		22	47.9205	10.2167

Table showing correlation of Mean and Standard Deviation (SD) of the authenticity of glasses prescribed cycloplegic refraction as verified by post mydriatic (p-value=0.20, paired sample t-test).

Table 2: Descriptive Statistics.

	N	Min.	Max.	Mean	SD
RE_VA	29	0	1	0.6931	0.29146
LE_VA	29	0	1	0.7	0.28284
RE_Cyclo_Ref_Sv	29	-13	5.5	-0.6638	5.20228
RE_Cyclo_Ref_Cv	22	-2.75	2.5	-0.2273	1.56012
RE_Cyclo_Ref_Axis	22	20	180	115	59.74151
LE_Cyclo_Ref_Sv	29	-10	5.5	-0.2328	4.8352
LE_Cyclo_Ref_Cv	22	-2.75	2	-0.2955	1.37935
LE_Cyclo_Ref_Axis	22	25	180	122.9545	43.98753
RE_PMT_Sv	29	-11	3.5	-0.8103	3.77294
RE_PMT_Cv	22	-2.5	1.75	-0.2614	1.37251
RE_PMT_Axis	22	20	180	115	59.74151
LE_PMT_Sv	29	-9	4	-0.5	3.54751
LE_PMT_Cv	22	-2.5	1.75	-0.2614	1.19642
LE_PMT_Axis	22	25	180	120.2273	47.9205
RE_VA_after_cyclo	29	0	0.3	0.0828	0.11973
LE_VA_after_cyclo	29	0	0.3	0.0828	0.11973

Table 3 shows descriptive statistic study of cycloplegic refraction and post mydriatic test.

Discussion

Following a cycloplegic (wet) retinoscopy, the patients are examined three to four days later for Post Mydriatic subjective refraction, when the mydriasis and cycloplegia have worn off. Even though there is no scientific evidence of any advantage of PMT but still it is done as a routine or rather, a tradition. On the other hand there is evidence that PMT increases the cost of eyecare and wastage of time because of the further follow up needed.

This study evaluates that the authenticity of glasses prescribed after cycloplegic refraction as verified by post mydriatic test; that there is non-significant difference in glasses prescribed after cycloplegic refraction and verified it after post mydriatic test.

The current Study was carried out in order to find the authenticity of glasses prescribed after cycloplegic refraction as verified by post mydriatic test. Study was conducted in Eye ward, Mayo Hospital Lahore. 30 patients were included in the study and their age limit is 5-15 years. Male were more prevalent (i.e. 51.72%) than females (i.e. 48.28%) in the study. Mean, standard deviation (SD) and the 95% confidence interval (CI) for the total sample were studied but non-statistically significant differences in the glasses prescribed after cycloplegic refraction and as verified after post mydriatic test among the study group (Sig diff >0.05).

A study conducted by Mihir Kothari and coworker, "published in Clinical Ophthalmology and Research" in 2015 to study the need of post mydriatic test (PMT) in children with mild to moderate compound myopic astigmatism. Eighty four eyes of 42 children aged 3 to 16 years (Mean 9.6, SD 3.2) were included. In his study he founded that the correlation coefficient (r) between non-cycloplegic refraction and cycloplegic refraction; non-cycloplegic refraction and PMT; cycloplegic refraction and post mydriatic test was 0.9. However, in correlation to cycloplegic refraction, post mydriatic test was nearer to non-cycloplegic refraction and altered by only 0.01 D (± 0.9) in sphere and 0.2 D (± 0.7) in cylinder. Post mydriatic test is not needed in children with compound myopic astigmatism. In my study I also found that there is no any significant effect after post mydriatic test. The refraction done with cycloplegic refraction is more accurate refraction and the children's were more comfortable with it.

Conclusion

This study concludes that there is non-significant comparison of visual factors related to cycloplegic refraction and refraction after post mydriatic test. There is no such better improvement in vision after post mydriatic test just a tonus allowance effect is cancelled. The authenticity of glasses prescribed to patient using cycloplegic refraction prescription is just same as verified by post mydriatic test refraction.

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