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Research Article

A STUDY OF THE POTENTIATING EFFECT OF TOPICAL PROPARACAINE 0.5% ON TROPICAMIDE 0.8% AND PHENYLEPHRENE 5% INDUCED MYDRIASIS IN A SOUTHINDIAN POPULATION

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ABSTRACT

Objectives: Pupillary dilatation is an integral part of comprehensive ophthalmic examination. It is also essential for cataract surgery and outpatient laser procedures. Rapid and sustained dilatation is often required. It has been proposed that prior instillation of proparacaine 0.5% can potentiate the effect of the routinely used tropicamide 0.8% phenylephrine 5% combination mydriatic agent. However, certain studies have shown that it is not effective in dark colored iris as compared to light colored iris; hence, this study was done on a predominantly South Indian population with dark iris.

Methods: Hundred eyes of 50 patients requiring pupillary dilatation as part of routine ophthalmic evaluation were included in the study. The patients were divided into two groups. The study group was given 0.5% proparacaine before instillation of mydriatic agent and the control group was given only tropicamide 0.8% and phenylephrine 5% eye drops. Pupillary dilatation was measured after 15 min and 30 min in both eyes. The end point was taken as 6 mm pupillary dilatation.

Results: There was a statistically significant difference in the rate of pupillary dilatation between the control and the study group at 15 min and 30 min after instillation of eye drops.

Conclusion: The study concluded that prior instillation produced faster dilatation even in patients with dark colored iris; hence, we suggest the use of topical anesthetic proparacaine 0.5% in situations where rapid mydriasis is required.

Keywords: Pupillary dilatation, Proparacaine, Tropicamide, Phenylephrine.

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INTRODUCTION

Pupillary dilatation is an integral part of comprehensive ophthalmic examination to visualize the fundus. It is also necessary for surgical procedures such as small incision cataract surgery, phacoemulsification, and outpatient laser procedures. The commonly used mydriatic agent is the cholinergic antagonist tropicamide and adrenergic agonist phenylephrine. Tropicamide is a non-selective muscarinic agent which produces mydriasis and minimal cycloplegia due to its parasympatholytic action [1,3]. Phenylephrine is a sympathomimetic drug which acts on alpha 1 receptors and causes pupillary dilatation by stimulating the dilator pupillae [1,2].

Proparacaine is a general purpose topical anesthetic used for a variety of ocular procedures. It has been proposed that prior instillation of proparacaine improved the rate and magnitude of pupillary dilatation. It produces microepithelial changes, disrupts the corneal epithelium and thereby increases the absorption of the mydriatic agent through the cornea [1-3]. However, certain studies have shown that prior instillation of proparacaine is not effective in dark colored iris as compared to light colored iris; hence, this study was done on a predominantly South Indian population with dark iris [5].

This study was done to compare the mydriatic efficacy of 0.8% tropicamide – 5% phenylephrine combination eye drops with or without preinstillation of 0.5% proparacaine and to analyze if pre instillation of topical proparacaine can potentiate the effect of the mydriatic agent in patients with dark colored irides.

METHODS

The study was conducted in the department of ophthalmology, Sree Balaji Medical College and hospital, Chromepet, Chennai between January 2019 and December 2019. Hundred eyes of 50 patients requiring pupillary dilatation as part of their routine ophthalmic evaluation were included in the study.

Inclusion criteria

Patients attending the ophthalmic outpatient department between the ages of 20 and 60 requiring pupillary dilatation as part of their routine ophthalmic examination were included in the study.

Exclusion criteria

The following criteria were excluded from the study:

1. Patients with history of diabetes mellitus, systemic hypertension
2. Patients using topical medication
3. Patients with prior history of intraocular inflammation
4. Patients who have undergone intraocular surgery
5. Patients with pupillary abnormalities
6. Patients with glaucoma, pseudoexfoliation syndrome
7. Patients with corneal scars
8. Patients above 60 years of age.

All patients underwent visual acuity testing, slit lamp examination, and retinoscopy. The need for dilatation was explained to all patients and ethical committee clearance was obtained as it is a routine ophthalmic procedure.

The right eye was taken as the study eye and the left eye was the control eye. The undilated pupil measurements were taken from both eyes in a dark room using pupillary gauge. The study eye received one drop of 0.5% proparacaine eye drops in the inferior fornix, after 2 min both the eyes received the mydriatic agent. Pupillary measurement was taken after 15 min and 30 min using pupillary gauge. 6 mm pupillary dilatation was considered as adequate size for evaluation.

RESULTS

The undilated pupil diameter in the study group and control group at 0 min was 2.5±0.5 mm. The mean pupillary diameter in the study group at 15 min was 5.5±0.5 mm and control group 5±0.5 mm, respectively. The pupillary diameter at 30 min was 8±0.5 mm and control group 7.5±0.5mm.

Distribution of patients according to gender

Total	Male	Female
50	27	23

Distribution of patients according to age

Age	Male	Female
20–39	15	12
40–59	12	11

Comparative study

Time (min)	Study eye (RT)	Control eye (LT)	p-value
0	2.5±0.5 mm	2.5±0.5 mm	Not significant
15	5.5±0.5 mm	5±0.5 mm	<0.001
30	8±0.5 mm	7.5±0.5 mm	<0.001

DISCUSSION

A study done by Ghose *et al*. on the potentiating effect of 4% lignocaine on tropicamide induced mydriasis found a mean maximum pupil size of 6.75±0.8 mm in the study eye and 6.08±0.97 mm in the control eye. The mean time to achieve the critical 6 mm was significantly faster in the study group.

Mordi *et al*. stated that preinstalling 0.5% proparacaine 5 min before tropicamide significantly hastens speed of dilatation in blue green eyes and not hazel brown eyes. Ogun *et al*. and Emiru studied the effects of dilatation in in African population and did not find any statistical difference and stated that iris pigmentation is more likely to be responsible for poorer pupil dilatation.

Siderov *et al*. reported that the speed of dilatation was not changed in either lighter or dark iris by prior use of proparacaine. In their study, instillation of 0.5% proparacaine, followed by 0.5% tropicamide produced statistically significant increase in pupil size in light colored but not in dark colored irides.

Indian population consists of predominantly dark brown eyes and our study was conducted on a South Indian population with dark colored iris, where we observed that prior instillation of proparacaine 5% produced faster dilatation and it was statistically significant.

CONCLUSION

In the present ophthalmic practice particularly in an urban setting, where most patients are not willing to wait long periods to get their eyes checked we recommend the use of topical proparacaine 5% before instillation of mydriatic agent as it produces faster dilatation, reduces waiting time, and also has an effect on the reduction of the transient stinging and discomfort caused by commercially available mydriatic agents.

AUTHORS CONTRIBUTION

Dr. Vikram Chellakumar conception, data analysis, interpretation, and drafting the article. Dr. Dharshini Ravindran data collection and statistical analysis.

CONFLICTS OF INTEREST

None.

AUTHORS FUNDING

No financial interest in any product. Since it was a routine ophthalmic examination no funding was received.

ETHICAL COMMITTEE APPROVAL

As it is a part routine comprehensive ophthalmic examination waiver from ethical committee was obtained.

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