



## COTTON PLEDGET SOAKED IN SINGLE DROP OF TROPICAMIDE 0.8% AND PHENYLEPHRINE 5% EYE DROP KEPT IN LOWER FORNIX TO DILATE PUPIL

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**ABSTRACT** **Aim:** To study the effect of cotton pledget soaked in single drop of Tropicamide 0.8% and Phenylephrine 5% eye drop kept in lower fornix on the pupillary dilatation.

**Materials and methods:** This is a Prospective Observational study conducted at Sarojini Devi Eye Hospital between October 2014 to September 2016. 400 patients of both sex who required dilatation of pupil for Cataract surgery or posterior segment evaluation are included in the study. Patients who had, Posterior synechiae, sphincter atrophy, Pseudo-exfoliation and any other pupillary abnormality were excluded from the study. Informed consent was obtained from the patients. One drop of Paracaine 0.5% eye drops was instilled in the lower fornix and patient is asked to close the eyelids for five minutes. A cotton pledget soaked in one drop of Tropicamide 0.8% and Phenylephrine 5% combination eye drops was placed in the lower fornix of the patient for 20 minutes. Pupillary dilatation was recorded after 5, 10 and 20 minutes.

**Results:** 300 patients achieved pupillary dilatation of 6-8mm at the end of 20 minutes. Remaining 100 patients achieved dilatation between 5-6mm at the end of 20 minutes.

**Conclusion:** By using this method, dilatation of pupil was achieved with single drop of Tropicamide 0.8% and Phenylephrine 5% eye drops sufficient enough to perform cataract surgery and evaluation of fundus oculi.

**KEYWORDS :** Pupil, Dilatation, Tropicamide, Phenylephrine, Eye drops.

**Introduction:** Pupillary dilatation is required for Cataract surgery, Evaluation of Fundus Oculi, Diagnostic procedures like FFA, Therapeutic procedures like Intra vitreal injection, Laser Photo Coagulation<sup>1</sup>. Normal size of pupil in adult is between 2-4 mm<sup>2</sup>. Cycloplegics like Tropicamide, Cyclopentolate, Homatropine and Atropine will passively dilate the pupil up to mid dilated position by paralysing the sphincter pupillae<sup>3</sup>. Phenylephrine will stimulate the dilator pupillae and helps in maximum dilatation of pupil<sup>4</sup>.

Parasympathetic regulation of pupil dominates over the Sympathetic control. Sympathomimetic drug like Phenylephrine will not sustain dilatation of pupil in bright illumination. Parasympatholytic drug like Tropicamide will not dilate the pupil to maximum. So combination of these two drugs will achieve maximum dilatation of pupil. Sympathomimetic drug like Phenylephrine will also act on arterioles and constrict them there by raising Systemic Blood Pressure<sup>5</sup>. Repeated instillation of this drug had proved to raise Systolic and diastolic blood pressure to the tune of 40mm of Hg and 20mm of Hg respectively in Hypertensive patients<sup>6</sup>. In this study we used Cotton pledget soaked in one drop of Tropicamide 0.8% and Phenylephrine 5% eye drop kept in lower fornix to reduce the risk of raising Systemic blood pressure in the high risk population.

**Materials and Methods:** This is a Prospective Observational study conducted at Sarojini Devi Eye Hospital between October 2014 to September 2016. 400 patients of which 193 were males and 207 were females, who required dilatation of pupil for Cataract surgery or posterior segment evaluation were included in the study. Patients who had, Posterior synechiae, sphincter atrophy, Pseudo-exfoliation and any other pupillary abnormality were excluded from the study. Informed consent was obtained from the patients.

One drop of Paracaine 0.5% eye drop was instilled in lower fornix of the patient and patient is instructed to close the eyelids for 5 minutes. Baseline pupillary diameter was measured using a transparent ruler. A cotton pledget soaked in one drop of Tropicamide 0.8% and Phenylephrine 5% combination was placed in the lower fornix of the patient. Patients were instructed to keep the eyelids closed. Pupillary dilatation was measured after 5 minutes, 10 minutes and 20 minutes. Results: Of 400 cases selected for study 193 (48%) were males and 207 (52%) were females. The patients were between 20 -80 years of age. 80% of the patients were between 40-70 years of age.

After 5 minutes 182 (45.5%) patients had 4mm of pupillary dilatation, 182 (45.5%) patients had 5mm of dilatation and 36 (9%) patient had 6mm of pupillary dilatation.

After 10 minutes 360(90%) patients had 6mm of pupillary dilatation 40 (10%) patients had 7mm of pupillary dilatation.

After 20 minutes 300 (66.6%) patients had 8 mm dilatation of pupil. 100 (33.3%) patients had pupillary dilatation of 6-7 mm.



**Fig. 1** Cotton pledget soaked in mydriatic drops placed in lower fornix. The rationale for using the topical anaesthetic drops prior to mydriatic drop instillation is to increase corneal permeability<sup>7</sup>, so that more drug reaches the receptor site. It also reduces the stinging sensation of drug, and discomfort with cotton pledget. It also avoids reflex secretion of tears which will wash away the drug<sup>8</sup>.

**Discussion:** Jitendra Jethani et al could achieve 7mm of pupillary dilatation after one drop instillation of Tropicamide 0.8% and Phenylephrine 5% mixture<sup>9</sup>. This is in consistent with the present study in which 66.6% of patients achieved 8mm dilatation of pupil after 20 minutes. Though the method followed in present study is different.

Trinavarat et al did a study to compare the efficacy of pupillary dilatation by a mixture containing 0.75% tropicamide and 2.5% phenylephrine and the alternate application of 1% tropicamide and 10% phenylephrine eye drops. They found that the former combination is superior to the latter in providing faster and more successful pupil dilatation within 40 minutes with statistically significant P value (p=0.004)<sup>10</sup>. In present study we used Tropicamide 0.8% and Phenylephrine 5% and achieved similar results in 20 minutes.

T Ratnapakorn et al<sup>11</sup> conducted study at Khon Kaen university in 2006, on 160 eyes of 80 patients who were divided into two groups.

Group A received a single dose of 1% tropicamide and 10% phenylephrine eye drops. Group B received 3 doses of same drug. The mean difference of pupil size between the two groups 0.15mm ( $p=0.175$ ) in the right eye and 0.10mm ( $p=0.362$ ) in the left eye. The study showed single dose of 1% tropicamide and 10% phenylephrine eye drops was clinically equivalent to 3 doses of the same drug. In present study we used 0.8% tropicamide and 5% phenylephrine eye drops and achieved same results.

OnsiriThanathane et al<sup>12</sup> study conducted study at University, Khon Kaen, Thailand. The patients were randomized to receive either conventional instillation of mydriatic drops in one eye or lower conjunctival fornix packing in another eye as the alternate method. For the eyes receiving lower conjunctival fornix packing (study group), one small piece of the cotton wool soaked with one drop of 2.5% phenylephrine and one drop of 1% tropicamide was packed in the lower conjunctival fornix for 15 minutes. The mean pupillary diameter in study group and control group were  $5.76 \pm 1.01$  mm and  $4.50 \pm 1.08$  mm, respectively which is statistically significant ( $P < 0.05$ ). This study was conducted in the premature infants, The same cotton pledget method was also used in present study, but age group in present study ranged between 21-80 years.

**Conclusion :** Single drop of combination of tropicamide 0.8% and phenylephrine 5% eye drops soaked in cotton pledget under topical anesthesia is enough to achieve adequate pupillary dilatation instead of multiple instillation that is routinely done in the hospitals.

This can lower the risk of adverse reactions which have been reported with the use of phenylephrine and thus single instillation is safer instead of multiple instillations

Moreover this method can significantly reduce the cost as well as the need for man power for instillation of drops.

The soaked pledget may result in more drugs getting into the eye even though the amount is only one drop, due to the reservoir function of the pledget.

Financial interest:Nil

Institutional ethics committee approval obtain

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