e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(7); 580-587

Original Research Article

Study to Evaluate the Efficacy and Safety of Intracameral, Combination of Tropicamide, Phenylephrine and Lidocaine Injection for Mydriasis and Anaesthesia in Cataract Surgery

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Received: 28-03-2023 / Revised: 30-04-2023 / Accepted: 30-05-2023

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Conflict of interest: Nil

Abstract:

Background and Aim: Cataract is the leading cause of blindness in India while refraction error and glaucoma are the second and third leading causes of blindness respectively in India. This study was performed to define clinically the effectiveness of direct injection of intra-cameral, a commercially available drug having combination of tropicamide, phenylephrine and lidocaine as for the maintenance of mydriasis and anaesthesia during cataract extraction and its possible side-effects.

Material and Methods: This Interventional Study was conducted on 25 patients including indoor patient for cataract surgery. The visual acuity testing was done on Snellens charts of both eyes and if it was <6/60 then vision was tested with finger counting, hand movements, perception of light and perception of rays. After all this pre-operative evaluation; The drug, which is using in this study, contains two synthetic mydriatics (tropicamide and phenylephrine) and one local anaesthetic (lidocaine) active substances. It will be administered by injection into the eye at the beginning of cataract surgery, in order to enlarge the pupil of your eye (mydriasis) and to obtain anaesthesia in eye during the surgical procedure.

Results: Maximum patients were in age group of 61-65 years with mean age 64 year. Method of drug given was different in total 25 patients as 1st method –drug was given directly IC 0.2 ml without TM in 5(20%) patients, 2nd method - drug was given IC injecting 1 ml In 500 ml USOL pint with preoperative dilatation by TMin 10 (40%) patients and 3rd method-drug was given directly IC 0.2 ml with preoperative dilatation by TM in 10 (40%) patients. On comparison, dilation of pupil by all methods was as follows: in method 1) out of 5 patients, 1(20%) patient was maintaining dilatation and 4(80%) patients were failed. In method 2] - 8(80%) patient was maintain and other 2(20%) patients were not and in method 3) - maintain by 7(70%) patients and 3(30%) were failed to maintain.

Conclusion: Commercially available combination of tropicamide, phenylephrine and lidocaine intracameral drug is reduces the intraoperative pupil constriction when it was used along with pre operatively topical mydriatics. It is safe and effective way to achieve an adequate pupil size in order to carry out the cataract procedure.

Keywords: Blindness, Cataract, Lidocaine, Phenylephrine, Tropicamide.

Introduction

Blindness is an enormous burden to any society both socially and economically. As per WHO data there are globally, at least 2.2 billion people have a near or distance vision impairment. In at least 1 billion – or almost half – of these cases, vision impairment could have been prevented or has yet to be addressed.[1]Many causes of vision impairment can be prevented or treated. With an ageing global population, the demands for eye health services are increasing. We estimated the prevalence and relative contribution of avoidable causes of blindness and vision impairment globally from 1990 to 2020. We aimed to compare the results with the World Health Assembly Global Action Plan (WHA GAP) target of a 25% global reduction from 2010 to 2019 in avoidable vision impairment, defined as cataract and under-corrected refractive error.[2] Also, A variety of risk factors for

developing cataract have been studied. Personal factors such as age, gender, ethnic group and genetic factors are well accepted risk factors for cataract. Environmental risk factors such as cigarette smoking, ultraviolet B exposure, diabetes[3] and low socioeconomic status are of public health interest because preventive strategies can be targeted to these groups. Direct eye trauma is a known risk factor and there is also robust evidence that both systemic and topical steroids are significant risk factors for the formation of posterior subcapsular cataracts.[4,5] Cataract is the leading cause of blindness in India while refraction error and glaucoma are the second and third leading causes of blindness respectively in India. [6,7] From the above data it becomes clear that for any effective programme for the control of blindness to be successful, the major factor is the treatment of cataract. The added advantage of cataract is that this is one cause of blindness which is reversible if operated on at the right time and properly.

Surgery for cataract being the most common surgery in ophthalmology has undergone tremendous progress from the stage of simple couching to the more recent process of Phaco-emulsification, and is still developing with application of the femtosecond laser, termed as FLACS (femtosecond leser- assisted cataract surgery). Femtosecond lasers offer surgeons the ability to make very precise cuts in a targeted area without damaging the surrounding tissues.[8] Of the various techniques the one that has gained maximum popularity is extra-capsular cataract extraction with implantation of a posterior chamber in traocular lens, that provides nearly as good physiological vision as possible. The success of the surgery depends on various factors, one of the important ones being the maintenance of full mydriasis during surgery. Despite vigorous pre-operative papillary dilatation with para sympatholytic and sympathomimetic agents, miosis frequently occurs per-operatively which leads to the following.

1. Damage to the sphincter pupillae while delivering nucleus through a constricted pupil.
2. Rupture of the posterior capsule with associated loss of vitreous and its complications.
3. Leaving behind a large amount of residual cortex which may impair the visual axis lead to poor centering of the intra-ocular lens,TASS (toxic anterior segment syndrome). Phacotoxic glaucoma.

Present study was done with an aim to evaluate the efficacy and safety of intracameral, combination of tropicamide, phenylephrine and lidocaine as mydriatics and anaesthetics for mydriasis and anaesthesia in cataract surgery at department of ophthalmology as indoor patient in department, at Guru Govind Singh Government Hospital, Jamnagar.

Objectives

Primary Objective: To evaluate the efficacy of intracameral, combination of tropicamide, phenylephrine and lidocaine as mydriatics and anaesthetics in cataract surgery.

Secondary Objectives

1. To determine the correlation between early, postoperative corneal oedema and inflammation (anterior chamber reaction and iridocyclitis) after standardized phacoemulsification and SICS (small incision manual cataract surgery) cataract procedures and to evaluate other possible risk factors for postoperative corneal Oedema.
2. To evaluate that the intracameral lidocaine, tropicamide and phenylephrine give sufficient pupil dilatation and anaesthesia for an entire cataract operation and to clarify the individual mydriatic effects.

Material and Methods: This Interventional Study was conducted between 2019 to 2021 on 25 patients including indoor patient for Cataract surgery. The study was conducted in Department of Ophthalmology, Shri M.P. Shah Government Medical College and Guru Govind Singh Hospital, Jamnagar. Informed consent was obtained from all patients and nature of study was explained.

Inclusion Criteria:

1. The entire patient included in our study presented in our OPD with complains of diminution of vision due to cataract. (Patient with age-related cataract)
2. Patients, who are willing to take part in this study.

Exclusion Criteria:

1. Patients having history of uveitis and any other ocular inflammatory disease like…
- lens induce glaucoma (LIG)
- Glaucoma medication with pilocarpine.
- Previous intraocular surgery.

2. Those having not fully dilated pupil during pre-operative posterior segment examination (small pupil).
3. Previous any eye trauma.
4. Patient with diabetic retinopathy with proliferative changes.
5. Sign of corneal disease.
6. Any abnormality (malformation) present in the anterior segment of the eye.
7. Patients, who are not willing to take part in this study.

A Detailed history of each patient was recorded before performing procedure. The visual acuity testing was done on Snellens charts of both eyes and if it was <6/60 then vision was tested with finger counting, hand movements, perception of light and perception of rays. In each case detailed history was taken. These include- history of onset, duration of presenting complains, the eye affected, previous any ocular disease, any history of trauma, or any other triggering factors, any other drug allergy, any systemic and chronic illness about DM, HTN, TB, BT, COPD, ASTHMA, JAUNDICE, etc and about habits. The eyes were subjected to diffuse light and slit lamp examination to see if any anterior segment abnormality is there. Then detailed work up done including:

- Vision,
- Pinhole,
- Best corrected visual acuity,
- colour vision,
- Near vision.

After this pupil must be dilated by topical mydriatics for

1. Cataract grading on slit lamp.
2. Dilated fundus examination by direct ophthalmoscope or indirect ophthalmoscope.

After all this pre-operative evaluation; The drug, which is using in this study, contains two synthetic mydriatics (tropicamide and phenylephrine) and one local anaesthetic (lidocaine) active substances. It will be administered by injection into the eye at the beginning of cataract surgery, in order to enlarge the pupil of your eye (mydriasis) and to obtain anaesthesia in your eye during the surgical procedure.

Dosage and Methods of administration: Should only be given this medicine if you have already demonstrated, at pre-operative assessment, satisfactory pupil dilation with topical mydriatic therapy.

- Intracameral use only.
- One ampoule for single eye.
- Injection must be administered by ophthalmic surgeon

This solution contain: 1ml in 1 ampoule having

- 0.2 mg/ml tropicamide +
- 3.1 mg/ml phenylephrine hydrochloride +
- 10 mg/ml lidocaine hydrochloride.

The recommended dose is 0.2 ml of solution, in only one injection.

No additional dose should be injected as any additional effect So, 0.2 ml of solution contains:

- 0.04 mg tropicamide
- 0.62mgphenylephrine hydrochloride
- 2mg lidocaine hydrochloride

- After diluting 1 ml drug in irrigation solution (BSS 500 ml), concentration of drug:
- 0.0004 mg tropicamide in 500 ml
- 0.0062 mg phenylephrine hydrochloride in 500ml
- 0.02 mg lidocaine hydrochloride 500 ml
- The same dose is used for both adults and the elderly.

Technique to perform cataract extraction using intracameral combination drugs:

The cataract operation: The cataract removal procedure used in this thesis and in most developed countries today comprises (with some variations) the following 10 steps:

1. A main incision usually localized temporally at the limbal region and one or two side ports.
2. Injection of intracameral drug given by 3 methods:

- In patients, who were pre-op un-dilated – given0.2ml drug directly into AC by side port.
- In patients, who were already pre-op dilated by TM (topical mydriatics) –given 1 ml drug into 500ml BSS (balanced salt solution) for maintenance of pupillary dilatation.
- In patients, who were already pre-op dilated by TM (topical mydriatics) – given 0.2ml drug into AC by side port, when intra-op pupillary constriction observed.

3. Pupillary size was measured in mm with help of calipers at different stages as follows:

- Before intracameral injection of drug
- 20 second after intracameral injection of drug.
- 30 second after intracameral injection of drug.
- 1 minute after intracameral injection of drug.
- 5 minutes after intracameral injection of drug.
- 10 minutes after intracameral injection of drug.
- 15 minutes after intracameral injection of drug.

4. Injection of an ophthalmic visco-surgical device (OVD) into the anterior chamber to create a space and to protect the corneal endothelial cells.
5. Formation of a capsulorhexis, i.e. to tear a rounded hole in the anterior part of the lens capsule. The created "lid" of the capsule is removed.
6. Corneo-scleral tunnel made in case of SICS. AC entry by keratome through corneoscleral tunnel or k tunnel made i/c/o phacoemulsification.
7. Hydro-dissection of the lens by injecting fluid under the lens capsule in order to separate the lens from the capsule.
8. Lens removal through phacoemulsification (partition of the lens) and aspiration of the lens substance or nucleus removal by visco expression.

9. Aspiration of the remaining lens cortex with an irrigation/aspiration instrument.
10. Injection of OVD into the anterior chamber and the capsular bag in order to implant a foldable IOL.
11. Removal of the OVD, which if left in place will lead to a high postoperative pressure peak.
12. Antibiotic wash, antibiotic – steroid ointment and a pad and bandage was applied.

Suturing of the wounds is usually not required.

Post-Operative: on 1st post-operative day, detailed anterior segment examination with Slit-Lamp.

Statistical Analysis: The SPSS and Microsoft Office Excel software were used for statistical calculations. ANNOVA Test and T- test were used to see comparison between 3 Methods of the drug administration. A P value < 0.05 was considered statistically significant. Mean values were given with standard deviations for numeric data.

Results

Table 1: Age Distribution of Patients

Age	Gender	
	Male	**Female**
55-60	3	4
61-65	3	7
66-70	4	1
>70	1	2
Total	11	14

Table 1 indicates the age distribution of 25 patients included in study. Out of 25 patients, maximum number of patients were between the age of 61to 65years (cataract is usually a disease of ageing). In this study youngest patient was 55 years and oldest patients were 75 years. In our study, Mean age of patients was 64 year with standard deviation was (±5.3).

Table 2: Eye to Be Operated

Eye	Frequency	Percent
Right	15	60
Left	10	40
Total	25	100

Table no. 2 shows that study was conducted more in right eye than in left eye.

Table 3: Distribution of Patients According to Type of Cataract

Type Of Cataract	Number	Percentage
Immature cataract	**21**	**84**
Mature cataract	**4**	**16**
Total	**25**	**100**

Table no. 3 indicates the type of cataract included in study. Out of total 25 eyes, 21(84%) eyes had Immature Cataract and 4 (16%) eyes had Mature Cataract. This study drug was administered in 5(20%) patients without Topical Mydriatics (TM)-directly intracameral (IC), From remaining 20 patients with preop Topical Mydriatics, 10(40%) patients was given 1ml in pint (BSS) and 10(40%) patients was given 0.2ml directly intracameral. maximum pupillary dilation observed at 30 sec after administration of intracameral combined drug without pre-operative dilate by topical mydriatics.

Table 4: Pre-Op Topical Mydriatics plus Intracameral 1 Ml Drug in BSS pint

Method 2	Pupil size (mm)						
1ml in pint (BSS)	**Before drug**	**20 sec**	**30 sec**	**1st min**	**5th min**	**10th min**	**15th min**
Mean	7.3	7.3	7	6.8	6.3	6	5.9
Std. Deviation	0.48	0.48	0.47	0.42	0.48	0.67	0.57
Minimum	7	7	6	6	6	5	5
Maximum	8	8	8	7	7	7	7

According to table no. 4, pupillary dilation maintained throughout surgery in which pre-operative dilate by topical mydriatics plus per operative 1 ml intracameral combined drug add in 500 ml irrigation solution-BSS (balanced salt solution). pupillary dilation maintained throughout surgery after 0.2 ml intracameral combined drug administered along with pre-operative dilate by topical mydriatics.

Table 5: Effect of Drug after Intracameral Injected

Methods Of Drug Administration	Dilation		Total
	Maintain	Not maintain	
Without Topical Mydriatics, 0.2ml Undiluted	1 (20%)	4 (80%)	5
WithTopical Mydriatics plus 1ml in pint(BSS)	8 (80%)	2 (20%)	10
With Topical Mydriatics plus0.2ml Undiluted	7 (70%)	3 (30%)	10
Total	16	9	25

Table 5 shows that in method 1]- 1(20%) patient was able to maintain pupillary dilatation and other 4 (80%) patients were failed. In method 2] - 8(80%) patient was able to maintain pupillary dilatation and other 2(20%) patients were failed, in method 3)- pupillary dilatation was maintain by 7(70%)patients and rest 3(30%) were failed to maintain.

PHACO- performed in 5 (20%) patients in which corneal tunnel was made. In remaining 20 (80%). Patients SICS was performed in which C-S (Corneo-scleral) Tunnel kept suture less in 16(64%) patients and in 4 (16%) patient Corneo-Scleral Tunnel exposed with 1 int suture.

On comparison, 1st post operative day in 1stmethod:2(20%) patients had grade 1 corneal oedema and8(80%) patients had no corneal oedema. In 2nd method 5(50%) patients had grade 1 corneal oedema and 5(50%) patients had no corneal oedema where In 3rd method1(20%) patients had grade 1 corneal oedema and 4 (80%) patients had no corneal oedema.

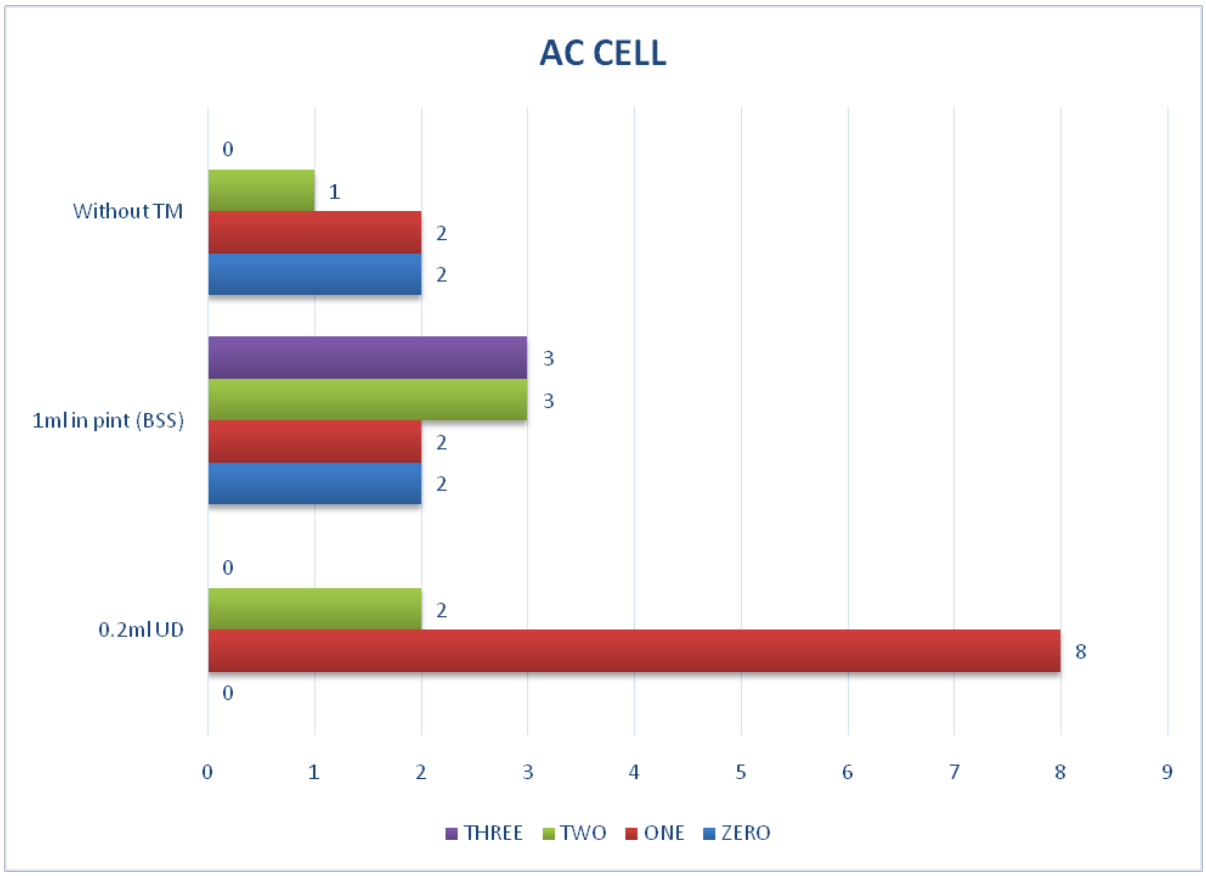

Figure 1

Graph 1 indicates numbers(%) of eyes with anterior chamber cells on Post Operative Day-1 after cataract surgery. Anterior chamber cells in all 3 methods were due to liberation of inflammatory cells from vessels. It is related to manipulation in anterior chamber during cataract surgery. On comparison, on 1st POD , 2 (40%) had grade 0 cells , 2(40%) had grade 1 cells and 1(20%) had grade 2 in method 1, whereas 3(30%) had grade 3 cells , 3(30%) had grade 2 cells , 2(20%) had grade 1 cells and 2 (20%) had grade 0 cells in method 2 and in method 3 -8(80%) had grade 1 cells and 2(20%) had grade 2 cells.

Table 6: Anterior Chamber Cell after Cataract Surgery -Post Operative 1st Day:

AC Cell	Number Of Eye (%)		
	Without TM	**1ml in pint (BSS)**	**0.2ml UD**
0	2(40%)	2(20%)	0
1	2(40%)	2(20%)	8(80%)
2	1(20%)	3(30%)	2(20%)
3	0	3(30%)	0
Total (25)	5	10	10

Table 6 indicates numbers (%) of eyes with anterior chamber cells on Post-Operative Day-1 after cataract surgery. Anterior chamber cells in all 3 methods were due to liberation of inflammatory cells from vessels. It is related to manipulation in anterior chamber during cataract surgery. On comparison, on 1st POD , 2 (40%) had grade 0 cells , 2(40%) had grade 1 cells and 1(20%) had grade 2 in method 1, whereas 3(30%) had grade 3 cells , 3(30%) had grade 2 cells , 2(20%) had grade 1 cells and 2 (20%) had grade 0 cells in method 2 and in method 3 -8(80%) had grade 1 cells and 2(20%) had grade 2 cells.

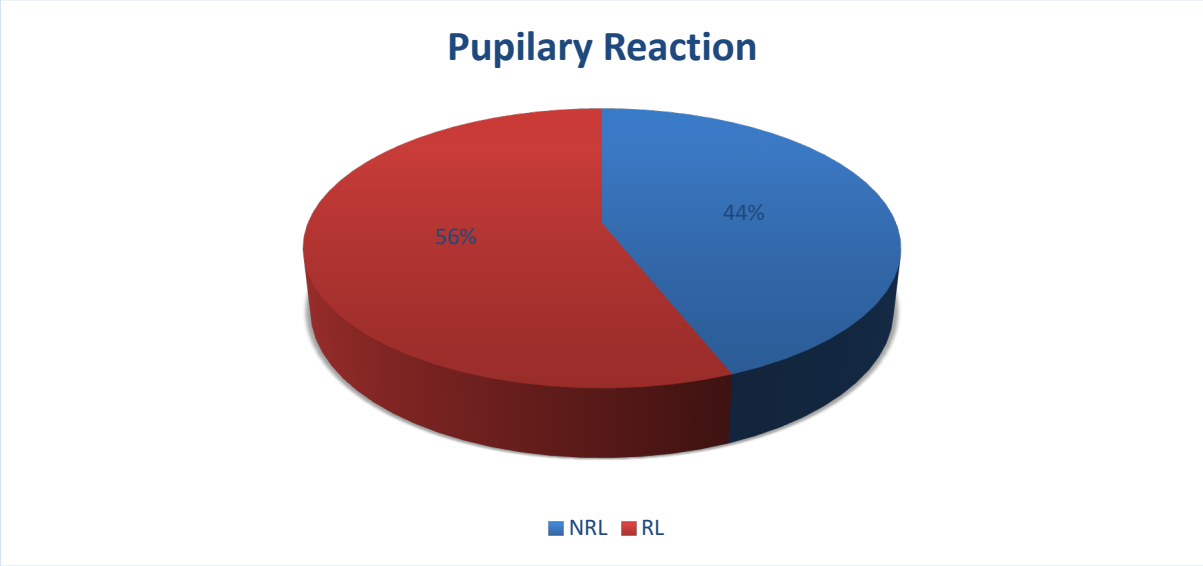

Figure 2

Graph 2 shows that in post-op 1st day, out of 25 - 11 (44%) patient's pupil were Non-Reactive to Light (NRL) and in remaining 14 (56%) pupillary reaction (RL: Reactive to Light) were present.

Discussion

Cataract extraction, in the majority of cases is safe and effective procedure, but maintenance of pre-operative mydriasis can contribute to the ease with which the cataract surgery can be performed. A small pupil during surgery may increase the risk of damage to the iris, clearance of soft lens matter or more importantly rupture of the posterior capsule.

To maintain mydriasis during surgery, in our study, out of 25 patients in which we used commercially available drug in 3 different methods:

1. Without TM (topical mydriatics) 0.2 ml undiluted,
2. 1ml in 500mlBSS pint (balanced salt solution),
3. 0.2ml (undiluted)

Intra operative measurement of size of pupil was done at different intervals of 20 sec, 30 sec, 1 min , 5 min, 10 min and 15 min.

Table 7: Comparison of 3 methods at different time interval

	Without topical mydriatics (TM)	**1ml in pint (BSS)**	**0.2ml undiluted**	**p-value**
Before drug	3.4(0.55)	7.3(0.48)	7.4(0.52)	<0.001
20 sec	6.6(0.55)	7.3(0.48)	7.6(0.52)	0.0063
30 sec	7(0.71)	7(0.47)	7.6(0.52)	0.0408
1st min	6.4(1.14)	6.8(0.42)	6.8(0.42)	0.4459

5th min	6(1.22)	6.3(0.48)	6.6(0.52)	0.2875
10th min	5(1.22)	6(0.67)	6.6(0.52)	0.0031
15th min	4.6(1.34)	5.9(0.57)	6.3(0.82)	0.0055

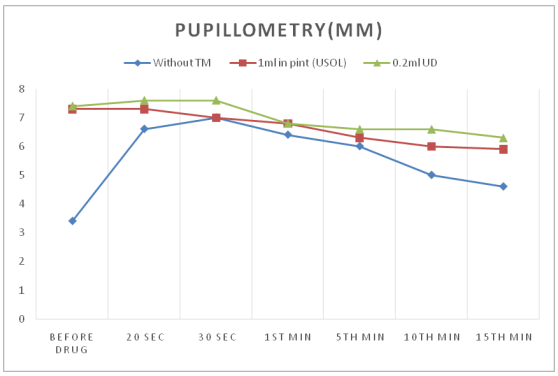

Figure 3

Table 7 and Figure 3 shows that in 1st method – without topical mydriatics mean pupillary size was 7mm (0.71) dilatation observed At 30 sec, 2nd method topical mydriatics plus1ml in BSS pint mean pupillary size was 7mm (0.47) dilatation observed At 30 sec and in 3rd method topical mydriatics plus 2ml undiluted mean pupillary size was 7.6mm (0.52) dilatation observed At 30 sec. So, observed difference among 3 method is statistically significant (p=0.0408). in 1st method – without topical mydriatics mean pupillary size was 6mm(1.22) dilatation observed At 5 min, 2nd method topical mydriatics plus 1ml in BSS pint mean pupillary size was 6.3mm(0.48) dilatation observed At 5 min and in 3rd method topical mydriatics plus 2ml undiluted mean pupillary size was 6.6mm (0.52) dilatation observed At 5 min.

Observed difference among 3 method is statistically not significant (p=0.2875). in 1st method – without topical mydriatics mean pupillary size was 4.6mm (1.34) dilatation observed **At** 15 min, 2nd method 1ml in BSS pint mean pupillary size was 5.9mm (0.57) dilatation observed At 30 sec and in 3rd method 2ml undiluted mean pupillary size was 6.3mm(0.82) dilatation observed At 30 sec.

Observed difference among 3 method is statistically significant (p=0.0055).

Table 8: Comparison between Topical Mydriatics plus Intracameral 1 Ml Drug in BSS Pint and 0.2 Ml Undiluted at Different Time Interval

Variable	1ml in pint (BSS)	0.2ml undiluted	1 ml in pint (BSS) vs 0.2mlundiluted p-value
Before drug	7.3(0.48)	7.4(0.52)	0.908
20 sec	7.3(0.48)	7.6(0.52)	0.434
30 sec	7(0.47)	7.6(0.52)	0.065
1st min	6.8(0.42)	6.8(0.42)	>0.999
5th min	6.3(0.48)	6.6(0.52)	0.630
10th min	6(0.67)	6.6(0.52)	0.225
15th min	5.9(0.57)	6.3(0.82)	0.588

At majority of time interval the p value obtained was >0.05, therefore difference between these two methods is statistically not significant. Hence, both the methods are effective in maintenance of pupillary dilation.

Table 9: Comparison between Intracameral 0.2 Ml Drug in Undiluted and Without Topical Mydriatics at Different Time Interval

Variable	Without topical mydriatics (TM)	0.2ml Undiluted	p-value
Before drug	3.4(0.55)	7.4(0.52)	<0.001
20 sec	6.6(0.55)	7.6(0.52)	0.006
30 sec	7(0.71)	7.6(0.52)	0.151
1st min	6.4(1.14)	6.8(0.42)	0.508
5th min	6(1.22)	6.6(0.52)	0.304
10th min	5(1.22)	6.6(0.52)	0.003
15th min	4.6(1.34)	6.3(0.82)	0.006

At majority of time interval the p value obtained was <0.05, therefore difference between these two methods is statistically significant. Hence, undiluted drug was more effective than without TM drug in maintenance of pupillary dilation.

Table 10: Comparison between Intracameral Drug in Without Topical Mydriatics and 1ml in BSS Pint at Different Time Interval

Variable	Without topical mydriatics (TM)	1ml in pint (BSS)	p-value
Before drug	3.4(0.55)	7.3(0.48)	<0.001
20 sec	6.6(0.55)	7.3(0.48)	0.063
30 sec	7(0.71)	7(0.47)	>0.999
1st min	6.4(1.14)	6.8(0.42)	0.508
5th min	6(1.22)	6.3(0.48)	0.734
10th min	5(1.22)	6(0.67)	0.073
15th min	4.6(1.34)	5.9(0.57)	0.038

At end of surgery (15 min), the p value obtained was 0.038, therefore difference between these two method is statistically significant (p value <0.05). Hence, 1ml in pint (BSS) drug was more effective than without TM drug in maintenance of pupillary dilation. Commercially available combination of tropicamide, phenylephrine and lidocaine intracameral drug proved to be effective in spite of diluting it in irrigation solution (BSS pint). Hence, it can be used instead of adrenalin in irrigation solution (BSSpint) for maintaining per operative pupillary dilation. In our study mean± SD age was 64±5.3 and in Marc Labetoulle et al[9] mean± SD age was 69.2±9.4 ,which slightly more than our study. The mean pupil size in our study after intracameral drug without TM administration was 5.57 with standard deviation of 0.79. In Amelia Lim lay et al[10] studied intracameral drug without TM administration had mean pupil size for dilated from baseline to end of surgery was 4.86 and standard deviation of 0.74. In study by Marc Labetoulle et al[11] total 609 patients were taken out of which in 266 patients intracameral drug was administered and 277 patients received topical mydriatics.

This study showed that maximum pupillary dilatation achieved in 30 sec and in our study, maximum pupillary dilatation after administration of intracameral drug was achieved in 30 sec which similar to Marc Labetoulle et al study.[11] A limitation of this study was that Castroviejo callipers were used to measure the pupils. The optical properties of the cornea can magnify and anteriorly displace the image. Therefore, the pupil size measurements using these callipers might not represent the actual pupil size. Intracameral combine drug is a time testing method and it may require further studies with larger sample size for confirming the effectivity of use of topical mydriatics plus intracameral drug.

Conclusion

The study showed that commercially available combination of tropicamide, phenylephrine and lidocaine intracameral drug reduces the intraoperative pupil constriction when it was used along with pre operatively topical mydriatics. It is safe and effective way to achieve an adequate pupil size in order to carry out the cataract procedure. Inspite of such low concentration of the drug , this method is able to maintain per operative mydriasis and is as good as adrenaline. So, we can use this drug in pint instead of adrenaline.

Commercially available combination of tropicamide, phenylephrine and lidocaine intracameral drug without topical mydriatics was not sufficient for the dilatation of the pupil during cataract surgery.

It may therefore be a future consideration to add a mydriatic drop during preoperative preparation in order to overcome this drawback. A limitation of this study was that Castroviejo calipers were used to measure the pupils. The optical properties of the cornea can magnify and anteriorly displace the image. Therefore, the pupil size measurements using these calipers might not represent the actual pupil size. Intracameralcombine drug is a time testing method and it may require further studies with larger sample size for confirming the effectivity of use of topical mydriatics plus intracameral drug. The degree of post-operative corneal oedema at 1st post-operative day was low grade. Even AC inflammation was also mild. The concentration of the constitutes in this drug is very low, which should ensure greater safety and lower side effect.

References

1. Blindness and vision impairment 14 October 2021,www.who.int/news-room/fact sheets/detail/blindness-and-visual-impairment.
2. GBD 2019 Blindness and Vision Impairment Collaborators; Vision Loss Expert Group of the Global Burden of Disease Study. Causes of blindness and vision impairment in 2020 and trends over 30 years, and prevalence of avoidable blindness in relation to VISION 2020: the Right to Sight: an analysis for the Global Burden of Disease Study. Lancet Glob Health. 2021 Feb;9(2):e144-e160.
3. Asbell PA, Dualan I, Mindel J, Brocks D, Ahmad M, Epstein S. Age-related cataract. Lancet. 2005 Feb 12-18;365(9459):599-609.
4. Hodge WG, Whitcher JP, Satariano W. Risk factors for age-related cataracts. Epidemiol Rev. 1995;17(2):336-46.
5. Murthy GVS, Gupta SK, Bachani D, et al Current estimates of blindness in India British Journal of Ophthalmology 2005;89:257-260.

6. E-Journal Dadhichi Deha Dan Samiti (dehdan.org)
7. Causes of Blindness In india https://www.medindia.net/health_statistics/general/causesblindness
8. He, Lingmin & Sheehy, Katrina & Culbertson, William. (2010). Femtosecond laser-assisted cataract surgery. Current opinion in ophthalmology. 22. 43-52.
9. Labetoulle M, Findl O, Malecaze F, Alió J, Cochener B, Lobo C, Lazreg S, Hartani D, Colin J, Tassignon MJ, Behndig A; Intracameral Mydrane Study 2 Group. Evaluation of the efficacy and safety of a standardised intracameral combination of mydriatics and anaesthetics for cataract surgery. Br J Ophthalmol. 2016 Jul;100(7):976-985.
10. Lay Suan AL, Hamzah JC, Ken TS, Mansurali VN. Intracameral mydriatics versus topical mydriatics in pupil dilation for phacoemulsification cataract surgery. J Cataract Refract Surg. 2017 Aug;43(8):1031-1035.
11. Labetoulle M, Findl O, Malecaze F, Alió J, Cochener B, Lobo C, Lazreg S, Hartani D, Colin J, Tassignon MJ, Behndig A; Intracameral Mydrane Study 2 Group. Evaluation of the efficacy and safety of a standardised intracameral combination of mydriatics and anaesthetics for cataract surgery. Br J Ophthalmol. 2016 Jul;100(7):976-985.