



EFFECT OF LOCALLY PREPARED 1% TOPICAL EPINEPHRINE IN CHRONIC SIMPLE GLAUCOMA: AN OLD STUDY REVISITED

Ophthalmology

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ABSTRACT

Introduction: The treatment of open angle glaucoma has always been problematic because of insidious onset, painless chronic destruction of optic nerve with overlapping age group of cataract to which it is quite often confused not only by a layman but most of the general practitioners too.

Aim: To evaluate efficacy of locally made topical epinephrine in lowering intra-ocular pressure in chronic simple glaucoma.

Material and methods: The work was undertaken in 50 patients at General Hospital, Udaipur. The drug was instilled into the eye 12 hourly for 3 months and the effects evaluated.

Results: 1. Average reduction in intraocular pressure in pressure range of 20-30 mm Hg was 37.6 percent both eye after 15 days of drug therapy. In intraocular pressure range 31 - 40 mm Hg, the fall in intraocular pressure was 40 percent RE and 37.6 percent LE after 15 days. In patients with intraocular pressure more than 40 mm Hg, the average reduction in tension after 15 days was 47 percent RE and 36.9 percent LE.

2. With initial increase in pupillary size by 0.5 to 4.0 mm on 1st day and 0.5 - 2.0 mm on 2nd day in most of the patients, the pupil returned to the original size on 3rd day and maintained at subsequent visit.

3. No change in pulse, blood pressure and respiration was observed.

4. No effect on visual acuity, fundus and field changes was found.

Conclusion: Epinephrine is very effective and advantageous drug in the management of chronic simple glaucoma patients with pressure range of 20-40 mm Hg.

KEYWORDS

INTRODUCTION

Glaucoma is a dreadful condition affecting the vision and results into blindness, if not diagnosed at an early stage and proper remedy is not given. The treatment of open angle glaucoma has always been problematic because of insidious onset, painless chronic destruction of optic nerve with overlapping age group of cataract to which it is quite often confused not only by a layman but most of the general practitioners too. As such the patients approach the ophthalmic consultant at a stage when the disease has advanced to almost terminal stage.

First effective medical treatment of glaucoma was introduced by Ludwig Laquer (1876) with the use of physostigmine, a drug which constricts the pupil and lowers the intra-ocular pressure in glaucomatous eyes. The ability of topical epinephrine to lower intraocular pressure has been appreciated for more than 75 years (Becker and Ley 1958). It is a known fact that epinephrine in chronic simple glaucoma is accepted because of its obvious advantages (i) less frequency of instillation (ii) greater efficacy in lowering intraocular pressure (iii) fewer incidence of side effects and (iv) non-interference in vision in central lenticular opacity. Present study concluded the efficacy of locally made topical epinephrine in lowering intra-ocular pressure in chronic simple glaucoma.

REVIEW OF LITERATURE

The earliest mention of disease resembling acute glaucoma was described in Sasruta Samhita (about 2000 B.U.) Hippocrates (460-370 B.C.) described in detail how greenness of eyes was premonitory sign of blindness. The term glaucoma was used by Aristotle, to refer to the weakness of eyes in day light.

The exact causative factor of the disease still remains a mystery, hereditary being one of the factor. Posner (1949) and Robert (1952) found positive family history in 13-25 % cases. Francois (1966) reported it to be in 20% cases. Goldman (1951) and Becker (1958) attributed the pressure lowering effect of topical epinephrine to a prolonged decrease in the secretion of aqueous humour. Weekers (1954) and Garner (1959) found not only the reduced secretion but also enhanced aqueous outflow facility.

Garner (1959) showed that epinephrine lowered intraocular pressure from 3.0 mm Hg to 38.0 mm Hg with an average of 13.5 mm Hg in wide angled glaucomatous eyes. Garner (1959) and Becker (1961) demonstrated an increase in facility of aqueous outflow of 45 % in three months and 63 % in about 6 months by adrenaline. Mills and

Ridgway (1978) showed a mean reduction in intraocular pressure 6.31 mm Hg by this drug.

MATERIAL & METHODS

The study was conducted in the Department of Ophthalmology R.N.T. Medical College, Udaipur. Fifty Patients irrespective of age sex and race, of chronic simple glaucoma were the subjects of the study. In each case a detailed history was recorded with special reference to family and personal history and response to previous therapy, drug or surgery. The patients who had a history of hypertension respiratory or cardiac disorder were excluded from the study. The complete recording of history systemic and ocular examination was done. Initial tension recorded. Then the drug epinephrine 1 percent 1 drop was instilled regularly at 8.00 am and 8.00 pm for 3 months. On first day, the tension was recorded at 9.00 am, 10.00am, 12 mid day, 4.00 pm. On second and third day tension was recorded at 8.00 am and 8.00 pm. Then patients were supplied locally made epinephrine drops 1 percent in sterile colored vials with the instructions : 1. keep the vial protected from sunlight 2. regular instillation of drug at 8.00 am and 8.00 pm. After this, the patients were reviewed every fifteen days and all records were repeated till 3 months.

Epinephrine 1 percent solution was prepared in the hospital itself according to the following formula:-

- i) Epinephrine or Adrenaline 1.1 gm
- ii) Boric acid 1.0 gm
- iii) Sodium borate (Borax) 0.6 gm
- iv) Sodium metabisulfite 0.3 gm
- v) Ascorbic acid 0.2 gm
- vi) Chlorhexidine gluconate .005 gm
- vii) Distilled water ad 100 ml

Where: Boric acid stabilize adrenaline solution. Boric acid and sodium borate act as buffer. Sodium metabisulfite and ascorbic acid are reducing agents and used as antioxidants. Chlorhexidine gluconate acts as preservative.

OBSERVATION

Followings tabulated observations were made:

TABLE 1 : DISTRIBUTION OF CASES IN RELATION TO AGE GROUP

Age group	30-40 years	41-50 years	51-60 years	Above 60 years
	3	20	17	10

Sex : Out of fifty cases 28 patients were male and 22 were females.

Religion : 47 patients were Hindu and 3 were Muslim.

TABLE 2: SHOWING CHANGE IN PUPILLARY SIZE AFTER DRUG

Initial pupillary size mm	Change in pupillary size (mm)	1st Day		2 nd Day		3rd Day		Subsequent (Visits every 15 days till 3 months)
		RE	LE	RE	LE	RE	LE	
I. 2 to 2.5	0.5 to 2.0 increase	6	7	26	25	00	5	No Change from original
	2.5 to 4.0 increase	21	17	00	1	00	00	
	More than 4.0 increase	00	2	00	00	00	00	
	No change	00	00	1	00	27	21	
	Non-affected eyes	3	5	3	5	3	5	
	Total	30	31	30	31	30	31	
II. 3 to 3.5	0.5 to 2.0 increase	9	7	5	2	00	00	-do-
	2.5 to 4.0 increase	1	00	00	00	00	00	
	More than 4.0 increase	00	00	00	00	00	00	
	No change	00	00	5	5	10	7	
	Non-affected eyes	00	00	00	00	00	00	
	Total	10	7	10	7	10	7	
III. Above 3.5	0.5 to 2.0 increase	06	5	1	00	00	00	-do-
	2.5 to 4.0 increase	00	00	00	00	00	00	
	More than 4.0 increase	0	00	00	00	00	00	
	No change	4	7	9	12	10	12	
	Non-affected eyes	0	00	00	00	00	00	
	Total	10	12	10	12	12	12	

TABLE 3: PERCENTAGE REDUCTION IN INTRAOCULAR PRESSURE

Intraocular pressure range (mm hg)	Eye	I visit	II visit	III visit	IV Visit	V visit	VI visit
21-30	R	37.6	40.5	41.2	41.5	42.0	42.1
	L	37.6	40.3	41.4	42.0	42.4	42.7
31-40	R	40.0	40.6	40.6	41.2	41.2	41.2
	L	37.6	38.2	38.2	39.6	39.6	39.6
More than 40	R	47.0	49.6	49.6	49.6	49.6	49.6
	L	36.9	36.9	36.9	36.9	36.9	36.9

DISCUSSION

The most dreadful feature of glaucoma is an irreparable damage to the sight. Chronic simple glaucoma has insidious onset, slow progress and age group common to cataract hence puts hurdles in the early diagnosis of the disease.

In the present study the family history of simple glaucoma in parents and siblings was present in 22% cases. In present study the mean reduction in intra-ocular pressure after 15 days of therapy in pressure range of 20-30 mm Hg was 9.96 and 10.08 in right and left eye respectively. The percentage reduction was 37.6 in both eyes. It went on decreasing till in final visit the mean fall was 11.17 (42.1 %) RE and 11.33 (42.7 %) LE. P value being less than 0.001 (highly significant) indicates its authenticity in the treatment of wide angled glaucoma. The mean reduction in intraocular pressure range of 31-40 mm Hg after 15 days of drug therapy was 14.02 (40%) RE and 13.42 (37.6 %) LE. It went on decreasing and in the final visit after 3 months the mean fall was 14.41 (41.2%) RE and 14.14 (39.6%) LE. P value remaining less than 0.001 (highly significant), indicates its effectively in this pressure range of chronic simple glaucoma. In patients with intraocular pressure more than 40 mmHg, the mean fall in pressure after 15 days of treatment was 23.75 (47 %) RE and 20.97 (36.9%) LE. After 3 months the mean fall was 25.05 (49.6%) RE and 20.97 (36.9%) LE. P value was less than 0.50 to less than 0.10 (significant) suggesting that although the drug was found to be reliable in lowering intraocular pressure but even then the resultant intraocular pressure remained above the normal limits. Hence drug may be used as an adjuvant with other drugs-in this group of patients.

Weekers (1954) and Garner (1959) did not observe any remarkable effect on pulse and blood pressure with adrenaline. In present study also no effect was noted.

Garner (1959) observed a few mm to wide pupillary dilatation with accompanying photophobia while Merkle (1982) noted negligible effect on pupillary size by adrenaline. Present study showed 0.5 - 4 mm increase in pupillary size in all patients except 3 on 1st day. On 2nd day all patients except one showed 0.5 - 2 mm increase in size of pupil. On 3rd day and at subsequent visits no change in pupil was seen and the drug did not interfere with vision in central lenticular opacity. Initially five patients developed photophobia for 1-2 days and was attributed to pupillary dilatation. Results are consistent with the results of Garner.

CONCLUSION

The epinephrine is very effective and advantageous drug in the management of chronic simple glaucoma patients with pressure range of 20-40 mm Hg because of following reasons.

- Effective control of intraocular pressure.
- Frequency of instillation being twice a day only.
- Its non-interference with vision in presence of central - cataract.
- Practically no side effects in chronic simple glaucoma.

In patients with intraocular patients more than 40 mm Hg, the drug causes reliable lowering in intraocular pressure but the resultant intraocular pressure remained above the normal limits and hence it should be used as an adjuvant with other antiglaucoma drugs.

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