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Original Research Article

Prevalence of Intraoperative Floppy Iris Syndrome in Patients Using Calcium Channel Blockers and ARBs as Antihypertensive Medication in Small Incision Cataract Surgery: A Prospective Observational Study

Kedarnath Uday Patil[1], Bibi Khuteja Shaikh Reshma[2], Syeda Zeba Fatima[3], Pavan MK[4]

[1]Post Graduate Student, Department of Ophthalmology, Navodaya Medical College, Hospital & Research Centre, Raichur

[2] Professor, Department of Ophthalmology, Navodaya Medical College, Hospital & Research Centre, Raichur

[3]Post Graduate Student, Department of Ophthalmology, Navodaya Medical College, Hospital & Research Centre, Raichur

[4]Post Graduate Student, Department of Ophthalmology, Navodaya Medical College, Hospital & Research Centre, Raichur

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Corresponding Author: Dr. Kedarnath Uday Patil

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Abstract:

Background: Intraoperative Floppy Iris Syndrome (IFIS) is a condition characterized by iris instability during cataract surgery. It includes features such as a billowing and floppy iris, a tendency for the iris to prolapse toward surgical incisions, and progressive intraoperative miosis. Small Incision Cataract Surgery (SICS) is a popular alternative to phacoemulsification, especially in regions with limited access to advanced phacoemulsification devices. However, due to the smaller and less controlled surgical environment of SICS compared to phacoemulsification, it is important to understand whether antihypertensive drugs like CCBs and ARBs have a similar or more pronounced effect in precipitating IFIS.

Objectives: To study the prevalence of IFIS in hypertensive patients undergoing SICS who are treated with CCBs or ARBs and combination of both.

Methodology: This prospective observational study conducted at a tertiary care center specializing in cataract surgery over a 12-month period including 50 hypertensive patients aged 50 years or older who were undergoing SICS classified in 3 groups each (150).

Results: Prevalence of IFIS in our study was 4% in the patients receiving CCBs. Prevalence of IFIS in our study was 6% in the patients receiving ARBs. Prevalence of IFIS in our study was 8% in the patients receiving CCB+ARB combination of drugs. In the group of patients receiving CCBs, prevalence was 4% in the age of above 70 years, patients receiving ARBs, the prevalence was 2% in 60-70 years and 4% in the age of above 70 years and patients receiving combination of both CCB+ARBs, the prevalence was 2% in 51-60 and 61-70 years and 4% in the age of above 70 years. Gender wise prevalence of IFIS in our study revealed 2% each in male and female in CCB group, 4% males and 2% females in ARB group and 4% each male and females in the combination group.

Conclusion: Prevalence of IFIS in our study was 4% in the patients receiving CCBs. Prevalence of IFIS in our study was 6% in the patients receiving ARBs. Prevalence of IFIS in our study was 8% in the patients receiving CCB+ARB combination of drugs. We observed the prevalence of IFIS as 4% in patients receiving CCBs, 6% in patients receiving ARBs and 8% in patients receiving combination of CCB+ARBs.

Keywords: Prevalence of Intraoperative Floppy Iris Syndrome (IFIS), hypertensive patients, SICS.

Introduction

Phacoemulsification is the modern state-of-art surgery used for restoration of vision in cataract patients. Pupillary dilatation and normal behavior of the iris is important for a successful cataract surgery. In 2005, Chang and Campbell described a novel entity called intraoperative floppy iris syndrome (IFIS) characterized by triad of flaccid iris stroma that undulates and billows in response to intraocular fluid currents, a propensity for the floppy iris stroma to prolapse toward the phacoemulsification and side-port incisions despite proper wound construction, and progressive

intraoperative pupil constriction despite standard preventive preoperative pharmacologic measures. [1] All these condition are known to increase the difficulty level for the surgeon and the rate of complications. [2-5]
Various risk factors for IFIS have been described in the literature.

Tamsulosin, a selective α1-adrenergic receptor antagonist, is a commonly prescribed drug for benign hyperplasia of prostate (BPH) and has been shown to have the strongest association with IFIS. [1-10] Patients on alfuzosin, another α-blocker, showed a lesser risk for development of IFIS compared to tamsulosin. Other drugs that predispose for IFIS include doxazocin, terazocin, finasteride, labetalol, mianserin, chlorpromazine, donepezil, and other antipsychotic agents. [11-18] Systemic factors that have been implicated for IFIS predisposition include diabetes and hypertension. [19]

Intraoperative Floppy Iris Syndrome (IFIS) is a condition characterized by iris instability during cataract surgery. It includes features such as a billowing and floppy iris, a tendency for the iris to prolapse toward surgical incisions, and progressive intraoperative miosis.

The syndrome was first described in association with tamsulosin, an alpha-1 adrenergic receptor antagonist. However, subsequent research has identified potential links between IFIS and other drug classes, including antihypertensive like CCBs and ARBs.

Small Incision Cataract Surgery (SICS) is a popular alternative to phacoemulsification, especially in regions with limited access to advanced phacoemulsification devices.

However, due to the smaller and less controlled surgical environment of SICS compared to phacoemulsification, it is important to understand whether antihypertensive drugs like CCBs and ARBs have a similar or more pronounced effect in precipitating IFIS.

IFIS is graded as following

Grade of IFIS	Signs
Mild	Billowing of a Floppy iris stroma
Moderate	Billowing of a floppy iris stroma + Progressive Intraoperative miosis / Iris prolapse into the Corneal Incisions
Severe	The Presence of all three signs

Objectives:

- To study the prevalence of IFIS in hypertensive patients undergoing SICS who are treated with CCBs or ARBs and combination of both.
- To study the age and gender wise prevalence of IFIS in hypertensive patients undergoing SICS who are treated with CCBs or ARBs and combination of both.

Methodology:

Study Design: This was a prospective observational study conducted at a tertiary care center specializing in cataract surgery over a 12-month period.

Sample Size: The study included 150 hypertensive patients aged 50 years or older who were undergoing SICS. These patients are classified in 3 groups, hence the sample size was 150 in our study.

- **Group CCB- 50 patients**
- **Group ARB- 50 patients**
- **Combination of CCb+ARBs- 50 patients**

Inclusion Criteria:

- Age ≥ 50 years.
- Patients on either monotherapy or combination therapy with CCBs and/or ARBs for at least 6 months.
- Patients with age-related cataracts and no prior history of ocular surgery.

Exclusion Criteria:

- Patients on alpha-1 blockers such as tamsulosin or those with a history of using these drugs in the past.
- Patients with significant ocular pathology such as glaucoma, uveitis, or pseudoexfoliation.
- Patients with previous ocular trauma or surgery.

Preoperative Evaluation: All patients underwent a detailed ophthalmic examination, including measurement of intraocular pressure (IOP), slit-lamp examination, and dilated fundus examination.

A complete medication history, including duration and dosage of antihypertensives, was recorded.

Surgical Technique: SICS was performed by the same experienced surgeon to maintain consistency. Preoperative dilation was achieved using tropicamide and phenylephrine.

The surgeon documented IFIS during surgery based on the following features:

- Iris billowing and floppiness.
- Iris prolapse through the surgical incision.
- Progressive intraoperative miosis.

Results

Table 1: Distribution of the cases according to age group

		CCB		ARB		CCB+ARB	
		No.	Percent	No.	Percent	No.	Percent
Age group in years	41-50	6	12.0	8	16.0	10	20.0
	51-60	24	48.0	25	50.0	12	24.0
	61-70	9	18.0	7	14.0	16	32.0
	>70	11	22.0	10	20.0	12	24.0
	Total	50	100.0	50	100.0	50	100.0

We included 50 cases in group respectively group receiving CCBs as antihypertensive, ARBs as antihypertensive and combination of both CCB+ARB. Out of 50 patients from CCB group, majority were from 51-60 years i.e. 48% followed by 22% from above 70 years, 18% from 61-70 years and 12% from 41-50 years. Out of 50 patients from ARB group, majority were from 51-60 years i.e. 50% followed by 20% from above 70 years, 16% from 41-50 years and 14% from 61-70 years. Out of 50 patients from CCB+ARB group, majority were from 61-70 years i.e. 32% followed by 24% each from 51-60 years and 70 years, 20% from 41-50 years age group.

Table 2: Distribution of the cases according to gender

		CCB		ARB		CCB+ARB	
		No.	Percent	No.	Percent	No.	Percent
Gender	Male	34	68.0	31	62.0	30	60.0
	Female	16	32.0	19	38.0	20	40.0
	Total	50	100.0	50	100.0	50	100.0

68% males and 32% female patients were from CCB, 62% male and 38% female patients were from ARB, and 60% male and 40% female patients from combination of CCB+ARB group in our study.

Table 3: Prevalence of IFIS

	CCB		ARB		CCB+ARB		p
	No.	Percent	No.	Percent	No.	Percent	
IFIS	2	4.0	3	6.0	4	8.0	0.08, Not significant
No IFIS	48	96.0	47	94.0	46	92.0	
Total	50	100.0	50	100.0	50	100.0	

Prevalence of IFIS in our study was 4% in the patients receiving CCBs. Prevalence of IFIS in our study was 6% in the patients receiving ARBs. Prevalence of IFIS in our study was 8% in the patients receiving CCB+ARB combination of drugs.

Table 4: Prevalence of IFIS with respect to age

		CCB		ARB		CCB+ARB	
		No.	Percent	No.	Percent	No.	Percent
Age group in years	41-50	0	0.0	0	0.0	0	0.0
	51-60	0	0.0	0	0.0	1	2.0
	61-70	0	0.0	1	2.0	1	2.0
	>70	2	4.0	2	4.0	2	4.0

We observed the prevalence of IFIS as 4% in patients receiving CCBs, 6% in patients receiving ARBs and 8% in patients receiving combination of CCB+ARBs. In the group of patients receiving CCBs, prevalence was 4% in the age of above 70 years, patients receiving ARBs, the prevalence was 2% in 60-70 years and 4% in the age of above 70 years and patients receiving combination of both CCB+ARBs, the prevalence was 2% in 51-60 and 61-70 years and 4% in the age of above 70 years.

Table 6: Prevalence of IFIS with respect to gender

		CCB		ARB		CCB+ARB	
		No.	Percent	No.	Percent	No.	Percent
Gender	Male	1	2.0	2	4.0	2	4.0
	Female	1	2.0	1	2.0	2	4.0

Gender wise prevalence of IFIS in our study revealed 2% each in male and female in CCB group, 4% males and 2% females in ARB group and 4% each male and females in the combination group.

Discussion

We included 50 cases each in group respectively group receiving CCBs as antihypertensive, ARBs as antihypertensive and combination of both CCB+ARB. Out of 50 patients from CCB group, majority were from 51-60 years i.e. 48% followed by 22% from above 70 years, 18% from 61-70 years and 12% from 41-50 years.

Out of 50 patients from ARB group, majority were from 51-60 years i.e. 50% followed by 20% from above 70 years, 16% from 41-50 years and 14% from 61-70 years. Out of 50 patients from CCB+ARB group, majority were from 61-70 years i.e. 32% followed by 24% each from 51-60 years and 70 years, 20% from 41-50 years age group. (Table 1) 68% males and 32% female patients were from CCB, 62% male and 38% female patients were from ARB, and 60% male and 40% female patients from combination of CCB+ARB group in our study. (Table 2)

Prevalence of IFIS in our study was 4% in the patients receiving CCBs. Prevalence of IFIS in our study was 6% in the patients receiving ARBs. Prevalence of IFIS in our study was 8% in the patients receiving CCB+ARB combination of drugs. (Table 3)

We observed the prevalence of IFIS as 4% in patients receiving CCBs, 6% in patients receiving ARBs and 8% in patients receiving combination of CCB+ARBs. (Table 4)

In the group of patients receiving CCBs, prevalence was 4% in the age of above 70 years, patients receiving ARBs, the prevalence was 2% in 60-70 years and 4% in the age of above 70 years and patients receiving combination of both CCB+ARBs, the prevalence was 2% in 51-60 and 61-70 years and 4% in the age of above 70 years. (Table 5)

Gender wise prevalence of IFIS in our study revealed 2% each in male and female in CCB group, 4% males and 2% females in ARB group and 4% each male and females in the combination group. (Table 6)

The reported incidence of IFIS in literature varies across different countries ranging 0.9-3.7%. [20] In its initial report from US by Chang and Campbell, the overall incidence was 2.3%. [1] Another study by Neff et al. from US has shown an incidence of 3.7%. [20]

Studies from UK have reported a lower overall incidence at 0.9-1.6%. [21,22,23] Similarly, Oshika found lower incidence of IFIS in the Japanese at 1.1%. [24]

On univariate analysis, the male gender was found to be risk factors for IFIS but on multivariate analysis, it was not found to be statistically significant. However, Neff et al. found male gender to be at a higher risk of developing IFIS with calculated OR of 4.7 on multivariate analysis. [20] Hypertension was found to be a significant risk factor on multivariate analysis with adjusted OR being 3.0 (95% CI: 1.39-6.57; P = 0.005), prevalence of hypertension was higher among IFIS-eyes as compared to non-IFIS eyes (64.6% vs. 34.6%; P < 0.0001).

Conclusion

Prevalence of IFIS in our study was 4% in the patients receiving CCBs. Prevalence of IFIS in our study was 6% in the patients receiving ARBs. Prevalence of IFIS in our study was 8% in the patients receiving CCB+ARB combination of drugs.

We observed the prevalence of IFIS as 4% in patients receiving CCBs, 6% in patients receiving ARBs and 8% in patients receiving combination of CCB+ARBs.

Ophthalmologists should be aware of this association and consider appropriate preoperative evaluation and surgical planning to manage intraoperative complications. Further studies are needed to elucidate the underlying mechanisms and develop guidelines for patient management

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