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Incidence and risk factors of intraoperative floppy iris syndrome

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Abstract
Purpose: To study the incidence and risk factors of intraoperative floppy iris syndrome (IFIS).
Methods: This was a retrospective study conducted at a private hospital. Detail history and examination data were reviewed for all the patients who underwent phacoemulsification during October 2017 to March 2019. Patients were divided into IFIS and non- IFIS group. The risk factors like alpha blocker use, diabetes and hypertension were statistically analysed in the two groups.
Results: 158 patients were operated during the study period. IFIS was observed in 8 patients (5.06%). Male gender (P = 0.04), hypertension (P = 0.01) and tamsulosin intake (P = <0.0001) were significant risk factors for IFIS, while the risk was not significant in diabetics (P = 0.98) and in patients on silodosin (P = 0.69).
Conclusion: IFIS has a higher incidence in Indian population. Unlike tamsulosin, silodosin is not a significant risk factor. Male gender and hypertension are other significant risk factors.

Keywords: intraoperative floppy iris syndrome, phacoemulsification, alpha blockers

1. Introduction
Intraoperative floppy iris syndrome is an entity first described by Chang and Campbell in 2005 as a series of events that can occur during phacoemulsification. It refers to the classic triad of billowing of the iris in response to intraocular fluid currents, prolapse of the floppy iris from the phacoemulsification and side port incisions, and progressive pupillary constriction despite preoperative measures to prevent it [1]. It poses as a surgical challenge and increases the risk of complications during surgery. Studies have reported increased incidence of posterior capsule rupture and vitreous loss in cases of IFIS [1-4].
Though initially described in patients who were on alpha blockers for lower urinary tract symptoms (LUTS), various other factors have been proposed which increase the risk of IFIS [1, 6]. These factors include male gender, diabetes, hypertension, short axial length and medications such as benzodiazepine, quetiapine, finasteride [1, 5]. A beforehand knowledge of the presence of these factors can make the surgeon more watchful and careful during the surgery.
Alpha blockers are a well-known risk factors for IFIS. However, the risk is lesser with the use of non-selective alpha blockers like alfuzosin, doxazosin and prazosin compared to alpha 1 selective blocker tamsulosin [7-9]. We conducted this study to find out the incidence and risk factors for IFIS in the Indian population.

2. Methods
This was a retrospective study conducted at a private eye hospital in Ahmedabad, India. The study was done in accordance with the Declaration of Helsinki. Detail history of all the patients who underwent phacoemulsification surgery from October 2017 to March 2019 was reviewed, including the history for systemic diseases and review of medications prescribed for the same, if any. Preoperative examination details including vision, intraocular pressure and detail anterior and posterior segment examination were also noted.
Before phacoemulsification, written Informed consent was taken from all the patients. All the patients were dilated with topical tropicamide (0.8%w/v) and phenylephrine (5%w/v). During phacoemulsification, notes were made in the intraoperative details if IFIS occurred. These details were reviewed from the records and noted. Patients with diabetes, hypertension and those on alpha blockers were divided into IFIS or non-IFIS group.
All the data were statistically evaluated using SPSS software version 20.0. Qualitative data was analysed using chi-square test and quantitative data was analysed using student t-test. P value was calculated for all the risk factors to find out whether they were significantly associated with IFIS or not. P value <0.05 was considered significant value.

3. Results
A total of 158 patients (174 eyes) were operated during the study period. The average age of the patients was 68.50 ± 8.51 years. There were 83 males and 75 females. The total number of patients with diabetes and hypertension was 39 and 54 respectively. A total of 10 males were on medical treatment for benign prostatic hyperplasia. Out of those 10 patients, 7 were on tamsulosin and 3 were on silodosin.
IFIS was observed in 8 patients (5.06%). Table 1 shows various risk factors whether significantly associated with IFIS or not. We found that male gender (P = 0.04), hypertension (P = 0.01) and tamsulosin intake (P = <0.0001) were significant risk factors for IFIS, while the risk was not

significant in diabetics (P = 0.98) and in patients on silodosin (P = 0.69).

Table 1

Risk factors	IFIS (n = 8)	Non- IFIS (n = 150)	P value
Gender			
Male	7 (87.5%)	76 (50.67%)	0.04
Female	1 (12.5%)	74 (49.33%)	
Diabetes	2 (25%)	37 (24.67%)	0.98
Hypertension	6 (75%)	48 (32%)	0.01
Alpha blocker use			
Tamsulosin	5 (62.5%)	2 (1.33%)	<0.0001
Silodosin	0	3 (2%)	0.69

4. Discussion

IFIS was originally described in 2005 in association with the systemic use of tamsulosin, an alpha blocker [1]. Later, studies showed that the risk is lesser with other alpha blockers [9, 10]. Also, apart from alpha blockers, studies have shown various other factors that increase the risk of IFIS [5, 9]. We aimed to study the incidence and risk factors for IFIS.

In our study, we found the incidence of IFIS to be 5.06%. This was similar to the incidence reported by Goyal *et al* in Indian population [11]. Studies from other countries like US, UK and Japan however report a lower incidence varying from 0.9-3.7% [3, 12, 13]. This can be because of tamsulosin being the most commonly prescribed drug for LUTS in India as compared to other countries [11].

There was a gender predisposition with male gender being significantly associated with IFIS. In our study, 7 IFIS patients were males and only 1 was female. This was also similar to previous studies with male gender clearly being more susceptible for IFIS [5, 11]. This can be explained by the fact that alpha blockers, which are known to cause IFIS, are prescribed commonly in males for LUTS.

In our study, we did not find any significant risk with the use of silodosin. But, as already established, the risk was significant with the use of tamsulosin. There are a few case reports which have reported IFIS with silodosin use [14, 15]. But none of the large scale studies have evaluated the risk with silodosin.

The risk of developing IFIS in patients on tamsulosin has been reported at the rate of 57% to 100% while it is very less with other non selective alpha blockers [1, 16, 17]. The possible explanation for this is that tamsulosin has greater specificity for α1A-receptor compared to other alpha blockers [18]. Animal studies have proven that α1A-receptor is the predominant alpha receptor in iris dilator muscles [19, 20]. Studies have reported that there is evidence of decrease in the thickness of iris dilator muscle with the use of alpha blockers, especially tamsulosin, and there is eventual iris atrophy [21-23]. The atrophy of the iris also explains why the risk persists even after stopping alpha blockers prior to surgery [24].

Among other systemic factors, we found that hypertension was significantly associated with IFIS while the risk was not significant in diabetes. This was supported by previous studies which reported similar finding [5, 9, 25].

The limitation of our study is the small sample size, so further study with a larger sample can be conducted.

5. Conclusion

IFIS has a higher incidence in Indian population. Tamsulosin usage, male gender and hypertension are significant risk factors while the risk is not significant with silodosin usage and diabetes mellitus.

6. Acknowledgements: None

7. References

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