Letter to the Editor

DOI: 10.5152/eurasianjmed.2019.19017

Bilateral intraoperative floppy iris syndrome associated with silodosin intake

RUNNING HEAD: Intraoperative floppy iris syndrome and silodosin

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The authors do not have any financial or proprietary interest in a product, method, or material mentioned in the manuscript.

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You may cite this article as: Özcura F, Gültekin Irgat S. Bilateral intraoperative floppy iris syndrome associated with silodosin intake. Eurasian J Med 2019; 10.5152/eurasianjmed.2019.19017.

Abstract

Intraoperative floppy iris syndrome (IFIS) was described by three characteristics: floppy iris that billows in reaction to intraocular fluid currents during phacoemulsification surgery, flaccid iris stroma that tends to prolapse through well-constructed surgical incisions, and progressive pupillary miosis despite preoperative pharmacologic dilatation. A 63-year-old man presented with decreased vision in his both eyes. Ophthalmic examination revealed bilateral nuclear cataract. He was prescribed silodosin for the management of benign prostatic hyperplasia a month ago. We planned consecutive cataract surgery two-week time interval. We encountered all features of IFIS in both eyes of patients during phacoemulsification surgery. We successfully managed IFIS by aid of iris retractor and reached 20/20 final visual acuity postoperatively in both eyes of the patients. To our best knowledge, this is the first bilateral IFIS associated with silodosin intake in the literature. Ophthalmologists and urologist prescribing silodosin should be aware of this possible association.

Keywords: benign prostatic hyperplasia, cataract, intraoperative floppy iris syndrome, phacoemulsification, silodosin

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Introduction

Intraoperative floppy iris syndrome (IFIS) was first described by Chang and Campbell in 2005. Classic triad of IFIS: floppy iris that billows in reaction to intraocular fluid currents during phacoemulsification surgery, flaccid iris stroma that tends to prolapse through well-constructed surgical incisions, and progressive pupillary miosis despite preoperative pharmacologic dilatation [1]. Alpha 1a antagonists especially tamsulosin have the strongest association with IFIS, although a number of cases are associated with other classes of drugs [2-4]. Silodosin is a novel, more selective alpha 1 adrenoceptor blocker, which is specific to the lower urinary tract and may have fewer side effects than other alpha-blockers [5]. Silodosin associated IFIS is very rare and was reported only two cases previously [6,7]. To our best knowledge, this is the first bilateral IFIS associated with silodosin intake in the literature.

Case Report

A 63-year-old man presented with decreased vision in his both eyes. He had been taking silodosin 8 mg daily for the management of benign prostatic hyperplasia for a month. His best corrected visual acuity was 0.3 (-5.0 -0.75 x70) in the right eye and 0.4 (-2.00 -1.00x 90) in the left eye. Intraocular pressure was 17 mm Hg with air-puff tonometry in both eyes. Slit-lamp biomicroscopic examination revealed bilateral nuclear cataracts, more severe in the right eye. Other structures of anterior segment were normal. Fundoscopic examination was normal.

We planned cataract surgery for both eyes of patients with right priority. Mydriasis of pupil was achieved preoperatively by topical instillation of cyclopentolate 1%, tropicamide 0.5%, and phenylephrine 2.5%. Despite instillation of preoperative eye drops to dilate the pupil pharmacologically, the pupil remained small (about 5 mm) during the surgery. After anesthesia with

0.5% topical proparacaine solution, a 2.2 mm clear corneal incision was made on the temporal quadrant of cornea. Intracamaral epinephrine 1:4000 diluted with BSS was injected into the anterior chamber for more pupillary dilatation and prophylaxis of IFIS. Sodium hyaluronate 3.0% was filled into the anterior chamber and then continuous curvilinear capsulorhexis was performed. There was undulated and billowing of the iris, which also prolapsed through the main corneal incision during the hydrodissection (Fig. 1A). Nucleus was emulsified using a peristaltic phacoemulsification machine (Centurion Vision System, Alcon Laboratories Inc., Fort Worth, TX, USA) after five iris retractors were placed (Fig. 1B). The cortex was removed using irrigation and aspiration (Fig. 1C). A single piece hydrophobic acrylic intraocular lens was implanted and the surgery was completed uneventfully (Fig. 1D). His best corrected visual acuity was reached 20/20 at the postoperative period.

We performed left eye cataract surgery two weeks later. We have not adequate dilatation of pupil although preoperative eye drops to dilate the pupil. We also encountered floppy iris that billows in reaction to intraocular fluid currents, and progressive pupillary miosis but it did not prolapse. Surgery was completed uneventfully after application of iris retractors. Also, no complications were observed in postoperative period.

Discussion

Benign prostatic hyperplasia is one of the most common conditions of lower urinary tract disease in elderly men. It is characterized by an unregulated proliferative process of connective tissue, smooth muscle and glandular epithelium within the prostate. Alpha 1a antagonists are widely used to treat benign prostatic hyperplasia and act by relaxing smooth muscle in the bladder neck, urethra, and prostate [5]. However, alpha 1a adrenoceptor is the dominant adrenergic receptor in the iris where it is important for pupillary dilation. Cataract is another common disease in elderly.

Inadequate pupil dilation led to increased risk for complications of cataract surgery. Therefore, ophthalmologists should be aware of situations that cause poor pupil dilatation before cataract surgery such as alpha 1a adrenoceptor blockers [2-4].

The alpha 1 adrenoceptors contribute to various physiological actions in and around the eye, and are, for example, involved in regulation of protein secretion in the lacrimal gland, tone of ocular blood vessels, and pupil diameter. The alpha 1 adrenoceptors family is composed of three subtypes, denoted alpha 1a, alpha 1b, and alpha 1d. All three receptor subtypes are activated by catecholamines and can mediate constriction of smooth muscle cells. Pharmacological studies in various species that used selective antagonists for individual alpha 1 adrenoceptors subtypes suggested that the alpha 1a adrenoceptors plays a major role in adrenergic pupil size regulation [3,8].

Tamsulosin is associated with the greatest risk for IFIS, presumably because of its high affinity and selectivity for the alpha 1a adrenoceptor. Chang and Campbell reported IFIS occurred in approximately 2% of a cataract surgery population and appeared to be caused by tamsulosin [1-3]. There are many reports considered tamsulosin associated IFIS after the Chang and Campbell's report. Recent studies comparing tamsulosin and alfuzosin (a nonselective alpha1-antagonist) indicated that IFIS was 30 times more frequent, and was more severe, in patients taking tamsulosin. Nonselective alpha1-antagonists are associated with a lower, but not negligible, risk of IFIS. Alfuzosin, terazosin, and doxazosin are all independent risk factors for IFIS [2-4].

In addition alpha antagonist drugs, IFIS was also reported with other drugs and substances such as the 5-alpha-reductase inhibitor finasteride, the herbal supplement for benign prostatic hypertrophy saw palmetto (Serenoa repens), several neuromodulators and antipsychotic medication including benzodiazepines, duloxetine, mianserin, donepezil, and some beta-blockers e.g. labetalol

with alpha-blocking properties [2-4,9]. Chatziralli and Sergentanis revealed that hypertension, but not diabetes mellitus, emerged as a risk factor for IFIS in meta-analysis [4]. Chatziralli et al. also reported that short axial length and rivastigmine were significantly associated with IFIS in their prospective study compromised 1274 consecutive patients [10].

Silodosin, a new selective alpha1-antagonist, has similar kinetics to tamsulosin in rabbit iris, and was associated with IFIS in recent two case reports [6,7,11]. Ipekci et al. are first reported silodosin associated IFIS in a 60 year old man. They reported the patient taking silodosin 8 mg daily for the management of benign prostatic hyperplasia for two months and stopped 45 days before cataract surgery. Nevertheless, triad of IFIS occurred during surgery [6]. Second, Chatterjee and Agrawal reported silodosin associated IFIS in a 75 year old man taking silodosin for the management of benign prostatic hyperplasia for four years [7].

Goseki et al. investigated of IFIS by examining the binding affinity of tamsulosin and silodosin to alpha adrenoreceptors and melanin pigment using control and alpha2 blocker chronically administered in isolated albino and pigmented rabbit iris dilators. In the isolated albino rabbit and pigmented rabbit iris dilator, tamsulosin and silodosin inhibited the contraction of phenylephrine in a dose-dependent manner. Compared with other nonselective alpha-blockers, the inhibitory effects of tamsulosin and silodosin were pK_B (constant of the antagonist–receptor complex) 8.0 or more, indicating the high affinity for alpha1-receptor of the rabbit iris dilator. They also reported that IFIS should not be attributed to long-term binding with receptors alone; the drug–melanin interaction causing dilator muscle atrophy is probably the other important factor in the mechanism of IFIS [11].

Another important subject about IFIS is discontinuing the alpha 1a adrenoceptor blockers does not reduce the risk of IFIS, so ophthalmologists should be asked current or prior use of alpha 1a

adrenoceptor blockers. This is often attributed to disuse atrophy of the dilator iris muscle. Intraoperative management of IFIS is included intracameral a-adrenergic agonists (epinephrine with and without lidocaine, phenylephrine), higher retentive or viscoadaptive ophthalmic viscosurgical devices, iris retractors, and pupil expanders. Mechanical pupil stretching and partial sphincterotomy were not recommended in IFIS, due to the elastic nature of the iris. Certain generally accepted surgical principles should be followed in IFIS cases as well. Well-constructed clear corneal incisions should be penetrated away from the iris root. Hydrodissection should be performed very gently to minimize iris movement or prolapse. Using low-flow phacoemulsification settings if possible and to directing irrigation currents away from the pupillary margin [1-3,12].

We encountered all features of IFIS in both eyes of patients during phacoemulsification surgery. We successfully managed IFIS by aid of iris retractor and reached 20/20 final visual acuity postoperatively in both eyes of the patient. Both the prevalence of cataract and benign prostatic hyperplasia are increasing in the aging world. Ophthalmologists and urologist prescribing silodosin should be aware of this possible association.

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Figure Legends

Fig. 1 – (A) Intraoperative floppy iris syndrome and iris prolapse during hydrodissection. (B) Placement of iris retractors before phacoemulsification. (C) Irrigation/aspiration of cortex. (D) After the intraocular lens implantation.

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