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Journal of Current Ophthalmology 27 (2015) 12–15

http://www.journals.elsevier.com/journal-of-current-ophthalmology

Pseudoexfoliation syndrome: Effect of phacoemulsification on intraocular pressure and its diurnal variation

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Available online 25 November 2015

Abstract

Purpose: To evaluate the effect of phacoemulsification on intraocular pressure (IOP) in pseudoexfoliation (PEX) syndrome and its diurnal variation.

Methods: In this prospective, non-comparative, interventional case series, phacoemulsification was done for patients with PEX and concomitant visually significant cataract. Follow-up examinations including IOP measurement were done at postoperative day 1, week 1, month 1, month 3, and month 6. All IOP measurements were performed twice daily: once in the morning between 8 and 10 AM and the other in the evening between 6 and 8 PM. The minimum and maximum IOP and the mean IOP were recorded. IOP variation was defined as the difference between maximum and minimum pressures.

Results: Sixty-eight eyes of 68 patients were analyzed. The mean IOP dropped from 17.45 $\pm$ 3.32 mm Hg to 12.57 $\pm$ 1.58 mm Hg at 6 months. The minimum and maximum IOP dropped from 14.97 $\pm$ 3.46 mm Hg and 20.03 $\pm$ 3.39 to 11.53 $\pm$ 1.79 mm Hg and 13.01 $\pm$ 1.81 after 6 months, respectively. Diurnal IOP variation dropped from 5.06 $\pm$ 1.85 mm Hg (range 2–10) at baseline to 1.49 $\pm$ 0.93 mm Hg (range 0–4) at postoperative month 6 ($p < 0.001$ for all). This drop was not correlated with age and CCT, but was strongly correlated with baseline IOP variation ($r = 0.847$, $p < 0.001$).

Conclusion: Phacoemulsification without any additional intervention can be an attractive choice in managing the IOP and its diurnal variations in pseudoexfoliation patients, even with elevated IOP, who do not have advanced optic nerve damage.

Keywords: Phacoemulsification; Pseudoexfoliation; Diurnal intraocular pressure variation

Introduction

Pseudoexfoliation (PEX) syndrome is an age-related systemic disease, with primarily ophthalmic manifestations. It is characterized by accumulation of abnormal extracellular fibrillary material on pupillary border, lens capsule, angle, and other tissues of the body.[1–3] Cataract and glaucoma are two main complications of the disease. In fact, PEX is the most common identifiable cause of open-angle glaucoma worldwide.[4–7] High baseline intraocular pressure (IOP) and high diurnal IOP fluctuation even in normotensive eyes with PEX are considered major risk factors for the development and progression of glaucoma.[8,9] Although the beneficial effect of cataract surgery on IOP drop in PEX patients has been reported in previous studies,[10–12] few studies have analyzed its effect on minimum and maximum IOP, and especially its diurnal variations in PEX patients.

The aim of this study was to evaluate the role of phacoemulsification on IOP changes and its diurnal variations in pseudoexfoliative eyes with concomitant visually significant cataract (Fig. 1).

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Peer review under responsibility of the Iranian Society of Ophthalmology.

http://dx.doi.org/10.1016/j.joco.2015.09.006

Methods

In this prospective, non-comparative, interventional case series, 76 eyes of 76 patients with PEX and concomitant visually significant cataract from January 2012 to February 2013 were included. All patients had been referred to Farabi Eye Hospital, a university-based tertiary care center. The study protocol was approved by the Ethics Committee of Tehran University of Medical Sciences, and patients who agreed and signed the informed consent form were enrolled.

Inclusion and exclusion criteria

Pseudoexfoliation syndrome was diagnosed clinically as presence of white fluffy dandruff-like material on the pupillary border, the lens capsule, or the angle. In patients with bilateral disease, only the eye with more advanced cataract was included in the study.

Patients with a history of ocular trauma or surgery, as well as those with any other coexistent ocular disease including any sign of glaucomatous optic neuropathy such as pathologic optic disc cupping, neuroretinal rim notching, or asymmetric cup to disc ratio (difference in cupping of > 0.2) were excluded from the study. Patients with severe phacodonesis and subluxated lens, posterior synechiae, laser iridotomy, and patients with posterior capsule rupture during the surgery were also excluded. Only those who completed at least 6 months of follow-up were included in the final analysis (68 cases).

Preoperative assessments

Preoperatively, a comprehensive ophthalmic examination including slit lamp examination, Goldmann applanation tonometry, gonioscopy, dilated fundus examination, and visual filed evaluation were done for all patients. Patients demographics and baseline characteristics including age, gender, Snellen chart best corrected visual acuity [converted to logMAR unit (logMAR BCVA)], and central corneal thickness (CCT), measured ultrasonically (Nidek UP-1000 Ultrasonic Pachymeter), were recorded. All IOP measurements were performed twice daily: once in the morning between 8 and 10 AM and the other in the evening between 6 and 8 PM. The minimum and maximum IOP and the mean IOP were recorded. Diurnal IOP variation was defined as the difference between maximum and minimum pressures.

Surgical technique and follow-up method

All patients underwent phacoemulsification by the same surgeon (G.F.). Briefly, under topical anesthesia and through a 3.2 mm-sized, temporal, clear-corneal incision, ocular viscoelastic agent was injected into the anterior chamber (AC), and a continuous curvilinear capsulorhexis was fashioned. Thereafter, hydrodissection, using balance salt solution (BSS), was done on a 25-gauge blunt needle. Phacoemulsification was then carried out, and a one-piece acrylic intraocular lens (AcrySof SA60AT, Alcon Laboratories, Inc., Fort Worth, TX) was implanted in the lens capsular bag. In the end, the AC was reformed with BSS, and corneal incisions were made watertight. Postoperatively, patients were given topical antibiotic and steroid eye drops, both of which were administered four times a day for one week; the latter was tapered within one month.

Follow-up examinations including IOP measurement were done at postoperative day 1, week 1, month 1, month 3, and month 6. More frequent visits were scheduled if needed based

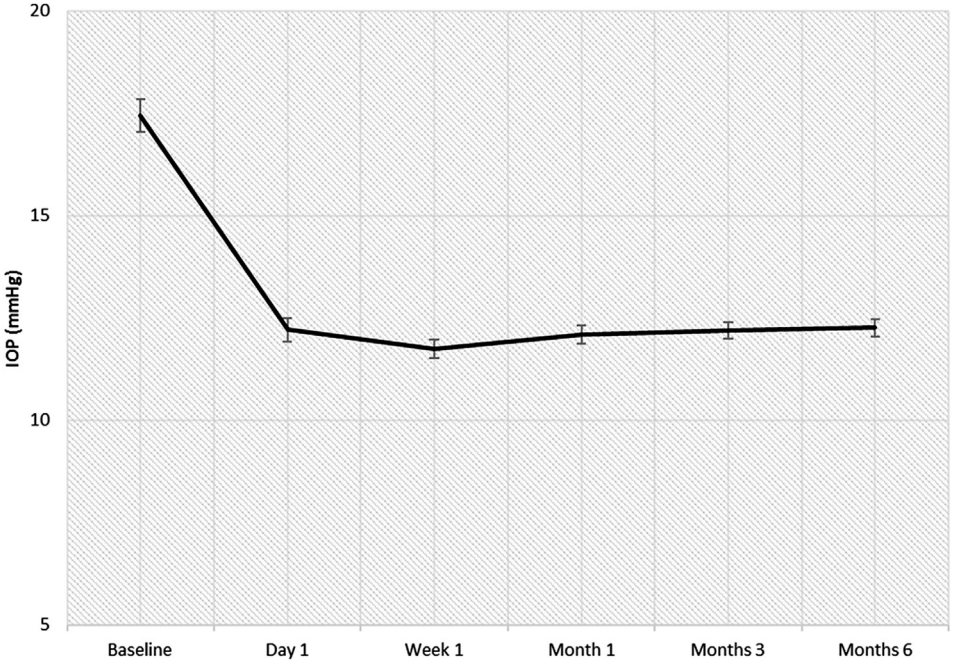

Fig. 1. Intraocular pressure trend during follow up period (mean ± standard error). IOP = intraocular pressure.