Medical Management of Cycloplegic-Induced Intraocular Pressure Spikes


Abstract

Tropicamide is routinely used for diagnostic mydriasis in many glaucoma clinics. This agent is the most effective available in the United States for short duration dilation of the pupil for visual field examination, stereoscopic disc examination, photography, and peripheral retinal examination. Previously published reports indicate that clinically significant intraocular pressure (IOP) spikes (≥ 6 mmHg) occur in approximately 2% of normal, 23% of chronic open angle glaucoma (COAG) eyes, and in 30–50% of COAG eyes on miotic therapy following the use of cyclopletics. This report includes preliminary data on a randomized, prospective, double masked study investigating the efficacy of Apraclonidine prophylaxis to prevent cycloplegic-induced IOP spikes in glaucoma patients and provides guidelines for management of this complication.

Introduction

A clinically significant (≥ 6 mmHg) pressure elevation has been detected after pharmacologic pupillary dilation in 2% of normal eyes, 23% of eyes with open angle glaucoma, and as many as 33% to 50% of patients on miotic therapy [1–4]. Among glaucoma patients using miotics, intraocular pressure (IOP) spikes can sometimes reach the heights of pressures seen clinically in acute angle closure glaucoma even though the angles of these eyes are open. High IOP spikes can be dangerous in an eye with a badly damaged optic nerve and may be difficult to manage if the patient is already on maximum medical therapy. Apraclonidine hydrochloride may be a useful alternative to oral or intravenous hyperosmotic therapy in such patients.

Apraclonidine is an alpha-adrenergic agonist that has been approved by the Federal Drug Administration in the United States to prevent IOP spikes following laser procedures including capsulotomies, trabeculoplasties, and iridectomies [5–8]. This drug may produce an intense anterior segment vasoconstriction and is thought to lower intraocular pressure by reduction of aqueous formation. The onset of action is within one hour and becomes maximal in terms of reduction of IOP three-five hours after topical
application of a single drop of 1% solution. Apraclonidine has been proven safe in normal volunteers who used it continuously for a period of four weeks [9]. Anecdotal uses of this agent in emergent situations in our own clinics have suggested its potential benefit in patients at risk for post-cycloplegic IOP spikes. This report summarizes a larger study reported elsewhere and describes the effects of Apraclonidine prophylaxis on the incidence and severity of post-cycloplegic IOP spikes in glaucoma patients [9].

**Materials and Methods**

Approval of the study protocol and informed consent form were obtained from the Los Angeles County-University of Southern California’s Human Studies Institutional Review Board Committee. Patients with open angle glaucoma, who were to undergo pharmacologic pupillary dilation for diagnostic purposes were offered participation in the study. Patients were entered in the study provided that they:

1) did not have systemic hypertension;
2) were not on monoamine oxydase inhibitors;
3) were not pregnant;
4) were not less than 18 years old;
5) were willing and able to give informed consent;
6) had not undergone glaucoma filtering surgery or penetrating keratoplasty;
7) had not undergone Argon laser trabeculoplasty; and
8) had no history or findings consistent with angle closure glaucoma.

Patients accepted into the study were divided into those using miotics and those not using miotics before being randomly assigned to receiving Apraclonidine or placebo prior to dilation with tropicamide (1%) and phenylephrin (2.5%). Patients were designated as being in one of four groups. Group 1 consisted of patients with open angle glaucoma not on miotic therapy who received a placebo (artificial tear solution) prior to dilation. Group 2 consisted of open angle glaucoma patients without miotic therapy who received Apraclonidine prior to dilation. Group 3 consisted of open angle glaucoma patients using miotic therapy who received a placebo (artificial tear solution) prior to dilation. Group 4 included open angle glaucoma patients with miotic therapy who received Apraclonidine prior to dilation. Statistically significant results were obtained in both nonmiotic and miotic groups between eyes showing elevation of intraocular pressure after placebo vs. those showing elevation of intraocular pressure after Apraclonidine (Tables 1 and 2).

Goldmann applanation tensions as described in the Glaucoma Laser Trial [11] were then taken by qualified ophthalmic technicians prior to dilation. Follow-up intraocular pressures were taken approximately one hour after dilation agent instillation by the treating physician using the same technique.