Ocular Hypotony – a Rare Sequela of iStent® Implantation

Abstract: Ocular hypotony presents at two week post-operative visit following cataract extraction and iStent® implantation. Case discusses use of iStent® in glaucoma management and the diagnosis, treatment and management of a rare sequela, ocular hypotony.

I. Case History
   a. Demographics
      i. 81 year old Caucasian male
   b. Chief Complaint
      i. “Hazy vision since cataract surgery” OU
      ii. One week post op visit, cataract extraction with iStent® OD
      iii. Two week post op visit, cataract extraction with iStent® OS
   c. Ocular History
      i. Normal tension open angle glaucoma, mild OD
         1. Treated with latanoprost 0.005% QHS prior to cataract extraction and iStent® implantation
      ii. Normal tension open angle glaucoma, moderate OS
         1. Treated with Latanoprost 0.005% QHS prior to cataract extraction and iStent® implantation
      iii. Anatomically narrow angle, OU
      iv. Whorl keratopathy, OU
      v. Mild non-exudative age related macular degeneration, OU
   d. Medical History
      i. Hypertension, Hyperlipidemia, Atrial fibrosis secondary to aortic stenosis, Type II Diabetes
   e. Medication
      i. Systemic: Amiodarone, Benicar, Cyclocet, Lovaza, Magnesium Oxide, Metformin, Tricor, Vitamins B-12, D2 & D3, Warfarin, Welchol
      ii. Ocular: Durezol, used post-surgically
   f. Other salient info
      i. Surgical history
         1. Hernia repair x 2 ~1960
         2. Compound leg fracture repair ~1959
      ii. Medication allergies
         1. Penicillin

II. Pertinent findings of initial encounter
   a. Clinical
      i. BCVA: 20/30+, NIPH OD; 20/50+, 20/40- PH OS
      ii. Pupils: PERRL OD, OS
iii. IOP: 15 mmHg OD; 02 mmHg OS 11:19 AM via GAT
iv. Anterior segment:
   1. OD: MGD, microcystic edema around CCI, vortex keratopathy, (-) Seidel, 1+ anterior chamber reaction
   2. OS: MGD, CCI, vortex keratopathy, (-) Seidel, (-) corneal striae, anterior chamber deep and quiet
      a. Gonioscopy: Cleft in trabecular meshwork behind iStent®, @ 7:00
v. Posterior segment:
   1. OD: PCIOL clear and centered, (-) blood, holes or tears 360
   2. OS: PCIOL clear and centered, (-) hemorrhages or choroidal effusion, boggy appearance of posterior pole

b. Testing
   i. Anterior segment photos and posterior segment OCT

III. Differential Diagnosis
   a. Primary
      i. Postsurgical sequela
   b. Others
      i. Posttraumatic sequela
      ii. Pharmacologically induced
      iii. Systemic condition, including myotonic dystrophy, dehydration, uremia and hyperglycemia

IV. Diagnosis and discussion
   a. Hypotony secondary to surgical complication, OS
   b. Patient presents with mild corneal edema and a boggy appearance to the fundus, causing visual haziness, a common presentation of early hypotony. Ocular hypotony is a very rare complication of iStent® implantation. A literature search of the safety profile of iStent® implantation revealed zero cases of chronic hypotony.¹⁻³ A single case of transient hypotony was reported on the day of surgery, but it resolved without treatment by post-operative day one.⁴ This is possibly the only reported case of chronic hypotony after iStent® implantation. It is unclear exactly what happened during the surgical procedure to cause the cleft in the trabecular meshwork adjacent to the iStent®.

V. Treatment, management
   a. Educated patient about condition and possible complications of ocular hypotony – patient given the urgent care number in case of decreased vision or signs of choroidal detachment. At first visit, instructed patient to keep his head above heart, not to strain, and to begin using Atropine 1% BID, OS. Patient also instructed to continue using Durezol 0.05% BID, OU. This treatment plan continued for twelve days (three office visits). At these three visits, no negative sequelae of hypotony were noted, IOP of left eye was 02, 03, and 05 mmHG via GAT, and PHVA of the left eye was 20/100-, 20/60-, and 20/40-, respectively. At the fourth visit, instructed patient to decrease Atropine 1% to QD OS and Durezol 0.05% QD, OU. IOP of the left eye at this visit was 06 mmHg via GAT and PHVA of the left eye was 20/40-. One week following, instructed patient to
maintain Atropine 1% dosing OS, but to discontinue Durezol 0.05% OU. IOP of the left eye at this visit was 06 mmHg via GAT and PHVA of the left eye was 20/40+. Another week following, instructed patient to discontinue Atropine 1%. Up to this point, every visit included instructions to the patient to keep his head above his heart and not to strain. At this visit, however, instructed patient to return to normal activity. IOP of the left eye at this visit was 06 mmHg via GAT and PHVA of the left eye was 20/40+. One week following, all findings were stable, including IOP and PHVA of the left eye. Patient was instructed to maintain normal activity. One month following, all findings were still stable, including IOP, and PHVA had improved to 20/25+ OS. Patient was instructed to return to clinic in three months for NTG evaluation.

b. Medical treatment of ocular hypotony is aimed at increasing aqueous production in order to raise IOP. Atropine can accomplish this goal, especially when hypotony is caused by cyclodialysis. When the ciliary body is unopposed to the sclera, the ciliary body tends to decrease or cease aqueous production. Atropine relaxes the ciliary muscle, causing re-apposition of ciliary body to the sclera with resultant increased aqueous production. Topical steroids can also increase aqueous production by decreasing inflammation of the ciliary body.5

c. Though hypotony was an unintended consequence of iStent® implantation, the resulting IOP has been significantly lowered – certainly a desired result for a mild to moderate primary open angle glaucoma patient. Patient will be monitored regularly for both glaucoma and possible sequelae of hypotony.

VI. Conclusion

a. Ocular hypotony has been defined two ways, statistically and clinically. Statistically, hypotony is defined as IOP less than 6.5 mmHg, which is more than three standard deviations from mean. Clinically, hypotony is defined as IOP low enough to result in vision loss.6 Patient’s hypotony meets both the statistical and clinical definition. Signs of hypotony include a shallow anterior chamber, corneal edema, manifestation of astigmatism or hyperopic shift, chorioretinal folds, optic nerve head swelling, and retinal vascular tortuosity.6 Possible sequelae of hypotony include hypotony maculopathy, suprachoroidal hemorrhage, and choroidal effusion.6 Throughout follow up period, patient exhibited none of these sequelae.

b. History is very important when determining the cause of hypotony as it will dictate treatment and long term management. Patient education of possible symptoms is also important so that appropriate action can be taken if the condition worsens (ie. hypotony maculopathy, suprachoroidal hemorrhage, and choroidal effusion).

VII. Bibliography
