

Analysis on Reasons and Treatment Approaches for Shallow Anterior Chamber after Glaucoma Surgery

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Abstract

Purpose: To analyze the causes of shallow anterior chamber after glaucoma surgery, and explore effective treatments correspondingly.

Methods: A total of 183 glaucoma patients (218 eyes) underwent trabeculectomy, and shallow anterior chambers were observed after surgery. The causes were analyzed and appropriate approaches were employed accordingly.

Results: Postoperatively, shallow anterior chamber occurred in 42 eyes (19.3%). Among those, 24 eyes (57.1%) had excessive filtrations, 8 eyes (19.0%) showed delayed anterior chamber formation, 5 eyes (11.9%) presented with choroidal detachments, 4 eyes (9.5%) displayed conjunctival flap leak ages, and 1 eye (2.4%) had ciliary block. Most shallow anterior chambers can be effectively improved after appropriate treatment.

Conclusion: Shallow anterior chamber can be caused by a variety of reasons, mainly by excessive filtration. We should actively take reasonable measures to improve the symptom and try to avoid its occurrence. (*Eye Science* 2011;26:100–102)

Keywords: Glaucoma; Shallow anterior chamber; Reason; Treatment

Shallow anterior chamber is a common complication occurring after trabeculectomy for glaucoma. Mild or temporal shallow anterior chamber has little impact on visual performance, while severe or persistent shallow anterior chamber can result in significant consequences, including corneal swelling and opacity, cataract, anterior and posterior synechia, chamber angle closure, and failure of glaucoma surgery¹. Therefore, to ensure surgical success, it is of great importance to analyze the causes for shallow

anterior chamber and to take timely and effective measures. Herein we analyzed the occurrence and treatment of shallow anterior chamber after trabeculectomy for glaucoma on 218 eyes from 183 patients in our hospital and reported hereunder.

Data and methods

General data

During August 2005 and August 2010, 183 patients (218 eyes) with glaucoma had been treated in our hospital: including 146 patients (179 eyes) with primary closure glaucoma, of whom 63 (78 eyes) were males and 83 (101 eyes) females; 37 patients (37 eyes) with post-traumatic secondary glaucoma, of whom 35 (35 eyes) were males and 2 (2 eyes) females. Through preoperative medication therapy, IOC of 183 eyes was controlled below 21 mm Hg, while IOC of 35 eyes was still higher than 21 mm Hg.

Surgical approaches

After surface anesthesia and retrobulbar block, and under surgical microscope, the surgery started with the preparation of a fornix-based conjunctival flap, followed by preparation of a lamellar scleral flap of 4 mm × 5 mm in size and 1/2 thickness; isolation proceeded until temporal corneal limbus; a piece of trabecular meshwork of 1.5 mm × 3 mm and corresponding tissue in the root of iris were resected; A stitch was made at both angles of the scleral flap using 10–0 nylon thread, and conjunctival flap sutured.

Grading of shallow anterior chamber

Shallow anterior chamber was rated as grades I, II and III based on the method proposed by Speath². Grade I: Peripheral iris is in contact with corneal endothelium, and a central anterior chamber formed. Grade II: The entire iris is in contact with corneal

endothelium, except for anterior lens capsule in the region of pupil. Grade III: The entire surface of iris and anterior lens capsule are in contact with corneal endothelium, and anterior chamber disappears.

Post-operative examination and treatment

Thorough ocular examinations after the surgery included intraocular pressure (IOP), slit lamp, fundus oculi, B-mode ultrasonography, and so forth. Treatments were given based on different causes, including glucocorticosteroid, antibiotics, non-steroid anti-inflammatory drugs, mydriatic, dehydrating agent, IOP-reducing agent, etc.

Results

Among 183 patients (218 eyes), a total of 42 eyes (19.3%) presented with shallow anterior chamber, excessive filtration in 24 eyes (57.1%), delayed formation of anterior chamber in 8 eyes (19.0%), choroidal detachment in 5 eyes (11.9%), leakage at conjunctival flap in 4 eyes (9.5%) and ciliary block in 1 eye (2.4%).

Shallow anterior chamber was maintained for 3 d in 3 eyes, 7 to 14 d in 35 eyes, and over 14 d in 4 eyes (including choroidal detachment in 3 eyes and ciliary block in 1 eye). Most eyes presented with low IOP after trabeculectomy (< 5 mm Hg), relatively low IOP in 5 eyes (5–10 mm Hg), and higher than 21 mm Hg in 1 eye.

After comprehensive treatment, those shallow anterior chambers caused by excessive filtration, delayed formation of anterior chamber and leakage at conjunctival flap were restored to normal limits. All eyes with shallow anterior chamber caused by choroidal detachment were restored to normal limits, except for one patient who underwent surgery two months after the first surgery due to subsequent associated retinal detachment. Another patient with ciliary block was improved after medication, but still required medication to maintain a stable anterior chamber.

Discussion

Shallow anterior chamber is a common complication after trabeculectomy for glaucoma, and its management is directly related to the success of the surgery. If not managed in a timely manner, it may

cause significant complications including corneal swelling or even corneal decompensation, chamber angle closure, anterior and posterior synechia, lens opacity, choroidal detachment and so on. Therefore, the occurrences of these complications can be reduced only by analyzing the causes of shallow anterior chamber after trabeculectomy targeting glaucoma and taking treatment measures in response to different causes, so as to ensure favorable efficacy of the surgery.

Analysis of causes and treatment approaches

Excessive filtration: post-operative examination found signs of shallow anterior chamber, low IOP, large and bulging filtering bleb. These suggested unduly large incision in the trabeculea, contraction of scleral flap or loosening stitch in scleral flap had caused excessive filtration. At this point, measures should be taken to reduce filtration properly. Apart from conventional treatments, such as topical application of antibiotics and glucocorticosteroid that aimed to reduce post-operative inflammatory response, administration of mydriatic tropicamide eye drop and application of a filtration-reducing pillow over eye lips were viable options. In the meantime, patients were instructed to reduce physical activities and to avoid constipation and fierce cough. In addition, auto-blood injection could be given. As the scleral flap was healed, shallow anterior chamber improved.

Delayed formation of anterior chamber: postoperative signs of shallow anterior chamber, normal or low IOP, significant mixed congestion, and flat filtering bleb were identified. Among 8 eyes, 3 eyes underwent surgery under ocular hypertension because of acute onset of glaucoma and the poor efficacy yielded by pre-operative IOP-reducing agents; remaining 5 eyes presented with post-traumatic secondary glaucoma with severe inflammatory response preoperatively. Significant pre-operative inflammatory response, congestion and adhesion in the tissue, and abrupt drop of IOP during the surgery were considered to possibly lead to decreased secretion of aqueous humor by the ciliary body. Antibiotic, glucocorticosteroid and non-steroid anti-inflammatory drugs were administered topically or systemically to reduce inflammatory response, and physical activity

and irritation avoided. With treatment over a period of time, anterior chamber was gradually restored to normal limits.

Choroidal detachment: post-operative examination revealed shallow anterior chamber, low IOP, cyan-greyish spherical bulging over fundus oculi, and flat filtering bleb, while B-mode ultrasound showed findings of choroidal detachment. Among 5 eyes, anterior chambers in 4 eyes were restored after treatment with non-steroid anti-inflammatory drugs, 20% mannitol or other dehydrating agents, and retrobulbar injection of glucocorticosteroids. Only 1 eye failed with conservative treatment due to lengthy course of disease, multiple episodes of ocular hypertension, poor efficacy with IOP-reducing agents before the surgery, post-operative occurrence of choroidal detachment and subsequent retinal detachment. The patient underwent surgery 2 months later.

Leakage at conjunctival flap: post-operative examination revealed the following signs including shallow anterior chamber, low IOP and flat filtering bleb. Seidal's findings³ showed a stream of fluorescein at the leakage site. By adopting conventional treatment, anterior chamber was restored as conjunctival flap was healed.

Malignant glaucoma: post-operative examination revealed clinical signs including severe congestion, progressive shallow anterior chamber, refractory ocular hypertension, swollen cornea, and myosis. Axis oculi was found short in 1 eye with signs mentioned above where ocular hypertension was uncontrolled on a long term basis before the surgery. It was considered that post-operative ciliary swelling has caused aqueous humor to reflux into vitreous cavity and to push the ciliary body and iris forward, leading to shallow anterior chamber and forming a vicious cycle. After treatment with mydriatic atropine,

IOP-reducing agent carbonic anhydrase inhibitors, inflammation-controlling corticosteroid, dehydrating agent mannitol, and corneal protectant, anterior chamber slowly formed, corneal swelling was gradually abated, and IOP was reduced. However, medications should be given continuously.

Precautions

In most cases, the occurrence of shallow anterior chamber is related to long-term ocular hypertension, poor medication control, and abrupt drop of IOP during surgery. Therefore, the patients with poor response to conservative treatment should be surgically treated as early as possible. For those patients with persistent ocular hypertension, 250 ml of 20% mannitol should be given via intravenous dripping 30 min before the surgery.

Long-term administration of aqueous humor production inhibitors and myotics before surgery may also be a factor causing post-operative shallow anterior chamber. Therefore, relevant medications should be discontinued preoperatively to avoid the occurrence of shallow anterior chamber to maximal extent possible.

Intraoperatively, aqueous humor should be released slowly with gentle manipulation and rigorous suturing.

Postoperatively, close observation should be conducted, and underlying causes should be analyzed and management should be given in a timely manner.

References

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