Value of Ultrasound Biomicroscopy in Diagnosis of Suprachoroidal Fluid after Trabeculectomy

Ayser Abd El Hamid Fayd, MD; Tamer Ibrahim Salem, MD; Tarek Nehad Attiya, MD.

Purpose: To report suprachoroidal effusion after trabeculectomy with the use of ultrasound biomicroscopy.

Methods: In a prospective study 30 eyes of 19 patients with primary open-angle glaucoma that underwent trabeculectomy were evaluated preoperatively and postoperatively by ultrasound biomicroscopy.

Results: 3 eyes showed a hypoechoic suprachoroidal space that remained stable for 6 months postoperatively. These 3 eyes had intraocular pressures of 11mmHg or less on no antiglaucoma medications and without signs of choroidal detachment.

Conclusion: Ultrasound biomicroscopy proved to be a useful method of detecting, after trabeculectomy, suprachoroidal fluid without clinically detectable choroidal detachment. This fluid may signify an iatrogenic cycloidalysis during surgery or, less likely, subclinical ciliochoroidal detachment.

Trabeculectomy is the most common filtration surgery to reduce intraocular pressure in primary open-angle glaucoma. This procedure is thought to facilitate aqueous humor filtration from the anterior chamber to the episcleral and subconjunctival spaces. Ultrasound biomicroscopy allows detailed assessment of the ocular globe anatomy after trabeculectomy (Pavlin et al., 2002).

Trabeculectomy with scleral spur excision removes the barrier between the anterior chamber and the suprachoroidal space. Aqueous humor could pass from the anterior chamber into the suprachoroidal space, as observed recently with ultrasound biomicroscopy after deep sclerectomy (Chious et al., 2008).

Cycloidalysis can be caused accidentally by trauma, intentionally as a treatment for glaucoma, or iatrogenically during intraocular surgery. It’s believed that the observed hypoechoic space may be produced by increased uveoscleral outflow resulting from iatrogenic cycloidalysis, a possible complication of the surgical technique, or, less likely, by a mechanism similar to the one occurring after postoperative exudative choroidal detachment (ocular hypotension, inflammation).

Ultrasound biomicroscopy allows detection of suprachoroidal fluid after trabeculectomy in eyes without clinically detectable choroidal detachment. Suprachoroidal fluid is probably caused by iatrogenic cycloidalysis (Carlos et al., 2008).

Patients and Methods

In a prospective study 30 eyes of 19 patients with primary open-angle glaucoma that underwent trabeculectomy were evaluated preoperatively and postoperatively by ultrasound biomicroscopy 1 week; 3 months and 6 months after surgery.
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Figure (1): Postoperative ultrasound biomicroscopic image of ciliary body – angle regional fluid accumulation is apparent over the ciliary body. The anterior chamber angle is open.

Figure (2): Ultrasound biomicroscopic image of the suprachoroidal effusion.

All cases underwent complete postoperative ophthalmic examination for:
- IOP.
- Visual acuity.
- Evaluation of conjunctival bleb.
- Fundus examination.

Results

We used the UBM paradigm 80 system to obtain high-frequency ultrasonic scans. One week, 6 months after surgery for all eyes. In three of the 30 eyes in the 30 eyes we found a hypoechogenic suprachoroidal fluid level 3 and 6 months after surgery, which remained stable (Figure 1). In two of these three eyes, suprachoroidal effusion appeared in the quadrant where trabeculectomy was performed, but in one eye the effusion appeared in all four quadrants (Figure 2).

Discussion

Trabeculectomy with scleral spur excision removes the barrier between the anterior chamber and the suprachoroidal space. Aqueous humor could pass from the anterior chamber into the suprachoroidal space, as observed recently with ultrasound biomicroscopy after deep sclerectomy (Chious et al., 2008).

Watson (1970) studied 28 eyes of 19 patients with medically uncontrolled glaucoma. All eyes underwent trabeculectomy with scleral spur excision. In 13 eyes, mitomycin C (0.2 mg/ml; 3 minutes) was applied intraoperatively. They observed low intraocular pressure postoperatively in spite of shallow bleb.

Carlos et al., (2008) used the Humphrey UBM 840 System (Humphrey Instruments, San Leandro, California) to obtain high-frequency ultrasonic scans, 2 days before surgery and 3 and 6 months after surgery, for all eyes. In four of the 28 eyes (12.5%), they found a hypoechogenic suprachoroidal fluid level 3 and 6 months after surgery, which remained stable. In three of these four eyes (Cases 1 through 3), suprachoroidal effusion appeared in the quadrant where trabeculectomy was performed, but in one eye (Case 4), the effusion appeared in three quadrants. Case 1 (the only patient who received mitomycin C) showed fluidfilled spaces inside the bleb. Cases 2 through 4 were characterized by medium-reflectivity blebs. In all four cases, the internal ostium was not blocked by iridectomy or ciliary processes, and the anterior chamber angle was open.

Postoperatively, the lowest intraocular pressures appeared in Cases 1 and 4 (4 mmHg). The other two cases had moderately higher values (10 and 11 mmHg). No reduction in best-corrected visual acuity was observed, and no antiglaucoma medications were required. The four eyes had a negative Seidel test. No intraocular inflammatory clinical signs or choroidal detachment was seen by indirect ophthalmoscopy.

Ultrasound biomicroscopy has proved to be a useful tool to study chronic hypotony after glaucoma filtration surgery.

Chious et al., (2008) observed suprachoroidal fluid by ultrasound biomicroscopy after deep sclerectomy with collagen implant in 51% of the eyes in their study. These authors speculated that a combined subconjunctival and suprachoroidal outflow pathway filters the aqueous humor after deep sclerectomy. Trabeculectomy with scleral spur excision removed the barrier between the anterior chamber and the suprachoroidal space, if suprachoroidal fluid were a typical additional effect of this surgical technique.
(scleral spur excision in trabeculectomy), it should have occurred more frequently.

Aqueous humor could pass from the anterior chamber into the supraciliary space, as observed with ultrasound biomicroscopy after deep sclerectomy (Pavlin et al., 2002).

In our study, supraciliary fluid was observed in only 10% of the eyes which is the cause of the lower intraocular pressures appeared in case 1 (7mm Hg). The other two eyes had moderately higher values (10 and 10.5mmHg).

Ultrasound biomicroscopy allows detection of suprachoroidal fluid after trabeculectomy in eyes without clinically detectable choroidal detachment suprachoroidal fluid is probably caused by iatrogenic cyclodialysis.

Reference


