Comparison of Filtering Blebs of Trabeculectomy and Tube Shunts Using Conjunctival Impression Cytology

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Purpose
To compare impression cytology findings obtained from filtering blebs and interpalpebral surface of patients who had undergone trabeculectomy or tube shunt surgery.

Methods
Consecutive patients who had undergone trabeculectomy or tube shunt surgery 3 or more months ago and attended routine follow-up visits between August-December 2011 were recruited. Patients who had ocular surgery other than phacoemulsification, ocular surface disease or eyelid/eyelash malposition were excluded. All had non-leaking blebs. Specimens were collected with a 2x3 mm cellulose acetate filter paper which was applied for 3 seconds to the elevated bleb area and to the nasal conjunctiva. Squamous metaplasia was evaluated according to Nelson’s grading system. Bleb morphology, duration of topical antiglaucomatous drug (number of drops/day) and intraoperative antimitabolite use were noted.

Results
Seventeen patients with an average age of 63.2±14.6 years were included in the study. Nine patients (53%) had Ahmed glaucoma valve implantation, 8 patients (47%) had trabeculectomy with mitomycin C (0.2 mg/ml-2 min;MMC). Average time from surgery to impression cytology was 30.6 ±24.7 months. Nasal conjunctival and filtering bleb impression cytology grades of the patients were the same except for one patient (r=0.953, p=0.0001). Average filtering bleb gradings and nasal conjunctival gradings were 1.18± 0.95 and 1.24±0.90, respectively (Table 1). There was no relationship between cumulative dose of topical glaucoma medication and impression cytology results (p=0.18), however, the amount of drugs used in the last two years had effects on impression cytology. (p=0.044). There was significant relationship between Nelson grades and time from surgery to impression cytology (bleb cytology r = 0.583 p=0.014; nasal cytology, r=0.490 p = 0.046). Higher scores were obtained when impression cytology was performed soon after surgery. Five patients had scores of 2 or more; their surgical interventions were within 12 months of impression cytology except one. Nine patients were noted to have intraoperative MMC use, their grades ranged between 0 to 3. Average bleb cytology scores of patients with and without MMC use were 1.2±0.8 and 1.1±1.1, respectively (p=0.50). Median bleb cytology scores of trabeculectomy and tube shunts were both 1 (p=0.76; Table 2).

Discussion
Conjunctival breakdown and leakage are serious problems that limit the success of glaucoma surgery. Structural changes that are encountered after glaucoma surgery had been examined either by histopathologic examination or impression cytology in a limited number of studies. Histologic studies of leaking blebs had shown thinner epithelial layers and lower goblet cell counts. Kim investigated conjunctival impression cytology of trabeculectomy blebs. They examined 22 eyes (19 patients), and noted Nelson grades of 2 or 3 in 9 patients (41%). MMC was used in six patients. Higher Nelson grades, squamous metaplasia and goblet cell loss were observed in patients with cystic blebs and with MMC use.

In the current study bleb cytology was compared to nasal conjunctival cytology. Strong correlation between nasal conjunctiva and bleb cytology was noted. Five patients had Nelson grades 2 or 3 (29.4%). Significant association of Nelson grades with the total amount of topical antiglaucomatous drug use during the last 2 years was detected. Recent surgery was associated with more metaplastic changes, however, MMC use was not. Failure to detect an association might be related to low number of MMC augmented cases, yet our patient number was higher than Kim. MMC effect might be time dependent and as the time from surgery to cytology increases, conjunctival changes may improve. The effect of topical drugs / preservatives may become more important than the effect of MMC in the long run. No previous study has investigated impression cytology of tube blebs. Our results revealed similar bleb impression cytology to that of trabeculectomy blebs.

Despite the low number of patients included in the study, the results indicate the importance of recent cumulative dose of topical antiglaucoma drops in patients with non-leaking blebs. Nasal conjunctival cytology appeared to be a good surrogate of filtering bleb cytology. Future prospective and randomized studies with high number of cases may provide better information about the role of impression cytology in determination of bleb related risk factors.