Advances in Ophthalmology and Optometry 2 (2017) 279–300

ADVANCES IN OPHTHALMOLOGY AND OPTOMETRY

Management of Conjunctival Bleb Leaks

Benjamin Abramowitz, MD[a,b,*], Marlene R. Moster, MD[a,b]

[a]Glaucoma Service, Wills Eye Hospital, 840 Walnut Street, 11th Floor, Philadelphia, PA 19107, USA; [b]Department of Ophthalmology, Thomas Jefferson University Hospital, 111 South 11th Street, Philadelphia, PA 19107, USA

Keywords

• Early bleb leak • Late bleb leak • Trabeculectomy • Hypotony • Blebitis • Conjunctival advancement

Key points

- Bleb leaks present in 2 major categories: early bleb leaks and late bleb leaks.
- Early bleb leaks are a manifestation of unanticipated wound healing or iatrogenic surgical trauma.
- Early bleb leaks are often managed with conservative measures, but may ultimately require surgical repair.
- Conversely, late bleb leaks are areas of structural weakness in cystic, avascular blebs.
- Conservative measures may be attempted as first-line measures for late bleb leaks; however, surgical revision often is required.

INTRODUCTION

Conjunctival bleb leaks are one of the most common complications after trabeculectomy. Henderson and colleagues [1] studied early bleb leaks in a prospective manner to elucidate their epidemiology with a total of 286 operations for a mean follow-up of 353 days. These early bleb leaks almost always occurred along the wound edge and represent a lack of water-tight closure. A mild leak was detected in 32% of patients and a moderate to severe leak in 27% of patients. Most leaks were noted within the first 2 weeks, most commonly

Disclosure Statement: None of the authors have any relevant financial interests.
The authors have nothing to disclose.

*Corresponding author. Wills Eye Hospital, 11th Floor, 840 Walnut Street, Philadelphia, PA 19107. *E-mail address:* abramowitz3@gmail.com

http://dx.doi.org/10.1016/j.yaoo.2017.03.013

within the first several days. Fornix-based flaps had leaks in 65% of the operations, whereas limbus-based flaps experienced leaks in 24% with a smaller sample size of limbus-based flaps. Overall, leaks were not found to have any impact on the success of the bleb. Although these rates may seem high, these authors used digital pressure to detect even the mildest of bleb leaks. The ability to detect mild bleb leaks was highlighted by Susanna and colleagues [2], noting no bleb leaks without pressure and 31% with digital massage. Other groups have confirmed that early bleb leaks have no significant effect on the outcome of trabeculectomy surgery [3].

Risk factors for early bleb leak were identified by the Fluorouracil Filtering Surgery Study Group and included inferior surgery, single-layer closure, a history of ocular inflammatory disease, and older age [4]. In contrast, a Canadian group identified young age as the only identifiable risk factor for severe early bleb leaks requiring extensive revision of the operative wound. The type of glaucoma, previous ocular surgeries, use of topical medications, location of the leak, fornix- versus limbus-based flaps, and intraocular pressure (IOP) on the first postoperative day were noted not to have any impact [5].

Bleb leaks from trabeculectomy may also occur in the late postoperative course, classically defined as after 3 months. These leaks are often associated with thin-walled, cystic, avascular blebs. Greenfield and colleagues [6] prospectively studied 525 eyes and noted that leakage occurred in 3.7% of eyes after mitomycin C use, 1.4% after 5-fluorouracil use, and 2.6% of eyes with no antimetabolite use. Leakage rates with antimetabolite use have ranged in the literature from 1.0% [7] up to 12.9% for inferior blebs with 5-fluorouracil use [8]. Histopathologic examination of late-leaking blebs revealed focal epithelial thinning and interruption with hypocellularity and stromal collagen degeneration (Fig. 1) [7].

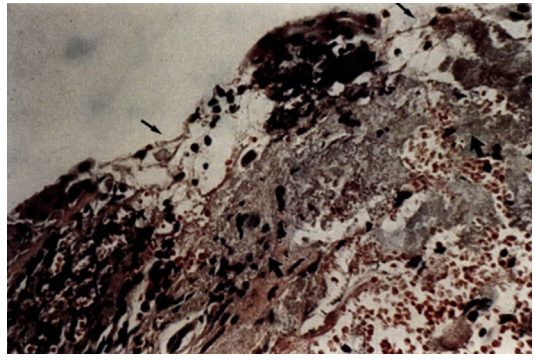

Fig. 1. Light microscopic appearance of excised filtering bleb with focal epithelial thinning (*small black arrows*) and interruption with subjacent hypocellularity and stromal collagen degeneration, which contains lymphocytes and plasma cells (*large black arrows*) (stain: hematoxylin and eosin; original magnification, ×100). (*From* Belyea DA, Dan JA, Stamper RL, et al. Late onset of sequential multifocal bleb leaks after glaucoma filtration surgery with 5-fluorouracil and mitomycin C. Am J Ophthalmol 1997;124(1):43; with permission.)