A New, Safer Method of Applying Antimetabolites During Glaucoma Filtering Surgery

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ABSTRACT
Blebs resulting from glaucoma filtration surgery tend to result in lower intraocular pressure and to be associated with fewer complications when they are diffuse and spread over the globe rather than localized to the area over the scleral flap. One way to achieve this type of bleb morphology is by applying the antimetabolite to a larger area than the one usually used in the past, in which the antimetabolite was placed only over the area of the scleral flap. In this article, the authors present a safe and inexpensive technique, which consists of using sponges with long, colored tails. This allows applying antimetabolite as far under the Tenon’s capsule as desired without the risk of losing the sponges in the sub-Tenon’s space.


INTRODUCTION
The use of antimetabolites has significantly improved the success of trabeculectomy, but has also increased the rate of bleb-related complications. This is thought to occur mainly because of the increased risk of developing a thin, avascular bleb, which can then lead to a bleb leak, hypotony, blebitis, and endophthalmitis. One of the hypothesized reasons for the development of this type of bleb morphology is the relatively small area of antimetabolite application. The resulting smaller bleb, and the so-called “ring of steel” around it, leads to increased intra-bleb pressure, which in turn causes progressive thinning of the bleb wall.

Applying the antimetabolite more diffusely decreases the incidence of cystic bleb morphology and hence the rate of bleb-related complications. However, achieving a larger area of treatment requires placing the antimetabolite underneath the Tenon’s capsule, well away from the cut edge of the conjunctiva, and extending its application to the superonasal and supertemporal quadrants. With any of the currently used techniques, the sponges may be hard to find after the antimetabolite application.

The technique presented here avoids taking these risks by using sponges that have colored tails, making them easily visible and readily retrievable.

TECHNIQUE
After a superior limbal- or fornix-based conjunctival flap has been developed, blunt dissection under Tenon’s capsule extends the flap superonasally and superotemporally, as far as the lateral and medial rectus muscles, and along both edges of the superior rectus muscle. Four Codman Surgical Patties (Codman, Raynham, MA) are prepared by cutting the colored tail approximately 1 cm from the pledget (Fig. 1). The pledget is then soaked in the antimetabolite. One patty is placed under Tenon’s capsule close to the medial rectus muscle, another close to the lateral rectus muscle, and two along the temporal and nasal sides of the superior rectus muscle, approximately 10 to 15 mm posterior to...
the limbus (Figs. 2, 3, and 4). Care is taken to place the sponges under Tenon’s capsule. After the desired application time has elapsed, the sponges are easily found and removed from the sub-Tenon’s space and the application area is irrigated with balanced salt solution. The trabeculectomy is then continued and finished according to the surgeon’s preferred technique.

DISCUSSION

Some of the most serious and vision-threatening complications of trabeculectomy, such as endophthalmitis and hypotonic maculopathy, are bleb related. They have a higher chance of occurring when the bleb is thin, cystic, and avascular than when the bleb is thicker and more diffuse. One reason why this occurs is related to the way the antimetabolite is applied. Cordeiro et al. showed that, in an experimental model, increasing the area of mitomycin C (MMC) application leads to a reduction in the cystic appearance of MMC-treated blebs and an increase in bleb survival. Önol et al. compared the effects of small-area versus large-area MMC application in trabeculectomy in a retrospective comparative case series of 66 patients, finding that the number of diffuse blebs was higher and that the number of cystic blebs was lower in the patients having a large area of MMC treatment. They also reported that, after 2 years, mean intraocular pressure and mean number of antiglaucoma medications were lower in the large-area group.

Since the method was reported by Khaw and Wells et al., many surgeons now use a technique employing wide application of antimetabolite to try to achieve more diffuse blebs. Codman Surgical Patties (used in neurosurgery and x-ray detectable) can be useful to help achieve this safely. With the technique described, antimetabolite can be delivered as far back into the sub-Tenon’s space as desired without the risk of losing the application sponges.

We believe this procedure offers a safe, effective,
and inexpensive way of applying the antimetabolite in a larger area without requiring any change in the surgical technique.

REFERENCES


