An unusual case of posttrabeculectomy conjunctival granuloma

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Abstract:
We report an unusual case of granulomatous inflammation that presented adjacent to bleb 3 weeks postoperatively after combined phacoemulsification and trabeculectomy surgery with mitomycin-C due to retained microfragments of methyl cellulose sponge. The commonly used antimetabolite delivery devices are made of cellulose. Methyl cellulose sponges are friable, and they are likely to leave behind microfragments in subconjunctival space. In our case, bleb integrity was maintained, unlike the earlier reported cases which presented with bleb leak. Hence, one should have high index of suspicion in unusual cases of postoperative inflammation not resolving conservatively. Although rare, retained sponge particles can be a cause of early bleb-related inflammation which can lead to bleb failure.

Keywords:
Cellulose sponge, granuloma, trabeculectomy

Introduction
Surgical management of glaucoma is common in third world countries because of lack of compliance, availability, and expense of lifelong medical therapy. Trabeculectomy with the concurrent use of mitomycin-C (MMC) as the primary procedure still remains the favored technique because it is economical and replicable with short learning curve. The standard method of delivery of MMC to the surgical site is through several small pieces of microsurgical sponges. We report an unusual case of conjunctival granuloma posttrabeculectomy due to retained cellulose sponge fragment.

Case Report
A 63-year-old female with primary open angle glaucoma underwent combined phacoemulsification and trabeculectomy augmented with MMC in the left eye. Intraoperatively, fornix-based flap was dissected, MMC (0.2 mg/ml) was applied using four pieces (1 mm x 1 mm) of methylcellulose sponge on the sclera beneath the conjunctival flap away from cornea for 1.5 min. Care was taken to ensure that the edges of the conjunctiva were kept clear of the sponge. All the four pieces were counted and removed using nontoothed forcep. After the sponge was removed, the space between conjunctival flap and episclera was thoroughly irrigated with normal saline. The surgery was uneventful. Conjunctiva was closed using 10-0 nylon suture.

The patient was doing well with visual acuity 6/12, and intraocular pressure (IOP) ranging from 10 to 16 mmHg with a diffuse posterior bleb with minimal vascularity extending over 2 clock hours. At 3 weeks postoperatively, the patient presented with severe pain and redness in the operated eye. A granuloma adjacent to the bleb was noted [Figure 1a]. Probable diagnosis of suture granuloma was made.

Suture removal was done. The frequency of topical steroids was increased, and oral
steroids were started. After 2 weeks, two whitish areas at the center of the granuloma were seen which was assumed to be either necrosis of the overlying conjunctiva or white foreign body material partially extruding on to the surface from the subconjunctival space [Figure 1b]. There was no anterior chamber reaction, and the bleb remained uninvolved so surgical exploration was done.

Two fragments of methyl cellulose sponge were retrieved surgically from the lesion [Figure 2]. The underlying sclera was healthy. The microfragment was sent for culture which was found to be sterile. Topical steroids and antibiotics were continued. On the subsequent visits, patient maintained a best-corrected visual acuity of 6/12 with IOP in the range of 10–12 mmHg with a functioning bleb.

**Discussion**

The high success rates of trabeculectomy are confounded by various antimetabolite-related complications such as hypotonous maculopathy, cataract, bleb leak, bleb-related infections, and endophthalmitis.\(^\text{[3,4]}\)

Most of the delivery devices such as scleral shields, methyl cellulose sponges, gel foam discs, and various other unspecified types of sponges are cellulose based. They are used to soak the antimetabolite to be placed on the sclera.\(^\text{[5]}\)

On subsequent wetting, lint particles develop along the surfaces of these sponges. When used in surgical procedures, very fine particles of this lint frequently become dislodged. The cellulose sponge used is slowly degradable. The time needed for the total disappearance of the cellulose sponge from subcutaneous tissue is longer than the 60 weeks.\(^\text{[6]}\) It stays at the site as foreign particles which may potentially initiate inflammation and contribute to early postoperative failure of the filtering bleb.

In our case, the granulomatous inflammation caused due to retained sponge microfragment presented after 3 weeks. There have been similar reports which presented as bleb leaks\(^\text{[7,8]}\) [Table 1]. In our case, inflammation started near the bleb adjacent to the sutures, so the probable diagnosis of suture granuloma was made. The practice of more posterior and lateral dissection of conjunctiva and placement of sponge in these locations to avoid “Ring of steel phenomena” and bleb dysesthesia explains the unexpected site of retained sponge.

Although we followed the protocol of thoroughly irrigating and inspecting the space between conjunctival flap and episclera and counting the sponge as recommended by Shin *et al.*, yet this microfragment was missed.\(^\text{[7]}\)

Lindfield *et al*. experienced the unfortunate scenario of misplacing a MMC soaked pledget and devised a technique of “necklace” suture, in which polyvinyl alcohol (PVA) pledgets were strung to silk suture to prevent inadvertent pledget loss during trabeculectomy.\(^\text{[9]}\)

Poole *et al*. assessed four different brands of microsurgical sponge spears and concluded that PVA microsurgical sponge is a safer vehicle for antiproliferative agent delivery as its cut pieces do not leave behind any microfragments, when soaked with antimetabolite, unlike cellulose microsurgical sponge spears.\(^\text{[10]}\)

Methyl cellulose sponge spears being cheaper are still widely used in developing countries. Poole *et al*. demonstrated that uncut whole sponges made of cellulose did not leave behind microfragments so they could be safely used in glaucoma surgery.\(^\text{[10]}\) Thus, adequate-sized microsurgical sponges made of cellulose customized for glaucoma surgery can be a cost-effective option.

Two cases of retained cellulose fiber after the use of Whatmann filter paper #1 presented at 4 months.
postoperatively have been reported. Another case report of retained cellulose sponge microfragment presenting 3 weeks postoperatively was similar to our case. Filter paper usually leaves behind lint fiber whereas sponge spear leaves a bigger microfragment. These cases strongly suggest that the timing of presentation of these lesions depends on the size of the retained foreign body. Larger the fragment earlier is the presentation.

Bleb-related inflammation occurring within 6–8 weeks can be due to wound dehiscence, inadvertent conjunctival buttonhole. Late leaks occur after 3 months. Suture-related foreign body granuloma occurring in the early postoperative period is mostly associated with vicryl sutures. It usually resolves after suture removal and steroids. Microfragments of sponge made of cellulose can easily be retained because of its inherent friable nature and initiate foreign body such as reaction in conjunctival tissues, which will not resolve with steroids. Thus, unsuccessful outcome with short course of steroids should raise the suspicion of retained sponge microfragments and prompt for a conjunctival exploration.

We recommend that PVA sponges should be the preferred delivery device in glaucoma surgeries and each piece should be meticulously counted and removed by nontoothed forceps. Any bleb-related inflammation in early postoperative period not resolving conservatively should arouse high index of suspicion. Early intervention may help to salvage the bleb.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

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