Bleb needling with subconjunctival ologen insertion using IOL cartridge

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Abstract:
We describe a novel technique to bleb needling by injecting subconjunctival ologen through an intraocular lens (IOL) delivery system to modulate wound healing in a failing filter. Bleb needling with 26G needle was performed, followed by subconjunctival injection of a biodegradable collagen implant using an IOL delivery system with cartridge in two eyes with a failing filter and high intraocular pressure (IOP). Postoperatively, the bleb was diffusely elevated, and the IOP was maintained between 10 and 14 mmHg at 6 weeks, 3 and 6 months follow-up. Therefore, bleb needling augmented with a biodegradable collagen implant inserted through an IOL injector system is a useful option in the management of failing filter posttrabeculectomy.

Keywords: 5-Fluorouracil, bleb needling, failed filtering surgery, intraocular lens delivery system, ologen

Introduction
Trabeculectomy remains the surgery of choice in patients with advanced glaucoma, but failure of filtration may be caused by subconjunctival and episcleral fibrosis. The success rate of bleb needling with 5-fluorouracil (5FU) injection varies between 75% and 94%. However, risk factors for failure of needle revision include preneedling intraocular pressure (IOP) >30 mmHg, aphakia or pseudophakia, a fornix-based conjunctival flap during surgery, with previous surgery involving a conjunctival incision; as was present in our case. We, therefore, added a biodegradable collagen implant to the standard procedure of needling to modulate wound healing and augment the success of this procedure.

Case Reports

Case 1
A 54-year-old male with the diagnosis of OD Aphakia with corneal decompensation, spheroideal degeneration, fibrous downgrowth and secondary glaucoma, post trabeculectomy, and OS absolute eye; presented with IOP of 32 mmHg. The patient had undergone trabeculectomy with 0.02% mitomycin C (MMC), 2 months back and a mildly elevated, vascularized, encysted bleb was noted [Figure 1a]. Best-corrected visual acuity in the right eye was only light perception with accurate projection of rays and no light perception in the left eye.

Case 2
A 61-year-old male with the diagnosis of OU pseudophakia with OS secondary glaucoma with twice operated trabeculectomy; presented with IOP of 28 mmHg. The patient had undergone trabeculectomy with 0.02% MMC, 6 weeks back and a relatively flat, extensively vascularized bleb was noted.

Materials and Methods
In both the cases, needling with 5 FU, 5 mg/0.1 ml was performed with additional use of a biodegradable collagen implant to

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maintain the subconjunctival space and modulate wound healing in the postoperative period.

**Ologen implant**
The ologen implant (Biodegradable Collagen Matrix Implant, Aeon Astron Europe, The Netherlands) is a porous implant comprising >90% Type I atelocollagen and <10% lyophilized glycosaminoglycan with a pore size of 10–300 µm. We used a cylindrical implant of 6 mm diameter and 2 mm in height (Model No. 830601).

**Surgical technique**
After anesthetizing, the eye with topical proparacaine 0.5% drops, a wire speculum was inserted, and a 30G needle loaded on 2 ml syringe was advanced into the bleb and swept in a side to side motion within Tenon’s fascia, making multiple perforations within the bleb wall while still preserving the overlying conjunctiva. The ologen implant (6 mm × 2 mm) was loaded into the IOL cartridge using a McPherson’s forceps [Figure 2]. Thereafter, a small (1.5 mm) conjunctival opening was made with Westcott scissors, 10 mm from the limbus and blunt dissection performed. The ologen implant was then injected through this opening, using a Monarch© III IOL Delivery System in a D cartridge (Alcon, Fort Worth, Texas, USA) [Figure 3a and b]. After injection, the implant was gently massaged 2 mm away from the limbus to maintain a slightly posterior bleb. A watertight closure of the conjunctiva was done with a single 8-0 polyglactin horizontal mattress suture. Thereafter, 0.1 ml of 5 FU (5 mg/0.1 ml) was injected posterior to the bleb with a 30G needle, loaded on a tuberculin syringe.

**Results**
Postoperatively, the bleb was diffusely elevated [Figure 1b], and the IOP was 8 mmHg at 1 week, 12–14 mmHg at 6 weeks, 3 and 6 months follow-up in the first case (on no medications). In the second case, IOP was 12 mmHg at 1 week, 14 mmHg at 6 weeks and 3 months, and 16 mmHg at 6-month follow-up (on timolol + brimonidine eye drops BD). Anterior segment optical coherence tomography of the bleb at 3-month follow-up showed a raised bleb with multiple small hyporeflective spaces, suggestive of a filtering bleb along with subconjunctival ologen *in situ* [Figure 4].

**Comments**
The principle of ologen (Biodegradable Collagen Matrix Implant) is to induce the fibroblast to randomize within its porous matrix, which leads to the formation of a loose connective tissue. It also maintains the subconjunctival space preventing adhesion and scarring while supporting and maintaining the size of the bleb even after partial degradation.[6]

Dada *et al*. have previously reported encouraging short-term results with the use of subconjunctival ologen implant with anti-scarring agents for trabeculectomy.[7] The use of subconjunctival ologen implant after needling may be a useful adjunct in eyes with a high risk of failure of trabeculectomy. In addition, the use of intraocular lens (IOL) injector system for subconjunctival ologen insertion, usually employed in microincision cataract surgery, helps in minimizing tissue injury by reducing the size of the incision and taking it away from the area of the bleb, thereby reducing scarring at the site of the scleral flap.

**Conclusion**
We report a new application of ologen implant with needling for a failing filter post trabeculectomy using

![Figure 1: (a) Preoperative photograph showing a flat vascularized bleb. (b) Postoperative photograph showing a diffusely raised bleb](image1)

![Figure 2: Intraoperative photograph showing the loading of ologen implant (6 mm × 2 mm) into the D cartridge using a McPherson’s forceps](image2)

![Figure 3: (a) Intraoperative photograph showing ologen (6 mm × 2 mm) loaded into the D cartridge. (b) Intraoperative photograph showing injection of ologen through a Monarch© III intraocular lens Delivery System in a D cartridge through a small conjunctival opening](image3)
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a small incision technique. The use of subconjunctival ologen with bleb needling has not been previously reported in literature and we encourage clinical trials in the future, using this technique for improving the management of failing blebs – a common clinical challenge after trabeculectomy.

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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