

# A brief note on the use of ologen collagen matrix implants to treat ocular hypotony developing after trabeculectomy

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## Abstract

Ocular hypotony is an adverse and potentially sight-threatening complication that may occur after trabeculectomy. It is usually associated with over filtration or bleb leakage and has a wide variety of treatments, including non-surgical procedures such as pressure patching, application of bandage contact lenses, autologous blood injection, and intracameral viscoelastic injection. More invasive treatments include placement of transconjunctival compression sutures, excisions of the ischemic conjunctiva, scleral flap suturing, and scleral patch grafting. More recently the use of collagen matrix implants has been suggested in these cases due to their potential of inhibiting conjunctival scarring and contraction and promoting the formation of an organized collagen network that resembles normal conjunctiva.

**Keywords:** Ocular hypotony, Glaucoma, Trabeculectomy, Ologen collagen matrix.

## About the Study

Ocular hypotony is a potentially vision-threatening complication that can occur after trabeculectomy. It can be associated with hyperfiltration or bleb leakage and has a wide variety of treatments, including non-surgical procedures, pressure patching, application of contact lenses, autologous blood injection and intracameral viscoelastic injection, in order to prevent exaggerated flow of aqueous humor [1,2]. More invasive treatments include placement of transconjunctival compression sutures, ischemic conjunctival excisions, scleral flap suturing, and scleral patch grafting [3]. The use of collagen matrix implants has been suggested in these cases because of their potential to inhibit conjunctival healing and contraction and promote the formation of an organized collagen network that resembles the normal conjunctiva [4,5].

Ologen<sup>®</sup> is a flexible biodegradable collagen matrix of animal origin whose porous matrix structure (0-300 µm) is obtained by cross-linked lyophilized type I atelocollagen (>90%) and glycosaminoglycans (<10%). It has been successfully used in ocular surgeries, especially pterygium, glaucoma drainage implants, and trabeculectomy and its potential effect is due to the prevention of fibrosis and subconjunctival scarring, reduction of conjunctival contraction, and promotion of the development of a near-normal subconjunctival stroma [6-11].

## Efficacy

A few studies have compared Ologen<sup>®</sup> versus Mitomycin in terms of efficacy. Cillino, et al. evaluated 40 eyes assigned to trabeculectomy with Mitomycin C or Ologen<sup>®</sup> and by the end of 60 months, both materials presented a similar reduction in IOP and no intergroup difference in use of antiglaucoma medications [12]. Similar results were found by He et al. in a systematic review and meta-analysis that included 227 eyes and both materials had no statistical significance in IOP, glaucoma medication or adverse events. More recently, Song et al.

published a meta-analysis including 11 studies and 443 participants and even though no differences were observed regarding reduction in glaucoma medications, success rate or complications, Trabeculectomy (TRAB) with MMC was associated with higher IOP-lowering efficacy and a higher incidence of postsurgery hypotony in contrast to that of TRAB with Ologen<sup>®</sup> [13].

Regarding the treatment of hypotony, Ologen<sup>®</sup> was also significantly effective at increasing IOP and VA in a recent case series. Similarly, one retrospective observational case series showed a significant increase in IOP from  $3.8 \pm 2.7$  mmHg) to  $9.0 \pm 3.2$  mmHg after twelve months [14,15].

## Safety

The most frequent complications regarding the use of Ologen is comparable to the complications found in trabeculectomies and include hyphema, hypotony maculopathy, hypotony, bleb leakage, encapsulated bleb, shallow anterior chamber, choroidal detachment, blebitis and anterior chamber reaction [16]. However, Senthil et al. found that compared to mitomycin, Ologen showed a slight increase in transient hyphema rates, which could be to the loose scleral suture allowing ooze from the cut ends of the sclera into the anterior chamber [17]. Infrequently, distressing conditions may occur, especially kissing choroidal effusions requiring urgent surgical drainage [18]. As shown recently in a prospective randomized clinical trial, there were no differences in terms of complication rates in trabs with mitomycin or Ologen [19].

A history of hypersensitivity to porcine collagen is a contraindication and, as with antimetabolites, no safety studies were conducted in children and pregnant women. A possible advantage over the use of antimetabolites is the fact that the filtration blebs obtained are flat, with no increased risk of hypotonia, infection or bleb leak. If there are signs of allergy or presence of hypotony maculopathy, it can be removed. It also

seems to reduce the need for needling or antimetabolite injections in the postoperative period [9,12].

### Technique

Some techniques have been described, but the standard involves creating a posterior conjunctival incision distant from the bleb, near the posterior fornix, followed by careful dissection of the scleral-conjunctival adhesion with a 27-gauge needle or a crescent knife followed by the placement of Ologen Collagen Matrix [14].

### Conclusion

There are various techniques to treat late-onset hypotony developing after trabeculectomy, from conservative to invasive options. The use of Ologen has shown to be an effective and safe option, although more comparative studies are required to support it as a first-line treatment for hypotony.

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