International Surgery Journal
Gupta P et al. Int Surg J. 2017 Jul;4(7):2369-2371
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20172801

Case Report

Role of oral doxycycline in the management of conjunctival dehiscence following glaucoma drainage device

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Received: 25 April 2017
Accepted: 23 May 2017

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ABSTRACT

Importance of matrix metalloproteinase inhibitor like Doxycycline in the management of conjunctival dehiscence following glaucoma drainage device. A 50 years old man developed conjunctival retraction after a glaucoma grainage device with was managed with oral doxycycline. After 4 month of continuous treatment there was complete healing of conjunctival defect. Oral doxycycline is a viable alternative in the conservative management of conjunctival retraction obviating the need for surgical intervention.

Keywords: Ahmed glaucoma valve, Doxycycline, Glaucoma drainage devices, Penetrating keratoplasty

INTRODUCTION

The glaucoma filtration device has been approved for usage for lowering intraocular pressure in patients who have uncontrolled glaucoma, including those who have failed prior medical and conventional surgical treatments.[1] The use of glaucoma drainage devices is becoming more frequent in the treatment of both refractory glaucoma and as the first filtration procedure. With the increased use of these devices, understanding their complications is essential in managing these patients. There is a long list of possible complications related to Ahmed glaucoma valve (AGV) implant insertion. One complication encountered was retraction of the conjunctival flap with barring of implant or exposure of graft. Retraction of conjunctiva over the AGV prevents bleb formation.[2] The predisposing risk factor for early post-operative conjunctival retraction are previous conjunctival damage caused by ocular medications, trauma, and surgeries, ocular inflammatory or surface disease or previous surgical technique etc.[3] The management of conjunctival retraction with exposure of underlying donor patch varies from simple observation to surgical intervention. Usually does not need repair as long as the tube is well covered. Choice of treatment depends upon presence or absence of leakage, severity of leakage, and health of surrounding conjunctiva. In this, we present a case that developed conjunctival retraction over the tube of an Ahmed valve implant and was successfully managed with oral Doxycycline.

CASE REPORT

A 50-year-old man referred from cornea unit in view of raised intraocular pressure. He had a history of both eye cataract surgery in 2013 and left eye penetrating keratoplasty (PK) for Pseudophakic bullous Keratopathy in 2014. At presentation IOP was 16 and 40 in right and left eye respectively, on maximal topical antiglaucoma medication combination of dorzolamide 2% and timolol maleate 0.5% twice daily, latanoprost 0.005% once at bed time and brimonidine tartarate 0.1% twice daily) and oral acetazolamide. Visual acuity was 20/40 in right eye and 20/125 in left eye. In left eye cornea graft was clear with intact 16 sutures. Gonioscopy revealed open angle in right eye and peripheral anterior synechiae inferotemporally in left eye. Fundus examination showed

normal healthy disc with CD ratio of 0.4 in right eye and in left eye showed thin inferior rim with CD ratio of 0.8. In view of uncontrolled IOP planned to go for surgical management. As superior conjunctiva was scarred, plan was to implant Ahmed Glaucoma Valve (AGV) in inferotemporal area. On post-operative day, first (Figure 1), best corrected visual acuity (BCVA) was 20/200, conjunctiva was congested, AGV well placed, cornea graft was clear with intact 16 sutures. In anterior chamber, tube was well placed with fibrinous membrane noticed. IOP was 03 mmHg. Patient was started on prednisolone 1% eye drop 1 hourly, Homatropine 2% eye drop three times a day and Moxifloxacin 0.5% eye drop 4 times a day. On post-operative day 5 (Figure 2) conjunctival retraction with graft exposure was noted. AGV was in placed. Siedel's test showed minimal leak. Tube was in place with lumen free. IOP was 01 mmHg, BCVA was 20/100. Plan was to continue topical medication and start oral doxycycline 100 mg 2 times a day. After 10 days, there was improvement in the area of conjunctival retraction, with conjunctiva started healing and covering the graft, seidel's test became negative. Patient was put on same medication.

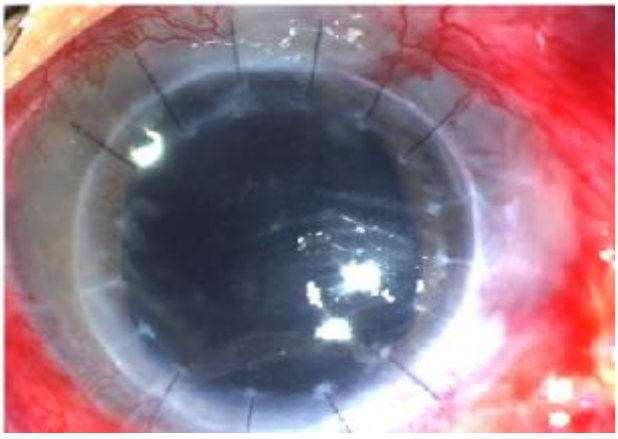

Figure 1: Post-operative day 1.

Figure 2: Post-operative day 5 -conjunctival retraction with exposure of graft.

After 4 month of continuous treatment there was complete healing of conjunctiva and coverage of exposed graft, BCVA was 20/125, IOP was 14mmHg and AGV and tube was well placed (Figure 3).

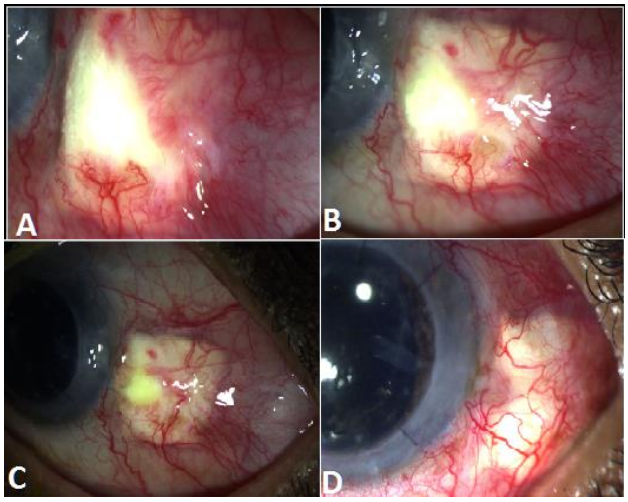

Figure 3: A) - Postoperative at 15 days; B) - Postoperative at 1 month; C) Postoperative at 2 months; D) Post-operative 3 months.

DISCUSSION

Doxycycline is semi synthetic tetracycline with broad spectrum antibiotic activity that prevents access of acyl t-RNA to the acceptor site on the mRNA-30s ribosomal subunit complex. Beside this doxycycline also act as metal ion chelator and therefore inhibit the activity of members of matrix metalloproteinase family. It also inhibits the activity of proinflammatory cytokine interleukin 1 and inhibit collagen synthesis.[4]

Whenever there is conjunctival insult either due to persistent inflammation or trauma, activation and proliferation of fibroblast occurs. Metallic metaloproteinases (MMP) 1, 3 and 9 release which promote the fibroblast migration and contraction and extracellular matrix synthesis and re-modelling which ultimately lead to conjunctival scar formation.[5] Key components of a balanced wound healing response are matrix production, matrix degradation, and formation of cellular adhesion complexes. Production of MMPs is controlled by the tissue inhibitors of metalloproteinases (TIMP).[6] But concentration and activity of metalloproteinase-9 are increased in patients with chronic inflammation which is not associated with increased levels of TIMP, result in excessive degradation of extracellular matrix.[5] Increased levels and/or activity of several members of the matrix metalloproteinase enzyme family, including metalloproteinase-2 and metalloproteinase-9, have been reported in patients with recurrent corneal erosions.[7] Along with this there is release of proinflammatory cytokine IL- 1 which induce the synthesis of MMP 1, 3 and 98. Over expression of MMPs results in excessive extracellular matrix degradation which lead to tissue destruction. These MMPs required ions (Ca 2+, Zn2+ and Mg2+) for their activity. These metal ions hold the enzyme in its catalytically active conformation.

Doxycycline inhibit the activity of MMPs (1, 3 and 9) indirectly by abstracted the Ca 2+, Zn2+ from hemidesmosomes and other Ca2+ dependent junctional proteins4. And also by its anti-inflammatory property doxycycline suppress the activity of proinflammatory cytokine IL-1.[8] So, by inhibiting the activity of MMPs doxycycline prevent the scar formation and promote complete coverage of the ocular surface with epithelial basal cells and development of stable, stratified epithelium.[4]

Clinical response to Doxycycline in our patient could probably be the result of direct inhibition of inflammation or inflammation-induced metalloproteinase activity. In our case this took~ 3 month to completely cover the graft.

So, conjunctival retraction after glaucoma drainage device implantation is usually benign and common complication and may require repeat surgeries in the form of Autologous conjunctival graft, Oral buccal mucous membrane or Amniotic membrane transplantation. But Scarring at the implant site and poor conjunctival status due to chronic use of medications greatly reduces the chances of success. Oral doxycycline is a viable alternative in the conservative management of conjunctival retraction even in the presence of bleb leak and the tube and implant are not exposed obviating the need for surgical intervention.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Gupta P, Senthil S, Srirampur A, Mittal P. Role of oral doxycycline in the management of conjunctival dehiscence following glaucoma drainage device. Int Surg J 2017;4:2369-71.