

Case Report

Recurrent glaucoma drainage device erosion in association with occult infection with biofilm-producing organisms.

Abstract

Aim

We report the first case of recurrent erosion of a glaucoma drainage device (GDD) caused by chronic infection with biofilm-producing bacterial organisms.

Presentation of Case

A 68-year-old Caucasian female was referred to a tertiary glaucoma service with uncontrolled left inflammatory glaucoma and cataract in association with Fuchs Heterochromic Cyclitis. Combined glaucoma drainage device (GDD) implantation and phacoemulsification cataract surgery was performed. Fourteen months post-operatively, the patient presented with recurrent GDD erosion requiring multiple ocular surface repairs over the next 12 months. The device was finally explanted and sent for microbiological analysis after all surgical strategies to control the refractory erosions were unsuccessful.

Discussion

Cultures of the GDD were positive for *Streptococcus parasanguis* and *Rothia dentocariosa*; organisms commonly found in the oral flora. *S. parasanguis* is known to form biofilm and is a common cause of late prosthetic valve endocarditis. Both organisms were sensitive to chloramphenicol, and the patient responded to topical chloramphenicol therapy with good final vision and intraocular pressure control.

Conclusion

Mechanical factors are often used to explain GDD erosion. This case demonstrates that in recurrent GDD erosion, occult chronic infection, particularly with biofilm-producing organisms, should be

considered in the differential diagnosis. Surgical repair of the erosion may have a low chance of success in occult or chronic infection and definitive GDD explantation may be required. With the current trend towards earlier and more frequent GDD implantation in glaucoma, it is likely that this problem will increase in prevalence.

Key words: Glaucoma Drainage Device, Complications, Infection, Erosion.

List of abbreviations used

GDD: Glaucoma drainage device

IOP: Intraocular pressure

Introduction

Glaucoma is the commonest cause of irreversible blindness in the world. The main risk factor for this sight threatening optic neuropathy is raised intra-ocular pressure (IOP). Intraocular pressure can be controlled with topical medication but failing this, these patients require surgery to divert the aqueous humour externally from the anterior chamber into the sub-Tenon's space surrounding the globe.

Glaucoma drainage devices (GDDs), as shown in Figure 1, are made of smooth, tumbled-polished, silicone. They are being increasingly used in external glaucoma filtration surgery [1,2]. However, GDDs are associated with long-term complications, including erosion and extrusion of the device through the conjunctival tissue. Extrusion has traditionally been assumed to occur in association with local mechanical factors, such as device movement. Although chronic low-grade infection may be a factor in GDD erosion, there is little data to support this hypothesis, with a lack of published microbiological data in this area [1-5].

We describe a case of recurrent GDD erosion requiring explantation. The device was sent for microbiological analysis and culture. Two organisms commonly found in flora of the mouth and implicated in prosthetic valve endocarditis were isolated.

56 **Presentation of Case**

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58 A 68-year-old Caucasian female was referred to a tertiary glaucoma service with a diagnosis of
59 uncontrolled inflammatory glaucoma and cataract in association with Fuchs Heterochromic Cyclitis in
60 the left eye.

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62 The IOP on maximal tolerated medical therapy was elevated at 24mmHg (normal range 12-21mmHg)
63 in the affected eye with moderate glaucomatous optic neuropathy. Combined GDD implantation with
64 a Baerveldt 350mm tube and phacoemulsification cataract surgery was performed. The GDD was
65 placed in the supero-temporal quadrant of the sub-Tenon's space and the tube was covered with a
66 donor lamellar scleral flap.

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68 The post-operative course was uncomplicated for the first 4 months with good IOP control off
69 glaucoma medication (18mmHg) and excellent visual acuity at 6/9. However at 4 months post
70 surgery, anterior uveitis was noted and a tapering short course of topical steroid was used. Over the
71 next 10 months there were several further episodes of anterior chamber inflammation, each of which
72 partially resolved with short courses of topical steroid.

73

74 Fourteen months after the original surgery the patient experienced supero-temporal ocular pain and
75 was noted to have a small area of tube erosion in the supero-temporal quadrant (Figure 2). The defect
76 was repaired with a patch graft of tutoplast (processed pericardium) in theatre.

77

78 Three months later the eye was again painful and examination revealed evidence of recurrent erosion
79 at the previous site. Further surgical repair was performed with a donor lamellar corneal graft. Three
80 further episodes of GDD erosion occurred at the same site over the next 10 months; each time
81 requiring reconstructive surgery to cover the defect.

82

83 Because of the risk of potentially blinding infectious endophthalmitis in association with the

refractory GDD erosion, the GDD was explanted and the filtration area closed with donor scleral patch grafting and conjunctival flap mobilisation. The explanted GDD was sent for microbiological examination. Topical chloramphenicol 0.5% drops was commenced post-operatively and the area rapidly healed with preservation of vision and good IOP control.

Streptococcus parasanguis and *Rothia dentocariosa* were isolated from the Baerveldt GDD. Both organisms were sensitive to chloramphenicol.

Discussion

Glaucoma drainage devices are being increasingly used in the management of refractory glaucoma. Recurrent erosion of a GDD is a significant surgical challenge and this case demonstrates that low-grade chronic infection may be a significant pathogenic factor. Both organisms isolated from direct culture of the GDD in this case are found in the oral cavity. *S. parasanguis* and *R. dentocariosa* are part of the spectrum of flora associated with dental caries [6,7]. *S. parasanguis* is known to form biofilm and is a common cause of late prosthetic valve endocarditis [6].

Chronic infection and recurrent erosions associated with a GDD colonised by these organisms can be difficult to treat as the biofilm protects these organisms from the effects of antibiotics [6,8]. As in prosthetic valve endocarditis where removal of the valve is indicated [9], the management of this case required explantation of the colonised GDD.

Pre-operative assessment of the patient's dental hygiene and immune status may reduce the risk of intra and post-operative implant colonisation by oral flora and subsequent chronic infection. A high index of suspicion of low-grade infection is required in cases of recurrent GDD erosion.

Conclusion

To our knowledge, this is the first reported case of recurrent erosion of a GDD due to chronic infection with a biofilm-producing bacteria. In cases of recurrent erosion, infective causes,

particularly by biofilm-producing organisms, should be considered in the differential diagnosis. Surgical repair may have a low chance of success in occult and chronic infection and definitive GDD explantation may be required. With the current trend to earlier and more frequent GDD implantation in glaucoma, it is likely that this problem will increase in prevalence.

Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor of this journal.

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Figures

Fig. 1. A Baerveldt glaucoma drainage device in situ connected to the anterior chamber.

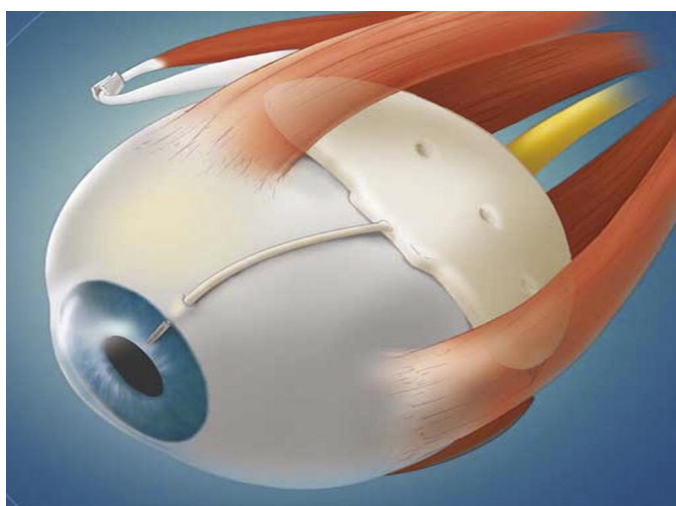
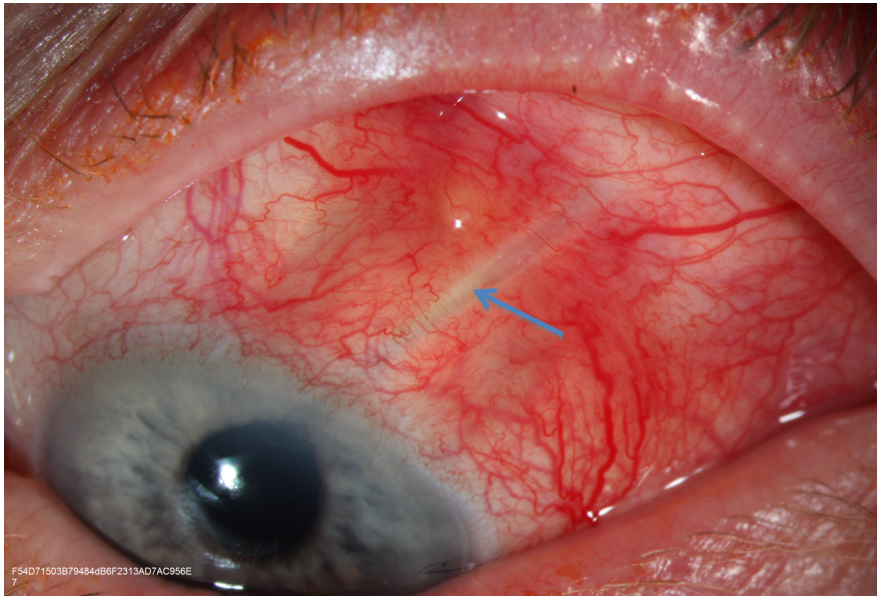


Fig. 2. The tube is eroding through the conjunctiva just to the centre of the tube with surrounding conjunctival injection.



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