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Case Report

A Case Report: Endophthalmitis after Implantation of XEN® Glaucoma Stent

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Abstract

Purpose: To report a case of endophthalmitis after XEN® 45 stent implantation for managing primary open angle glaucoma (POAG) intolerant to topical therapy.

Patient and Methods: A patient with POAG underwent bilateral, non-simultaneous XEN® stent implantation and developed an early-onset endophthalmitis secondary to Staphylococcus epidermidis in one eye.

Results: Four days after XEN® implantation in the second eye, the patient developed anterior chamber reaction in form of fibrin and hypopyon, which was handled initially with topical therapy, including fortified antibiotic eye drops. With worsening findings, on postoperative day 6, antibiotics were administered by means of intracameral lavage and subconjunctival injection. Subsequently, vitritis was diagnosed on postoperative day 9 and a pars plana vitrectomy with intravitreal administration of clindamycin and vancomycin was performed together with XEN® stent explantation, followed by an intensive topical treatment. Clinical improvement was achieved after 46 days. At the 12-month follow-up visit, the affected eye had a best-corrected visual acuity of 0.7 Snellen decimal value and the intraocular pressure (IOP) remained above target in both eyes and was again controlled with anti-glaucoma drops bilaterally.

Conclusions: The XEN® stent is an ab interno MIGS approach to subconjunctival outflow, and is not exempt from risk of severe complications including endophthalmitis.

Keywords: Endophthalmitis; Glaucoma; Implantation; XEN® stent explantation

1. Introduction

Micro-invasive glaucoma surgeries (MIGS) are creating new options for patients with mild to moderate glaucoma, often in combination with cataract surgery [1]. The XEN® 45 stent (Allergan Inc., Irvine, USA) is the first ab interno MIGS approach to subconjunctival outflow [2], in contrast to MIGS devices which primarily target Schlemm's canal and the suprachoroidal space [3]. The XEN® implant was designed to limit hypotony by virtue of its length and width, through the principle of the Hagen-Poiseuille equation, which allows us to calculate the resistance to flow through a cylindrical tube [4]. MIGS procedures have been shown to be effective in decreasing intraocular pressure (IOP) as well as a patient's need for glaucoma medications [1]. Although MIGS procedures have a higher safety profile and a more rapid recovery time than other shunt and trabeculectomy techniques, a risk of postoperative complications still exists, of which endophthalmitis remains one of the potentially most debilitating [1].

2. Case Report

R.L. is a pseudophakic 70-year-old Caucasian male who underwent bilateral, non-simultaneous XEN® stent implantation and developed an early-onset endophthalmitis secondary to *Staphylococcus epidermidis* in the second eye, with subsequent explantation of the stent.

2.1 Pre-operative

The patient had a diagnosis of primary open angle glaucoma (POAG) for 12 years, treated bilaterally with anti-glaucoma eye drops (Table 1), with no history of prior glaucoma procedures. He was intolerant to most of the topical medications and was admittedly incompliant, and therefore was advised to undergo MIGS with implantation of the XEN® stent. At first, right eye was operated in March 2015 and left eye on month later. The pre-operative findings included best-corrected visual acuity (BCVA) of 0.8 Snellen decimal value bilaterally, IOP 24 and 23 mmHg, and cup-disc ratio (CDR) of 0.6 and 0.7, for right and left eye respectively. The visual fields in both eyes included enlarged blind spot scotomas by Humphrey perimetry which showed a mean deviation (MD) of -2.96 dB and -2.39 dB, and pattern standard deviation (PSD) of 2.77 dB and 2.31 dB, for right and left eye respectively.

2.2 Implant

The XEN® 45 implant is derived from cross-linked collagen and made of non-degradable gelatin, either bovine or porcine; its lumen diameter is 45 microns and length is 6 mm. The soft micro implant provides minimal resistance to flow and is designed to rely on subconjunctival resistance alone. The stent is implanted through the scleral spur and tracked 3.0 mm posterior to the limbus exiting through the sclera to the subconjunctival space, where it creates a permanent patent channel for the flow of aqueous humor, which is regulated by the physics of the internal stent lumen. It is preloaded into a handheld, disposable injector with a 27-gauge needle [6].

2.3 Surgery

The surgery was performed under general anesthesia and included a subconjunctival injection of 1 ml of mitomycin C, 0.01%, which was not washed out, at the site of future XEN® implantation in the superior nasal quadrant. Using an ab interno approach, the preloaded injector is inserted through a 1.2 mm incision in the inferior temporal clear cornea. The injector is advanced through the anterior chamber, filled with highly cohesive viscoelastic device. The stent is implanted through the scleral spur and tracked 3.0 mm posterior to

the limbus exiting through the sclera to the subconjunctival space. The surgeries of both eyes were uneventful and were concluded by viscoelastic aspiration and an intracameral injection of 1 mg of cefuroxime. The patient dropped the standard protocol postoperatively (Table 2).

2.4 Post-operative course

On the first postoperative day, the BCVA was 0.8 and 0.7 Snellen decimal value, and the IOP was 10 and 11 mmHg, for right and left eye respectively. The bleb was well-formed, the stent appeared well-placed both under the conjunctiva and in the anterior chamber, and other findings were within the postoperative norm. The recovery of the right eye was uncomplicated. In contrast, the left eye presented with an early-onset endophthalmitis. On postoperative day 4, the patient presented with severe red left eye and light sensitivity. Upon examination, the BCVA was 0.7 Snellen decimal value, IOP was 10 mmHg, and slit-lamp findings included conjunctival injection, Tyndall reaction, and fibrin in the anterior chamber. The patient was given a more intensive topical therapy, including fortified vancomycin eye drops (Table 2). Two days later, the patient had signs of worsening of his condition in addition to pain. In spite that the BCVA was 0.6 Snellen decimal value and IOP was 10 mmHg, there was evidence of developing endophthalmitis via increasing amount of fibrin and a hypopyon in the anterior chamber. An aqueous tap biopsy from the anterior chamber was obtained and sent for microbiological assessment, followed by a lavage with cefuroxime and ceftazidime antibiotics and a subconjunctival gentamycin injection, in addition to the adjuvant topical therapy (Table 2).

On the 8th postoperative day, vitritis developed in addition to existing fibrin and hypopyon still visible in the anterior chamber; the BCVA was 0.5 Snellen decimal value and the IOP was 10 mmHg. The laboratory gram and fungal stains and cultures from the previous anterior chamber tap revealed a monomicrobial growth of Staphylococcus epidermidis. A decision was made to perform a pars plana vitrectomy together with XEN® stent explantation to save the eye. The next day, anterior chamber and vitreous-chamber tap biopsies were collected, followed by XEN® stent explantation through superior nasal quadrant conjunctival incision. A 25 G vitrectomy together with intravitreal antibiotic administration was carried out, where clindamycin and vancomycin antibiotics were injected into the BSS irrigation source. The subsequent microbiological laboratory results confirmed the previous responsible pathogen and the antibiotic sensitivity profile revealed an antibiotic treatment course in coherence with the results (Table 2).

On the 12th postoperative day, the BCVA was at its lowest of 0.05 Snellen decimal value with IOP 11 mmHg and

findings of conjunctival injection, corneal haze, Tyndall reaction in the anterior chamber, small infiltrate in the peripheral retinal, and no fibrin or hypopyon. Antibiotic therapy was given further (Table 2). At the 4th week visit, the IOP was 29 mmHg and after the patient declined bleb-needling as an attempt to reduce the IOP, topical anti-glaucoma therapy was started again (Table 1).

On the 46th postoperative day after the initial implantation of the XEN® stent, the antibiotic therapy was discontinued. The BCVA was 0.4 Snellen decimal value, the IOP under medications was 18 mmHg, there were no signs of inflammatory cells in all chambers, and the peripheral retinal infiltrate was no longer visible. At the 3-month visit, the BCVA was 0.8 and 0.4 Snellen decimal value, and the IOP was 23 and 14 mmHg, right and left eye respectively. Once again, the patient refused

bleb-needling of his only good eye as an IOP-reducing procedure, and was started on anti-glaucoma therapy on the right eye (Table 1). At the 12-month follow-up visit, the examination revealed proper localization of the XEN® stent in the right eye, an IOP of 20 mmHg bilaterally, and a BCVA of 0.9 and 0.7 Snellen decimal value, right and left eye respectively. The anti-glaucoma therapy was continued bilaterally (Table 1). No further deterioration of visual field was detected.

	Dates	**Right eye**	**Left eye**
Pre-operative	-	Lumigan® 0.3 mg/ml (Allergan USA) once daily Clonid Ophthal® 1/8% sine, (Winzer, Germany) twice daily	Lumigan® 0.3 mg/ml Clonid Ophthal® 1/8% sine
Post-operative	Week 1-4	No drops	Cosopt®(Merck, Germany) twice daily
	Month 2-3	Cosopt® twice daily	Cosopt® twice daily
	Month 3-9	Cosopt® twice daily	Cosopt® twice daily
	Month 9-12	Cosopt® twice daily Monoprost® (Théa, Germany) once daily	Cosopt® twice daily

Table 1: Anti-Glaucoma Therapy pre and postoperative.

Medications	**Active Ingredients & Dosage**	**Post-op. Day # Used**
Topical		
Isoptomax®, Alcon, USA	Dexamethasone 3500 I.U. + Neomycin 1mg/ml + Polymyxin B 6000 I.U.	1-10
Ketovision®, OmniVision, USA	Ketorolac trometamol 5 mg/ml	1-3
	Fortified Clindamycin, 50 mg/ml	8-18
	Fortified Vancomycin, 50 mg/ml	8-18
Vigamox®, Alcon, USA	Moxifloxacin 0,5%	4-46
Pred forte® 1%, Allergan, USA	Prednisolone 10 mg/ml	4-46
Intracameral Lavage		
Fortum®, Ratiopharm, Germany	Ceftazidime, 50 mg/ml	6
Kefurox®, GlaxoSmithKline, UK	Cefuroxime 1 mg/0.1 ml	6
Intravitreal		
Vancomycin HEXAL 0.5G Hexal AG, Holzkirchen Germany	Vancomycin 1 mg/0.1 ml (500 mg in BSS)	9
Clindamycin-ratiopharm® 600 mg/4 ml. Injection, Ulm Germany	Clindamycin 1 mg/0.1 ml (2 mg in BSS)	9

Subconjunctival		
Gentamycin Rationpharm GmbH Ulm Germany	Gentamycin 20 mg/ml	6
Fortecortin®, Merck Serono, Germany	Dexamethasone 4 mg	12

Table 2: Endophthalmitis Therapy.

3. Discussion

There has been a dramatic growth in development and clinical implementation of diverse MIGS devices as new therapy options for patients with mild to moderate glaucoma, who previously had limited surgical options, as they did not meet the criteria for trabeculectomy [1]. The XEN® 45 stent (Allergan Inc., Irvine, USA) is the first ab interno MIGS approach to subconjunctival outflow and to date, there are very few publications about it [2]. Although MIGS procedures are by definition less invasive, a risk of postoperative complications such as endophthalmitis still exists, and despite major advances in asepsis, surgical technique and antibiotic therapy, it remains a major concern for any ocular surgeon [5]. This case illustrates prompt diagnosis and adequate treatment of acute postoperative endophthalmitis after MIGS. We explanted the XEN® stent together with a 25 G vitrectomy, as it was the only remaining option to save this eye's vision after intensive topical and periocular therapy had failed. After all, the visual outcome is very satisfactory, in comparison to the much lower average cited in many studies assessing visual prognosis in patients with posterior acute bacterial endophthalmitis undergoing glaucoma surgery [5-8]. MIGS procedures are altering the glaucoma treatment paradigm and giving doctors and patients an opportunity to effectively manage glaucoma, while potentially reducing or eliminating the need for daily eye drops [1]. However, these results may not be attained with every patient, as seen in this case; the patient continued topical anti-glaucoma therapy in both eyes, even in the eye with the remaining XEN® stent.

In conclusion, MIGS procedures are not exempt from major postoperative complications.

Conflict of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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References

1. Richter GM, Coleman AL. Minimally invasive glaucoma surgery: current status and future prospects. Clinical Ophthalmology 10 (2016): 189-206.
2. Galal A, Bilgic A, Eltanamly R, et al. XEN Glaucoma Implant with Mitomycin C 1-Year Follow-Up: Result and Complications. Journal of Ophthalmology 2017 (2017): 5457246.
3. Gedde SJ, Herndon LW, Brandt JD, et al. Postoperative complications in the Tube Versus Trabeculectomy (TVT) study during five years of follow-up. Am J Ophthalmol 153 (2012): 804-814.
4. Sheybani A, Reitsamer H, Ahmed I. Fluid Dynamics of a Novel Micro-Fistula Implant for

the Surgical Treatment of Glaucoma. Invest. Ophthalmol Vis Sci 56 (2015): 4789-4795.

5. Vaziri K, Schwartz S, Kishor K, et al. Endophthalmitis: state of the art. Clin Ophthalmol 9 (2015): 95-108.
6. Brillat-Zaratzian E, Bron A, Aptel F, et al. FRIENDS Group: Clinical and microbiological characteristics of post-filtering surgery endophthalmitis. Graefes Arch Clin Exp Ophthalmol 252 (2014): 101-107.
7. Endophthalmitis Vitrectomy Study Group. Results of the endophthalmitis vitrectomy study: a randomized trial of immediate vitrectomy and of intravenous antibiotics for the treatment of postoperative bacterial endophthalmitis. Arch Ophthalmol 113 (1995): 1479-1496.
8. Al-Turki TA, Al-Shahwan S, Al-Mezaine HS, et al. Microbiology and visual outcome of bleb-associated endophthalmitis. Ocul Immunol Inflamm 18 (2010): 121-126.