

Tube Migration Associated with Hypotony After Xen Implantation and Its Management

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ABSTRACT

We report a case of primary open angle glaucoma uncontrolled with maximum medical therapy in left eye, which underwent XEN implant surgery. Intraocular pressure (IOP) was measured as 11 mmHg and 3mmHg on the first and third postoperative days, respectively. Examination of the operated eye on the third post operative day revealed decrease in visual acuity, hypotony maculopathy and migration of the collagen implant towards the anterior chamber. After the injection of viscoelastic into the anterior chamber, IOP had risen to 19 mmHg. XEN implant is a microinvasive surgical treatment of glaucoma, and tube migration with hypotony might be encountered as an early postoperative complication.

Key words: Xen implant, Hypotonia, Tube migration.

INTRODUCTION

Although medical therapy and laser are first line treatments of glaucoma, surgical interventions are mostly reserved for eyes with uncontrolled intraocular pressure (IOP) with progressive disc damage and impending visual loss^{1,2}. Trabeculectomy and drainage devices have been performed for years but they have risk of serious complications³. In recent years, less invasive procedures have been introduced to minimize complications. The XEN Gel Implant is one of them, which is inserted ab interno, from the anterior chamber (AC) into the subconjunctival space^{4,5}. The aim of this paper is to present a patient with primary open angle glaucoma (POAG) who underwent XEN implant surgery, and developed tube migration with hypotony maculopathy.

CASE REPORT

A 40 year old man, with POAG of 6 years duration, was referred to our clinic with uncontrolled IOP in OS despite maximal tolerated topical medical therapy. Best corrected visual acuities (BCVA) were finger counting at 3 meters OD, and 20/20 OS. IOPs measured by Goldman applanation tonometry were 13 mmHg OD, and 22 mmHg

OS. Iridocorneal angles were grade 4 open OU. Cup to disc ratios were 1.0 and 0.9 in OD and OS, respectively. Retinal nerve fiber layer analysis demonstrated the presence of subtotal nerve fiber loss bilaterally. XEN implant surgery together with subconjunctival Mitomycin C injection was performed in OS, without any complications.

Although the implant was in ideal position peroperatively, on the 1st day of the operation, it had moved into the anterior chamber, 3.5 mm in length (Figure 1A). Bleb around the shunt was clearly seen. IOP was measured as 11 mmHg. However, on the third postoperative day, the patient's BCVA was found to be 20/200 and IOP was measured as 3mmHg. Bleb was more diffuse, nearly 360 degrees subconjunctivally and AC was shallow (Figure 1B). Patient did not report any compression on the eyelid or rubbing. Dilated fundus examination revealed choroidal folds in the posterior pole. Optical coherence tomography (OCT) revealed hypotony maculopathy (Figure 2A-B). Subsequently, viscoelastic was injected into the AC. IOP was measured as 19 mmHg on the first postoperative day, topical brinzolamide treatment was initiated and hypotony maculopathy resolved (Figure 3A-C). BCVA was 20/20 on the following day. IOP was measured as 15 mmHg and

None of the authors has conflict of interest with the submission. No financial support was received for this submission

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Received: 03.12.2019

Accepted: 03.12.2019

Glo-Kat 2020; 15: 130-132

DOI: 10.37844/glauc.cat.2020.15.24

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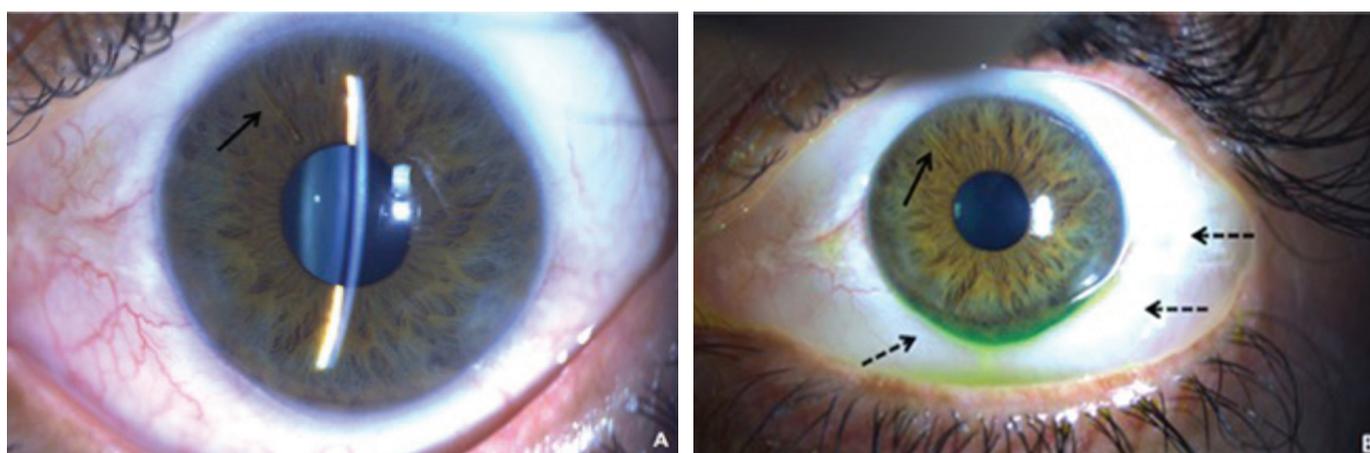


Figure 1: Anterior segment picture of the left eye, 1st day postoperatively; inner portion of the implant (**black arrow**); 3.5 mm in length (A) 3rd day postoperatively, almost 360 degrees bleb formation (**dashed arrows**) and inner portion of the implant (**black arrow**) (B).

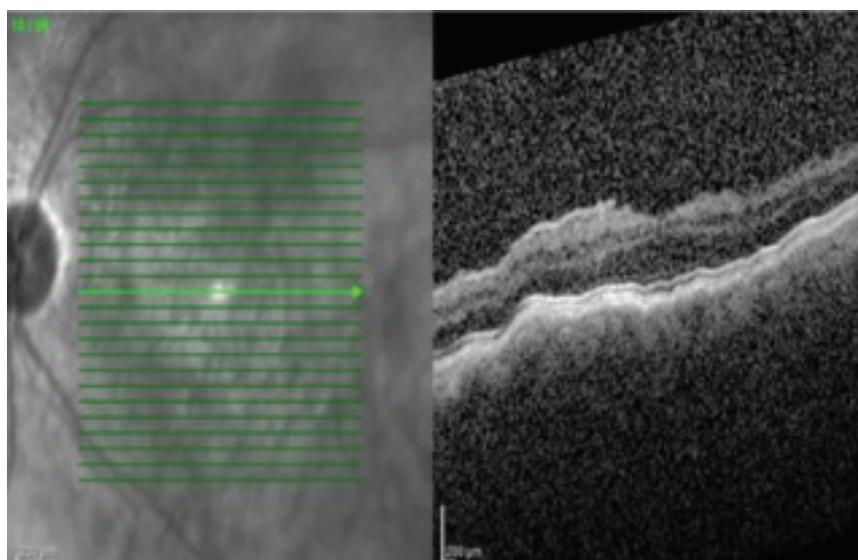


Figure 2: Optical coherence tomography (OCT) of the left eye, revealed hypotony maculopathy, demonstrating choroidal thickening, accompanied by irregularity of retinal outer layers.

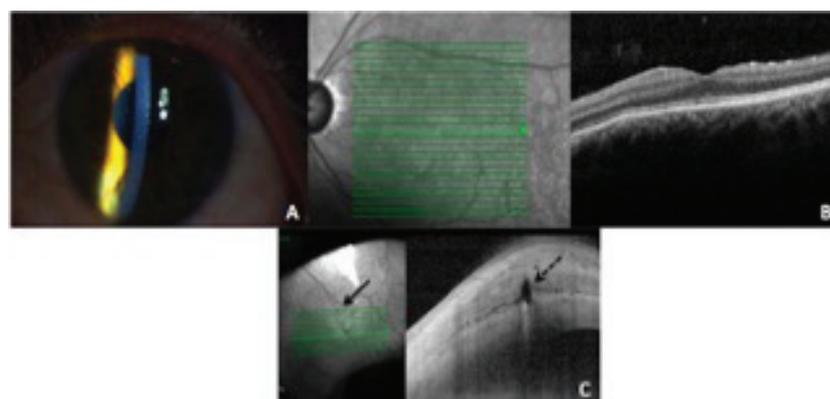


Figure 3A-C: Anterior chamber reformed (A), Hypotony maculopathy resolved (B), Anterior segment OCT; subconjunctival (**black arrow**) and scleral (**dashed arrow**) portion of the tube shown (C).

11 mmHg on 1st and 6th months respectively with topical brinzolamide two times daily.

DISCUSSION

Filtration surgery has been a gold standard for years for the surgical treatment of glaucoma. However, attempts to control aqueous outflow in a reproducible manner may still result in early postoperative hypotony⁵. XEN implant is free of any valve system, as opposed to Ahmed glaucoma implant; which is expected to give more dynamic pressure balance system, preventing early postoperative hypotony. In this case, early postoperative hypotony associated with tube migration was encountered although the optimum positioning was achieved according to 1-2-3 rule. This refers to the 1 mm of the implant in the anterior chamber, 2 mm of it in the scleral tunnel and 3 mm of it in the subconjunctival space, as recommended by the experts⁶.

Postoperative bleb formation was noted superonasally, AC was formed and IOP was 11 mmHg at first post operative day. However, tube was found to be displaced 2.5 mm farther into the anterior chamber, and clinical hypotony was encountered on third post operative day. Bleb was diffuse and nearly 360 degree in extent. Possible mechanism might be the mechanical compression of the eye, leading to migration of the tube and then hypotonia. Furthermore, the subconjunctival portion of the tube, maintaining the main resistance factor for flow control, was shortened. This might also lead to an abnormal uncontrolled outflow and shallow AC although our patient did not remember any compression or rubbing. Another possible mechanism for Xen migration proposed by Ali et al is, the increased frictional forces due to the altered tear film and poor ocular surface quality⁷. Increased friction in between the eyelid and the ocular surface might lead to augmented micro-trauma affecting the bleb. Numerical hypotony was reported by Karimi et al as a most common complication of XEN implantation that often resolves spontaneously (34.7%) while hypotony maculopathy was reported as a rare entity (1.9%)⁸. Atalay et al. mentioned subtotal displacement attributed to a maneuver applied to correct the bent portion of subconjunctival tube⁹. Derveniz et al. reported a case of a total displacement into the AC after an episode of episcleritis. Prior reports emphasize that implant position is not fixed therefore migration might occur even after successful placement¹⁰. However, they suggested that the inadequate IOP control was attributed to the dislocation,, resulting in ineffective drainage, which is not consistent with the current case. Gillmann et al, also reported dislocation into the AC, resulting in insufficient IOP control¹¹. Early postoperative overfiltration and large bleb formation might have facilitated the migration of the tube towards the anterior chamber, which might explain

why the tube migration occurred at an earlier postoperative period than declared in literature⁷. In the current case, the shortening of the subconjunctival portion of the tube might have lead to an abnormal uncontrolled outflow and shallow AC.

In summary, XEN implantation is a new modality of treatment and few reports are available on its potential complications. Tube migration associated with hypotony might occur as an early postoperative complication. Besides, improvements in the tube design to increase its stability and recommending patients to avoid rubbing after XEN placement could be main measures to avoid such complication.

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