

CASE REPORT

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Inferonasal XEN gel stent implantation in a refractory glaucoma patient with failed multiple glaucoma filtration surgeries: Case report**Abdurrahman Alpaslan Alkan¹, Eyup Duzgun¹, Ali Olgun¹, Ece Ozdemir Zeydanli¹, Murat Karapapak²**¹Sisli Hamidiye Etfal Education and Research Hospital, Department of Ophthalmology, Istanbul, Turkey²Polatli Duatpe State Hospital, Clinic of Ophthalmology, Istanbul, Turkey

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Abstract

A 59-year-old male with a history of diabetes mellitus and bilateral primary open angle glaucoma was referred to our clinic due to uncontrolled intraocular pressure (IOP) in the right eye. On examination, the visual acuity was 20/20 in both eyes and IOP was measured 22 mmHg in his right eye and 14 mmHg in his left eye despite maximal medical treatment. The patient had undergone two trabeculectomy and an EX-Press shunt surgery in the right eye previously. XEN gel stent (Allergan, Dublin, CA) implanted in the inferonasal quadrant due to the scarring in superior and nasal conjunctiva as a result of failed surgeries. The patient was followed up for 18 months with an IOP under 10 mmHg without any medication or a second intervention. XEN stent implantation may be considered as an effective option where other surgical techniques failed, and the conjunctiva is unsuitable in the superior quadrant.

Keywords: Refractory glaucoma, XEN gel stent, inferonasal quadrant**Introduction**

Trabeculectomy is the gold standard treatment for the control of intraocular pressure (IOP) in patients with open-angle glaucoma (OAG) which can not be controlled by medical treatment [1]. However, in recent years, studies have been carried out to prevent complications related to trabeculectomy and to find less traumatic surgical options. As a result, various minimally invasive glaucoma surgery (MIGS) techniques have started to be used in mild to moderate glaucoma patients with poor medication compliance [2]. One of these surgical techniques is the implantation of the XEN gel stent (Allergan, Dublin, CA). The XEN stent is a hydrophilic tube, which is produced by using porcine collagen-derived gelatin cross-linked with glutaraldehyde. One of the most important advantages of this technique is that it is less traumatic than other surgical techniques since it does not require a conjunctival or scleral incision [3]. With increased clinical experience and encouraging results with XEN stent, it has started to be used to after unsuccessful trabeculectomy or Ahmed Glaucoma Valve (AGV) implantation surgeries in which the superonasal conjunctiva has been preserved. [4-6]. Here, we present a case of refractory glaucoma patient who

underwent XEN stent implantation in the inferonasal quadrant due to conjunctival scarring in the superior quadrant following multiple failed glaucoma surgeries.

Case Report

A 59-year-old male was referred to our glaucoma clinic for uncontrolled IOP in the right eye despite medical and surgical treatments. His past medical history was notable for type II Diabetes Mellitus. Past ocular history revealed that he had a diagnosis of primary OAG and a mini-Ex-Press Glaucoma Filtration Device (Alcon lab., Fort Worth, TX) implanted four years ago due to IOP over 30 mmHg that couldn't be controlled with maximal medical therapy. Two years later, combined trabeculectomy with phacoemulsification was performed for progressive field loss along with cataract development. Despite the surgery, adequate IOP reduction could not be achieved and a second trabeculectomy was performed six months later. After the last operation, the patient was referred to our glaucoma clinic for refractory glaucoma. On admission, the best-corrected visual acuity (BCVA) was 20/20 in both eyes. Intraocular pressure was 22mmHg in the right eye and 14mmHg in the left eye (Goldmann applanation tonometer). Biomicroscopic examination revealed iridectomies secondary to trabeculectomy surgeries at superonasal and superotemporal quadrants, flat blebs at both sides and a posterior chamber intraocular lens (IOL) in his right eye and anterior segment evaluation of the

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left eye was unremarkable. In the fundus examination, cup to disc ratio was 0.8 in the right eye and 0.3 in the left eye; no additional retinal pathology was observed. After the patient's consent was obtained, XEN stent implantation was performed under local anesthesia. After skin disinfection, proper field dressing, and speculum insertion, the target sector was marked with a sterile pen in the inferonasal quadrant, 3 mm from the limbus. The surgeon aimed to insert the XEN stent as inferiorly as possible, as far as the speculum or eyebrow technically allowed. Mitomycin C (0.1 mL, 0.01%) (MMC) was injected under the conjunctiva 6 mm away from the limbus and massaged toward the anticipated insertion site. Two corneal incisions were made with a 19 Gauge (G) MVR knife in the inferotemporal and superotemporal quadrants. A 27 Gauge needle of the pre-loaded injector was guided into the inferonasal angle region by entering through the superotemporal incision, and XEN stent was placed under the conjunctiva through the scleral tunnel. After the uncomplicated implantation surgery, IOP was 9 mmHg on the first postoperative day. The stent was appropriately located at 4-5 o'clock position in the subconjunctival space. On the 1st week, gonioscopic examination revealed that the stent ostium was open with a diffuse bleb formation, and IOP was measured as 7mmHg. (Figure 1) The patient was treated with topical moxifloxacin (0.5%) and prednisolone acetate (1%) eye drops 4 times a day for one month. In the examination on day 30, there was no change of BCVA of the right eye and IOP was measured as 8 mmHg. After the first month, the patient was followed up without any medical treatment. There was no change in visual acuity and IOP values ranged between 8-10 mmHg during the 18-month follow-up period. Diffuse bleb formation in the inferonasal quadrant was maintained throughout the follow-up and visual field and retinal nerve fiber layer measurements remained stable. We planned to follow up 6-month intervals without medical treatment.

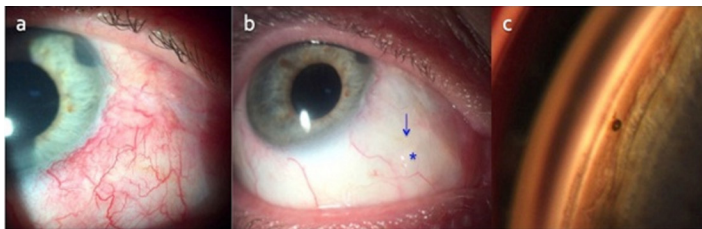


Figure 1. a) View of the bleb with dilated conjunctival veins in the postoperative early period; b) XEN stent is visible subconjunctivally (arrow) in the inferonasal quadrant and view of posteriorly located diffuse bleb formation (*) at 12th month. c) The internal ostium of the XEN stent is visible in the angle on gonioscopy

Discussion

Traditionally, a re-trabeculectomy or a shunt surgery with various tubes is generally preferred following failed trabeculectomy. However, the success rate for the second surgery is lower than that of the primary trabeculectomy regardless of the surgical techniques [7]. In addition, every surgical procedure increases the risk of complications. Therefore, MIGS procedures have begun to be preferred in refractory glaucoma cases. Since it is a new surgical technique, there are few studies in the literature showing the success of XEN stent implantation surgery in refractory glaucoma cases. Karimi et al. [4] reported that XEN stent implantation surgery following failed trabeculectomy efficiently reduced IOP as well as the need for medical treatment. Besides, the authors reported adequate IOP reduction and successful results with XEN

stent implantation in patients who had multiple failed filtration surgeries or other surgical options were unsuitable [5,8].

The superonasal region is the suggested quadrant for XEN implantation [6]. However, a new bleb that is created adjacent to a superiorly located, failed bleb after a glaucoma filtering surgery can affect the bleb function and increase the risk of complications. This may also indicate the need for a second intervention or increase the probability of failure. The application of a second anti-metabolite for a XEN stent may further increase conjunctival damage. Consequently, the conjunctival support of the stent will be weakened and the extrusion of the stent will be unavoidable. Authors described stent exposure in patients who underwent XEN implantation in the nasal quadrant close to a scarred bleb after a prior failed glaucoma procedure [9,10]. XEN stent extrusion poses a great risk for late-onset leakage or endophthalmitis. In addition, placing the stent more nasally, further away from the scar tissue may cause a hypertrophic bleb formation or bleb dysaesthesia after XEN surgery or as previously documented after trabeculectomy [11-13]. It is emphasized that the XEN stent should be implanted as superiorly as possible to minimize mentioned risks [11]. Therefore, we routinely use superior quadrant in patients if superior conjunctiva is preserved for surgery. However, in the current case, superior conjunctiva was not suitable for surgery due to extensive scarring; therefore, inferior quadrant was utilized for implantation. Besides, the XEN stent may be a good choice to avoid corneal problems caused by increased endothelial loss due to repeated surgeries. Another reason to prefer XEN stent implantation is that it does not limit AGV surgery or a re-trabeculectomy even if it fails.

With the increased use of XEN stent, a small number of transient or sight-threatening postoperative complications were also reported [2,4,6]. Unfortunately, bleb-related infections after XEN surgery have been reported in the upper quadrant blebs in a few cases [14,15]. In this case, due to the inferior localization of the bleb and the use of MMC, the bleb-related infections were our main concerns. Many investigators reported that inferiorly located blebs had a high risk of bleb-related infections [16,17]. However, all reports indicate that the risk of endophthalmitis in the inferior filtering blebs is associated with trabeculectomy surgery. Moreover, an anterior segment optical coherence tomography study showed that the bleb morphology after XEN stent is different from the blebs after trabeculectomy [18]. This difference may be due to changes in wound healing as a result of not forming conjunctival and scleral dissection. Additionally, blebs after XEN stent implantation occur further away from the limbus compared to that of trabeculectomy. In this way, the bleb is covered by the lower eyelid, and the risk of infection is reduced. In addition, lower eyelid malposition due to high filtering bleb may also occur, but not in this case.

To the best of our knowledge, this is the first report of XEN stent implantation to the inferonasal quadrant. The patient was followed up for 18 months, and IOP was controlled without any need for medical treatment, needling or a second surgery. XEN stent implantation in the inferonasal quadrant may be considered as an effective option where other surgical techniques failed, and the conjunctiva is unsuitable for surgery in the superior quadrant. Prospective studies with larger patient groups would be required

to assess the outcomes of this method in patients with a history of failed glaucoma surgeries.

Competing interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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