CASE REPORT

A Novel Technique for Repositioning of a Migrated ILUVIEN® (Fluocinolone Acetonide) Implant into the Anterior Chamber

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ABSTRACT

Introduction: Fluocinolone acetonide (FAC) intravitreal implant (ILUVIEN®; Alimera Sciences Limited, Aldershot, UK) has been approved in the UK for the treatment of chronic diabetic macula edema, insufficiently responsive to available therapies. It is inserted into the vitreous cavity through a 25-gauge needle. Migration of the implant to the anterior chamber (AC) can occur through gaps in the posterior capsule especially in vitrectomized eyes. Early removal of AC-dislocated FAC implant is essential to prevent corneal edema and damage from raised intraocular pressure.

Aim: To demonstrate a simple and novel technique, with a previous capsular tear, for removal of AC-migrated FAC implant and reinsertion into the vitreous cavity without compromising implant integrity.

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Method: A side port incision was created with a keratome and an anterior chamber maintainer introduced and secured. Subsequently, a corneal incision was created at 12 o'clock through which a 23-gauge backflush needle (flute needle) was advanced into the anterior chamber and passive suction used to secure the implant. The flute needle was then placed through the defect in the posterior capsule and the exit port blocked, causing loss of suction and allowing the implant to fall into the posterior segment. The sulcus intraocular lens (IOL) was centralized simply by manipulating it approximately 180 degrees to provide adequate anterior capsule support.

Results: The FAC implant was successfully removed from AC in two patients and reinserted into the vitreous cavity without damage or complications either for the eye or the implant. IOL in both patients were repositioned to close the gap in posterior capsule. After 2 months, the implant remains in the vitreous cavity. This paper presents data from one of these cases.

Conclusion: Using 23-gauge flute needle to retrieve dislocated FAC implant is a safe and easy technique.

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Keywords: Chronic diabetic macular edema; Fluocinolone acetonide; ILUVIEN; Intravitreal implant; Steroid implant migration

INTRODUCTION

A 74-year-old male with a 24-year history of Type 2 diabetes developed chronic diabetic macula edema in his right eye. Previous therapies included macular grid laser and intravitreal avastin for diabetic macula edema. He had phacoemulsification complicated by posterior capsule rupture and loss of a nucleus fragment into the posterior segment. He subsequently underwent 23-gauge pars plana vitrectomy and removal of lens fragment, followed by sulcus placement of an intraocular lens.

At his 1-month post-operative visit, the right visual acuity was 6/60 and intraocular pressure was 22 mmHg. Slit lamp examination revealed a slightly inferiorly displaced intraocular lens and on optical coherence tomography (OCT); his central macula thickness was 619 μm . He underwent monthly intravitreal Lucentis injections over 4 months, but his macula edema persisted, with no improvement in visual acuity. At this time, the decision was made to proceed with insertion of the fluocinolone acetonide intravitreal (FAC) implant (ILUVIEN®; Alimera Sciences Limited, Aldershot, UK), which was performed without complication as an outpatient procedure.

He was reviewed in the clinic 13 days later and the right visual acuity was 6/36 and central macular thickness was 517 μm . However, slit lamp examination revealed the FAC implant lying horizontally in the inferior angle of the anterior chamber (Fig. 1). Intraocular pressure

Fig. 1 Migrated ILUVIEN implant in the inferior angle of anterior chamber

was 30 mmHg and there was no associated corneal edema.

METHOD USED TO REPOSITION THE MIGRATED IMPLANT

Five days later, the patient was taken to the operating room. (Please see the video for case 1 in the supplementary material.) A side port incision was created with a keratome and an anterior chamber maintainer introduced and secured (Fig. 2). Subsequently, a corneal incision was created at 12 o'clock through which a backflush needle (flute needle) was advanced into the anterior chamber and passive suction used to secure the intact implant (Fig. 3). The flute needle was then placed through the defect in the posterior capsule and the exit port blocked, causing loss of suction and allowing the implant to fall into the posterior segment. The sulcus intraocular lens (IOL) was centralized simply by rotating it approximately 180 degrees to provide adequate anterior capsule support (Fig. 4). Three weeks post-operatively, the patient's visual acuity was 6/60, the IOL is centrally placed, intraocular pressure (IOP) is 17 mmHg, the cornea remains clear and the FAC implant remains in the

Fig. 2 Anterior chamber maintainer in the anterior chamber, superior gap in posterior capsule and inferior displacement of the intraocular lens

Fig. 3 ILUVIEN implant inside the tip of flute needle and redirected to vitreous cavity through the gap in posterior capsule

Fig. 4 Centralized intraocular lens after repositioning and covering posterior capsule

posterior segment. This outcome remained stable after 1 year of follow-up.

Informed consent was obtained from the patient for being included in this study.

DISCUSSION

FAC implant is a non-biodegradable cylindrical tube (measuring 3.5×0.37 mm) of polyimide loaded with 190 micrograms of FAC that is inserted into the vitreous cavity through a 25-gauge needle in an outpatient setting [1]. The FAC implant has been approved by the United Kingdom National Institute for Health and Care Excellence (NICE technology appraisal TA301) for people with chronic diabetic macular edema (DMO) who have an artificial lens in their eye if: the implant is used in the eye with the artificial lens; and, their DMO has not responded sufficiently to other treatments [2].

To our knowledge, this is the first reported case of anterior chamber migration of the FAC implant. Multiple cases of anterior migration of the intravitreal dexamethasone implant (Ozurdex®; Allergan Pharmaceuticals Ireland, Westport, Ireland) have been reported in the literature [3–5]. The importance of prompt removal of the anteriorly migrated dexamethasone implants was emphasized by Khurana et al. [6] in their recently published series of 18 episodes (15 patients) with anterior migration of the dexamethasone implant. In their series, 89% of cases developed corneal edema, with keratoplasty recommended in 43% for non-resolving corneal edema after removal of the dexamethasone implant. They also identified previous vitrectomy and an absent or compromised posterior capsule (factors which are present in our case) as risk factors for anterior migration. Khurana et al. also described unsuccessful attempts to grasp the implant with tying forceps and intraocular forceps in some cases, resulting in disintegration of the implant into smaller pieces.

In our report, we describe a novel technique for surgical removal and repositioning. The

flute needle devised by Dr. Steve Charles (Memphis, USA) is an invaluable tool used for various posterior segment procedures. This includes simultaneous exchange of intraocular fluid for air, a gas/air mixture or silicone oil, internal drainage of subretinal fluid through a hole in the retina and manipulation of a giant retinal tear. It consists simply of a blunt-ended needle (available in various gauge sizes) connected by a Luer fitting or Luer lock to a handle.

Within the handle, an internal channel connects the Luer terminal to an exit port in a depression on the side of the handle. When the needle is introduced into the vitreous cavity via a pars plana sclerotomy, closure of the exit port by the surgeon's finger prevents flow of fluid or gas from the eye. Removal of the finger allows egress of fluid along the needle and through the exit hole, provided an infusion of gas or fluid maintains the intraocular pressure above atmospheric pressure. Using the same principles, the flute needle can be used in the anterior chamber, in our case as a suction/aspiration device to grasp and reposition the FAc implant.

We used a 23-gauge backflush/flute needle, which allowed easy grasp of the FAc implant. For a dexamethasone implant, a 20-gauge needle would be appropriate. This technique is quick, requires minimal manipulation or tissue disturbance and allows for easy repositioning of the implant, if desired. The non-biodegradable nature of the FAc implant allowed manipulation and repositioning without the implant breaking into pieces.

While corneal decompensation has been described in association with anterior migration of the dexamethasone implant and Retisert® insert (containing 0.59 milligrams of FAc [7]; Bausch & Lomb, Rochester, NY, USA), this did not occur in our patient. We postulate

that this is as a result of prompt repositioning of the implant, the smaller size of the FAc implant compared to the dexamethasone implant (which is 0.46 mm in diameter and 6 mm in length [8]) or a combination of both factors. However, there are reports of the drug-eluting portion of the Retisert insert (which is 1.5 mm) dislocating into the anterior chamber and causing corneal edema [9]. As non-resolving corneal edema is a potential risk [10], prompt removal is advocated in these cases.

Of note, there was resolution of intraocular pressure back to normal limits after removal of the implant. Reports suggest that placement of steroid implants closer to the trabecular meshwork or ciliary body results in a higher incidence of raised intraocular pressure [7].

CONCLUSION

In conclusion, we describe a case of a FAc implant dislocation and a novel technique for ease of removal from the anterior chamber of the eye. Early removal is essential to prevent corneal edema and damage from raised intraocular pressure. Caution should be employed when deciding to inject the FAc implant in the eye with posterior capsule defects and when anterior migration occurs, we recommend repositioning into the vitreous cavity with a backflush/flute needle as a straightforward technique.

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Conflict of interest. I. A. El-Ghrably, A. Saad and C. Dinah have nothing to disclose.

Compliance with ethics guidelines. Informed consent was obtained from the patient for being included in this study.

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