

Acquired iris inclusion cysts

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Dear Sir/Madam,

The development of epithelial implantation cysts of the iris is rare and they pose a major therapeutic challenge due to the poor overall surgical outcome and high risk of recurrence. Several conservative and invasive treatment strategies such as needle aspiration, viscodissection, endolaser photocoagulation, endodiathermy, cryotherapy, local excision or en bloc resection of the cyst and associated tissue have been reported ^[1,2]. These definitive management options are major surgical interventions and they result in severe structural anterior segment deformity and frequently lead to poor post-operative visual prognosis.

In contrast, the irrigation with 100% ethanol and subsequent excision of the epithelial implantation cysts results in less tissue disruption and this technique is rarely practiced. In the following two interventional case reports and literature review we emphasise the safety and efficacy of this technique in combination with further anterior segment surgery which has shown to improve the quality of vision in these patients.

The success of the surgical treatment exclusively depends on the correct surgical technique of this procedure. After a detailed explanation of risks and benefits, an informed consent should be obtained from the patient for the treatment. The patient is anaesthetised with general or peribulbar anesthesia. The patient is prepped and draped in the sterile ophthalmic fashion. A Clarke's lid speculum is placed. If the corneal oedema obscures the visualisation of the anterior segment the corneal epithelium is removed carefully using a scalpel blade or with 15% alcohol. A 2.8 mm main corneal incision is made with a keratome. A "side port" paracentesis incision is made and the anterior chamber is filled with a dispersive viscoelastics to protect corneal endothelium during

the surgery. Then the cyst is carefully entered with a 27G needle on an empty insulin syringe *via* the main corneal incision. The contents of the cysts are very slowly aspirated until the cyst is completely empty. Then the assistant removes the syringe from the needle and measures the volume of fluid aspirated from the cyst. Then the assistant connects an insulin syringe which contains the exact same volume of 100% Ethanol to the needle held by the main surgeon. The inclusion cyst is injected with this equal volume of 100% ethanol *via* the same needle to kill the epithelial tissue by the main surgeon. After 3min the Ethanol is aspirated and the 27G needle is removed from the cyst. Immediately the anterior chamber is thoroughly irrigated with balanced salt solution. A two week course of 0.1% dexamethazone eye drops, chloramphenicol eye drops and 1% cyclopentolate eye drops are given postoperatively. The patient is closely followed up over a period of 3-6mo to assess for recurrence of the cyst and to exclude corneal endothelial decompensation. The second stage of the surgical treatment depends on the presence or absence of corneal endothelial decompensation and a cataract. The next stage of the surgery involves en bloc excision of the iris inclusion cyst. A cataract extraction with intraocular lens implant and a penetrating keratoplasty may be needed in selected cases. Post-operative topical steroids, antibiotics and mydriatics are prescribed.

A 78-year-old retired ophthalmologist with a longstanding history of iris implantation cyst formed as a result of previous penetrating eye injury at age 7 was referred to our Corneal and External Eye Disease service. His primary complaint was ocular discomfort and his visual acuity had been poor since the initial ocular trauma. The visual acuity in the affected eye was "perception of light". On examination, he had corneal endothelial decompensation, bullous keratopathy and a large iris inclusion cyst obstructing his visual axis. The reduced vision was thought to be due to a combination of corneal oedema, corneal scarring from the initial penetrating trauma, cataract and obstruction of visual axis by the iris inclusion cyst. There was an area of irido-corneal adhesion inferiorly resulting in correctopia. The B-scan ultrasound examination showed no abnormality in the posterior segment of the eye. The visual acuity of the other eye was 20/20 and the field of vision was full. After a detailed discussion of risks and benefits the iris implantation cyst was collapsed by aspiration of its contents with a 27G needle and injected with an equal volume of 100% ethanol *via* the same needle to kill the

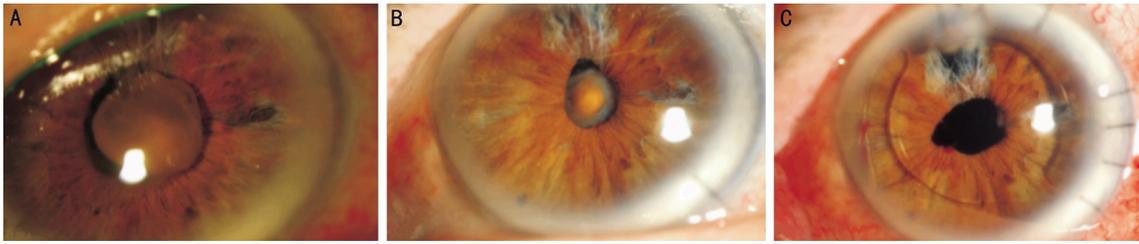


Figure 1 Pre- and post-operative photographs of second case A: Anterior chamber inclusion cyst of the second patient covering the entire pupil (before surgery); B: Appearance of the contracted inactive inclusion cyst at the pupil one month after irrigation with 100% ethanol; C: Appearance of the anterior segment after complete excision of the ethanol treated iris implantation cyst and secondary intraocular lens implant.

epithelial tissue of the cyst. A two week course of 0.1% dexamethazone eye drops, chloramphenicol eye drops and 1% cyclopentolate eye drops were given postoperatively. The patient was carefully followed up for a period of 6mo to assess for recurrence of the cyst. The second stage of the surgical treatment involved cataract extraction with intraocular lens implant and a penetrating keratoplasty. The pupil was reformed with a purse-string suture. Light microscopy and electron microscopy of the corneal button showed corneal epithelial amyloid deposits, oedema, reduplication of corneal epithelium and subepithelial fibrosis. The stroma was intact with no vascularisation or intrastromal amyloid. The Descemet's membrane was thickened and laminated and the endothelial cells were reduced in number. At the 18mo follow-up, the best-corrected visual acuity in the affected eye was logMAR 0.18. He has been followed-up for over seven years up to now and he has had no post operative complications to date.

An 82-year-old female with an anterior chamber inclusion cyst (Figure 1A) was referred to our cornea and external eye disease department for further management. This iris inclusion cyst had formed after a brunescant cataract extraction procedure. The cataract surgery had been done 3mo previously and had been unfortunately complicated by an expulsive haemorrhage. She had been left aphakic and the visual acuity had dropped to only "perception of light" in the affected eye. She also had a longstanding macular pigment epithelial detachment in the same eye. Prior to the formation of visually significant cataract the best corrected visual acuity in this eye was LogMar 1.0 according to her previous ophthalmic medical records. The fellow eye was blind with rubeotic glaucoma presumed to be due to an ischaemic central retinal vein occlusion. After a detailed discussion explaining risks and benefits the contents of the inclusion cyst was aspirated and irrigated with 100% ethanol similar to our previous case. After one month the inclusion cyst appeared to be inactive and contracted (Figure 1B). This was subsequently excised and an anterior chamber intraocular lens was implanted (Figure 1C). The post operative care was similar to our previous case. Her visual acuity improved to

LogMar 1.0 post-operatively and was maintained until her last follow-up at 2y post-operation with no complications.

The cystic epithelial down growth and iris implantation cyst formation is a recognized complication following penetrating eye injury. Rarely, it can also be seen after anterior segment surgery. It is characterized by the diffuse or cystic proliferation of surface epithelium within the anterior chamber of the eye. Although some epithelial cysts can be managed conservatively, in most cases more definitive results are achieved with en bloc excision. In most patients the iris inclusion cyst occupies most of the anterior chamber space at the initial presentation and definitive results may not be possible without major surgical interventions which can result in severe structural damage to the anterior segment of the eye resulting in poor visual prognosis. Haller *et al*^[1, 2] reported their results of 7 cases of anterior chamber cysts managed surgically. Three cases were treated with aspiration alone. One keratin "pearl" cyst was treated with local excision with endolaser photocoagulation of the collapsed cyst wall and base. The other 3 cases were treated with vitrectomy, en bloc resection of the cyst and associated tissue, fluid-air exchange and cryotherapy. Al-Ghadeer *et al*^[3] reported the technique and the outcome of viscoelastic dissection of a traumatic iris cyst.

The sclerotherapeutic properties of ethanol are well known and it is used in several medical and surgical specialities as a very effective sclerosant^[4-6]. Absolute ethanol kills the cyst endothelium and more importantly induces fibrosis and contracture of the abnormal cystic tissue. This facilitates the excision of relatively small amounts of anterior segment tissue during cyst excision. Although rarely practiced, absolute alcohol has been successfully used in the management of anterior chamber epithelial implantation cysts. In a retrospective non-comparative interventional case series Behrouzi *et al*^[7] reported 93% success rate after irrigation with 100% ethanol. In this case series, iris cysts showed complete resolution, 3% after the second irrigation and 2% after the third irrigation. In spite of the above report, this technique is not very popular due to potential adverse effects of 100% ethanol on the corneal endothelium and

crystalline lens. In our first case, the presence of bullous keratopathy and a cortical cataract warranted lens extraction and keratoplasty during the excision of the alcohol treated inclusion cyst and justified the injection of 100% ethanol into the inclusion cyst in the first instance. The bullous keratopathy impairs the visibility of the anterior chamber and the corneal epithelium can be removed in such cases to improve the visibility. This can be achieved either by Paton spatula/scalpel blade which could leave small nicks in Bowman's layer or by alcohol debridement which leaves Bowman's layer intact. Our second case was more challenging and we had to select the most effective and least invasive procedure with the best prospects for rapid visual rehabilitation for her only seeing eye. Having successfully treated our first patient with 100% ethanol it was decided that this was the best option in this case. Her visual acuity improved to her previous documented visual acuity prior to development of her cataract.

These two case reports and the case series of Behrouzi *et al*^[7] highlight that the use of 100% ethanol is safe and effective and when combined with surgery it offers a good post-operative visual improvement and a low recurrence rate in the management of epithelial inclusion cysts in the eye.

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