CASE REPORT

Iris retractors: the saviours in cataract surgery for cataract in lens coloboma

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SUMMARY

A 67-year-old woman presented with features of bilateral cataract and lens coloboma. The lens coloboma was from 1 to 8 o'clock and from 5 to 9 o'clock positions in right and left eye, respectively. With some modifications, phacoemulsification was performed in both eyes at an interval of 1 month. A smaller (4.5 mm) anterior capsulorhexis was made due to poor peripheral lenticular support. Three iris retractors were used to stabilise anterior capsulorhexis margin to the limbus. Phacoemulsification was performed by direct chop technique under low phacodynamics. A capsular tension ring was placed in a bag followed by tangential cortical clean up and implantation of a foldable intraocular lens (IOL). One month following surgery, both eyes had a visual acuity of 20/20 with a stable IOL. This case report highlights the rarest malformation of the lens with cataract and its successful management by phacoemulsification using iris retractors as capsule supporting device.

BACKGROUND

Lens coloboma, a rare congenital lens anomaly, is featured by a localised flattening or indentation at the lens equator.^{1 2} The exact pathogenesis of this condition is unknown, however a localised zonular absence^{1 2} has been implicated in its causation. As described by Kim *et al*³ phacoemulsification in eyes with congenital lens coloboma is challenging as there is a high risk of extension of the zonular dialysis with subsequent herniation of the vitreous into the anterior chamber and decentration of the IOL. To overcome intraoperative extension of zonular dialysis, the usage of iris retractors and capsular tension ring (CTR) as capsule stabilising devices have been variably described in the literature.^{4–10} However, a MEDLINE search did not reveal the role of iris retractors for capsule stabilisation in lens coloboma. Herein, we report a rare case of bilateral lens coloboma with cataracts managed successfully using iris retractors as capsule stabilising devices during phacoemulsification.

CASE PRESENTATION

This 67-year-old woman reported to us with painless progressive diminution of vision in both eyes. Initial ocular examination revealed best corrected visual acuity as 20/200 with −3.00 dioptres (D) in both eyes. Intraocular pressure as recorded by applanation tonometer was 12 mm Hg in both eyes. Slit lamp examination of right eye under mydriasis showed grade 3 nuclear sclerosis (lens opacity classification system II) and lens coloboma

with the absence of zonules from 1 to 8 o'clock positions (figure 1A). A left eye examination showed a similar grade cataract with lens coloboma with the absence of zonules from 5 to 9 o'clock positions (figure 1B). Bilateral fundus examination revealed no abnormality. Axial lengths on A-scan biometry were 23.50 and 23.25 mm in the right and left eye, respectively.

TREATMENT

Under peribulbar anaesthesia, phacoemulsification was first performed in the right eye. The anterior chamber was entered at the 10 and 2 o'clock positions and filled with 1% sodium hyaluronate (Healon). A relatively small, that is, 4.5 mm anterior capsulorhexis (figure 2) was made with the help of cystotome (bent 26 gauge needle) and microincision capsulorhexis forceps (Indo German, India). Three iris retractors (Indo Gem, IG-1809) were then used at the lenticular colobomatous site to stretch and stabilise the capsulorhexis edge to the limbus (figure 3). Through the main triplanar incision, a gentle hydrodissection was performed at multiple sites. Phacoemulsification (Stellaris, Bausch & Lomb, USA) was performed in the bag using horizontal direct chop technique. Subsequently, in order to prevent inadvertent intraocular lens (IOL) decentration at the lenticular colobomatous site, a CTR (12/10-mm diameter ring (Morcher type 14)) was introduced through the side port incision using a Sinskey hook. Following CTR implantation, tangential cortical clean up was carried out followed by implantation of hydrophilic foldable IOL (U.S. IOL, Inc, Lexington, Kentucky, USA).

OUTCOME AND FOLLOW-UP

The postoperative period was uneventful. One month following surgery, her visual acuity was 20/20 in the right eye with a stable IOL (figure 4A). A similar procedure was then performed in the left eye with the help of iris retractors (to stretch and stabilise the capsulorhexis edge to the limbus) and a CTR. As was the case with the right eye, she achieved a visual acuity of 20/20 in the left eye with a stable IOL (figure 4B). In spite of a slight decentration of the IOL, which can only be noticed after dilating the pupils, there was no pseudophacodonesis. The reason for the slight decentration is the shortening of the lens capsule in lens coloboma. The last review of the patient was at 3 months after the left eye was operated upon. At this stage, the IOLs in both eyes were stable without any pseudophacodonesis.

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Figure 1 Preoperative photographs showing bilateral lens coloboma and cataract in the right (A) and left eye (B).

DISCUSSION

Phacoemulsification in a patient with lens coloboma is full of challenges. The challenge begins with the construction of the capsulorrhexis. A smaller capsulorrhexis is preferred because of poor support of intralenticular material towards the periphery of the lens. The challenge continues with phacoemulsification as raised intracameral pressure with the introduction of the phacoemulsification probe is likely to exert stress on to the existing zonules, leading to extension of the dialysis with subsequent consequences. The later challenge prompted us to use iris retractors as artificial zonules, to exert a centrifugal force following hooking of the anterior capsulorrhexis margin in the segment of zonular deficiency. This brought intraoperative stabilisation of the capsular bag for safer emulsification of the nucleus and IOL implantation.

The usage of iris retractors for capsule stabilisation is not new in eyes with zonular compromise. They were first, introduced by Novák⁶ in the late nineties in eyes with damaged zonules. Subsequently, Lee and Bloom⁷ reported their usage in patients with pseudoexfoliation syndrome. In eyes with almost two quadrants of zonular compromise, Santoro *et al*⁸ advocated the usage of both iris retractors and CTR for adequate capsular stability. Moreover, the intraoperative usage of iris retractors as described by Sethi *et al*⁹ was related to the patient with inferior zonular weakness corresponding to the site of the iris defect and not in a patient with lens coloboma. We believe that these two entities cannot be equated as the surgical challenges are more pronounced in a patient with lens coloboma. First, the size of anterior capsulorrhexis has to be kept relatively small in

lens coloboma due to poor peripheral lenticular support and the small capsulorrhexis has its own inherent problems during hydrodissection, phacoemulsification, cortical clean up and implantation of the IOL in the bag. Second, the implantation of CTR is relatively difficult due to shortening of the lens capsule at the site of the lens coloboma. This results in undue stress on to the existing zonules and may cause extension of the zonular dialysis while implanting CTR. Third, the achievement of IOL centration even after implanting CTR is sometimes difficult in lens coloboma due to inherent shortening of the lens capsule. Recently, Nishimura *et al*¹¹ and Gupta *et al*¹² have advocated the usage of modified versions of iris retractors in order to prevent trauma to the capsule. However, none of the reported series have described the intraoperative benefits of iris retractors as capsule stabilising devices in patients with lens coloboma.

Following achievement of capsule stabilisation by iris retractors; a thorough, repeated and gentle hydrodissection helped us in minimising the stress on to the existing zonules. Phacoemulsification was performed under low settings, in order to minimise the turbulence in the anterior chamber. CTR was introduced into the capsular bag following emulsification in order to achieve symmetrical centrifugal force even at the site of zonular absence. This facilitated achievement of a proper post-operative centration of IOL. The usage of CTR alone as capsule stabilising device is not new and had earlier being described by Mizuno *et al*¹⁰ in a patient with bilateral lens coloboma. However, their successful completion of phacoemulsification

Figure 2 Intraoperative photograph showing smaller anterior capsulorrhexis.

Figure 3 Intraoperative use of iris retractors for capsular stabilisation.

Figure 4 Postoperatively, the right (A) and left (B) eyes showing proper decentration of IOL and in situ capsular tension rings.

using CTR alone, unlike our case, could be attributed to the small size of the lens coloboma.

This case report highlights one of the rarest congenital malformations of the lens, that is, bilateral lens coloboma, and its association with cataract. Also, it has shown the successful outcome of phacoemulsification with the intraoperative usage of iris retractors and CTR. To the best of our knowledge, this is the first report highlighting the usage of iris retractors as saviours during phacoemulsification in eyes with cataract and lens coloboma.

Learning points

- ▶ Lens coloboma is one of the rarest congenital malformations of the lens and is associated with absent zonules at the site of the coloboma.
- ▶ Usage of iris retractors as capsule supporting devices can facilitate the phacoemulsification procedure in patients with lens coloboma.
- ▶ Besides the usage of iris retractors, it is required that certain modifications be made in various steps of phacoemulsification.

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