Combined penetrating keratoplasty and implantation of iris prosthesis intraocular lenses after ocular trauma

Raneen Shehadeh Mashor, MD, Irit Bahar, MD, Igor Kaiserman, MD, MSc, Amy Lauren Berg, Allan Slomovic, MA, MD, FRCSC, David S. Rootman, MD, FRCSC

PURPOSE: To report the outcomes of implantation of intraocular lenses (IOLs) with a prosthetic iris to correct traumatic iris deficiency.

SETTING: Department of Ophthalmology, Toronto Western Hospital, University Health Network, Toronto, Ontario, Canada.

DESIGN: Case series.

METHODS: The medical records of consecutive patients who had had implantation of an Ophtec or Morcher IOL combined with corneal transplantation were retrospectively reviewed. Preoperative data collected included demographics, etiology of the iris deficiency, previous surgeries, preoperative eye pathology, and visual acuity. Operative data and postoperative outcomes included visual acuity, subjective perception of glare and photophobia, and postoperative complications.

RESULTS: The records of 11 patients were reviewed. The corrected distance visual acuity improved from 2.39 logMAR ± 0.53 (SD) preoperatively to 1.50 ± 1.11 logMAR postoperatively (P=.0037). Four (36.4%) of 9 patients reported an improvement in glare sensation; 5 (45.5%) reported no change in glare (P=.99). Postoperative complications included 2 graft rejection episodes in 2 patients during the first year after surgery, 1 case of increased inflammation that required removal of the IOL, and 2 cases of new-onset glaucoma. At the last follow-up visit, the centration and positioning of the IOLs were excellent. There were no cases of IOL dislocation, macular edema, or retinal detachment.

CONCLUSIONS: Implantation IOLs with a prosthetic iris in traumatic aniridia improved visual acuity significantly in most patients and reduced photophobia and glare symptoms in many cases. Graft rejection, glaucoma, and postoperative inflammation are possible complications.

Financial Disclosure: No author has a financial or proprietary interest in any material or method mentioned.

J Cataract Refract Surg 2011; 37:582–587 © 2011 ASCRS and ESCRS

Patients who lack adequate iris tissue can develop disabling glare and photophobia, decreased depth of focus, and increased higher-order aberrations.[1] Implantation of a standard intraocular lens (IOL) after cataract surgery without addressing the iris deficiency may result in further aberrations caused by light rays passing at the margin of and around the IOL.

To address these optical effects, posterior chamber IOLs with an opaque peripheral segment to simulate the iris diaphragm were developed and are used in cases of congenital and traumatic iris defects. Several studies report the outcomes of implantation of iris prosthetic IOLs, including models by Morcher GmbH[2–7] and Ophtec BV.[5,8,9] These studies report favorable results; however, some major complications, mainly the development of glaucoma, can occur. We report the outcomes in 11 eyes that had Ophtec or Morcher IOL implantation to correct iris deficiency combined with corneal transplantation.

PATIENTS AND METHODS

The medical records of all consecutive patients who had implantation of an Ophtec or Morcher iris prosthetic IOL by 1 of 2 surgeons (D.S.R., A.S.) at Toronto Western Hospital, University Health Network, were reviewed. The study was approved by the Institutional Research Ethics Committee,

0886-3350/$ - see front matter
doi:10.1016/j.jcrs.2010.10.038

University Health Network, Toronto, Ontario, Canada. Preoperative data collected included patient demographics, etiology of the iris deficiency, previous surgeries, preoperative eye pathology, and visual acuity. Operative data included the type of IOL implanted, the type of procedure, and intraoperative complications. Postoperative data included visual acuity, subjective perception of change in glare and photophobia, and postoperative complications.

Statistical Analysis

The paired Student *t* test was used for continuous variables and the Fisher exact test for proportions (SPSS software, version 12, SPSS, Inc.). Probabilities less than 5% were considered statistically significant.

RESULTS

Eleven eyes of 11 patients (8 men, 3 women) were included in this study. The mean age of the patients was 43.9 years ± 17.7 (SD) and the mean follow-up, 13.7 ± 11.2 months (median 13 months, range 2 to 44 months). Table 1 shows the characteristics of each patient.

All 11 patients had combined penetrating keratoplasty (PKP) and transscleral fixation of an iris diaphragm IOL. Penetrating keratoplasty was performed because of corneal or graft injury secondary to the trauma or postoperative corneal or graft decomposition. Anterior vitrectomy was performed at the time of surgery in 4 patients (36.3%). An anterior chamber IOL was removed from 1 patient (9.0%).

The mean corrected distance visual acuity (CDVA) improved from 2.39 ± 0.53 logMAR (median counting fingers at 5 feet) before surgery to 1.50 ± 1.11 logMAR (median 20/80) after surgery ($P = .0037$, paired *t* test).

Data on glare and photophobia sensation were available for 9 patients. Four patients (36.4%) reported an improvement in glare sensation, whereas 5 (45.5%) reported no change in glare ($P = .99$).

Postoperative complications included 2 graft rejection episodes in 2 patients that occurred during the first year after surgery. In 1 eye, the episode resolved; in the other eye, it resulted in graft failure. Another patient presented with graft edema 3 years after surgery with no obvious signs of rejection that might represent endothelial failure rather than rejection. Other complications included 1 case of increased postoperative inflammation that required the eventual removal of the Morcher IOL.

Glaucoma was present in 7 patients (63.6%) preoperatively and in 8 patients (72.7%) postoperatively. One of the 7 patients diagnosed preoperatively was tapered off glaucoma medication postoperatively, after which the intraocular pressure (IOP) returned to normal without further treatment. Thus, 2 patients developed new-onset glaucoma after surgery. One of the patients required a glaucoma shunt tube, and the other was referred for diode laser cyclophotocoagulation for glaucoma control. All patients with preoperative glaucoma were controlled with topical antiglaucoma medications postoperatively.

At the last follow-up visit, the iris prosthetic IOLs were well centered with good positioning in all cases (Figure 1). There were no cases of IOL dislocation, retinal detachment, or macular edema during the follow-up.

Table 2 compares the outcomes of the 2 IOL models. The CDVA (logMAR) was statistically significantly better in the Morcher IOL group ($P = .01$). There were no statistically significant between-group differences in IOP, postoperative glaucoma, graft rejection, or postoperative inflammation.

DISCUSSION

In this study, the mean CDVA was better and the glare or photophobia symptoms were improved in approximately one half of patients who had implantation of an Ophtec or Morcher IOL with an iris prosthesis. The main complications were glaucoma (2 of 11 patients) and postoperative inflammation, which in 1 case required removal of the Morcher IOL. In the other cases, the IOLs remained well centered and positioned.

Ocular trauma, including previous surgical trauma, was the cause of aniridia in all patients in our study. In traumatic aniridia, the eye's anterior segment, including the cornea, is often severely disrupted.[2,7–9] In our study, all patients required corneal transplantation combined with the iris prosthetic IOL implantation. The surgeons in our study had no difficulty implanting the IOL through a 7.0 to 8.0 mm trephination (at the open-sky stage). Traumatic aniridia is also frequently associated with aphakia or cataract, and vitreous prolapse as was seen in 10 patients in our series who had secondary aniridic IOL implantation. Preexisting

Submitted: March 24, 2010.
Final revision submitted: October 12, 2010.
Accepted: October 13, 2010.

From the Departments of Ophthalmology, Toronto Western Hospital (Mashor, Berg, Slomovic, Rootman), University of Toronto, Toronto, Ontario, Canada; Rabin Medical Center (Bahar), Petah-Tiqva; Barzilai Medical Center (Kaiserman), Ashkelon, Israel.

Fellowship funding provided by the Schwartz Reismann Foundation, Toronto, Ontario, Canada (Dr. Mashor).

Corresponding author: Raneen Shehadeh Mashor, MD, Toronto Western Hospital, East Wing 6-401, 399 Bathurst Street, Toronto, Ontario, M5T 2S8, Canada. E-mail: raneen_sh_mash@hotmail.com.