Translimbal Fixation of Posterior Chamber Lenses

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Objectives: *To evaluate the result of a surgical technique to insert and secure a standard posterior chamber lens through a simple limbal incision in eyes that had no capsular support or whose capsule was inadvertently ruptured during extracapsular cataract extraction.*

Material and Method: *Retrospective review of the medical records of patients who underwent translimbal fixation of posterior chamber lenses according to age, gender, preoperative visual acuity, postoperative visual acuity, follow-up period and any complications, especially those that may be related to the surgical technique.*

Results: *Twelve patients were recruited in the present study. The patents'age ranged from 31 to 77 years, with a mean of 62.58 years. There were 9 male and 3 female patients. The preoperative visual acuity ranged from hand motion to counting fingers, and the postoperative visual acuity ranged from 6/6 to 6/24 except one patient who had postoperative visual acuity of counting fingers due to a pre-existing macular hole. The length of follow-up period ranged from 3 to 12 months, with a mean of 6.17 months. There was no clinically significant lens-related complication.*

Conclusion: *This simple surgical technique controls the location of the needle entry and exit to decrease the risk of bleeding and increase the chance of ciliary sulcus placement. An inferior groove was made to bury the suture knot and was sutured closed to prevent the knot erosion through the conjunctiva.*

Keywords: *Translimbal fixation, Posterior chamber lenses, Intraocular lenses*

J Med Assoc Thai 2005; 88 (Suppl 9): S77-81
Full text. e-Journal: *http://www.medassocthai.org/journal*

Intraocular lens implantation has been accepted as the standard of care for the treatment of aphakia. In the absence of capsular support, anterior chamber lenses have been used in the past. Unfortunately, these lenses result in complications such as corneal decompensation, trabecular meshwork damage and prolonged inflammation[1-5]. Transscleral fixation of posterior chamber lenses have been proposed as an alternative to anterior chamber lens implants in eyes with inadequate capsular support[6-8]. Various approaches to this technique have relied on tying a polypropylene suture to the haptic of an implant and then suturing for fixation to the ciliary sulcus[9-13]. This placement of a posterior chamber lens in the sulcus is anatomically more similar to that of the crystalline lens and has some theoretical advantages including decreased endothelial cell trauma and reduced trabecular meshwork damage. However, erosion of polypropylene knots, loops and suture tips can occur at any time postoperatively[14-16], and results in a potential route for epithelial downgrowth[14] or infection[17]. Several strategies have been used to minimize the chance of suture erosion including covering the sutures with corneal autografts[18], conjunctival or scleral flap [19-21], tunneling the suture posteriorly in episclera before tying[21] and shrinking the suture tips down to the knot with thermal cautery. Recently, Lewis used a new lens design with islets on lens haptics to eliminate scleral flap and suture erosion[22]. In the present report, the authors devised a surgical technique to insert and secure a standard posterior chamber lens through a simple limbal incision in eyes that had no capsular support or whose capsule was inadvertently ruptured during extracapsular cataract extraction.

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Material and Method

Twelve patients underwent translimbal fixation of posterior chamber lenses in the absence of capsular support. The medical charts of these patients were reviewed and analyzed according to age, gender, preoperative visual acuity, postoperative visual acuity, follow-up period and any complications, especially those that may be related to the surgical technique.

All patients were prepared and draped in the routine manner for cataract surgery. Superior and inferior rectus muscle stay sutures were placed. Two fornix-based conjunctival flaps were made at the 10- to 2-o'clock position and at the 5.30 to 6.30 o'clock position. Wet-field cautery was used for hemostasis. A 2-mm groove was made at 6 o'clock position, about 1 mm. behind the posterior surgical limbus. A 3-mm limbal incision was made and peripheral iridectomy was performed at the 12 o'clock position. Sodium hyaluronate was injected into the anterior chamber to push the vitreous posteriorly. A 20-cm double-armed 10-0 polypropylene suture on a CIF4 needle (product code 788G, Ethicon Inc, Sommerville, NJ) was passed through the inferior groove from outside, behind the inferior iris, through the pupil and out through the iridectomy superiorly. A sinskey hook was inserted through superior limbal incision to withdraw the middle part of the suture from the eye. The externalized suture was cut and each end was tied to the appropriate haptics of an one-piece, all polymethylmethacrylate, 10-degree vaulted, posterior chamber intraocular lens. After the limbal wound was enlarged, the inferior haptic of the lens was inserted through the limbal incision and through the pupil into the sulcus inferiorly. The inferior polypropylene suture was gently pulled with Mcpherson tying forceps. This directed the inferior haptic into the sulcus. The superior haptic was then grasped with forceps and placed beneath the superior iris using superior haptic compression technique. The superior polypropylene suture was gently pulled again. The superior needle was passed about 1 mm. behind the posterior lip of the limbal incision and the suture was tied on itself with the knot buried in the limbal wound. The suture exiting the 6 o'clock groove was also tied in the same manner, thereby preventing the suture knot exposure. After removal of sodium hyaluronate, the inferior groove and superior limbal incision were sutured closed with 10-0 Nylon.

Results

Twelve patients underwent translimbal fixation of posterior chamber lenses. The patents' age ranged from 31 to 77 years, with a mean of 62.58 years. There were 9 male and 3 female patients. The preoperative visual acuity ranged from hand motion to counting fingers, and the postoperative visual acuity ranged from 6/6 to 6/24 (Table 1). An exception was patient 3 who had postoperative visual acuity of counting fingers due to a pre-existing macular hole. The length of follow-up period ranged from 3 to 12 months, with a mean of 6.17 months. During the postoperative follow-up period, the posterior chamber lens remained in place without a clinically significant lens-related complication.

Table 1. Visual results of the patients

No.	Age	Sex	Visual Acuity		Follow up (months)
			Preoperative	Postoperative	
1	50	M	HM	6/24	4
2	67	M	CF	6/6	10
3	62	F	CF	CF[a]	7
4	77	M	HM	6/24	4
5	67	F	HM	6/6	12
6	61	M	CF	6/9	10
7	31	M	CF	6/9	3
8	53	M	HM	6/9	4
9	61	M	CF	6/9	7
10	72	M	CF	6/24	6
11	85	F	HM	6/9	4
12	65	M	CF	6/12	3

[a] due to macular hole HM = Hand motion CF = Counting finger

Discussion

Scleral fixation has been adopted as a means of implanting posterior chamber lenses when capsular support is absent or inadequate[6-13]. Originally, techniques ignored the danger of an exposed suture. Conjunctiva was simply used to cover the knot. Later, surgeons advocated the use of partial-thickness scleral flaps to minimize knot erosion[20,21]. However, a number of cases with suture and knot erosion were reported despite scleral flap protection[14-16]. This indicates that simply guarding the polypropylene knot under a scleral flap was not good enough. The authors' technique al-lows the knot to be buried in the inferior groove and superior limbal wound, thus eliminating suture knot erosion through the conjunctiva.

In other publications, two cases of endophthalmitis have been reported with transclerally sutured posterior chamber lenses[17,23]. In one case, a 9-0 polypropylene suture knot had eroded through a partial-thickness scleral flap and overlying conjunctiva six years postoperatively. In the other case, a 9-0 polypropylene suture knot eroded through a conjunctival flap five months postoperatively. This indicates that suture erosion to the conjunctival surface results in a potential route for infection. In the present report, the inferior groove and superior limbal wound were sutured closed to prevent sutures from eroding through the conjunctiva and risking endophthalmitis.

Intraoperative bleeding may be observed with transclerally sutured intraocular lenses[14]. This dreaded complication exists, primarily because of the adjacent highly vascularized ciliary body. The techniques that require passing the needle from inside the eye increase the chance of hitting the major arterial circle of iris and the risk of acute bleeding. In the present report, the authors controlled the location of the needle entry and exit by passing the needle from outside at the inferior groove and passing throught the iridectomy at the superior limbal incision. This technique minimizes the risk of acute bleeding. In the same manner, needles and sutures pass through the sclera and ciliary body increase the risk of acute bleeding. Therefore, it is advisable to limit the number of needle and suture passes through them. In the present study, One scleral suture pass per haptic was adequate for stable fixation and centration of the intraocular lens. This minimizes the risk of bleeding and also obviates the double arm suture passes per haptic recommended by others[19,21].

According to the ciliary sulcus placement of the haptic, Duffey et al have shown in work with cadaver eyes that the suture which passed 1 mm. posterior to the posterior surgical limbus corresponded most closely to the ciliary sulcus[24]. They also recommended that sutures should be placed 0.83 mm. vertically and 0.46 mm. horizontally behind the surgical corneoscleral limbus to improve the chance of sulcus placement[24]. In the present report, the authors placed the inferior groove 1 mm. behind the posterior surgical limbus and passed the suture 1 mm. posterior to the limbal incision superiorly. This technique increases the probability of ciliary sulcus placement.

In conclusion, the authors have devised a new surgical technique to insert and secure a standard posterior chamber lens through a simple limbal incision in eyes that had no capsular support. The authors controlled the location of the needle entry and exit to decrease the risk of bleeding and increase the chance of ciliary sulcus placement. An inferior groove was made to bury the suture knot and was sutured closed to prevent the knot erosion through the conjunctiva.

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การผ่าตัดเย็บเลนส์ตาเทียมในช่องหลังม่านตา

ยศอนันต์ ยศไพบูลย์, พรรณทิพา ว่องไว, ธนภัทร รัตนภากร, สุธาสินี สีนะวัฒน์

วัตถุประสงค์: *เพื่อศึกษาผลของการผ่าตัดเย็บเลนส์ตาเทียมในช่องหลังม่านตาโดยใช้แผลที่ limbus ในผู้ป่วยที่ไม่มีถุงหุ้มเลนส์ตา หรือถุงหุ้มเลนส์ตาฉีกขาดขณะผ่าตัด*

วัสดุและวิธีการ: *ศึกษาย้อนหลังจากข้อมูลเวชระเบียนของผู้ป่วยที่ได้รับการผ่าตัดเย็บเลนส์ตาเทียมในช่องหลังม่านตาด้วยวิธีดังกล่าว ในเรื่อง อายุ เพศ การมองเห็นก่อนและหลังการผ่าตัด ระยะเวลาติดตามผลการรักษา และภาวะแทรกซ้อนจากการผ่าตัด*

ผลการศึกษา: *ผู้ป่วย 12 รายได้รับการผ่าตัดด้วยวิธีดังกล่าว อายุ 31-77 ปี (ค่าเฉลี่ย 62.58 ปี) เป็นชาย 9 ราย และหญิง 3 ราย ผู้ป่วยทุกราย ก่อนการผ่าตัดเห็นเพียงมือโบกไปมา และนับนิ้วมือได้ ส่วนการมองเห็นหลังผ่าตัดดีขึ้นเป็น 6/6-6/24 ยกเว้นผู้ป่วย 1 รายที่การมองเห็นเป็น นับนิ้วมือได้ เนื่องจากมีรูฉีกขาดที่จุดรับภาพ ระยะเวลาติดตามผล 3-12 เดือน (ค่าเฉลี่ย 6.17 เดือน) ไม่พบมีภาวะแทรกซ้อนจากการผ่าตัด*

สรุป: *เทคนิควิธีการผ่าตัดนี้มีข้อดีคือ ทำง่าย สามารถควบคุมตำแหน่งที่เย็บเข็มเข้าและออกจากลูกตา ทำให้ลดความเสี่ยงของภาวะเลือดออก และทำให้เลนส์ตาเทียมอยู่ในตำแหน่ง sulcus ที่ถูกต้องแม่นยำ วิธีการผ่าตัดนี้ยังซ่อนปมไหมอยู่ในแผลที่กรีดไว้ด้านล่าง และแผลผ่าตัดที่ limbus ด้านบน เพื่อป้องกันไม่ให้ปมไหมโผล่ที่เยื่อบุตา*