Visual Outcome After Cataract Surgery in Extremely High Axial Myopia

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ABSTRACT
We retrospectively investigated visual outcome after cataract surgery with implantation of zero or negative-power intraocular lenses (IOLs) in 110 eyes with extremely high axial myopia. Extremely high axial myopes can benefit from cataract surgery and implantation of zero or negative-power IOLs with few complications. Factors associated with visual outcome included preoperative best-corrected visual acuity, gender, and age. Method of surgery did not influence the visual outcome.

INTRODUCTION
High axial myopia has constituted a substantial proportion of the etiology of low vision in our clinic (1). One of the major causes of the poor vision in high axial myopia is the early development of cataracts (2). Before the introduction of negative-power intraocular lenses (IOLs), the highly myopic eyes were inevitably kept aphakia after cataract surgery. They have been associated with increased retinal complications and poorer visual outcome postoperatively (3-6). The use of posterior chamber IOLs and small incision phacoemulsification techniques has significantly reduced the complications in high myopes (7-11). However, patients with high axial myopia still take more risks of complications in cataract surgery and have less favorable visual outcome. For most surgeons who do not have instruments such as laser interferometry or potential acuity meter to predict macular function, to investigate factors associated with postoperative best-corrected visual acuity (BCVA) and the improvement of BCVA would help make decision before surgery.

In this study, we retrospectively reviewed the records of high axial myopes who had undergone either extracapsular cataract extraction (ECCE) or phacoemulsification with implantation of posterior chamber zero or negative-power IOLs. We reported their visual outcome and assessed the factors associated with postoperative BCVA and BCVA improvement.
We also compared the difference in postoperative visual outcome between conventional ECCE and phacoemulsification.

**METHODS**

All records of the patients who had received cataract surgery with implantation of a posterior chamber zero or negative-power IOL at Chang Gung Memorial Hospitals, Taoyuan or Taipei, Taiwan, between January 1995 and January 2003 were retrospectively reviewed. Cataract surgery was performed with either conventional ECCE with nuclear expression or phacoemulsification by 22 surgeons. Patients with follow-up for at least 6 months were included.

Complete ophthalmological examinations, including slit lamp, pneumatic tonometer and detailed fundus examination with indirect ophthalmoscopy were performed preoperatively and postoperatively. The patients with other ocular diseases or severe choroidoretinal degenerative changes such as subretinal hemorrhages or choroidal neovascular membranes were excluded. Studies of topography to exclude topographic keratoconus and refractive myopia were performed. Axial lengths were measured using an ultrasonic A-scan (Cinescan, Quantel Medical, Clermont Ferrand, France). Corneal curvatures were measured by an automatic keratometer (RM-A600), Topcon, Cortland, New York. The IOL power was determined by the Sanders Retzlaff Kraft (SRK) II, SRK/T, and Holladay 1 formulas. The postoperative refractive target was aimed at 0 to –3 Diopter (D) according to the need of patients. Peribulbar anesthesia was performed before surgery. Cataract surgery was performed with either conventional ECCE or phacoemulsification. A posterior chamber one-piece, polymethylmethacrylate IOL was implanted within the capsular bag. If the posterior capsule ruptured, the IOL was implanted within the sulcus. The refraction data with the best BCVA after surgery was collected as the main postoperative refraction data. The visual acuity in Snellen fraction was converted to the base-10 logarithm of the minimum angle of resolution or recognition (logMAR) for further calculation. The improvement of BCVA was computed as: improvement of BCVA (logMAR) = preoperative BCVA (logMAR) – postoperative BCVA (logMAR).