Introduction

As cataract surgery techniques have advanced, the rate of postoperative complications has decreased and postoperative outcomes have improved. This type of surgery has long been recognized to be safe and effective, and, therefore, most patients with lens opacity desire to undergo it to improve their quality of life. Patients with bilateral cataract undergoing unilateral cataract surgery have less satisfaction and lower quality of life owing to binocular inhibition in the remaining cataract eye than do those undergoing bilateral cataract surgery. The timing of surgery in the second eye after unilateral cataract surgery is influenced by various factors such as extent of cataract, feasible surgical techniques, associated ocular and systemic diseases, hospital facilities, and the patient’s desire to return to normal activities.

Because of safety considerations, cataract surgery has traditionally been performed in one eye at one session. However, in pediatric patients with bilateral cataract, simultaneous bilateral cataract surgery has been accepted as a reasonable treatment modality in consideration of general conditions and ophthalmological aspects. Simultaneous bilateral cataract surgery can also be an option when patients with bilateral cataract are unable to undergo cataract surgery separately under two separate administrations.

CLINICAL INVESTIGATION

Bilateral Cataract Surgery: A Controlled Clinical Trial

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Abstract

Purpose: To evaluate the efficacy and safety of simultaneous bilateral cataract surgery with respect to patient satisfaction, outcomes, and complication rates.

Methods: We conducted a prospective study of consecutive patients who had simultaneous bilateral cataract surgery on the same day or separate bilateral cataract surgery with an interval of 2 days between operations. The changes in refraction, visual acuity, degree of anisometropia, and complication rates were compared between the simultaneous bilateral cataract surgery and separate bilateral cataract surgery groups. Patient satisfaction was assessed with a questionnaire.

Results: Ninety-four patients who had simultaneous bilateral cataract surgery and 100 patients who had separate bilateral cataract surgery were enrolled in this study. The preoperative best-corrected visual acuity (logMAR) was 0.31 ± 0.17 in the simultaneous bilateral cataract surgery group and 0.29 ± 0.16 in the separate bilateral cataract surgery group, and it improved postoperatively to 0.11 ± 0.12 in the simultaneous bilateral cataract surgery group and to 0.10 ± 0.11 in the separate bilateral cataract surgery group. There was no significant difference between the two groups (P = 0.061). In addition, 96.8% of eyes in the simultaneous bilateral cataract surgery group and 97.0% of eyes in the separate bilateral cataract surgery group were within 1.0 diopters of the mean absolute error, and there were no sight-threatening intraoperative or postoperative complications in the two groups.

Conclusions: Simultaneous bilateral cataract surgery may be an effective and safe bilateral cataract surgery option with a high degree of patient satisfaction.

Key Words: cataract, efficacy, safety, separate bilateral cataract surgery, simultaneous bilateral cataract surgery

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of general anesthesia because of their poor general condition and uncertain visual prognosis.\textsuperscript{5–12}

Although it has been debated for decades, simultaneous bilateral cataract surgery is not established as a versatile procedure.\textsuperscript{6} Disadvantages of simultaneous bilateral cataract surgery are serious postoperative bilateral sight-threatening complications such as endophthalmitis or corneal edema secondary to corneal decompensation. Several recent studies of the safety and efficacy of simultaneous bilateral cataract surgery reported no serious postoperative complication related to visual acuity or outcomes after relatively satisfactory simultaneous bilateral cataract surgery.\textsuperscript{5–12}

There have so far been quite a few analyses of outcomes of simultaneous bilateral cataract surgery and indirect comparative studies between simultaneous bilateral cataract surgery and separate bilateral cataract surgery. Yet, in patients with bilateral cataract, there has been no direct comparative study between simultaneous bilateral cataract surgery and separate bilateral cataract surgery with an interval between operations.

The present study was designed to investigate postoperative complications and outcomes of the two surgical procedures and to assess patients’ reasons for selecting a surgical procedure and their degree of satisfaction using a questionnaire.

Subjects and Methods

The present study used a prospective nonrandomized parallel-groups design involving patients who underwent bilateral phacoemulsification with posterior chamber intraocular lens implantation at the Department of Ophthalmology of Soonchunhyang University Hospital. The study was designed and performed in accordance with the ethical standards of the Declaration of Helsinki and conducted after ethical approval by the local ethics committee. The present study included 168 patients (336 eyes) who underwent simultaneous bilateral cataract surgery and 177 patients (354 eyes) who underwent separate bilateral cataract surgery with an interval of 2 days between operations conducted by a single surgeon over a period of 18 months.

We explained the operative procedures and postoperative complications to all patients who decided to have cataract surgery. We explained the operative procedures and risk of postoperative complications to patients who desired simultaneous bilateral cataract surgery and let them decide again. We explained the surgical process and the advantages and disadvantages of separate bilateral cataract surgery to patients who desired separate bilateral cataract surgery. Slit-lamp examination, refraction and correction, corneal endothelial cell count, and fundus examination were conducted preoperatively in all patients. A-scan biometry and keratometry were performed. Intraocular lens power was calculated using the SRK-II formula in patients with axial length of 25 mm or less and using the SRK/T formula in patients with axial length exceeding 25 mm.

Patients who underwent simultaneous bilateral cataract surgery were admitted on the day of surgery and discharged the next day. After complete explanation of the surgery, informed consent was obtained. All patients were given a questionnaire. Questions in the preoperative questionnaire pertained to reasons for deciding on simultaneous bilateral cataract surgery and concerns about the surgery, and those in the questionnaire collected at the time of discharge pertained to postoperative discomfort and whether the patient would recommend simultaneous bilateral cataract surgery to neighbors or relatives.

In the case of separate bilateral cataract surgery, the first eye operation was performed the day after admission or on the day of admission according to the patient’s convenience, and cataract surgery in the second eye was performed on the second postoperative day.

Topical anesthesia was achieved with 2\% lidocaine, and the first cataract surgery was performed in the eye with poorer visual acuity. Cataract surgery in the fellow eye was performed separately by the same surgical team using another set of sterilized surgical instruments and balanced salt solution after the team scrubbed again and changed surgical robes. In all patients, we preoperatively sterilized the lid margin and conjunctival sac with 5\% povidone–iodine solution, prepared the facial skin using 10\% povidone–iodine solution, and then draped the operative site with a disposable sterile plastic drape. After performing clear corneal incision in the steepest axis determined by keratometry and continuous curvilinear capsulorhexis, the lens was removed by phacoemulsification (Accurus Surgical System, Alcon Laboratories, Fort Worth, TX, USA) and an intraocular lens was implanted in the bag. Before completion of surgery, tobramycin and betamethasone were injected subconjunctivally. In patients who underwent simultaneous bilateral cataract surgery, the patch dressing over one eye was exchanged for a transparent eye shield 5 h after surgery, and the other patch dressing over the fellow eye was removed the day after surgery. The binocular patch dressing over the first and second eyes was kept overnight in the separate bilateral cataract surgery group patients and removed the morning after surgery. Topical antibiotics and steroids were given to patients for 1 month postoperatively. At 1 day, 1 week, and 1 and 3 months after surgery, patients received slit-lamp examination, fundus examination, and refraction and correction, and visual acuity was measured using the Snellen C chart and recorded on the decimal scale. For statistical analysis, visual acuity was calculated only after conversion to logarithm of the minimum angle of resolution (logMAR) units.

To avoid the risks associated with simultaneous bilateral cataract surgery, we performed unilateral cataract surgery in the cases of corneal opacity, corneal endothelial dystrophy, uveitis, previous refractive correction surgery, and unreliable biometric measurements due to abnormalities of the cornea and retina, even though patients desired simultaneous bilateral cataract surgery. These patients were not included in any groups in the present study. Instillation of topical antibiotics was started 3 days before surgery in