The Clinical Outcomes of Phacoemulsification Cataract Surgery in Patients Over 90 Years

90 Yaş Üzerindeki Hastalarda Fakoemülsifikasyon Katarakt Cerrahisi Klinik Sonuçları

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ABSTRACT

Purpose: The aim of this study was to investigate the clinical outcomes of phacoemulsification cataract surgery in subjects aged over 90 years.

Materials and Methods: We retrospectively reviewed the charts of 34 (41 eyes) eligible patients who underwent phacoemulsification cataract surgery. Demographics, co-existing ocular diseases, preoperative and postoperative best-corrected visual acuity (BCVA), intraoperative and postoperative complications were noted.

Results: The mean age of the patients was 93.42 years (range 90-103). The most frequent coexisting ocular diseases were age-related macular degeneration and glaucoma. Preoperative BCVA was above 1 logMAR in 16 eyes (47%) and 1 logMAR or below in 18 (53%) eyes. In the third month after surgery, BCVA improved in all subjects and was below 0.3 logMAR in 26 (76%) eyes. A mean improvement of 1.15 logMAR was obtained postoperatively ($p<0.001$). The most frequent intraoperative complications were zonular dialysis (3 eyes) and posterior capsule rupture with vitreus loss (3 eyes).

Conclusion: Cataract removal with phacoemulsification seems to be effective in subjects over 90 years of age. Advanced age alone may not be a barrier to perform cataract surgery in this age group but benefit-risk assessment should be individualized.

Key Words: cataract, elderly, geriatrics, phacoemulsification.

ÖZ

Amaç: Bu çalışmanın amacı 90 yaş ve üzerindeki hastalarda fakoemülsifikasyon katarakt cerrahisi sonuçlarını araştırmaktır.

Gereç-Yöntem: Fakoemülsifikasyon katarakt cerrahisi geçiren ve çalışmaya dahil edilme kriterlerine uyan 34 hastanın (41 göz) dosyaları geriye dönük incelendi. Hastaların demografik bilgileri, eşlik eden oküler hastalıkları, ameliyat öncesi ve sonrası en iyi düzeltilmiş görme keskinlikleri (EİDGK), intraoperatif ve postoperatif komplikasyonlar not edildi.

Bulgular: Hastaların yaş ortalaması 93.42 yıl (90-103) olarak saptandı. En sık görülen eşlikçi oküler hastalıklar yaşa bağlı makula dejenerasyonu ve glokom idi. Ameliyat öncesi EİDGK, 16 gözde (%47) 1 logMAR üzerinde, 18 gözde (%53) ise 1 logMAR ve altındaydı. Ameliyattan 3 ay sonra tüm gözlerde görme keskinliğinde artış izlendi ve 26 gözde (%76) 0.3 logMAR altındaydı. Gözlerdeki ortalama görme keskinliği iyileşmesi 1.15 logMAR idi ($p<0.001$). En sık karşılaşılan intraoperatif komplikasyonlar zonül dializi (3 göz) ve vitreus kaybının eşlik ettiği arka kapsül rüptürü (3 göz) idi.

Sonuç: Fakoemülsifikasyon katarakt cerrahisi 90 yaş üzerindeki hastalarda etkin bir tedavi yöntemidir. Bu yaş grubunda tek başına ileri yaş katarakt cerrahisine engel olarak görülmemeli ve fayda-zarar değerlendirmesi her hastaya özgü bireysel olarak yapılmalıdır.

Anahtar Kelimeler: Katarakt, ileri yaş, geriatri, fakoemülsifikasyon.

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INTRODUCTION

Cataract is one of the most frequent causes of avoidable blindness in elderly. The prevalence of cataract is increasing due to the demographic shift of the populations toward older ages.[1] Visual impairment in the elderly leads to a decrease in quality of life, loss of independence, social isolation, activity limitation and depression.[2] Additionally, vision loss is a serious risk factor for falls and subsequent injury and thus increases mortality.[3]

The decision of surgery in very elderly patients with cataract is extremely challenging. As age advances, the complication rates possibly increase due to hard nuclear cataracts, age-related endothelial cell loss and weak zonules.[4] Furthermore older people may likely have various additional systemic diseases, be uncooperative because of dementia, have hearing problems and not be able to lie flat because of neck and back issues. Because the older people mostly have coexisting ocular disorders such as age-related macular degeneration (ARMD), glaucoma and retinopathy, the visual rehabilitation of cataract surgery may not be satisfying.[5]

Cataract surgery is one of the most performed surgical interventions that dramatically improves quality of life. Phacoemulsification with foldable intraocular lens (IOL) implantation is the gold standard wherever appropriate technical support and trained surgeons are available.[6] Recently with the development of new modern phacoemulsification techniques and equipment, hard cataracts of very elderly patients previously thought to be unsafe for phacoemulsification are now routinely and safely succeeded with this technique.[7]

The aim of our study was to investigate the effectiveness and safety of phacoemulsification cataract surgery in patients aged 90 years or older.

METHODS

The medical records of patients aged ≥90 years who underwent phacoemulsification cataract surgery between 2014 and 2017 were retrospectively reviewed. All subjects were informed about the goals of surgery and informed consent was obtained. This study followed the tenets of the Declaration of Helsinki and the protocol was approved by the local Ethics Committee.

Detailed data including best-corrected visual acuity (BCVA), anterior and posterior segment findings, intraocular pressure, type of cataract, intraoperative complications and coexisting ocular pathologies were noted. A Snellen chart was used to evaluate preoperative and postoperative visual acuity, then converted to logMAR unit.

The surgical technique performed was stop and chop phacoemulsification with superior clear corneal incision under local (peribulbar or topical) or general anesthesia. Dispersive viscoelastics such as Protectalon 3% (sodium hyaluronate, Vsy Biotechnology) or Viscoat (chondroitin sulfate, sodium hyaluronate, Alcon) were selected in order to coat and protect the endothelium. Eyes with hardrock cataracts, undilated pupils, serious exfoliation with phacodonesis and corneal opacity were operated through extracapsular cataract extraction (ECCE) and not included in this study.

Data analysis was performed by using SPSS for Windows, version 11.5 (SPSS Inc., Chicago, IL, United States). Descriptive statistics were shown as mean ± standard deviation (SD) or percentages. The mean difference between preoperative and postoperative BCVA values was compared by using paired t-test. A p value less than 0.05 was considered to be statistically significant.

RESULTS

The overall study population consisted of 41 eyes of 34 eligible patients (27 female, 7 male) underwent cataract surgery. The mean age of the patients was 93.42 years (range 90-103).

Most of the patients underwent phacoemulsification under topical or retrobulbar anesthesia (40 eyes), only one patient was operated under general anesthesia because of restlessness. In most of the eyes (n=36) IOL implantation was succeeded classically in the bag. In three cases IOL was implanted in sulcus and in one case to the anterior chamber. In one case implantation of IOL is impossible at the time of operation and scheduled for a secondary scleral fixated IOL implantation procedure.

Preoperative visual acuity was above 1 logMAR in 18 (53%) patients and 1 logMAR or below in 16 (47%) patients with a mean 1.45±0.75 logMAR. Postoperative mean visual acuity was 0.3±0.1 logMAR and in 26 eyes 0.3 logMAR or better vision improvement was achieved. A mean change of 1.15 logMAR was obtained postoperatively and BCVA significantly improved 3 months after surgery in all eyes ($p<0.001$).

The most common coexisting ocular diseases were ARMD and glaucoma. For all other preexisting ocular pathologies please see Table 1.

Intraoperative and postoperative complications are listed in Table 2. During the surgery, posterior capsule rupture with vitreus loss and zonular dialysis occurred in three cases. Capsular tension rings were successfully implanted in eyes with zonular dialysis. Three eyes needed iris hooks

Table 1. *Coexisting ocular diseases.*	
Ocular pathologies	N (41 eyes) (%)
Dry AMD	12 (29.2)
Macular scar	6 (14.6)
Glaucoma	10 (24.3)
Pseudoexfoliation syndrome	9 (21.9)
Celllophane maculopathy	1 (2.4)
Ectropion	2 (4.8)
Optic atrophy	4 (9.7)

Table 2. *Intraoperative and postoperative complications.*	
Complications	N (41 eyes) (%)
Posterior capsule rupture and vitreus loss	3 (7.3)
Zonular dialysis	3 (7.3)
Iris hook needed middilated pupils	3 (7.3)
Corneal edema	4 (9.7)
Cystoid macular edema	1 (2.4)

because of insufficient pupillary dilation. Postoperative complications such as transient corneal edema and cystoid macular edema were resolved successfully with medical treatment.

DISCUSSION

Cataract is one of the most common ocular disorders responsible for visual loss in the very elderly. The impairment of vision is a serious risk factor for depression, social isolation, loss of independence and loss of balance, perhaps leading to falls and increases mortality.[8] With an increase in life expectancy and the demand for a high quality of life, and by advancement of modern cataract surgery techniques that allow rapid visual recovery, the number of very elderly patients undergoing cataract surgery is exponentially growing.[4]

In the current study, we observed that phacoemulsification in subjects aged over 90 years is efficient and safe. Toyama et al. observed that phacoemulsification in patients aged ≥90 years improves visual acuity as effectively and safely as it does in younger patients.[9] Similarly, in a retrospective case series Michalska-Małecka et al. reported that both ECCE and phacoemulsification are safe and effective in very elderly (over 90 years) patients.[8] Lundström et al. have shown improvement in visual acuity in 84.3% of patients over 85 years.[10] Syam et al. obtained good visual outcomes in a small study group including 34 eyes of elderly patients aged over 96.[4] In a large study population of 207 subjects, Lai et al. studied the cataract surgery results in very elderly patients and concluded that despite the high rates of ocular and systemic comorbidities, good visual improvement is possible in that age group.[11] Borazan et al. showed that cataract surgery is effective in restoring good visual outcome and satisfactory daily activity score in a patient group aged over 80 years.[1] In our study we observed that the mean change in visual acuity was 1.15 logMAR and all eyes achieved significant visual improvement after the surgery.

Despite the literature supporting the efficacy of cataract surgery in geriatric population, surgeons still hesitate to recommend surgery to a very elderly patient because of the age related possible intraoperative difficulties resulting from extremely hard nucleus, weak zonules and exfoliation syndrome. Additionally, ocular comorbidities may limit the postoperative visual expectations and discourage both the patients and the surgeon in the decision of surgery. Mutoh et al. reported poorer cataract surgery outcomes due to systemic and ocular comorbidities but no significant differences in terms of intraoperative complications in a study comparing two groups of patients, older or younger than 90 years.[12] Intraoperative complications in the >90 years group were posterior capsule rupture in one case and partial zonular dialysis in another case. Similarly, Toyama et al. observed no statistical difference in the frequency of postoperative complications between younger (<80 years old) and older (>90 years old) patients.[9] In a study including 802 cataract operations, Berler found cataract surgery complications were seen more frequently in patients older than 88 years. Posterior capsule tears, vitreous loss, and loss of the nucleus were noted as the most frequent complications.[13] In contrast, Robbie et al. reported no significant differences in intraoperative complications in patients who were over 90 years of age.[14] In our study, consistent with the current literature, we observed that the most common complications in very elderly patients were posterior capsule rupture and zonular dialysis.

Cataract surgery in patients with hard nucleus is usually prolonged and requires more manipulations and ultrasound power than in softer nuclei. Therefore, in addition to proper surgical technique, measures that further protect the corneal endothelium must be considered in elderly patients.[15] Mutoh et al. found no significant differences in preoperative corneal endothelial cell density in the over-90 group and in the control group but they observed a significant decrease in postoperative corneal endothelial cell density in the over-90 group.[12] Endothelial protection is best achieved under a dispersive, retentive ophthalmic viscosurgical device and in the current study our choice of viscoelastic material was either Protectalon 3% or Viscoat to protect and coat the endothelium.

The incidence of coexisting ocular diseases such as ARMD, glaucoma and retinal problems increases as age

advances and these comorbidities may limit the expected visual acuity gain after surgery. Individuals aged over 85 years have a 10-fold higher prevalence of late AMD than those aged 70–74 years.[16] In a study, subjects with ARMD were found less likely to achieve postoperative visual improvement.[11] Monestam et al. reported individuals with ocular comorbidity were 2.8 times as likely to be dissatisfied with the cataract surgery as those without.[17] Demir et al. reported a mean change of 1.01 logMAR in visual acuity whereas only 0.82 logMAR improvement was observed in patients with ARMD.[5] In ARMD patients it was found that reduced contrast sensitivity, loss of depth perception and visual field size, rather than central visual acuity, were more strongly associated with falls and fractures in elderly people.[18] Although the measured visual acuity outcomes are not satisfactory in patients with ARMD where central vision is lost, the peripheral visual field necessary for confident navigation can be improved by cataract surgery, and may improve quality of life for very elderly patients.[8] In concordance with the current literature, in our study we also observed that ARMD and glaucoma were the most frequent preexisting ocular pathologies.

The main limitation of our study was its retrospective nature. Additionally, the study population was relatively small and we did not have a control group. Prospective population-based studies with a large sample size can better evaluate the clinical outcomes of cataract surgery in elderly adults over 90 years of age.

In conclusion, the clinical outcome of phacoemulsification cataract surgery is effective and safe in patients over the age of 90. In the decision process of cataract surgery of the very elderly patients, benefit-risk assessment should be individualized and life expectancies, systemic and ocular comorbidities should be taken into account carefully.

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