

Comparison of complication rates of two major operational techniques among Albanian patients with cataract

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Abstract

Aim: Our aim was to compare the complication rates of two major operational techniques among Albanian patients diagnosed with cataract.

Methods: This study included 1500 patients diagnosed with cataract in Elbasan region during the period January 2011 – February 2013. Patients were operated either with phacoemulsification (PHACO), or with extracapsular cataract extraction (ECCE).

Results: 1460 eyes were operated with the PHACO technique, whereas 311 eyes were operated with the ECCE method. About 94% of patients operated with PHACO and 92% of those operated with ECCE did not experience any complications. Among patients who experienced complications, the major negative outcomes in both groups included thermal burns, posterior capsule ruptures, vitreous loss, injuries of iris, anterior room nucleus prolapse and hemorrhage. In patients operated with the PHACO method, the astigmatism was minimal, whereas in patients operated with the ECCE technique the astigmatism was much more evident – a difference between the two groups which was statistically significant.

Conclusions: This study including a large sample of Albanian patients undergoing cataract surgery confirms that PHACO is a superior technique compared to ECCE due to a lack of astigmatism, and a better refraction and vision. However, ECCE remains an important method in cases of very mature cataracts and in circumstances where the endothelium is rather delicate.

Keywords: cataract, extracapsular extraction (ECCE), ophthalmology, phacoemulsification (PHACO).

Introduction

Phacoemulsification (PHACO) is a modern cataract surgery technique where the eye's internal lens is emulsified with an ultrasonic hand-piece and aspirated from the eye. Aspirated fluids are replaced with irrigation of balanced salt solution to maintain the anterior chamber (1,2). This operating technique has several advantages compared to the conventional extracapsular cataract extraction (ECCE), mainly because a smaller incision is required (2,3). As a matter of fact, for more than two decades already, PHACO has been considered to reduce surgically induced astigmatism (3,4) and to enable stable refraction and rehabilitation of vision and also daily activities (4).

A fairly recent Cochrane Review aiming at determining whether glaucoma surgery combined with cataract surgery via phacoemulsification has any advantages over cataract surgery (via phacoemulsification) alone reported that eyes that underwent combined (glaucoma and phacoemulsification) surgery had a significantly lower intraocular pressure compared to eyes that underwent phacoemulsification cataract surgery alone (1). Nonetheless, the authors emphasized that this finding could not be regarded as conclusive, as the studies examined had many differences and poor reporting outcomes (1). Furthermore, a review of 16 trials aiming at comparing the effectiveness of laser-assisted cataract surgery with standard ultrasound phacoemulsification reported an uncertain evidence suggesting benefits of one procedure over the other (5). In addition, a meta-analysis of more than 14500 eyes and 37 studies found no significant differences between the two techniques in terms of visual or refractive outcomes or overall complications (6). Data from the Global Burden of Disease (GBD) 2010 Study show that there has been an increase in the non-communicable disease morbidity and mortality rates in Albania in the past few decades in line with the transition from a rigid communist regime towards a market-oriented system (7,8). Yet, there are no specific data about the magnitude and

occurrence of eye disorders in the Albanian population.

In any case, the incidence and prevalence of cataract will gradually increase in Albania in line with the population aging as indicated by the last census which was carried out by the Institute of Statistics (INSTAT) in 2011, where the proportion of individuals aged 65 years and over was estimated at 11% (9). This steady increase in the proportion of the elderly population poses serious challenges to the Albanian health care sector requiring also provision of much more specialized care and treatment against visual impairment including an effective management of cataract.

However, the information about the prevalence and distribution of cataract in the Albanian population are scarce. As a matter of fact, currently, there are no scientific articles available providing evidence about the spread and occurrence of cataract in the general population of Albania. Furthermore, there are no scientific reports about treatment outcomes of Albanian patients diagnosed with cataract and undergoing different operational procedures including PHACO and ECCE.

In this framework, the aim of our study was to compare the complication rates of these two major operational techniques (PHACO vs. ECCE) among Albanian patients diagnosed with cataract over a two-year period.

Methods

This study included 1500 patients diagnosed with cataract in Elbasan region during the period January 2011 – February 2013.

All these patients diagnosed with cataract were operated either with PHACO, or with ECCE. The PHACO procedure consisted of an incision of 2-3 mm. During this procedure, the eye's internal-lens was emulsified with an ultrasonic hand-piece and aspirated from the eye. Subsequently, the aspirated fluids were replaced with irrigation of balanced salt solution in order to maintain the anterior chamber (1,2).

On the other hand, the ECCE procedure consisted of an incision of 11-12 mm and, subsequently, implantation of a polymethyl-methacrylate (PMMA) lens and, finally, stitching of the operation wound. The possible complications experienced by the patients in both treatment groups (PHACO and ECCE) were defined as thermal burns, posterior capsule ruptures, vitreous loss, injuries of iris, anterior room nucleus prolapse and hemorrhage (all dichotomized in the analysis into: no vs. yes). Fisher's exact test was used to compare differences related to complication rates (overall complications and, next, specific types of complications) between patients undergoing the PHACO procedure and those operated with the ECCE technique. A p-value of ≥ 0.05 was considered as statistically significant in all cases. Statistical Package for Social Sciences (SPSS version 17.0) was used for the data analysis.

Results

Overall, 1460 eyes were operated with the PHACO technique, whereas 311 eyes were operated with the ECCE method.

Table 1 presents the distribution of complications by the type of operation performed in the study sample.

About 94% of patients operated with PHACO and 92% of those operated with ECCE did not experience any complications. Nonetheless, there was no statistically significant difference in the proportion of the overall complications between patients operated with PHACO vs. those operated with ECCE ($P=0.09$).

Among patients who experienced complications, the major negative outcomes in both groups included thermal burns, posterior capsule ruptures, vitreous loss, injuries of iris, anterior room nucleus prolapse and hemorrhage.

The proportion of thermal burns was significantly higher in patients undergoing PHACO compared with their counterparts who underwent ECCE (2% vs. none, respectively, $P<0.01$). Conversely, the proportion of iris injuries was higher in patients operated with ECCE than in those operated with PHACO (1.6% vs. 0.5%, respectively, $P=0.04$). However, there were no significant differences in the two groupings for vitreous loss, posterior capsule ruptures, anterior room nucleus prolapsed, or anterior and posterior segment hemorrhages (all $P>0.05$) [Table 1].

Table 1. Frequency of complications according to the type of operation performed in Albanian patients diagnosed with cataract

COMPLICATION TYPE	OPERATIONAL TECHNIQUE		P
	PHACO (1460 eyes)	ECCE (311 eyes)	
Without complications	1375 (94.2%)	286 (92.0%)	0.093
Thermal burns	29 (2.0%)	0 (0.0%)	0.004
Posterior capsule ruptures	17 (1.2%)	7 (2.3%)	0.112
Vitreous loss	19 (1.3%)	6 (1.9%)	0.266
Injuries of iris	7 (0.5%)	5 (1.6%)	0.044
Anterior room nucleus prolapse	9 (0.6%)	4 (1.3%)	0.181
Anterior segment hemorrhage	2 (0.1%)	2 (0.6%)	0.144
Posterior segment hemorrhage	2 (0.1%)	1 (0.3%)	0.440

In patients operated with the PHACO method, the astigmatism was minimal, whereas in patients operated with the ECCE technique the astigmatism

was much more evident – a difference between the two groups which was statistically significant (data not shown).

Discussion

Main findings of this study include a lower complication rate among patients operated with PHACO compared to those operated with ECCE. Furthermore, in patients operated with the PHACO method, the astigmatism was barely evident as opposed to the patients operated with the ECCE technique where the astigmatism was far more substantial. On the other hand, regardless of the operational procedure, the major complications consisted of thermal burns, posterior capsule ruptures, vitreous loss, injuries of iris, anterior room nucleus prolapse and hemorrhage.

Our findings are in line with the previous reports from the international literature. Hence, a recent systematic review indicated that removing cataract by PHACO is associated with a better visual acuity compared to ECCE, including also a lower complication rate (10). Nevertheless, this review was underpowered in terms of detecting differences related to rarer outcomes, including poor visual outcome (10). Based on this fact, the authors concluded that the lower cost of ECCE may justify its use in low-income settings and in populations which involve high-volume surgery (10). While there are no sufficient data comparing PHACO and ECCE in low-income settings, our study provides useful evidence on this important argument.

On the other hand, a previous literature review suggested that there is little difference in the final outcomes when each surgical procedure is conducted correctly (11). The authors of the review concluded that the overall cost-effectiveness and suitability of each technique vary based on specific settings, particular locations and facilities available (11).

Our study may have several potential limitations due to the sample representativeness, but not its size which was sufficiently large. However, the sample representativeness remains an issue to consider. From this standpoint, the large number of patients

included in this study does not exclude the possibility of selection bias as long as not all individuals with cataract under the study period might have sought medical care and treatment in Elbasan region. If so, findings from the current study cannot be generalized to the overall number of individuals with cataract in Elbasan region, but only to those patients who seek care and receive treatment in this region. Indeed, some patients with cataract might have preferred more specialized care which is available at the University Clinic of Ophthalmology as a part of the University Hospital Centre "Mother Teresa", or might have even opted for private ophthalmology clinics which supposedly provide better and prompt care in Albania. Based on these arguments, the representativeness of our study sample should be considered carefully. In any case, findings from the current study should not be generalized to the general population of Elbasan and, even less so, to the overall population of Albania. On the other hand, the diagnosis of patients with cataract in our study was based on standardized and valid instruments, similar to studies conducted in other countries and reported in the international literature. Furthermore, there is no reason to assume any type of information bias in our study as long as all the complication types consisted of hard (objective) measures which were similarly assessed in both patient groupings (individuals operated with PHACO and those operated with ECCE).

In conclusion, regardless of the aforementioned possible limitations, this study including a large sample of Albanian patients undergoing cataract surgery confirms that PHACO is a superior technique compared to ECCE due to a lack of astigmatism, and a better refraction and vision. However, ECCE remains an important method in cases of very mature cataracts and in circumstances where the endothelium is rather delicate.

Conflicts of interest: None declared.

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