

Studying the Effect of LASIK on the Cataract Extraction Timing: A Retrospective Study

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Abstract

Background: With the aging of the people who had LASIK, the number of patients requiring cataract surgery after LASIK has been increasing.

Aim of Study: To study the effect of having LASIK on the timing of cataract extraction.

Setting: Eye Care Center, time period from June 2014 to June 2022.

Patients and Methods: The data of the population of this retrospective observational study was collected from files of a private ophthalmology hospital. The patients were divided into two groups of matched axial length and sex, Group A: Eyes with a history of LASIK before having cataract extraction. Group B: Eyes with no history of LASIK before having cataract extraction. In each group the average, median, maximum and minimum age were calculated. We excluded any patient with history of any systemic or local disease associated with early cataract such as diabetes mellites or previous surgeries apart from LASIK in the first group.

Results: The study showed a statistically significant difference of 16.77 years in the average age between group A compared to group B with the lower age being evident in group A. As in group A, the average was 50.19 ± 8.5 years, while in group B, the average age was 66.96 ± 9.4 years ($p < .001$).

Conclusion: The study showed that patients with history of LASIK tend to seek cataract extraction earlier than patients who didn't have history of LASIK with more than 16 years difference.

Key Words: Cataract – LASIK – Age.

Introduction

CATARACT is the main cause of preventable blindness and visual impairment [1]. Cataract surgery with an intraocular lens (IOL) implant is one of the most popular and regarded as the most successful surgical intervention. Although aging

is the most prevalent cause, there are other recognized risk factors for cataract development, such as illness, trauma, drugs, and genetic susceptibility [2].

Laser-assisted in situ keratomileusis (LASIK) is one of the most commonly performed kerato-refractive surgery globally. Since its introduction in 1990, there has been a constant evolution in its technology to improve the visual outcome [3]. Nowadays, with the aging of the people who had LASIK, the number of patients requiring cataract surgery after LASIK has been increasing.

The predictability of the intraocular lens (IOL) power calculation has received the most attention in the studies of cataract surgery conducted in post-LASIK eyes [4,5]. Only few reports studied the epidemiology of those who get cataract surgery following LASIK. There is an assumption that patients who underwent refractive procedures will seek cataract extraction at an earlier age than those who didn't, due to the high order aberrations associated with early cataract [6,7] and the type of personality looking for a sharp uncorrected far vision [8]. The purpose of this study was to compare the timing of cataract extraction in patients who had previously undergone LASIK procedure (post LASIK group) and compare it to patients with same axial length with no LASIK history in private and governmental eye care centers (control groups).

Patients and Methods

The data of the population of this retrospective observational study was collected from files at a private ophthalmology hospital. The records of patients who were candidates for cataract surgery between June 2014 and June 2022 were reviewed.

The study protocol was revised and approved by the scientific committee of the department of

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ophthalmology and the institutional ethical committee and followed the tents of the declaration of Helsinki.

The patients were divided into two groups, group A: 53 eyes of 53 patients witha history ofmyopic LASIK before having cataract extraction, group B: 53 eyes of 53 patients with no history of LASIK before having cataract extraction with the matched sex and average axial length of group A.

All records of patients were revised to determine demographic and clinical data including age, gender, history of systemic diseases, and any previous intraocular intervention. For each group, the axial length average was revised from their records to make sure the two groups had a matched average axial length. In each group the average, median, maximum and minimum age were calculated. We excluded any patient with history of any systemic or local disease associated with early cataract such as diabetes mellitus or previous surgeries apart from LASIK in the first group.

To our knowledge, this is the first study about the demographic data of patients seeking cataract surgery following LASIK in the Egyptian population.

Statistical analysis:

This study's sample size was calculated to provide more than 86% statistical power at the 5% level to detect a 5-year difference in the time of cataract surgery between Group A and Group B, when the standard deviation (SD) of the mean difference was 10 years. All statistical analyses were performed using Social Sciences (SPSS) version 26 (IBM Corp., Armonk, NY, USA). The normality of all data samples was checked using the Kolmogorov-Smirnov test, and the student *t*-test was used to compare data between the 2 groups. *p*-values less than 0.05 were considered as statistically significant.

Results

This retrospective study aimed at comparing the timing of cataract extraction in patients with history of LASIK (group A) and those with no history of LASIK seeking medical care in the same private center (group B). All the groups were sex and axial length matched.

The study showed a statistically significant difference of 16.77 years in the average age between group A compared to group B with the lower age being evident in group A. As in group A, the average was 50.19 ± 8.5 years, (median 52, maximum 68

and minimum 40 years) while in group B, the average age was 66.96 ± 9.4 years (median 69, maximum 86 and minimum 40 years) ($p < .001$).

Table (1): Demographic and clinical data of the 3 groups.

| Characteristics | Group A | Group B |
|-----------------|-----------------|-----------------|
| Age: | | |
| Mean \pm SD | 50.19 \pm 8.5 | 66.96 \pm 9.4 |
| Sex : | | |
| Female (%) | 25 (47.17) | 23 (43.40) |
| Male (%) | 28 (52.83) | 30 (56.60) |
| AL (mm) | 25.64 \pm 2.9 | 24.89 \pm 1.9 |

AL: Axial lengths in millimeters.

Discussion

Studying the demographyof patients with history of cataract surgery following LASIK, the most common performed refractive surgery is a point of interest. In this study, we compared the timing of cataract extraction in patients with and without history of LASIK procedure. To our knowledge, this is the first study about the demographic data of patients seeking cataract surgery following LASIK in the Egyptian population. It was found that patients with history of LASIK tend to seek cataract extraction earlier than patients who didn't have LASIK in the past with more than 16 years. There are several adopted explanations for this earlier cataract surgery in post-LASIK eyes. First of which, is that post-LASIK eyes tend to have significantly longer axial lengths than eyes in the entire population. Eyes withlonger axial lengths (ALs) frequently are affected by cataract formation earlier than those with normal ALs [9,10]. However, in this study, we tried to abolish the effect of longer axial length by choosing groups of patients with matched axial lengths. Still, we were surprised by this wide difference. We now could attribute such finding to other explanations including that the high order aberrations (HOA) that may take place after LASIK and increases in early cataract have a great affection on the visual quality in group A. This could be a pushing factor for early cataract extraction. Another explanation we could attribute this difference to it, is the type of personality, as for patients with history of LASIK are probably seeking spectacle independence and perfect sharp uncorrected far vision. Similar findings were reported by Iijima et al., in 2015 in Japan. They studied the demographics of patients having cataract surgery after LASIK and found a ten-year difference in timing of cataract extraction in patients who underwent LASIK and patients with no history of LASIK. Patients post LASIK tends to have cataract

extraction early [8]. Again, Yesilirmak in 2016 also found that patients undergoing cataract extraction with history of LASIK are 10 years younger than the control group of the same axial length [11].

However, further studies with larger population are needed to confirm this finding. The limitation of this study is not reporting the high order aberrations of the patients before surgery being a retrospective study, in addition, we didn't include the data contributing the time difference between having the LASIK and cataract extraction.

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دراسة تأثير الليزك على توقيت ازالة المياه البيضاء : دراسة بأثر رجعي

تم إجراء الدراسة في الفترة الزمنية من يونيو ٢٠١٤ إلى يونيو ٢٠٢٢.

تم جمع بيانات المرضى في هذه الدراسة القائمة على الملاحظة بأثر رجعي من ملفات مستشفى عيون خاصة. تم تقسيم المرضى إلى مجموعتين من حيث جنس المريض والطول المحوري للعين، المجموعة أ: العيون التي لديها تاريخ إجراء الليزك قبل إزالة المياه البيضاء. المجموعة ب: عيون ليس لها تاريخ إجراء الليزك قبل إزالة المياه البيضاء. في كل مجموعة تم حساب متوسط العمر ومتوسط الحد الأقصى والحد الأدنى للعمر. استبعدنا أي مريض لديه تاريخ مرضي لأي أمراض مزمنة، أو أيًا من أمراض العين، مثل اعتلال الشبكية السكري أو العمليات الجراحية السابقة باستثناء الليزك في المجموعة الأولى.

أوضحت النتائج الدراسة وجود فرق ذو دلالة إحصائية في متوسط العمر بين المجموعة (أ) مقارنة بالمجموعة (ب) بفارق ١٦.٧٧ سنة مع انخفاض العمر الواضح في المجموعة (أ).

في المجموعة (أ) كان المتوسط ٨.٥±٥٠.١٩ سنة، بينما في المجموعة (ب)، كان متوسط العمر ٩.٤±٦٦.٩٦ سنة. $p < 0.001$.

أظهرت الدراسة أن المرضى الذين لديهم تاريخ من الليزك يميلون إلى السعي لإزالة المياه البيضاء في وقت أبكر من المرضى الذين لم يكن لديهم تاريخ من الليزك مع فارق بين المجموعتين بأكثر من ١٦ عاماً.