LUPINE PUBLISHERS

ISSN: 2643-6760

Surgery & Case Studies: Open Access Journal

DOI: 10.32474/SCSOAJ.2020.05.000218

Research Article

Astigmatism Control in Cataract Surgery by Phacoemulsification

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Received: August 13, 2020 **Published:** August 20, 2020

Summary

Cataract is a cause of visual deterioration in quantity and quality, surgery is the only solution to cure this disability. A prospective and analytical study of case series was carried out in 43 eyes of patients, diagnosed with cataract, operated by the phacoemulsification technique by Pre Chop with implantable intraocular folding lens, at the Cuban Institute of Ophthalmology Ramón Pando Ferrer since November 2018 until April 2020. Descriptive statistical techniques such as mean and standard deviation were used. In the non-compared results, the test used was the Chi square test, with a significance of 95%, a difference with a value of $p < 0.05$ was considered statistically significant and the contingency coefficient to measure the strength of the relationship. The topographic and refractive changes of the cornea and their influence on the astigmatism induced after surgery were evaluated. The mean age was 69.4 ± 8.3 years, according to LOCS III 51.16% had NO3 hardness, the best visual acuity without correction in 76.75%, improved between 0.8 and 1.0, as well as the corrected vision with crystals in 93.02%; the mean keratometry pre vspost operative did not show statistically significant values ($p > 0.05$), the postoperative refractive cylinder in 72.09% was less than 0.5D; 51.17% of the eyes in the preoperative period had refractive astigmatism against the rule, 60.47% changed to astigmatism according to the rule one month after surgery. According to the FV-14 quality of life survey, 100% of patients had a very good quality of life one month after surgery. We conclude that with cataract surgery by personalized phacoemulsification, total efficiency is achieved in the correction of preoperative refractive defects.

Keywords: Astigmatism, Cataract, Phacoemulsification, Toric Intraocular Lenses, FV-14, Quality of life

Introduction

Cataract remains the leading cause of curable blindness in the world, reaching 33% of blindness cases in general and its only effective treatment is surgical, to date [1]. Surgery to remove the cataract lens is maintained in constant perfection to restore the vision of the patients with the highest quality and quantity, the Phacoemulsification surgical technique has helped to gradually improve the quality of the result.The pre-operative examination is very important to guarantee the quality of the surgical result, and in this consultation, astigmatism and its magnitude must be identified to plan the surgery. Astigmatism is the refractive defect in which the radius of curvature of any of the refractive surfaces of the eye is not uniform, and may be present from birth, as a consequence of some corneal disease or as a result of surgery performed on it [2-5].

Ferrer's studies suggest that there is a prevalence of approximately 70% of corneal astigmatism in the cataract population. 64.4% of patients present with astigmatisms between 0.25 and 1.25 diopters (D) and 22.2% astigmatisms with 1.50 D or greater[6]. In patients older than 65 years, the type of astigmatism varies and 60% of them have astigmatism against the rule, with values higher than 1.0 D [7]. The current objective of cataract surgery is to achieve a refractive result, for this it is important to carry out a detailed and personalized preoperative examination to determine the most accurate eye measurements possible, to plan the appropriate size and location of the main incision, the selection of the intraocular lens that adjusts to the daily visual needs of the patient and to the refractive defects of the patient and

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thus, with the result of the surgery, minimize astigmatism induced by the procedure as much as possible.The preoperative diagnosis of the amount and location of the patient's corneal astigmatism is determined by different preoperative studies to determine the amount of preoperative corneal astigmatism and the location of the most curved meridian, one of these tests is the keratometric study that will allow us to determine the axis and cylinder power, with the IOL master 700 (Zeiss) equipment and using corneal topography the precision of these measurements is greater, in addition to having information on any cornea site, elevation maps and anterior and posterior surface of the cornea, through conventional surveyors such as the Magella (Nidek) or high precision such as the Galilei, the Pentacam (Oculus) and the OPD Scan [8].

The Pentacam surveyor (Oculus) is used to detect and monitor patients with refractive defects and to assess topographic irregularities, important in the detection of keratoconus and its monitoring, determination of keratometric values and elevation maps of the anterior and posterior face. of the cornea[8].After diagnosing the amount and location of preoperative astigmatism, we must evaluate the tools we have to eradicate it with surgery or prevent it from increasing, in the first place, the location and size of the main incision is important, since they are performed on the temporal side and not greater than 3mm, valued in two or three planes, have not shown an increase in the mean astigmatism induced after surgery since the horizontal surface diameter of the cornea is greater than the vertical, so that the temporal incisions are further from the visual axis and, therefore, have less astigmatic effect because they do not modify the curvature of the cornea, resulting in a more stable refraction[9,10].

Other tools that we must take into account in surgical planning that reduce corneal astigmatism between 0.50 and 4.00 D, are the limbal relaxing incisions (IRL) adjusted by nomograms, which are usually two arcuate incisions parallel to the corneo-scleral limbus in the most curved meridian and in the flattest part of the cornea, the opposite incisions in clear cornea (IOCC) placed symmetrically along the curved axis of corneal astigmatism [1-13].When we diagnose high astigmatism values in the preoperative examination, toric IOLs, alone or combined with correction of near, intermediate and distant vision, are effective in values between 1 to 4 D; For values between 4.5 to 7 D, toric IOLs can be combined with IRL in the most curved corneal meridian. Among the toric IOL models we can point out the AcrysoftToric®, Rayner T-flexTM model 620 T or 623 T, and currently, diffractive trifocal toric lenses such as the PanOptix-Toric (Alcon), FineVision-Pod F Toric have been introduced (PhysIOL) and AT LISA 939 (Zeiss), for its calculation it is recommended to use fourth generation formulas, such as Hill-RBF, Barrett Universal II and Holladay II, in addition to taking into account the posterior aspect of the cornea and new technologies for this calculation[14,15].

Once cataract surgery is planned as a refractive lens surgery for its excellent results, that is, in addition to removing the lens from the patient, it is planned to emmetropise it, reducing as much as possible its dependence on corrective glasses in the postoperative period, it is necessary to mention the selection of the appropriate surgical technique, where phacoemulsification is currently considered the safest, most reproducible and excellent technique due to the results of its use, which allows early visual gain and high satisfaction for patients and families.The development of the specialty applied to the surgery process to obtain these high results of excellence, has developed the Cataract Refractive Suite Platform (ALCON), to avoid intraoperative errors in the placement of toric IOLs, since it integrates the phacoemulsification team Centurion®, LuxORTM Ophthalmic Microscope, LenSx® Femtosecond Laser and VERIONTM Image Guidance System, designed to add greater precision and efficiency during surgery planning and execution.

Another technological innovation is the ORA® system with VerifEye + ®, which provides a continuous evaluation of intraoperative measurements of the eye, using the diagnosis of wavefrontaberrometries and the AnalizOR TM database analyzer; to obtain high-precision refractive measurements, data on anterior and posterior corneal astigmatism, which allow reducing the incidence of unwanted postoperative residual astigmatism and perfecting the implantation of multifocal intraocular lenses, the result will be a better expected spherical equivalent, with an error less than 0.5D in 95% of cases[16,17].When all this planning fails and refractive errors occur after cataract surgery, with moderate or high cylinders, piggy back, IOL change and excimer laser-assisted corneal refractive surgery can be performed, using LASIK or LASEK techniques. a simple and effective solution or the Femtosecond laser[18].At the Cuban Institute of Ophthalmology Ramón Pando Ferrer, phacoemulsification techniques have been developed with effective control of astigmatism induced by surgery, with topographic control of the incision site, which will allow refractive correction of cataract surgery. , according to the visual needs of the patient, which translates into a more satisfied patient, who will socially rejoin his tasks early[19].

Material and Methods

A prospective and analytical study of case series was carried out in 48 eyes of patients, diagnosed with cataract, operated by the technique of phacoemulsification by Pre Chop with implantation of a foldable intraocular lens, which, once attended, were included in the database of the Ocular Microsurgery Center of the Cuban Institute of Ophthalmology Ramón Pando Ferrer from November 2018 to April 2020, performed by the same surgeon.The topographic and refractive changes of the cornea, its influence on the astigmatism induced after cataract surgery, and its impact on the visual and life quality of the studied patients were evaluated. The universe was made up of all the patients operated on with the

diagnosis of cataract, attended at the Ocular Microsurgery Center of the Cuban Institute of Ophthalmology (ICO): "Ramón Pando Ferrer", in the consultation, during the period from November 2018 to April 2020; from which a sample of 48 patients was selected, operated on by the Phe Chop Phacoemulsification surgical technique, with a foldable intraocular lens implant, selected from the CMO database of the Cuban Institute of Ophthalmology Ramón Pando Ferrer; who fulfilled the inclusion criteria such as having a phacoemulsification criterion, being over 50 years of age, having expressed their willingness to participate in the research and having complete information on the pre and postoperative examinations required for the study.

Patients with general diseases such as: Collagenopathies and immunological conditions, patients with eye diseases such as: eyelid diseases (ectropion, entropion, eyelid ptosis), tear disorders (dry eye), cornéal disorders (dystrophies, degenerations, keratoconus, leucoma), traumatic, complicated and pathological cataracts, glaucoma in any of its classifications, retinal and macular degenerations if detected in the preoperative period, congenital ocular abnormalities (microcornea, aniridia, persistence of the hyperplastic primary vitreous)

Patients who decided to leave the study for medical and / or personal reasons left the study.To output the proposed objectives, the following variables were analyzed: Age, Sex, Lens hardness measured by the LOCSIII (Lens Opacities Classification System) classification system [20], endothelial microscopy, to determine endothelial cell density, hexagonality, coefficient of variation, minimum cell size, maximum cell size, average cell size and pachymetry.Phacodynamic parameters were studied: effective ultrasound time (TEU) and power, provided by the Phacoemulsification team (Revolution, OPTIKON), using the time scale performed (minutes), representing the effective time it took to emulsify the lens nucleus. , which was preset using a variable value of less than 10% power, as the pedal is in position three. The best visual acuity without correction (MAVSC) and the best visual acuity with correction (MAVCC) were evaluated, measured by the Snellen chart, the spherical equivalent (EE), mean induced astigmatism (AMI), contrast sensitivity test, determined at through the Pelli-Robson Primer, the aberometric study, carried out with the OPD Scan II [21].

The index of variation of visual function VF-14 [22]was calculated and its score was related to quality of life and was grouped into poor quality of life (0-25), moderate quality of life (26-50).), good quality of life (51-75) and very good quality of life (76-100).All the patients underwent a preoperative diagnostic line, where after their diagnosis was defined, they explained what the surgical technique consisted of, its risks and benefits, and after surgery they were scheduled for consultation the following day, one week. and one month.A diagnostic protocol was applied where the patient and relatives were asked about their acceptance to perform the surgical procedure, through informed consent, living conditions, hygiene and habits, intellectual level and profession; in addition to conducting a comprehensive preoperative ophthalmological examination and by trained personnel.

To calculate the power of the IOL, the Carl Zeiss IOL Master 700 equipment was used, where Keratometry (K), White - White (White to White, WTW), Anterior Chamber Depth (ACD), Pupillometry, Thickness of the Crystalline, Pachymetry and Biometry, with these data the IOL calculation formula was applied according to their measurements, the 3rd generation formulas used were SRK-T for emmetropic and myopic patients, as well as Hoffer Q for hyperopic patients, for the IOL calculation for its high precision since they are based on the effective position of the lens with respect to the plane of the cornea (ELP) to increase its accuracy.

The surgery was performed following the protocol for the prevention of post-surgical infections, with the implementation of security measures for the surgical procedure and all patients received antibiotic treatment with Ciprofloxacin 0.3% (eye drops) every four hours two days before surgery. On the day of surgery we used Prednisolona and Ciprofloxacin 0.3% every three hours before surgery, pupillary dilation was performed with Phenylephrine and 1% Tropicamide eye drops.

Asepsis was carried out by applying Povidone Iodine 10% on skin of the eyelids and appendages, and Povidone Iodine diluted 5% in both eyes, about three to five minutes before surgery in both eyes. The preparation of the surgical field always included the isolation of the palpebral edge (eyelashes and Meibomian Glands) by means of a sterile surgical field with transparent adhesive that is drilled for the placement of the blepharostat. Anesthetic lidocaine eye drops were placed, after three minutes the surgery was performed, which was performed by phacoemulsification with the OPTIKON Revolution equipment, with constant irrigation of Balanced Saline Solution (BSS) for intraocular and ocular surface irrigation, aswell as the memory foam at 4 °C. The main incision was made in the clear cornea by the most curved meridian according to corneal topography (in 98% of the patients it corresponded to the temporal side in both eyes), using a 2.7mm bevelled blade and a 1mm accessory. The continued circular capsulorhexis was 5mm, somewhat smaller than the lens to be implanted. Hydrodissection released the capsule cortex to perform the bimanual phacofragmentation technique or Pre Chop, with two Nagahara choppers, to emulsify the crystalline nucleus and aspirate the cortex and its remnants with the Buratto bimanual system.

Regarding the ultrasound mode used, the multi-burst or multi-bursts, providing us with 80 milliseconds of long bursts linked to an ultrasound power, was preset at less than 10%, through a linear control of the pedal at the beginning, the impulses are separated by spaces of 2.5 seconds and so on, the bursts increase as we depress the pedal until reaching the figure of four bursts per second, in

this way we avoid unnecessarily administering ultrasonic energy to the eye with the consequent protection of the tissues, being the mode ideal for Chopping or fracturing techniques. The vacuum was prefixed at 400 mmHg, in 5 mmHg steps and a suction flow of 30 ml / min.

After aspiration of the cortical remains, the foldable intraocular lens of hydrophilic acrylic of the Ocuflex brand, model RYCF, was introduced to proceed with the final washing of the remains of the viscoelastic material. No suture was performed, the wound lips were closed by hydrating the lips using a syringe with Balanced Saline Solution (BSS), then an antibiotic (Cefuroxime 750mg- 1mg in 0.1ml) was diluted in BSS to inject it in the anterior chamber at the end of surgery, according to doses recommended by the European Society for Cataract and Refractive Surgery (ESCRS). At the end of the surgery of the first eye, the blepharostat was removed, and the surgical field was cleaned with sterile gauze moistened with BSS and Povidone-Iodine-stained skin of the operated eye; applying topical antibiotic therapy with Ciprofloxacin 0.3%.

The ocular occlusion after surgery depended on the surgeon's criteria and only for the transfer of the patient to the home, although most of them were not occluded.Treatment was started with topical antibiotics with Ciprofloxacin eye drops 0.3%, and steroidal anti-inflammatory drugs (Prednisolone 0.5% or Dexamethasone 0.1%), every two hours, respecting sleep for the first 24 hours and then every four hours, the topical antibiotic was suspended after ten days and the steroidal anti-inflammatory drug was maintained for four weeks after surgery.They were evaluated after surgery at 24 hours, one week, 15 days and six weeks, where the parameters taken into account in the pre-operative examination were evaluated to decide the medical discharge.

The data collection was carried out using forms and they were poured into a database prepared in SPSS version 15.0 previously prepared by the author of the research where the variables under study were included.Descriptive statistical techniques such as mean and standard deviation were used. In the non-compared results, the test used was the Chi square test (of independence or with yacht correction as appropriate), with a significance of 95%, a difference with a value of p <0.05 was considered statistically significant and the contingency coefficient to measure the strength of the relationship.From an ethical point of view, the investigation was justified since it was carried out in accordance with the provisions of the National Health System and provided for in Law No. 41 of the Ministry of Public Health (MINSAP).The patient and their relatives were offered an explanation of the research, its importance, benefits and drawbacks, as it was a non-aggressive and not mandatory study. Informed consent was obtained from the people who participated and their approval was verified by signing these individuals.

Results

In the present study, females were more frequent, who represented more than 60% of the total, as well as those over 70 years of age, who occupied 62.79%. The mean age was 69.4 ± 8.3 years, with a range between 49-84 years.51.16% of the patients had NO3 hardness according to LOCSIII.Regarding the best visual acuity without correction, at the start of the study more than 65% were in the group with vision <0.3; however, after seven days of evolution, only two patients remained with this condition, while 76.75% were in the group between 0.8 and 1.0. In relation to the MAVCC, 93.02% were in this last group.When analyzing the visual acuity means obtained with and without correction, a highly significant increase was observed in both between preoperative and 30 days postoperative, with differences of 0.59D for MAVSC and 0.29D for MAVCC (Table 1).

Table 1: Comparison between the MAVSC and MAVCC means between each evaluation moment.

MAV	Pre	30 días	Diferencia	p
SC	0.28±0.18	0.87±0.23	0.59	0.0000**
CC	0.66±0.25	0.94±0.11	0.29	0.0000**

Source: Database. [**: highly significant (Values are expressed as Mean ± SD; DS: standard deviation of the mean)]

The Pre vs. Post Mean Keratometry showed a difference of 0.08 between the beginning and 30 days after the operation, finding that it was not statistically significant (p> 0.05), therefore, astigmatism was not induced with surgery(Table 2). Most of the patients had a refractive cylinder initially 0.75D or more, who represented 74.42%, however after seven days of evolution 72.09% had less than 0.5D.The mean refractive cylinder (Table 3) at the beginning of the study was -1.10 ± 0.86D, which had a highly significant variation in 0.55D (p <0.01), measured thirty days after surgery.As can be seen in Figure 1, the refractive cylinder and the mean post-surgery keratometric do not have a linear correlation (r = - 0.07). The mean keratometric cylinder values range between 42 and 47 independently of the refractive cylinder values. High and low order corneal aberrations, as observed in Table 4, experienced significant increases in the order of 0.21 and 0.17; respectively, while when comparing the means of the totals, a significant reduction of 0.15 was observed.

Table 2: keratometry comparison between the means of each evaluation moment.

Km	Media ± DS	Diferencia	p
Pre	43,88±1,75	0,08	$p=0.8224^{ns}$
30 días	43,80±1,60		

Source: Database. [ns: not significant; DS: standard deviation of the mean].

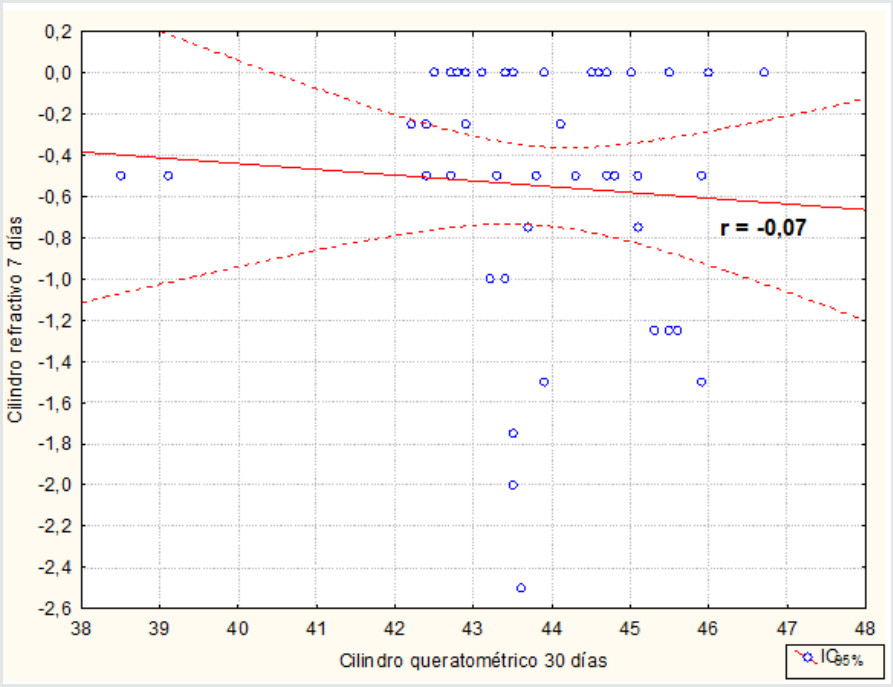

Figure 1: Scatter diagram of the relationship between the refractive and keratometric cylinder (r: Pearson's correlation coefficient). Source: Database.

Table 3: keratometry comparison between the means of each evaluation moment.

CilindroRefractivo (D)	Media ± DS	Diferencia	P*
Pre	-1.10±0.86	0.55	<0.001
7 días	-0.55±0.62		

Source: Database.* associated with T-test for paired data

Table 4: Corneal aberrations comparison in each evaluation moment.

Aberracionescornéales		Media ± DS	Diferencia	p
HOA	Pre	0.71±0.39	0.21	0.0000**
	30 días	0.92±0.46		
LOA	Pre	2.11±0.84	0.17	0.0236*
	30 días	2.28±0.84		
Totales	Pre	2.19±0.50	-0.15	0.0102*

Source: Database. [**: highly significant; DS: standard deviation of the mean]

The values of the Pearson correlation coefficients calculated for the interaction between the values of the high order pre and post aberrations with respect to those of the refractive cylinder and the mean keratometric pre vs post are very low, which denotes that there is no relationship between these variables. Only a positive relationship was found between the post-surgery high order aberrations values with respect to the refractive cylinder measured on the seventh day.51.17% of the eyes in the pre-operative period had refractive astigmatism against the rule, a situation that changed one month after the operation and 60.47% of the patients changed to astigmatism according to the rule.The preoperative refractive defect 46.53% of the cases had mixed astigmatism and 39.53% compound myopic astigmatism, and one month after surgery 27.91% had simple myopic astigmatism and 23.26% compound myopic astigmatism.

The preoperative quality of life was good in 90.69% and very good in 9.31%; According to the FV-14 survey, it was observed that the activities in which they manifested a degree of considerable difficulty were those related to near vision in terms of reading small printed letters, such as those in the telephone directory, on drug labels (Question 1) as well as reading newspaper and magazine articles (Question 2), they also referred this qualification for performing fine manual work (Question 7) and filling checks or filling forms (Question 8). Regarding distance vision, they rated the activity related to watching TV quite difficult (Question 12). %; one month after surgery, it was found that 100% of the patients had very good visual quality.

Discussion

The study of the relationship of astigmatism with visual quality as a result of cataract surgery by phacoemulsification, when analyzing its demographic data, showed that females were more frequent, who represented more than 60% of the total, as well as those over 70 years of age, who occupied 62.79%. The mean age

was 69.4 ± 8.3 years, with a range between 49-84 years. Nieves López C.J. and cols reported in their study an average patient age of 66.1 ± 12.4 years and 58.92% were women [23]; Mateo Garbas J. reported an average of 73.1 ± 9.6 years and 73.3% were women [24] , Castillejos Santos A. studied patients with an overall average age of 74.25 years, with the female sex also predominant [25]; Pico Garcia A. found in his research 61.19% of patients over 60 years of age and women also represented 51% of the sample [26], all these data reaffirm that the elderly is a growing group due to the increased life expectancy of the population, who need health services that, among other aspects, guarantee ophthalmological care, and within it cataract surgery.

The cataract has different degrees of hardness according to the LOCS III classification, and for this study 51.16% of the patients had NO3 hardness, Castillejos Santos A. reported that the subjects operated on in their study presented corticonuclear cataract (CN) in a 68.18 % [25]; Hernandez Silva JR., Reported in her study significant results in the staging of LOCS III in the group of nuclear opalescence and nuclear color 2 and 3 with a value of 30.0 and 22.5%, respectively [27].In the vision analysis regarding the best visual acuity without correction, at the beginning of the study more than 65% were in the group with vision <0.3; however, after 30 days of evolution, vision in 76.75% improved between 0.8 to 1.0, this analysis in relation to MAVCC, 93.02% of patients improved between 0.8 to 1, 0; therefore, a highly significant increase in vision is observed between pre-operative and 30 days post-operatively. Nieves López C.J. et al., report that 82.14% of patients reached less than 0.1 in their AVSC and after surgery 53.57% reached vision greater than 0.6, in their AVMC [23], Mateo Garbas J. reports that the mean value of far VA without correction was 0.2 and for far VA with the best correction, the mean value was 0.45 in the study group similar to that of this investigation [24]; Pico García A., in his study, reported a mean preoperative AVSC of 0.12, which improved to 0.32 a week, and when corrected with crystals, went from 0.33 in the preoperative period to 0.56 a week after surgery [26], all these reports correspond to the results of this work.

The Pre vs. Post Mean Keratometry, for this investigation, did not show statistically significant values (p> 0.05) between the beginning and one month after the operation, so astigmatism was not induced with surgery; the refractive cylinder was initially 0.75D or more, in 74.42% of cases, and after seven days of evolution 72.09% of them had less than 0.5D. The mean of the induced keratometric astigmatism was 0.45 D due to phacoemulsification in the study by Hernández Silva JR. et al [19]; Nieves López C.J. et al. found that the total number of patients with astigmatism increased between the pre and postoperative period (89.28% to 98.28%), with respective variation from 1.43D ± 0.79 to 2.20D ± 0.99 diopters, an increase average of 0.78D (p = 0.000) and induction of astigmatism in 9.09% of the operated [23]; Mateo Garbas J., found in his work that refractive astigmatism decreased significantly with surgery (P <0.001) [24]; Castillejos Santos A., reported that the total cylinder decreases markedly from the preoperative one week after surgery, possibly due to the extraction of the opacified lens that induces unwanted astigmatisms [25]; Pico García A., in his research, found a mean preoperative astigmatism of 0.77D (SD 0.55), range 0.05 to 2.99, which showed values of 0.75D a week and a mean of 0.02. (SD 0.56) range 0.00 to 3.00, which were not significant P = 0.646; and at the end of the study the mean astigmatism was 0.67D with a mean of 0.08D, which represents a significance of P = 0.011 [26]. The mean of the induced keratometric astigmatism was 0.61 diopters one month after surgery, according to González Peña A. et al. [28], in their study; for his part, Hernández Ramos H. in his research found that there was a significant reduction in the mean astigmatism induced between the pre and postoperative period, parameters that evaluate the quality of the process and its results [29,30].

The values of the Pearson correlation coefficients calculated for the interaction between the values of the high order pre and post aberrations with respect to those of the refractive cylinder and the mean keratometric pre vs post for this investigation are very low, which denotes that it does not exist relationship between these variables, only a positive relationship was found between the values of high-order aberrations after surgery with respect to the refractive cylinder measured on the seventh day by the immediate changes in corneal curvature and transient corneal edema after cataract surgery by phacoemulsification , with incisions less than three millimeters in the most curved corneal meridian.51.17% of the eyes in this investigation in the pre-operative period had refractive astigmatism against the rule, a situation that changed one month after the operation and 60.47% of the patients changed to astigmatism according to the rule. Pico García A. reports that 38% of the cases in his study had corneal astigmatism according to the rule, 45% corneal astigmatism against the rule and 17% oblique astigmatism in the preoperative period [26].

The classification of the refractive defect in this study showed in the preoperative period that 46.53% of the cases had mixed astigmatism and 39.53% compound myopic astigmatism, and one month after surgery 27.91% had simple myopic astigmatism. and 23.26% compound myopic astigmatism when we speak of astigmatism in patients with cataract.All the previously analyzed studies, closely related to each other due to their results, reaffirm the idea that when studying a patient for cataract surgery by phacoemulsification, an exhaustive pre-operative examination is essential to optimize the surgical result, taking into account that approximately 40% of cataract patients have astigmatism higher than diopter1, and pseudophakic patients show post-surgical astigmatism higher than 0.75 D, the results of which decrease visual acuity in quantity and quality, resulting in a deterioration in quality of life of these patients.

According to the FV-14 quality of life survey, in the preoperative period it was good in 90.69% and one month after surgery it increased to 100% of the patients. Hernández Ramos H. reports in the pre-operative period more than 60% of his cases with poor visa quality, which improved to more than 98.3% of the cases that reported good or very good quality of life in the postoperative period [29]; meanwhile Luján Paredes S. [30] concludes that the use of questionnaires allows an adequate measurement of the results of the surgery, knowing the clinical response and the degree of patient satisfaction, which leads to a better quality of life Harrer A&MilanésArmengol AR [31-33]observed a significant improvement in visual acuity represented in visual recovery and quality of life, according to the FV-14 visual function index, with a high degree of validity, results that coincide with this research. Research related to quality of life and cataract surgery have been carried out in Cuba by Trujillo Fonseca & Rodríguez Suárez B. [34-36], which coincide with the results of this study.

The current lifestyle dynamics that brings with it very specific visual needs to drive, read, consult the cell phone and work with the computer machine, patients seek a definitive refractive solution with cataract surgery, so they meet The objective of greater vision in quantity and quality includes evaluating the corneal curvature, and then deciding the lens to be implanted in the model and power, according to the personalized visual needs of each patient.In this preoperative study, we must take into account the prognostic factor and we must evaluate other aspects that may negatively influence the result expected by the patient after cataract surgery, which is why it is important to evaluate the tear film, optic nerve and taint.The analysis of the results shown in this study and those consulted showed that, to control the induction of astigmatism in cataract surgery, in the preoperative study it is necessary to consider the evaluation of corneal curvature and toricity, we must perform a corneal topography and an optical biometry, evaluate the anterior and posterior corneal surface and use the intraocular lens calculators with the appropriate information and the use of the latest generation calculation formulas, and as a result of this analysis find the correct decision for each case.

Currently, in addition to the correction options for astigmatism related to the incisions typical of cataract surgery due to phacoemulsification in the most curved meridian, corneal incisions for major astigmatisms; The toric lens is the option that offers the best predictability in the correction of astigmatism in patients who present with cataract, and although there are no studies that demonstrate full efficacy in correction, if pre, intra and postsurgical risk factors are controlled, may improve the accuracy of the results of phacoemulsification cataract surgery.

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DOI: 10.32474/SCSOAJ.2020.05.000218

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