EVALUATION OF OCULAR ANATOMICAL CHANGES AFTER SCLERAL BUCKLING SURGERY

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INTRODUCTION

Retinal detachment (RD) is a condition in which the neurosensory retina is separated from the retinal pigment epithelium. Among all the types of RD, the rhegmatogenous retinal detachment (RRD) is the most common of them[1]. The incidence of RRD ranges from 10 to 20 cases per 100.000 inhabitants per year[2].The RRD features vitreoretinal tractional forces that result in a full thickness retinal break, then the liquefied vitreous gel enters the subretinal space through the break, causing separation of the neurosensory retina from the underlying retinal pigment epithelium. RRD requires urgent vitreoretinal intervention and, if untreated, permanent loss of vision may occur.

Primary scleral buckle (SB) is one of the possible definitive managements of RRD in selected cases, such as uncomplicated retinal detachment in phakic eyes[3]. The goal is to relive the vitreoretinal traction through the scleral buckling and externally drain the subretinal fluid. All breaks must be located, then treated with cryotherapy or laser retinopexy.[3] Although infrequent, anterior segment complications following retinal reattachment operations have been reported, such as angular closure, anterior rotation of the ciliary body, shallowing of the anterior chamber, anteriorization of the iris and lens, anterior segment ischemia, besides refractive errors[3,4].

In the past years, the advancement of technology has enabled the creation and development of devices that analyze anatomically and functionally the eye, that helps the surgeon to evaluate and decide for the best treatment option individually.

In this prospective study, we evaluate thought optical biometer and corneal tomography measurements the keratometry (K), the central corneal thickness (CCT), anterior chamber depth (ACD) and the axial length (AL). We aim to analyze the anatomical changes caused by primary scleral buckling in RRD.

PURPOSE

The aim of the present study was to evaluate the anatomical changes caused by scleral buckling surgery through the analysis of parameters from optical biometry and corneal tomography in Santo André, Brazil.

METHODS

A prospective study was conducted between May 2020 and October 2020. Patients with RRD treated with scleral buckling surgery in a tertiary outpatient clinic specialized in retinal diseases in Santo André, Brazil, were invited to participate in the study. Exclusion criteria were presence of other retinal diseases and requirement of other surgical approaches than scleral buckling such as posterior vitrectomy or phacoemulsification.

The keratometry parameters and central corneal thickness were measured through corneal tomography (ORBSCAN II). The anterior chamber depth and axial length were acquired through optical biometrics. All measurements were obtained before surgery and after surgery (Day 1st, day 7th and day 30th pos-operative respectively PO1, PO7 and PO30).

All data were tabulated, and statistical analysis was performed SPSS software 17.0 version to Windows (SPSS Inc, Chicago).

RESULTS

12 patients were included in the study, 08 (66,66%) males and 04 (33,33%) females, with a mean (SD) age of 60±12,6 years. The main anthropological features are described in Table 1. All patients were diagnosed with RRD and underwent scleral buckle surgery.

Table 1. Anthropological features described as percentage and mean ± SD .

Characteristics		Value
Age (mean ± SD)		60 ± 12,6
Gender (%)	Male	66,66
	Female	33,33
Eye (%)	OD	50,00
	OS	50,00

Regarding the ACD, the patients showed a mean decrease of 13,94% ± 5,61% in the first day postoperative compared to the preoperative measurements. In the 7th day postoperative, the decrease was maintained, however at lower levels compared to the first day, with a mean of 6,08% ± 3,30%. After one-month postoperative, the mean decrease was 5,49% ± 2,75% compared to the preoperative measurements. The average variation of the parameters was described in table 2.

Table 2. Parameters mean variations ± SD (comparison pre- and postoperative).

Parameters	PO1	PO7	PO30
ACD	-13,94±5,61%	-6,08±3,30%	-5,49±2,75%
K1	*	-3,27±4,74%	+1,15±11,28%
K2	*	+0,48±2,49%	+1,32±1,14%
AL	+0,81±0,50%	+0,06±2,11%	+0,89±0,61%
CCT	+4,18±2,92%	+4,02±4,19%	+2,54±5,278

Legend: ACD, anterior chamber depth; K1, flat keratometry; K2, steep keratometry; AL, axial length; CCT, central corneal thickness.

As for the keratometry, the axial length and central corneal thickness, variation in the measurements of these parameters was observed, tough no statistically significant patterns were observed. The parameter variation graphic is demonstrated in figure 1.

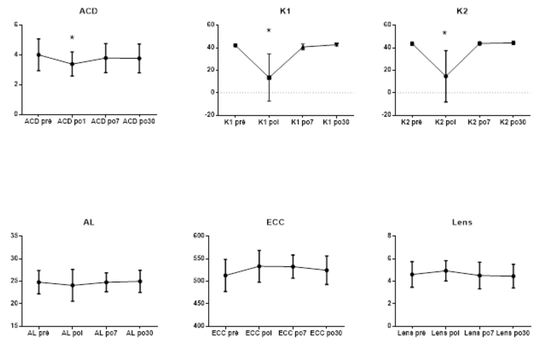

Figure 1: Parameters variations throughout follow up

Legend: ACD, anterior chamber depth; K1, flat keratometry; K2, steep keratometry; AL, axial length; CCT, central corneal thickness.

DISCUSSION

The main result in our study was the difference in the ACD during the postoperative follow-up. There was a mean decrease of 13% in anterior chamber depth at the first day postoperative compared to previous measurements before surgery. This outcome reinforces the correlation with possible complications expected in the postoperative period and previously described in the literature, such as angular closure and anteriorization of the iris and lens[3,4]. Thus, a careful preoperative evaluation of the anterior chamber structures thought biomicroscopy examination and close follow-up of the intraocular pressure after surgery are fundamental.

The decrease in ACD remains in seven and thirty days postoperative, but at lower levels, with an average of 6% and 5%, respectively, compared to the period prior to surgery. In order to promote the study of the anterior chamber structures thought the period pre- and postoperative, we suggest extending the analysis to ultrasonic biomicroscopy and optical coherence tomography of the anterior chamber.

Differences in keratometry measurements may be related to refractive alterations also described by other authors[3,4]. In our study, K1 and K2 varied without establishing a solid pattern. It would be interesting to increase the number of study participants to confirm whether the parameter would establish a patter of variation or not. Furthermore, it would be interesting to enhance the study to compare refraction before and after surgery, to verify the influence of keratometry on refraction. The same reasoning is valid for the AL, which can also influence the refraction of these patients, and in our study, it also showed variations in the measurements without a pattern.

These data are preliminary, and it will be necessary to evaluate a larger number of patients for a longer period to corroborate the results found in our study.

CONCLUSION

In the present study, the main alteration detected in the anterior chamber was the decrease of its depth. This result correlates with some of the possible complications expected in the postoperative period of scleral buckle surgery.

These data are preliminary, requiring a larger number of patients in order to establish new relationships and confirm the results obtained.

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