Introduction

Previous studies have shown that many cases display some degree of anterior chamber shallowing and angle narrowing in the early postoperative period after scleral buckling surgery for retinal detachment, with incidence increasing as examinations are performed closer to the actual time of surgery **(Hartley & Marsh; 1973).**

Choroidal detachment was found to develop occasionally following scleral buckling procedures for cases of rhegmatogenous retinal detachment. The ciliary body presumably is involved in these choroidal detachments, although there has been no means of detecting its presence. With the development of ultrasound biomicroscopy (UBM), it is possible to clinically and echographically observe the ciliary body at a high resolution **(Pavlin et al; 1993).**

Some patients with shallow anterior chambers have choroidal detachments visible on fuduscopic examination, but in most cases no detachments are detected clinically. The cause of this syndrome has been ascribed variously to anterior movement of

anterior segment structures secondary to choroidal detachment, ciliary body thickening or direct globe distortion from the buckle. Experimental studies have supported these theories, but direct confirmation of events occurring in patients has not been possible previously **(Pavlin et al; 1997).**

Different parameters such as anterior chamber depth, degree of angle opening, level of supraciliary effusion and ciliary body changes can now be imaged and assessed quantitatively, both pre and postoperatively using the ultrasound biomicroscope (UBM) **(Pavlin & Foster; 1994).**

Recently, with the use of ultrasound biomicroscopy (UBM), ciliochoroidal detachment was detected in a high percentage of cases following scleral encircling, but in a relatively lower percentage of cases following segmental scleral buckling **(Kawahara et al; 2000).**

Aim of Work

The aim of this study is to evaluate the changes in the ciliary body and anterior choroid as well as to identify and quantify changes in anterior segment parameters after scleral buckling procedures for rhegmatogenous retinal detachment using ultrasound biomicroscopy (UBM).

Contents

List of Abbreviations

AC: Anterior Chamber.

ACG: Angle-Closure Glaucoma.

ANOVA: Analysis of Variance.

AOD: Angle Opening Distance.

CB: Ciliary Body.

CCE: CilioChoroidal Effusion.

DOF: Depth of Field.

Fig.: Figure.

ILCD: Iris-Lens Contact Distance.

IOL: Intraocular Lens.

IOP: Intraocular Pressure.

LSD: Least Significant Difference.

N.: Number of cases.

OAG: Open-Angle Glaucoma.

ODLU: Ophthalmic Diagnostic and Laser Unit.

PC: Posterior Chamber.

***P* value:** Probability value.

PVD: Posterior Vitreous Detachment.

PVDF: Polyvinylidene Difluoride.

PVR: Proliferative Vitreoretinopathy.

RD: Retinal Detachment.

RPE: Retinal Pigment Epithelium.

SD: Standard Deviation.

SPSS: Statistical Package for the Social Science.

SRF: Subretinal Fluid.

TGC: Time-Gain Compensation.

UBM: Ultrasound Biomicroscopy.

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Anterior segment assessment using ultrasound biomicroscopy (UBM) following scleral buckling procedures

Thesis

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Discussion

Previous studies done by Hartley and Marsh in 1973 have shown that many cases with rhegmatogenous retinal detachment undergoing conventional scleral buckling procedures experienced some degree of anterior chamber shallowing and angle narrowing in the postoperative period with incidence increasing as examinations are performed closer to the actual time of surgery.

In 1997, Pavlin and his colleagues reported that some of the patients undergoing scleral buckling procedures have ciliochoroidal detachments visible on funduscopic examination, but in most cases no detachments are detected clinically. They ascribed the reason for this syndrome to anterior displacement of anterior segment structures, ciliary body thickening and direct globe distortion from the buckle. Experimental studies have supported these theories, but direct confirmation of events occurring in patients has not been possible previously.

The aim of this work is to identify and quantify the changes in anterior segment parameters in terms of anterior chamber depth

and angle width as well as the changes in ciliary body thickness and ciliochoroidal effusion (detachment) if present, using ultrasound biomicroscopy (UBM) after scleral buckling surgeries for rhegmatogenous retinal detachment. The values of these parameters in thirty eyes with such diagnosis were studied and compared pre- and postoperatively. The postoperative follow-up period was six weeks.

In this study, the anterior chamber depth was found to change at 6 weeks postoperative in comparison to its preoperative values in all cases (100%), but with variable amount of change. The mean preoperative anterior chamber depth was 2.892 mm (SD = 0.362), while at 6 weeks postoperative, the mean depth was found to be 2.739 mm (SD = 0.354). The difference between preoperative and 6 weeks' postoperative mean values is 0.153 mm. This was found to be statistically significant.

In 1997, Pavlin and his colleagues examined 15 patients with rhegmatogenous retinal detachment within one week before and after surgery. They reported that anterior chamber depth decreased after surgery in 14 patients (93%). The average change in depth was 0.22 mm.

However, Yasuhiro and his coworkers conducted an almost similar study on 33 eyes that were UBM-examined preoperatively and up to 14 days postoperatively. They reported that the anterior chamber depth became shallower at 0.15 mm to 0.54 mm in 12 eyes (36.4%) after surgery, but remained unchanged in the other 21eyes.

In 2000, Kawahara and his colleagues recorded shallowing of the anterior chamber depth in all 11 eyes (100%) after scleral encircling buckles and in 12 of 20 eyes (60%) after segmental scleral buckling.

From this study we concluded that the anterior chamber angle width in four quadrants changed at 6 weeks postoperative follow-up in comparison to preoperative values. The mean values of angle width (in degrees) in the four quadrants were found to be less at 6 weeks postoperative follow-up in comparison to preoperative values. However, none of our patients had complete angle closure or glaucoma by the end of follow-up period.

The mean change in angle width between preoperative and 6 weeks' postoperative values in superior quadrant was 4.81°. In inferior quadrant, it was 5.56°. In nasal quadrant, the mean change was 4.36°, and finally in the temporal quadrant, it was found to be 5.84°. From these values we calculate the mean change in angle width in all quadrants to be 5.14° shallower by the end of follow-up period (6 weeks postoperative) than mean preoperative measurements.

By correlating different events from this study, we can conclude that these changes could be strongly contributed to the fact that the low IOP (soft tension) in an eye with RD deprives the iris-lens diaphragm from its support with consequent posterior displacement of this diaphragm. The lens is slightly displaced posteriorly and the iris loses its normal support from the crystalline lens, and consequently shows posterior bowing *(sagging sign)*. This sign was evident in most preoperative UBM images of included cases. This sign disappeared completely from all postoperative images after reattachment of the retina and regaining of normal IOP.

Pavlin and his colleagues reported a decrease in angle opening in all 15 patients (100%) included in their study in 1997. The