Visualization of ciliary body structures after preoperative anti-inflammatory treatment in rhegmatogenous retinal detachment complicated by choroidal detachment

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EVRS, Prague, 2018
It is known that rhegmatogenous retinal detachment (RRD) in 0.5-4% is complicated by choroidal detachment (CD). An important role in the pathogenesis of this complication and in the degree of expression of intraocular inflammation is the disruption of the function of the ciliary body, however, the description of its morphological changes in the literature for this pathology is not presented.

To study the morphometric changes of ciliary body structures in RRD complicated by CD after preoperative anti-inflammatory treatment.
Materials and Methods

- 31 eyes of 31 patients were evaluated
- 14 males and 17 females
- Age ranging from 24 to 83 years and a mean age of 54.1 ± 14.9 years
- Duration of RRD – 20.6 ± 11.1 days (from 7 to 60 days)
- Height of CD 4.49 (2.29) mm
- Intraocular pressure (IOP) 7.7 ± 1.7 mm Hg
- Preoperatively the visual acuity (VA) was varying: from NPL to 0.04 with correction
- Observation period from 1 up to 4 days
Materials and Methods

All patients underwent the following examinations of both eyes before and after preoperatively anti-inflammatory treatment:

- Visometry
- Tonometry
- Biomicroscopy
- Ophthalmoscopy
- Ultrasonography (A-scan)
- Ultrasound Biomicroscopy (UBM)
- Near-Infrared transpalpebral transillumination (NIR TPT)

Before vitrectomy, all patients received anti-inflammatory treatment by intravitreal administration of 4.0 mg of triamcinolone acetonide (TA), either alone or in combination with perfluoropropane (C3F8) 0.5 – 0.8 ml until IOP became normotensive.

The intravitreal anti-inflammatory treatment used in this study aimed to remove intraocular inflammation and resolve the choroidal detachment in order to reduce the risk of intra- and post-operative complications of retinal reattachment surgery.
Materials and Methods

The ciliary body was visualized with NIR TPT, this used technique consisted of a wireless LED infrared light (IR) source (wavelength of 940 nm), slit-lamp attachable monochrome video camera capable of recording near-IR images and video, and computer with a software for processing the video captured from the camera and transferring the processed signal to the display. Images of scleral shadows of the pars plicata and pars plana extending to the ora serrata were taken and saved in the computer. The widths of the shadows of ciliary body structures were measured with calipers. These measurements were made at four meridians: 12 o’clock, 6 o’clock, nasally (3 o'clock OD and 9 o'clock OS), and temporally (9 o'clock OD and 3 o'clock OS).
Results

In all affected eyes, UBM revealed improvement in CD after anti-inflammatory therapy, although the retinal detachments were still present, and we noticed that:

- Pars plana reattached to the sclera in 29 eyes,
- Ciliary body thickness decreased from 0.83 ± 0.1 mm at baseline to 0.66 ± 0.1 mm at day 1, 2, 3 or 4 after anti-inflammatory treatment (P < 0.001),
- Mean IOP improved from 7.7±1.7 mmHg at baseline to 14 ± 1.0 mmHg at day 1, 2, 3 or 4 after anti-inflammatory treatment (P = 0.0001), whereas IOP in intact fellow eyes did not change (18 ± 1.0 mm Hg).

![Images of UBM scans](image-url)

- a. Superior meridian
- b. Nasal meridian
- c. Inferior meridian
- d. Temporal meridian
Results

Mean baseline dimensions of ciliary body pars plicata in eyes with RRD complicated by CD comparing to fellow intact eye and to those after preoperative anti-inflammatory treatment:

- Mean baseline thickness of the pars plicata was statistically significantly higher than in intact fellow eyes (0.83 ± 0.1 mm versus 0.65 ± 0.1 mm (P = 0.02, n = 31)) and decreased after preoperative anti-inflammatory treatment to 0.66 ± 0.1 mm (P < 0.001, n = 31).
- Mean baseline width of the pars plicata was statistically significantly higher than in intact fellow eyes (2.4 ± 0.1 mm versus 1.9 ± 0.1 mm (P = 0.01, n = 31)) and decreased after preoperative anti-inflammatory treatment to 2.2 ± 0.1 mm (P < 0.05, n = 31).
Results

Mean baseline dimensions of ciliary body pars plana in eyes with RRD complicated by CCD comparing to fellow intact eye and to those after preoperative anti-inflammatory treatment:

- **Before preoperative anti-inflammatory treatment**, the pars plana width was determined in 29 eyes after ciliary body reattachment and the average index was 4.7 ± 0.7 mm.

- **On fellow eyes**, the pars plana width was insignificantly different from initial values of the affected eyes and averaged 4.65 ± 0.3 mm (P = 0.6, n = 29).

- **After anti-inflammatory treatment and ciliary body reattachment**, it was possible to assess the pars plana width in all quadrants and it did not change in comparison with initial values and averaged 4.68 ± 0.7 mm (p > 0.05, n = 29).
Results

According to obtained morphometric data from UBM and NIR TPT, a difference in pars plana width was established in patients:

- **With axial length up to 24.9 mm** – 11 eyes (35.5%), the pars plana width averaged $4.2 \pm 0.6$ mm.
- **With axial length higher than 25 mm** – 20 eyes (64.5%), the pars plana width averaged $4.74 \pm 0.63$ mm.
Conclusions

1. **First**, in eyes with rhegmatogenous retinal detachment complicated by choroidal detachment, pars plana detachment were observed, and pars plicata width and thickness were greater than in intact fellow eyes, which may be evidence of intraocular inflammation.

2. **Second**, in eyes with rhegmatogenous retinal detachment complicated by choroidal detachment, there was evidence of re-attachment of the pars plana as well as reduction in pars plicata thickness and width after preoperative anti-inflammatory treatment.

3. **Finally**, ciliary body detachment tends to occur in longer eyes (therefore, those with a greater pars plana width) with rhegmatogenous retinal detachment complicated by choroidal detachment. Thus, the percentage of eyes longer than 25 mm (i.e., eyes with a wider pars plana) was 64.5% among eyes with RRD complicated by CD.
Quilibet debet, solem videre!
Everyone is born to see the sun!

Academic Filatov Vladimir Petrovich