

**Incidence and Effect of Unintentional Macula Displacement
Following Rhegmatogenous Retinal Detachment Repair
Thesis**

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in Ophthalmology

By

Mohammed AbdAllah Ahmed Abada

M.B.B.Ch; M.Sc. Ophthalmology

Under supervision of

Dr. Mahmoud Ahmed Kamal

Professor of ophthalmology

Fayoum University

Dr. Amr Abdelaziz Azaab

Professor of ophthalmology

Research institute of ophthalmology

Dr. Ragai Magdi Hatata

Lecturer of ophthalmology

Fayoum University

Dr. Khalid Kotb AbdAllah

Lecturer of ophthalmology

Fayoum University

Fayoum University
Faculty of medicine
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Summary

Pars plana vitrectomy (PPV) was first introduced by Machemer in 1972. Since then, PPV has undergone a major technical development and has become a standard procedure for rhegmatogenous retinal detachment (RRD) with favorable outcomes.

Despite all advantages and successful re-attachment of the retina, numerous studies have shown that up to 70% of patients did experience a retinal shift postoperatively. Retinal shift may lead to distorted vision and even severe binocular diplopia, especially in cases of macular involvement.

Unfortunately, young patients are at risk for complaining more about visual disturbances, such as metamorphopsia. Therefore, it is in the interest of the surgeon to discover methods and factors that decrease retinal shift after PPV in RRD.

Shiragami et al. have visualized retinal shift as hyperfluorescent lines by using fundus autofluorescence images (FAF). Those hyperfluorescent lines were described as retinal vessel printings or retinal pigment epithelium (RPE) vessel ghosts that indicate the location of retinal vessels preoperatively. By this method, retinal shift has also been observed preoperatively in cases of epiretinal membrane, while it has been observed following PPV in cases of idiopathic epiretinal membrane and macular hole surgery.

Various studies reported their outcomes after retinal detachment repair.

Also, prior studies investigated the relationship between metamorphopsia and retinal microstructure using spectral-domain optical coherence tomography in patients with RDs. The integrity of photoreceptor

line, inner retinal thickness and central foveal thickness was associated with the severity of metamorphopsia in patients with ERM. Fluid cuff size and asymmetric elongation of foveal tissue were related to metamorphopsia in macular hole patients. In patients after RD surgery, 36% of eyes having metamorphopsia exhibited abnormal structures in the macular region (ERM, disruption of ellipsoid zone [EZ], cystoid macular edema, macular hole, or subretinal fluid).

The aim of this study was to investigate the incidence of unintentional macular displacement by using fundus auto-fluorescence (FAF) imaging in eyes undergoing PPV for repair of primary RRD and tamponated with either SO or gas, its association with symptoms of visual disturbance and OCT changes following rhegmatogenous retinal detachment repair.

Forty eyes of forty patients which met the inclusion criteria were enrolled in the study. Patients were divided into two equal groups (A and B) according to intraocular tamponade; group (A) patients underwent pars plana vitrectomy with silicon oil, group (B) patients underwent pars plana vitrectomy with gas. Both groups were followed up for six months.

Inclusion criteria:

- Uncomplicated rhegmatogenous retinal detachment involving 1 or more quadrants (with PVR grade A or B) assigned for primary vitrectomy.

Uncomplicated RRD were defined as RRD without proliferative vitreoretinopathy (PVR) or with PVR grade A (vitreous haze and pigment) or grade B (wrinkling of the inner retinal surface, retinal stiffness, rolled edge of breaks, and vessel tortuosity).

A signed informed consent was obtained from all patients.

Exclusion criteria:

Patients were excluded if they have any of the following:

- 1-History of previous vitrectomy
- 2- Previous RRD repair.
- 3- Old standing Retinal Detachment(with Proliferative Vitreoretinopathy more than Grade B).
- 4- Corneal opacity.
- 5- History of binocular diplopia or macula disease.

Of the 40 cases, fundus autofluorescence images showed retinal displacement in 11 eyes (**27.5%**) after surgery. In group (A), 3 eyes showed retinal displacement upwards with incidence (**15%**). In group (B), 8 eyes showed retinal displacement downwards with incidence (**40%**).

In patients whose FAF images showed retinal displacement (11 eyes), the mean pre-operative BCVA (in logMAR) was **2.2 ± 0.60** and the mean post-operative BCVA **0.7 ± 0.2**. And in other patients whose FAF images showed no retinal displacement (29 eyes), the mean pre-operative BCVA (in logMAR) was **2.1 ± 0.90** and the mean post-operative BCVA **0.8 ± 0.3**. With no significant difference between these two groups in BCVA.

All patients underwent screening for symptoms of distortion using Amsler grid test, **12** patients from Group (A) reported to have Metamorphopsia in comparison to the **14** patients from Group (B) who also reported to have post-operative Metamorphopsia. While micropsia was detected in **4** patients from group (A) in comparison to **one** patient from

group (B). With no significant difference between the two groups in neither metamorphopsia nor micropsia detected in our patients.

In the patients with evidence of retinal displacement on FAF, metamorphopsia and micropsia were present in **81.8% (9/11)** eyes and **18.2% (2/11)** respectively, on the other hand in those with no evidence of retinal displacement on FAF, metamorphopsia and micropsia were present in **58.6% (17/29)** eyes and **10.3% (3/29) respectively.**

OCT images were reviewed for disrupted retinal structure postoperatively, **11** patients from Group (A) had an OCT abnormality in comparison to the **12** patients from Group (B) had an OCT abnormality. Overall among 40 eyes treated with vitrectomy for rhegmatogenous retinal detachment, **57.5% (23/40)** had an OCT abnormality at this time of imaging (for group (A) mean time of imaging is **21.2± 7.0 days** after SO removal and for group (B) first follow up visit following absorption of intraocular gas tamponade).

