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Article

Prevalence of Cystoid Macular Edema after Vitrectomy for Dislocated Lens Fragments

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Abstract

Pseudophakic cystoid macular edema (CME) is one of the most significant issues of visual impairment after cataract surgery. Phacoemulsification has significantly reduced the incidence of pseudophakic CME to 0.1 %. Optical coherence tomography (OCT) evidence of CME after small incision phacoemulsification is 4 %. CME was reported in up to 28 % of eyes after pars plana vitrectomy for retained lens fragments and becomes chronic in about 20% of these eyes. The present study aimed to determine the prevalence of CME in cases complicated with dislocated nuclear fragments. Thirty-five eyes of 35 patients were recruited for the study. All cases underwent pars plana vitrectomy (PPV) for dislocated nuclear fragments after complicated phacoemulsification. The outcomes were central foveal thickness, average macular thickness and macular volume measured by optical coherence tomography (OCT) at the 3rd, the 6th and 12th months postoperatively. The results illustrated that eight eyes (22.8 %) had CME detected by OCT at the 3rd months, while only 5 eyes (14.3 %) at the 12th months and only 4 eyes (11.4 %) had chronic CME. We concluded that the prevalence of CME is higher in cases complicated with dislocated nuclear fragments than uneventful phacoemulsification.

Keywords
Dislocated lens fragments, Pars plane vitrectomy, Cystoid macular edema, OCT

1. Introduction

Pseudophakic cystoid macular edema (CME), also known as Irvine-Gass syndrome, is one of the most significant issues of visual impairment after cataract surgery (Flach, 1998). Phacoemulsification and small incision cataract surgery have significantly reduced the incidence of pseudophakic CME (Perente, 2007; Belair, 2009; Loewenstein, 2010). CME was reported in up to 28% of eyes after pars plana vitrectomy for retained lens fragments and becomes chronic in about 20% of these eyes (Ho, 2007).

2. Patients and Methods

This is a prospective nonrandomized interventional case series in which 35 patients with a history of PPV for dislocated nuclear fragments after complicated phacoemulsification were recruited. The study was conducted in the department of ophthalmology, Sohag University Hospital during the period between February 2019 and December 2020. Written informed consent was taken from all patients about the planned investigations, the nature, and the aim of the study. Approval

of the ethical committee of the Sohag faculty of medicine was fulfilled. The study complied with the tenets of the Declaration of Helsinki.

Inclusion criteria: Eyes with the posteriorly dislocated nucleus, nuclear fragment(s), during phacoemulsification for age-related cataracts, and underwent PPV were included in this study.

Exclusion criteria: Previous pars plana vitrectomy, cases complicated with retinal detachment or endophthalmitis, presence of CME documented before cataract surgery, diabetic retinopathy, coexisting glaucoma preoperatively, and lost follow up for more than two visits.

Investigations: All eyes subjected to OCT-macula imaging using spectral-domain (SD)-Optovue OCT apparatus (Luneau Technology co, USA). The grid pattern and macular map were captured. Meticulous assessment of all images was done with special emphasis on central foveal thickness, average macular thickness, and macular volume. The cases were subjected to OCT-macula at the 3rd, 6th, 12th months postoperatively.

Statistical analysis: The data obtained were statistically analyzed using the SPSS version 16.0 for windows (SPSS, Inc, Chicago, Intl). Paired-t-test was used to assess statistical significance. Statistical difference was considered significant if the p-value was less than 0.05 and highly significant if the p-value was less than 0.01**.**

3. Results

This is a prospective non-randomized case series study. Thirty-five eyes of 35 patients (with a mean age of 56±10 years), (19 men and 16 women) were included in the study group. All cases were subjected to PPV for dislocated nuclear fragments and/or IOL after complicated phacoemulsification for age-related cataracts.

OCT evidence of CME was detected in 8 eyes (22.8 %) at the 3rd month compared to 5 eyes (14.3 %) at the 6th month. Only 4 eyes (11.4 %) had unresolved CME at the 12th month (see table 1, figure 1).

Table 1. OCT-macula findings in the three follow up visits

	3rd month	6th month	12th month	*p* value*
Incidence of CME (number of eyes and %)	8 (22.8 %)	5 (14.3 %)	4 (11.4 %)	0.04
Central foveal thickness (um): mean ± SD	306.18 ± 75.55	288.63 ± 61.19	260.19 ± 32.87	0.01
Average macular thickness (um): mean ± SD	272.023 ± 34.87	264.700 ± 27.68	250.226 ± 16.56	0.03
Macular volume (mm^3): mean ± SD	7.946 ± 1.09	7.679 ± 0.96	7.368 ± 0.72	0.04

**p-value was calculated with paired –t-test.*

All OCT-macula parameters were the highest at the 3rd month and gradually decreased. The mean of central foveal thickness, average macular thickness, and macular volume were 306.18 um, 272.023 um, and 7.946 mm^3, respectively. By the 12th month, they diminished to lower levels as follows: 260.19 um, 250.226 um, and 7.368 mm^3, respectively. The *p-value* was statistically significant (<0.05) (see table 1 and figures 2-6).

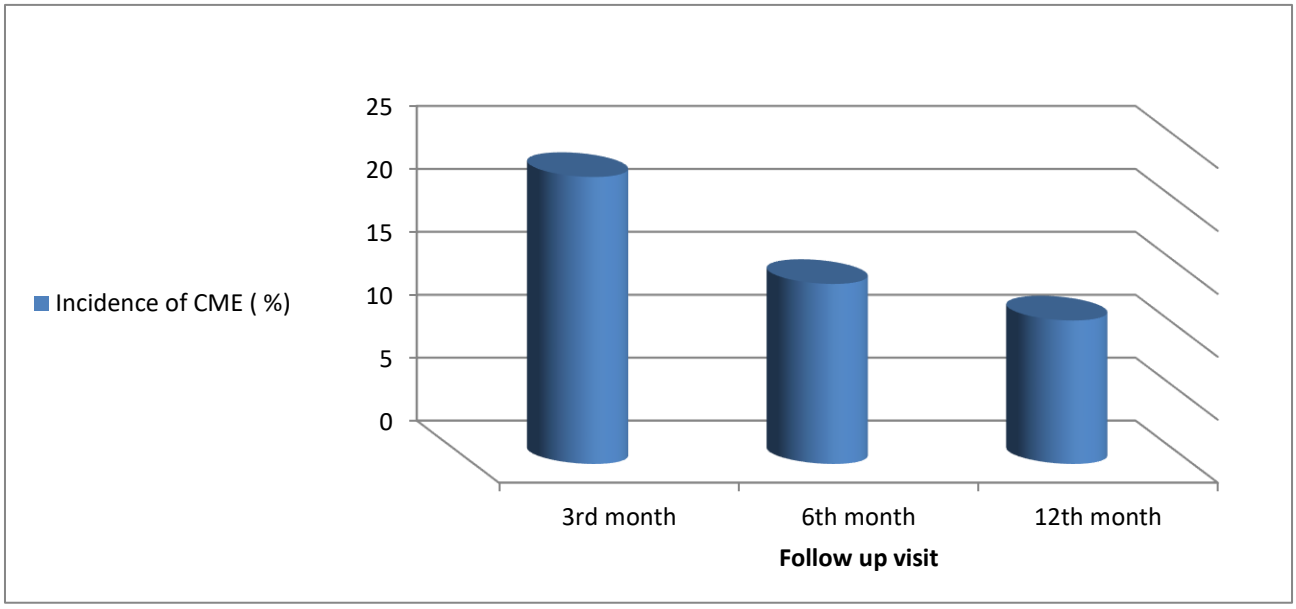

Figure 1. The incidence of CME during follows up visits

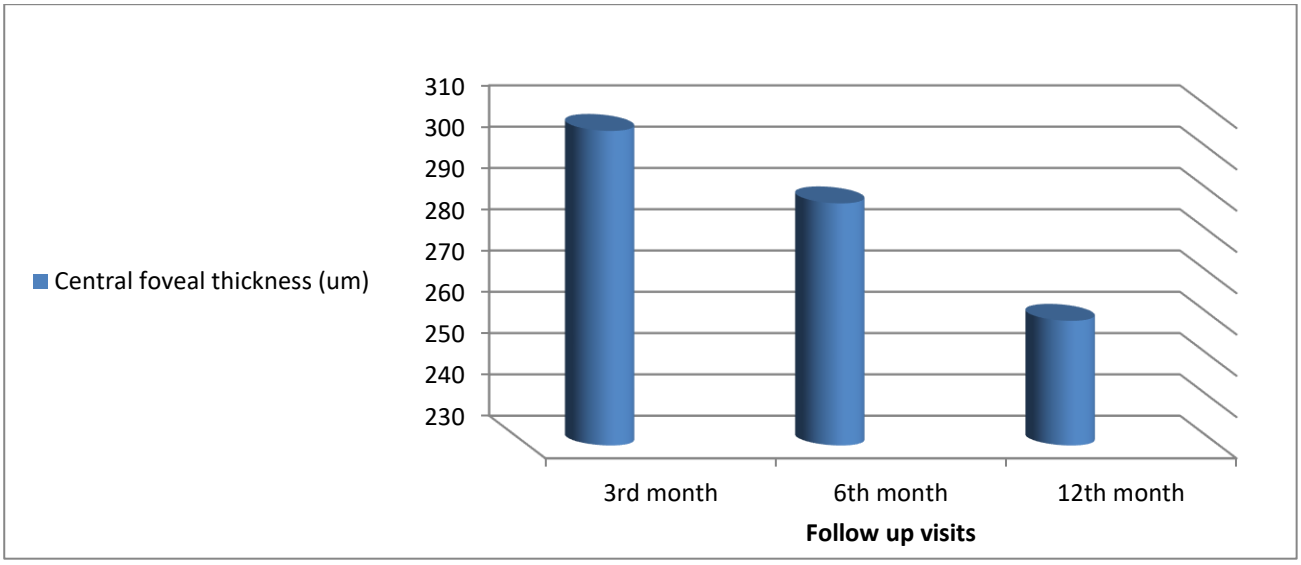

Figure 2. The mean central foveal thickness during follow-up visits

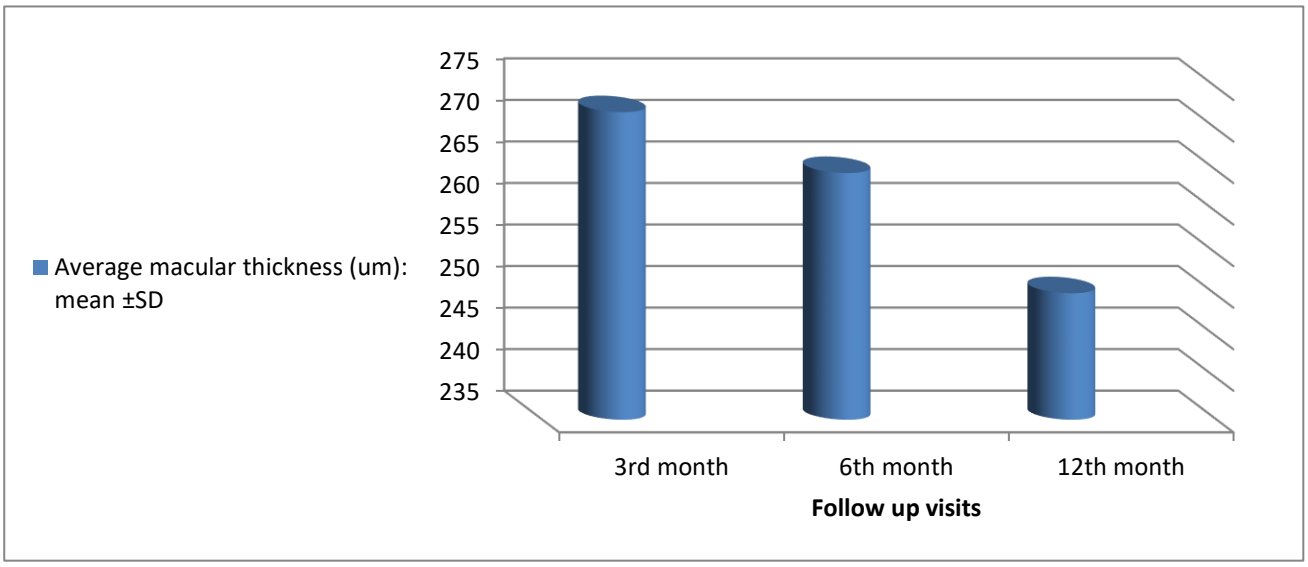

Figure 3. The mean average macular thickness during follow-up visits

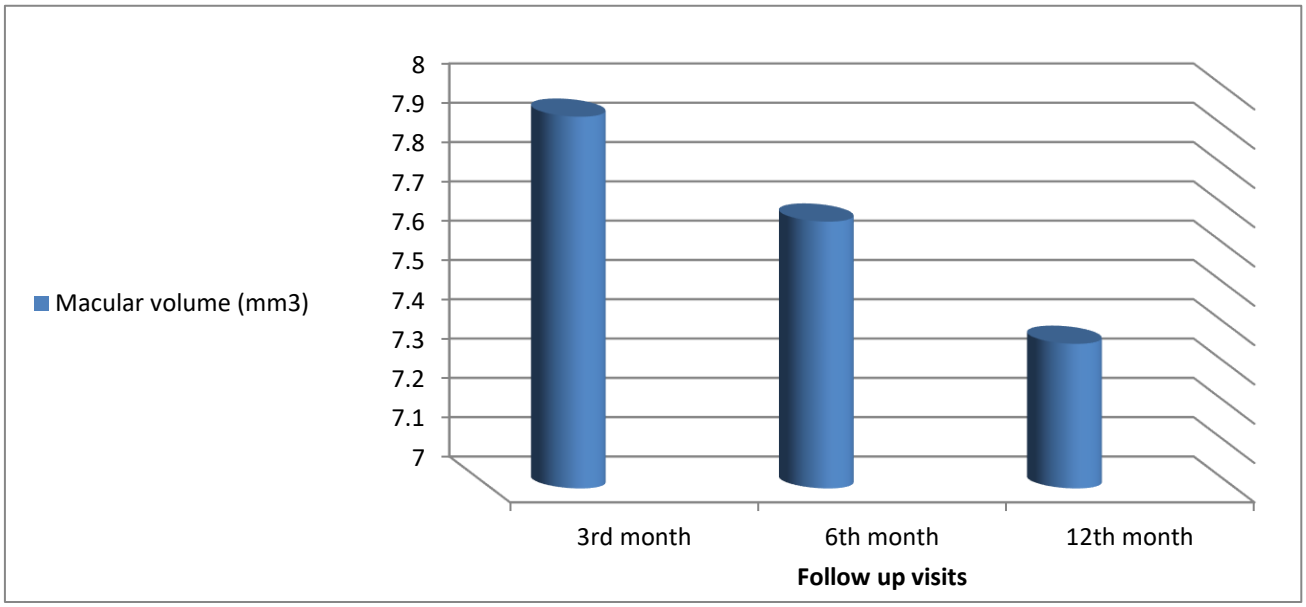

Figure 4. This is a figure of the mean macular volume during follow up visits

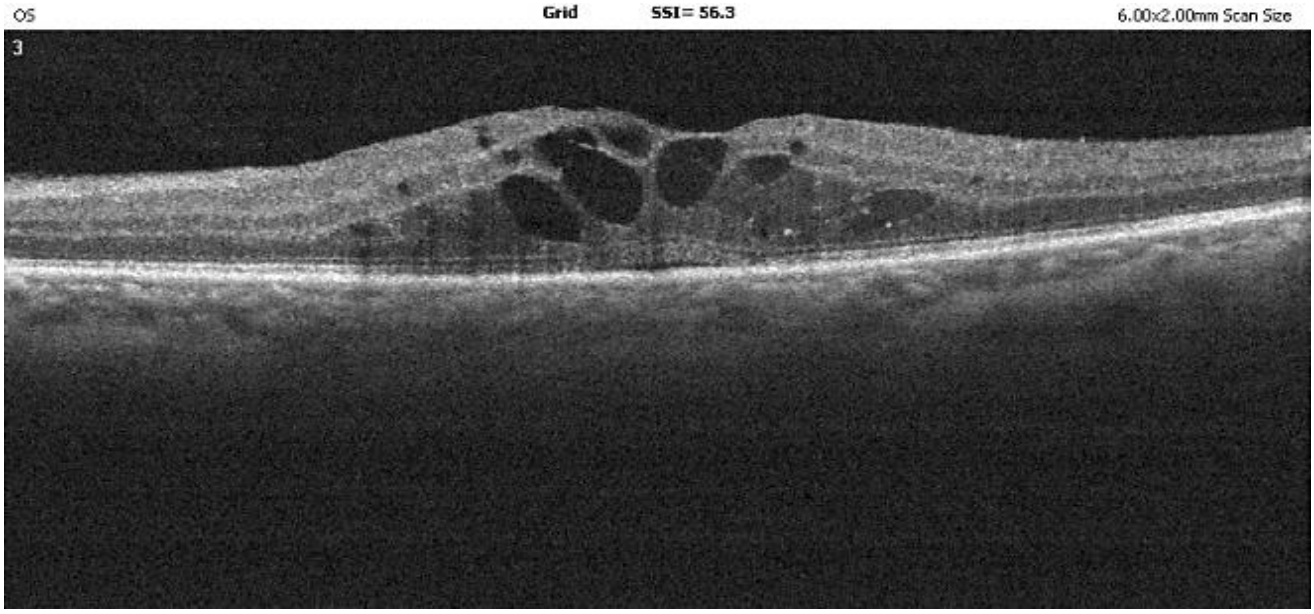

Figure 5. Grid OCT showing CME

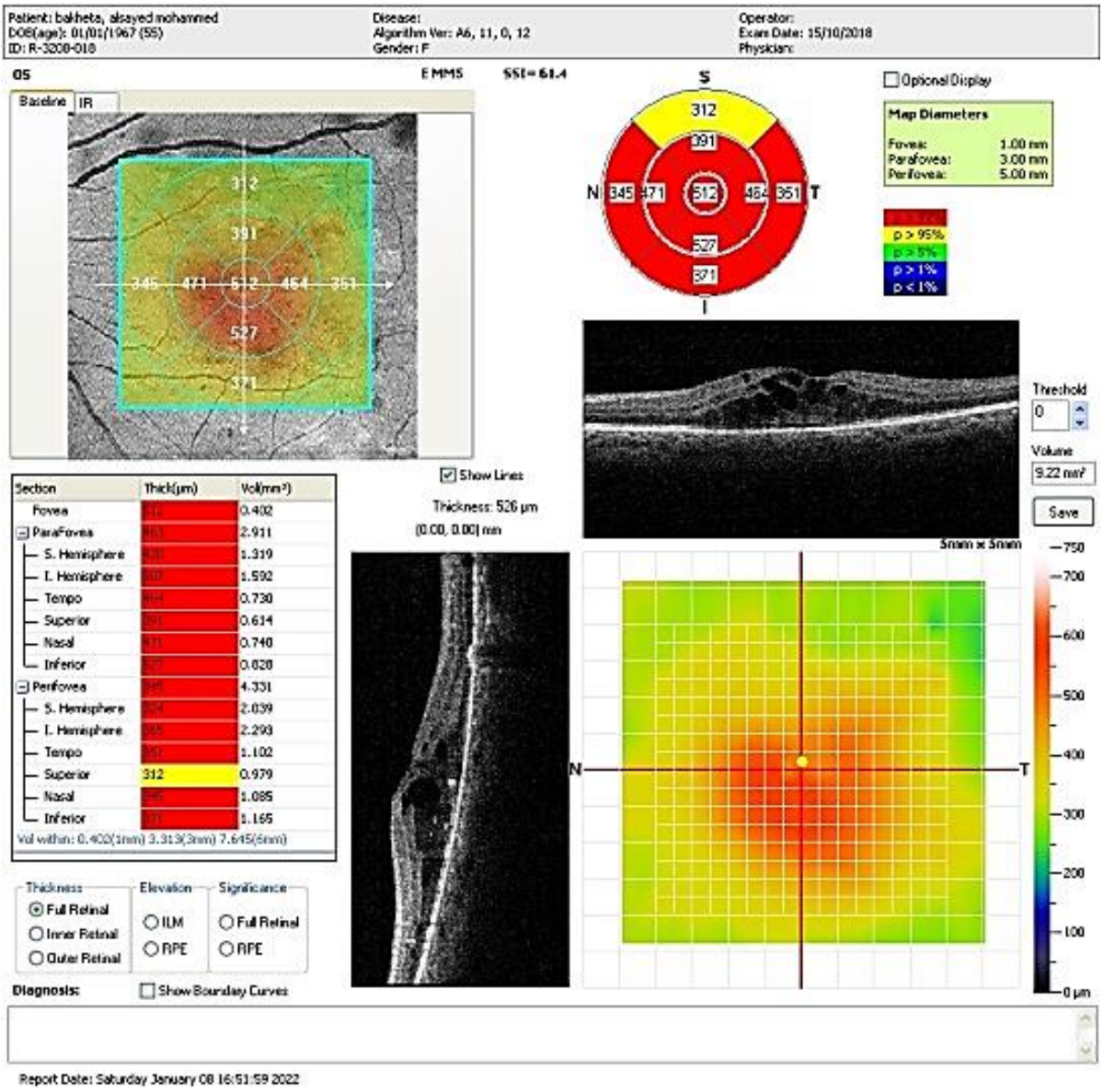

Figure 6. OCT macular map showing CME.

3. Discussion

In various previous studies, the main aim was to evaluate the clinical outcomes of PPV for cases complicated with dislocated lens fragments. They focused on visual outcomes and the incidence of postoperative complications. (Shelsta, 2011) One example was a retrospective study performed by Ghasemi et al who studied 22 patients to report the outcomes of PPV and intravitreal phacoemulsification in patients with dropped nuclei/nuclear fragments after complicated cataract surgery (Ghasemi, 2012).

In the present study, we documented the prevalence of CME detected by spectral-domain optical coherence tomography (SD-OCT) at three postoperative visits: 3rd, 6th, and 12th months.

Scott et al reviewed the records of 343 patients who underwent PPV for retained lens fragments with 8 months follow-up period the primary cause of visual impairment was cystoid macular edema (CME) in 41 (29 %) (Scott, 2003).

In a retrospective review of the records of 78 patients who underwent pars plana vitrectomy for retained lens fragments, Chen et al compared the outcomes among three groups: same day, early, and late vitrectomy. (Chen 2008) They reported that no patients in the same-day vitrectomy group developed complications, and 76 % achieved a final visual acuity of 6/12 or better. In the early vitrectomy group, all patients had elevated intraocular pressure, and 45 % achieved a final visual acuity of 6/12 or better. In the late vitrectomy group, all patients presented with corneal edema,

moderate or severe uveitis, and elevated intraocular pressure. Of these patients, 27 % had cystoid macular edema, 36 % developed retinal detachment, and 27 % had a final visual acuity of 6/12 or better. They concluded that immediate pars plana vitrectomy for retained lens fragments may achieve a better visual outcome, with reduced risk of secondary glaucoma, retinal detachment, or cystoid macular edema (Chen, 2008; Al-Amri, 2008).

Comparatively, in our study, we found that OCT evidence of CME was detected in 8 eyes (22.8 %) at the 3rd month compared to 5 eyes (14.3 %) at the 6th month. Only 4 eyes (11.4 %) had unresolved CME in the 12th month. All OCT-macula parameters were the highest at the 3rd month and gradually decreased. The mean of central foveal thickness, average macular thickness, and macular volume were 306.18 um, 272.023 um, and 7.946 mm3 respectively. By the 12th month, they diminished to lower levels as follows: 260.19 um, 250.226 um, and 7.368 mm3 respectively. The p-value was statistically significant (< 0.05). In comparison to previous studies10, we focused on three important parameters in OCT-macula: namely central foveal thickness, average macular thickness, and macular volume.

5. Conclusions

Cases complicated with dislocated nuclear fragments have a higher incidence of CME than uneventful cases even after PPV.

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الملخص العربي

معدل حدوث رشح مقولة العين بالشبكية بعد عمليات إزالة الجسم الزجاجي في حالات سقوط أجزاء عدسة العين

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تناولت هذه الدراسة معدل حدوث رشح مقولة الشبكية بعد عمليات إزالة الجسم الزجاجي في حالات عمليات المياه البيضاء المضاعفة بسقوط أجزاء عدسة العين داخل الجسم الزجاجي. تمت الدراسة على 35 مريض وقد تبين أن حوالي 22,8 % من الحالات وجد فيها رشح بالشبكية بواسطة الأشعة الترابطية عند الشهر الثالث ما بعد العملية. في حين أن 14,3 % فقط عند نهاية الشهر الثاني عشر. وتبين من نتائج هذه الدراسة أن نسبة حدوث رشح مقولة العين في الحالات المضاعفة بسقوط أجزاء عدسة العين تفوق بنسبة ذات دلالة إحصائية عالية عنها في الحالات غير المضاعفة.