

Special Article - Clinical Case Reports & Images

Subretinal Fluid Volume and Absorption Rate in Two Cases of Exudative Retinal Detachment with Pre-Eclampsia

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Abstract

Purpose: To report volume and absorption rate of SubRetinal Fluid (SRF) in two pre-eclampsia patients with exudative retinal detachment (ERD).

Methods: Clinical case reports of two healthy women with pre-eclampsia and exudative retinal detachment (ERD) are presented. Volume of subretinal fluid and absorption rate was calculated by Spectral Domain Optical Coherence Tomography (SD-OCT) analysis.

Results: Two patients were examined shortly after labor due to complain of visual obscuration. Fundoscopy revealed well demarcated bilateral accumulation of subretinal fluid (SRF) mainly at the posterior pole in both cases. The volume of SRF was between 2.92-36.35mm³. No signs of acute hypertensive retinopathy or shifting movement of SRF were seen. The two cases were managed conservatively with frequently OCT follow ups. 87.3%-99.9% of the subretinal fluid was absorbed within 2-5 days coupled with visual acuity improvement. Absorption rate was as high as 35.4mm³ per day in the first day and decreased gradually.

Conclusion: Subretinal fluid is rapidly absorbed in healthy cases with ERD and pre-eclampsia following labor if RPE is viable. Absorption rate of the SRF is highest initially and decreases later on.

Keywords: Absorption rate; Exudative retinal detachment; Pre-eclampsia; Subretinal fluid; Volume

Introduction

Pre-eclampsia is a systemic, pregnancy specific complication, characterized by hypertension, proteinuria and edema during the second half of gestation [1]. Ophthalmic complications of pre-eclampsia may include hypertensive retinopathy, cortical blindness and exudative retinal detachment [1]. We report two cases of bilateral exudative retinal detachment, mainly in the posterior pole, secondary to severe pre-eclampsia, emerging shortly after delivery. Frequently follow ups were conducted using spectral domain optical coherence tomography (SD-OCT) until nearly all fluid was absorbed. The rapid absorption of the fluid within days after labor, allows quantifying the pumping mechanism of RPE cells. OCT provides a precise and accurate imaging of the volume of subretinal fluid as well as the absorption rate. To the best of our knowledge, it is the first report of SRF volume and absorption rate in exudative detachment secondary to pre-eclampsia.

Materials and Methods

Examination of both patients included best corrected visual acuity, slit lamp examination of anterior and posterior segments and OCT imaging of posterior pole. OCT imaging was performed in the 1st, 4th and 6th postpartum day in patient 1 and 2nd, 3rd and 4th postpartum day in patient 2. IMAGEJ software was used in order to calculate the area of SRF in each 31 images of OCT raster scans. Each

SRF area was multiply by 0.275mm which is the distance between two consecutive scans in raster mode. Volume of SRF was calculated by the sum of all the products. Only posterior pole SRF was included in the analysis. One exception was on the 1st examination of patient 1 in which only radial scan were available, therefore volume was estimated to be as a volume of a cone (base area*height/3).

Cases Description

Case 1

A 27-year-old woman at 38 week of gestation was admitted to the obstetric department. Past medical history was positive to Factor v leiden thrombophilia heterozygote and methylenetetrahydrofolate reductase (MTHFR) heterozygote, therefore a low molecular heparin prophylactic treatment was given during the pregnancy. At admission, her blood pressure was 177/100 mm Hg, dipstick urinalysis revealed +4 albuminuria. The patient complained of headache and visual obscuration. The first ophthalmoscopy examination at admission revealed flat retina in each fundus. Severe pre-eclampsia was diagnosed and treatment with magnesium was applied. Subsequently, a normal vaginal delivery was induced with oxytocin.

Shortly after delivery, following continued complains of impaired vision, a second ophthalmological examination was performed. Best corrected visual acuity OU was count finger at 1 meter. Fundoscopy revealed bilateral SubRetinal Fluid (SRF) mainly at the posterior pole

Table 1: Volume and absorption rate of SRF in two patients with ERD and pre-eclampsia*

Patient	Eye	Postpartum day	SRF Volume	Absorption rate/day	Absorption rate/1mm ² RPE/day	Percentage of absorption
1	OD	1 st	24.88mm ³ **			
		4 th	1.75mm ³	7.71mm ³ /day	0.13mm ³ /1mm ² RPE/day	92.96%
		6 th	0.96mm ³	0.395mm ³ /day	0.025mm ³ /1mm ² RPE/day	96.14%
	OS	1 st	14.03mm ³ **			
		4 th	1.96mm ³	4.02mm ³ /day	0.093mm ³ /1mm ² RPE/day	86%
		6 th	1.78mm ³	0.09mm ³ /day	0.004mm ³ /1mm ² RPE/day	87.3%
2	OD	2 nd	36.35mm ³			
		3 rd	0.945mm ³	35.4mm ³ /day	0.61mm ³ /1mm ² RPE/day	97.4%
		4 th	0.03mm ³	0.915mm ³ /day	0.08mm ³ /1mm ² RPE/day	99.9%
	OS	2 nd	2.92mm ³			
		3 rd	0.0047mm ³	2.9153mm ³ /day	0.12mm ³ /1mm ² RPE/day	99.8%

*only posterior pole SRF was included.

**SRF was estimated to be as a cone (base*height/3) because only radial scan OCT was available.

with distinct demarcation between detached and attached retina. SRF was more pronounced on the right eye. Neither retinal hemorrhages nor exudates were seen. An optical coherence tomography (OCT) was performed at the 1st, 4th and 6th postpartum day. OCT imaging at the first postpartum day demonstrated SRF volume of 24.88mm³ and 14.03mm³ in the right and left eye respectively (Table 1). The patient was managed conservatively. Three days later, 92.9% and 86% of the SRF was absorbed in the right and left eye respectively (Table 1). Visual acuity improved to OD 6/12+1, OS 6/9-1.

Case 2

A 37-year-old woman at 34 week of gestation was admitted at the obstetric department. Blood pressure was 180/100 at the admission. Dipstick urinalysis albumin was +3 positive. Ophthalmic examination at the admission was normal. Severe pre-eclampsia was diagnosed followed by magnesium preventive treatment. Caesarian section was performed due to fetal distress. At the second postpartum day, following complain of visual obscuration, second ophthalmic examination with OCT imaging revealed well demarcated, lobulated bilateral accumulation of SRF, mainly at the posterior pole. The volume of SRF was OD-36.35mm³, OS-2.92mm³. Best corrected visual acuity was OD 6/36 OS 6/24. No signs of hypertensive retinopathy were seen. The patient was managed conservatively with Daily OCT'S at the 2nd 3rd and 4th postpartum day. 97.4% and 99.8% of the SRF was absorbed in the right and left eye respectively, at the next day examination. Visual acuity improved to OD 6/12 OS 6/9. Dexamethason 10 mg was given twice due to platelets count decrease. No aggravation was seen at the exudative retinal detachment during steroid therapy.

Discussion

Von Grafe was the first to describe retinal detachment as a complication of in toxemia of pregnancy [2]. Since then, exudative retinal detachment was reported with association to pre-eclampsia, eclampsia and HELLP syndrome [3-5].

It is well known that ERD due to pre-eclampsia is resolved within days-weeks following labor if RPE is viable [6-8]. SRF is pumped out by viable RPE cells, however, if the RPE was severely damaged, a

permanent visual loss may happen secondary to RPE necrosis. Hence bilateral ERD is an emergency, as well as indication for resolving the toxemia by delivery or medically.

Similarly, our cases demonstrate rapid resolution of ERD with 87.3-99.9% of fluid which was absorbed by 3-6 days postpartum. In the aforementioned cases, absorption rate were highest in the first day and decreases gradually, until complete resolution of SRF. We found the highest absorption rate to be 35.4mm³/day. However, absorption rate can be different in each eye, such as the left eye in patient 1 which had less SRF initially, but after 6 days had more SRF than the right eye due to lower absorption rate.

Our report demonstrates that SRF secondary to pre-eclampsia usually absorbed within several days from labor coupled with visual acuity improvement. We recommend on OCT examination for every woman with pre-eclampsia with even slight visual disturbance.

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