Pregnancy Associated Retinal Vascular Events: A Three-Case Series

Eventos Vasculares Retinianos Associados à Gravidez: Uma Série de Três Casos

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ABSTRACT

Pregnancy induces significant systemic and vascular changes that may acutely affect the eye. Some manifestations threaten vision and require multidisciplinary care.

A descriptive case-series of three pregnant women presenting with acute visual loss who underwent comprehensive ophthalmologic and systemic evaluation, including multimodal imaging, in close coordination with obstetric teams.

A case with exudative retinal detachment (ERD): A 28-year-old with severe preeclampsia developed bilateral serous detachments that resolved completely after delivery and systemic stabilization.

A case with paracentral acute middle maculopathy (PAMM): A 31-year-old at 12 weeks' gestation presented with a paracentral scotoma in the right eye (OD). Optical coherence tomography (OCT) showed parafoveal hyperreflectivity. Vision remained 1.0, with residual scotoma and with inner nuclear layer (INL) thinning.

A case with Valsalva retinopathy: A 35-year-old at 37 weeks developed a massive subhyaloid hemorrhage in the left eye (OS). Neodymium-doped yttrium aluminum garnet (Nd:YAG) laser hyaloidotomy enabled rapid visual recovery.

Pregnancy-associated retinal vascular events, though rare, reflect distinct pathophysiologic mechanisms and require prompt recognition, multimodal imaging, and coordinated obstetric-ophthalmologic management for optimal outcomes.

KEYWORDS: Ocular Physiological Phenomena; Pregnancy Complications; Retinal Detachment; Macular Degeneration; Retinal Diseases.

RESUMO

A gravidez induz alterações sistémicas e vasculares que podem afetar agudamente o olho. Algumas manifestações ameaçam a visão e exigem uma abordagem multidisciplinar.

Uma série de casos descritiva de três grávidas com perda visual aguda, que foram avaliadas por exame oftalmológico, imagiologia multimodal e em colaboração com a Obstetrícia.

Um caso de descolamento exsudativo da retina: Mulher de 28 anos com pré-eclâmpsia grave e descolamento seroso bilateral, com resolução completa após parto e estabilização sistémica.

Um caso de maculopatia aguda paracentral: Mulher de 31 anos, com 12 semanas, apresentou-se com escotoma paracentral no olho direito. A tomografia de coerência óptica revelou hiperrefletividade parafoveal. Acuidade visual manteve-se 1,0, com escotoma residual e adelgaçamento da camada nuclear interna.

Um caso de retinopatia de Valsalva: Mulher de 35 anos, com 37 semanas, com hemorragia subhialoide maciça no olho esquerdo. Foi realizada hialoidotomia Nd:YAG, permitindo recuperação visual rápida.

Os eventos vasculares retinianos associados à gravidez, embora raros, refletem mecanismos distintos. Requerem reconhecimento precoce, imagem multimodal e gestão multidisciplinar para resultados favoráveis.

PALAVRAS-CHAVE: Complicações na Gravidez; Degenerescência Macular; Descolamento da Retina; Doenças da Retina; Fenómenos Fisiológicos Oculares.

INTRODUCTION

Pregnancy induces profound physiological, hormonal, hematologic, and vascular changes that may affect the visual system. While many ocular alterations are benign and reversible, some present acutely, threaten vision, and require urgent multidisciplinary care. These manifestations may reflect systemic disease such as preeclampsia or arise from pregnancy-related vascular and immunologic adaptations.[1,2]

Retinal vascular complications deserve particular attention, as they may coincide with hemodynamic shifts, increased vascular permeability, or acute changes in intra-abdominal pressure. They can present as sudden visual loss from conditions such as paracentral acute middle maculopathy (PAMM), Valsalva retinopathy, and exudative retinal detachment (ERD). Some mimic neurological disease or represent the first sign of systemic compromise.

ERD occurs in approximately 1%–2% of patients with preeclampsia, which itself affects 2%–8% of pregnancies.[3,4] Valsalva retinopathy, although rare, may be triggered by vomiting, coughing, or labor.[5] PAMM, an ischemic lesion of the middle retina, has only sporadically been reported during pregnancy. The scarcity of published cases and variability of presentation contribute to underrecognition and misdiagnosis.[6]

We present a case series of three pregnant patients with acute visual disturbances secondary to distinct retinal pathologies: PAMM, subhyaloid hemorrhage from Valsalva retinopathy, and ERD associated with severe preeclampsia. This series underscores the importance of early recognition, interdisciplinary management, and multimodal imaging in pregnant patients with acute visual symptoms.

CASE REPORT

A descriptive case-series of three pregnant women evaluated for acute visual disturbances was conducted. All underwent best-corrected visual acuity testing, intraocular pressure measurement, slit-lamp biomicroscopy, indirect ophthalmoscopy, and spectral-domain optical coherence tomography (OCT). Additional multimodal imaging such as fluorescein angiography was performed when indicated. Systemic investigations and management were coordinated with obstetricians and other relevant specialties.

CASE 1 - EXUDATIVE RETINAL DETACHMENT IN SEVERE PREECLAMPSIA

A 28-year-old primigravida at 39 weeks + 6 days was admitted for elective cesarean due to breech presentation. Her pregnancy had been uneventful until the day before admission. She had no past medical or ophthalmologic history and was only on routine prenatal vitamins.

Approximately 12 hours before surgery she developed sudden bilateral lower limb and periorbital edema, followed by blurred vision and a central scotoma. Blood pressure rose above 160/100 mmHg. Labs revealed anemia (8.6 g/dL), thrombocytopenia (108 × 10^3/μL), proteinuria (3 g/day), prolonged activated partial thromboplastin time (aPTT), positive urinary nitrites, and markedly elevated D-dimers. A diagnosis of severe preeclampsia was established, and she was started on magnesium sulfate, enalapril, intravenous iron, and antibiotics. Cesarean section was performed the following morning.

Ophthalmologic evaluation on the day of delivery showed best-corrected visual acuity (BCVA) 0.3 in both eyes. Anterior segment was normal. A transient myopic shift (right eye (OD) -2.50 -7.25 × 177°, left eye (OS) -3.75 -0.50 × 87°) was attributed to probable ciliary body and crystalline lens edema. Fundoscopy revealed extensive bilateral serous retinal detachments: central and peripapillary OD; inferior and peripapillary OS. OCT confirmed neurosensory detachments with subretinal fluid, without retinal tears or choroidal thickening (Fig. 1).

Conservative management was adopted, including cycloplegia to relieve ciliary spasm and close ophthalmologic follow-up alongside systemic stabilization.

By day 4 postpartum, BCVA improved to 0.8 OD and 1.0 OS, with OCT evidence of fluid absorption and resolution of systemic symptoms. At 3 weeks postpartum, BCVA

was 0.9 OD and 1.0 OS with complete anatomical recovery, and resolution of myopic shift (OD -0.25 -0.25 × 100°, OS -0.50 -0.25 x 75°) (Fig. 2).

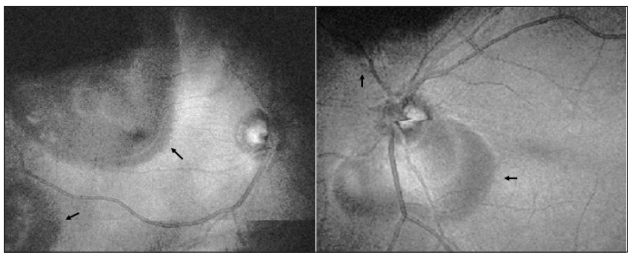

Figure 1. Baseline OCT of both eyes showing bilateral serous retinal detachment with subretinal fluid.

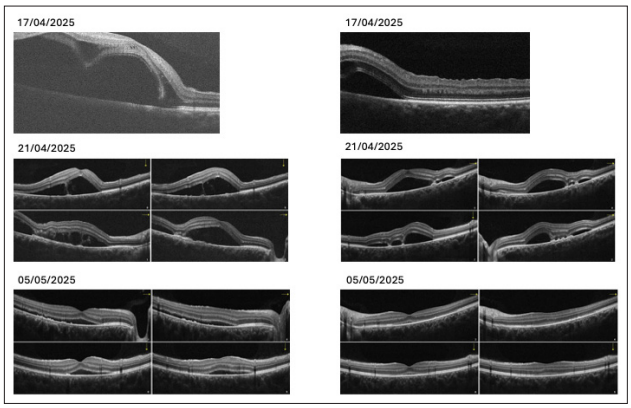

Figure 2. Follow-up OCT of both eyes demonstrating complete resolution of the subretinal fluid over time.

This case illustrates a distinctive but uncommon complication of severe preeclampsia. Prompt systemic stabilization and conservative ocular management resulted in full functional and anatomical resolution.

CASE 2 - PARACENTRAL ACUTE MIDDLE MACULOPATHY (PAMM) IN EARLY PREGNANCY

A 31-year-old woman at 12 weeks of gestation presented with a three-day history of a central scotoma in the OD. Symptoms began the morning after two brief presyncopal episodes the previous day, each lasting a few minutes and resolving spontaneously. She denied headache, diplopia or other neurological complaints.

Her medical history included a gastric sleeve procedure and bilateral laser-assisted *in situ* keratomileusis (LASIK) (2023), as well as a prior first-trimester miscarriage. She was not on any regular medication and had no history of systemic vascular risk factors or autoimmune disease.

On examination, BCVA was 1.0 in both eyes, although fixation OD was subjectively unstable despite preserved acuity. Pupils were equal and reactive, with no relative afferent pupillary defect (RAPD). The anterior segment was unremarkable except for LASIK scars. Fundus examination of the OD revealed sectoral inner retinal edema just superior to the fovea (Fig. 3).

Spectral-domain OCT demonstrated parafoveal hyperreflectivity confined to the middle retinal layers, consistent with PAMM (Fig. 4). The left eye was normal.

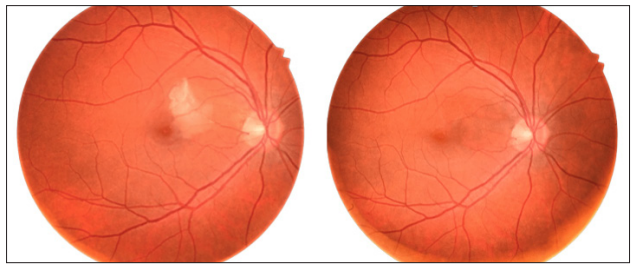

Figure 3. Right eye color fundus photograph showing a parafoveal grayish lesion corresponding to PAMM (right) and follow-up (left).

A comprehensive systemic work-up was performed. Neurological and cardiovascular assessments, including brain magnetic resonance imaging (MRI), transthoracic echocardiography, and cervical Doppler ultrasound, were unremarkable. Laboratory investigations, including autoimmune, inflammatory, and thrombophilia panels, were within normal limits.

After multidisciplinary discussion, low-dose aspirin (100 mg/day) was initiated, balancing its potential vascular benefit with minimal hemorrhagic risk. The patient was discharged with instructions for neurological surveillance, blood pressure monitoring, and routine obstetric follow-up.

At 1-month review, the scotoma persisted subjectively, but BCVA remained 1.0 in both eyes with no new neurological symptoms. Repeat OCT of the right eye demonstrated focal thinning of the inner nuclear layer (INL), consistent with PAMM sequelae (Fig. 4). Fluorescein angiography showed corresponding hypofluorescence (Fig. 5).

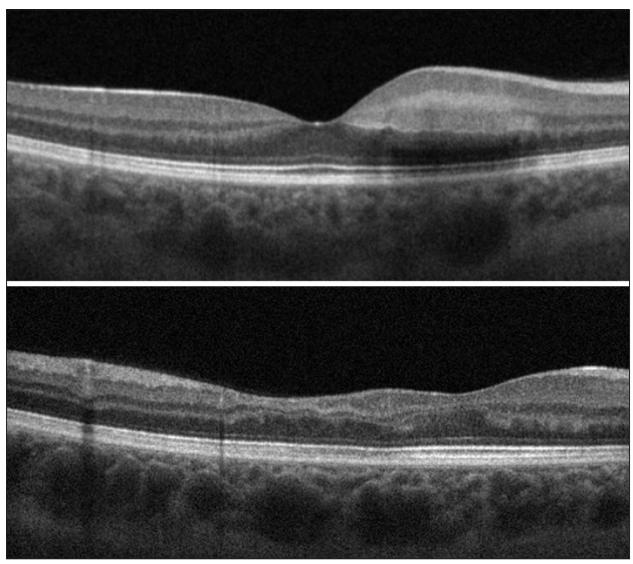

Figure 4. Right eye OCT at presentation and follow-up, showing a hyperreflective band in the inner nuclear layer that resolved over time.

This case highlights PAMM as a rare ischemic retinal vascular event in pregnancy, where early OCT recognition, exclusion of systemic causes, and coordinated follow-up are essential. Persistent paracentral scotomas may remain despite preserved visual acuity.

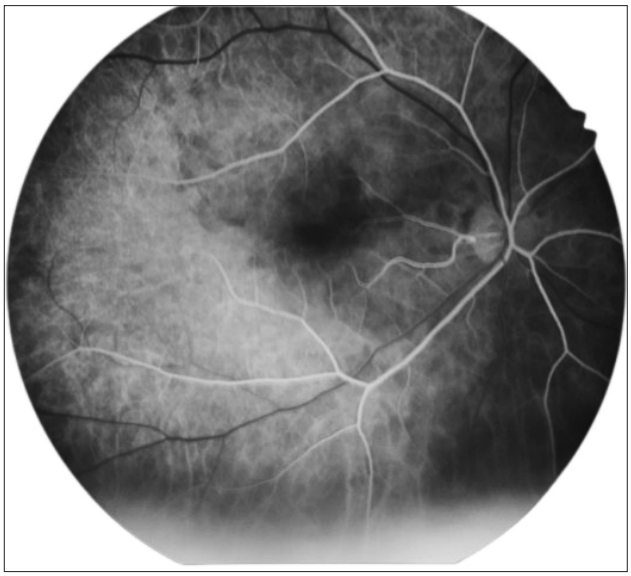

Figure 5. OCT angiography of the right eye showing hypofluorescence in the area corresponding to the PAMM lesion.

CASE 3 - MASSIVE SPONTANEOUS SUBHYALOID HEMORRHAGE IN LATE PREGNANCY

A 35-year-old woman at 37 weeks of gestation, previously healthy and on routine prenatal vitamins, awoke with sudden painless visual loss in the left eye. BCVA was 0.9 OD and <0.05 OS. The anterior segment was normal. Fundoscopy OS revealed a massive subhyaloid hemorrhage centered nasal to the fovea, extending beyond both arcades, and into the inferior peripapillary region (Fig. 6). The hemorrhage was dense, obscuring underlying retinal details and causing severe central vision loss.

There was no history of trauma, Valsalva maneuvers or strenuous exertion. Despite the absence of a clear trigger, the premacular location and presentation were most consistent with Valsalva retinopathy, likely facilitated by pregnancy-related vascular fragility and hemodynamic changes.

Given the hemorrhage's size, risk of foveal toxicity, and the patient's wish for visual recovery prior to delivery, neodymium-doped yttrium aluminum garnet (Nd:YAG) laser hyaloidotomy was performed on the same day. The laser was applied to the inferior margin of the hemorrhage, away from the fovea, creating an opening in the posterior hyaloid to allow blood drainage into the vitreous cavity.

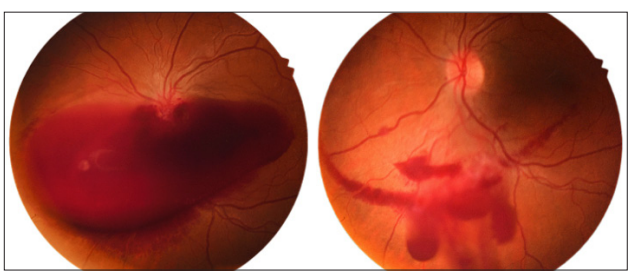

Figure 6. Left-eye Valsalva retinopathy at presentation and after resolution, showing clearance of the subhyaloid hemorrhage.

Over the following days, rapid clearance of blood from the macular area was observed, with partial visual improvement. In light of the advanced gestational age and risk of recurrence during labor, the obstetric team and patient opted for an elective cesarean section the following week.

At postpartum review, BCVA OS improved to 0.8, with complete restoration of macular anatomy, and only mild inferior vitreous hemorrhage persisting, without functional impact.

This case demonstrates that pregnancy-related vascular changes may predispose to massive subhyaloid hemorrhage even without precipitating events. Timely Nd:YAG hyaloidotomy and multidisciplinary care enabled rapid recovery and reduced delivery-associated risk.

DISCUSSION

This series highlights the heterogeneity of pregnancy-associated retinal vascular events, encompassing ischemic injury (PAMM), choroidal hyperpermeability (ERD) and premacular hemorrhage from Valsalva stress. Despite different mechanisms, all share the common backdrop of pregnancy-induced vascular, hormonal and hemodynamic alterations.

Pregnancy induces complex systemic adaptations, including increased blood volume and cardiac output, hormonal modulation of vascular tone, altered coagulation profiles and immune regulation. These shifts predispose to unique ocular pathologies and may also modify the course of pre-existing disease.[1,2]

Exudative retinal detachment is an uncommon manifestation of severe preeclampsia, affecting only 1%–2% of patients. It is typically bilateral, bullous and self-limiting, resolving after delivery and systemic stabilization. Pathophysiology involves choroidal ischemia from vasospasm and endothelial dysfunction, with increased permeability predisposing to subretinal fluid. OCT is valuable for documenting detachments and monitoring resolution, while management is almost always conservative. Prognosis is excellent, though subtle pigmentary or contrast sensitivity changes may persist.[7]

Paracentral acute middle maculopathy is an ischemic lesion of the intermediate and deep retinal capillary plexuses. OCT demonstrates hyperreflectivity in the acute phase, later evolving to INL thinning. While typically linked to systemic vascular risk factors, pregnancy-related hemodynamic instability and hypercoagulability may precipitate focal ischemia even in otherwise healthy women. Management is supportive, with no proven ocular intervention. Prognosis for central acuity is favorable, but paracentral scotomas often persist. Reported cases during pregnancy remain rare.[6]

Subhyaloid hemorrhage in pregnancy is most often secondary to Valsalva retinopathy. Increased vascular fragility and hormonal influences may predispose even healthy women to spontaneous hemorrhage. Small hemorrhages may resolve spontaneously, but dense premacular collections risk permanent foveal damage. Nd:YAG hyaloidotomy is a minimally invasive option for rapid clearance, while vitrectomy is reserved for non-resolving or extensive cases.[8]

Across all three cases, key clinical principles emerge: pregnancy-related retinal vascular events require early recognition, exclusion of alternative causes (arterial occlusion,

Table 1. Summary of clinical characteristics, management and outcomes.

Case	Age	Gestational Age	Diagnosis	Management	Outcome
1	28	39+6 weeks	Bilateral exudative retinal detachment in severe preeclampsia	Cycloplegia for ciliary spasm, systemic stabilization, cesarean	Full recovery: BCVA 0.9/1.0 at 3 weeks
2	31	12 weeks	PAMM OD	Multidisciplinary workup, low-dose aspirin	BCVA 1.0 both eyes; persistent scotoma; INL thinning
3	35	37 weeks	Massive subhyaloid hemorrhage (Valsalva retinopathy) OS	Nd:YAG hyaloidotomy, elective cesarean	BCVA 0.8 OS; full macular recovery; mild residual vitreous blood

vasculitis, hematologic disorders) and close coordination between ophthalmology, obstetrics and, when appropriate, neurology or internal medicine. Multimodal imaging, particularly OCT, is indispensable for diagnosis and follow-up.

CONCLUSION

Pregnancy can unmask or precipitate rare but vision-threatening retinal vascular events. Awareness of these entities, systematic multimodal imaging and coordinated multidisciplinary management are essential to preserve both vision and maternal health.

CONTRIBUTORSHIP STATEMENT / DECLARAÇÃO DE CONTRIBUIÇÃO

SJ: Writing of the article, data collection and analysis.

ARS, CF, ERN, and RCB: Data collection, analysis, and discussion of results.

All authors approved the final version to be published.

SJ: Escrita do artigo, recolha e análise de dados.

ARS, CF, ERN e RCB: Recolha de dados, análise e discussão dos resultados.

Todos os autores aprovaram a versão final a ser publicada.

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