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Case report

Profound bilateral post-partum retinal circulation ischemia in two diabetic mothers with pre-eclampsia

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ABSTRACT

Purpose: We report 2 cases of young diabetic mothers with pre-eclampsia and no previously documented visual deficits prior to pregnancy who were found to have profound retinal circulation loss during the postpartum period.

Observations: Fluorescein angiogram in both cases documented profound ischemia of retinal and macular circulation with resulting severe vision loss, leading to legal blindness.

Conclusions and Importance: While Pre-eclampsia and Eclampsia are well known clinical entities with potentially grave effects on both the mother and child, there is little information about the possible combined effects of diabetes and Pre-eclampsia/Eclampsia on the retinal circulation. We aim to raise awareness about this devastating association with a need for aggressive monitoring and prompt treatment of similar patients to potentially avoid poor visual outcomes.

1. Introduction

The effects of pregnancy on diabetic retinopathy are well known, including worsening of existing retinopathy leading to sometimes permanent loss of vision. However, little has been published in the literature about the changes that may take place in the retina of a diabetic mother who develops Pre-eclampsia or Eclampsia. Pre-eclampsia is a clinical syndrome defined as the new onset of hypertension and proteinuria during the second half of pregnancy, whereas the new onset of the grand mal seizures in a pre-eclampsia patient constitutes a diagnosis of Eclampsia.[1] Pre-eclampsia is a major cause of morbidity and mortality to both mother and child. Mothers with pre-existing diabetes mellitus have a 2–4-fold increased risk of developing pre-eclampsia/eclampsia.[2] The incidence of pre-eclampsia has increased by 25% in the past two decades.[3] We present two cases of African American diabetic mothers who developed pre-eclampsia during pregnancy resulting in a rather unusual presentation; wipeout of their retinal microvascular circulation including the macular circulation with significant visual morbidity. Both patients had no significant visual problems prior to the onset of pregnancy.

1.1. Case 1

A 20-year-old African American female, with a known diagnosis of Insulin-dependent diabetes for 10 years, was referred to the ophthalmology clinic for evaluation of postpartum decreased vision. The patient stated, “I lost my vision 6 weeks ago with the birth of my baby girl”. Due to poor socioeconomic status, the patient had no prior ophthalmic examinations but did report good vision in both eyes before her pregnancy. During her pregnancy, she developed pre-eclampsia (peak blood pressure, 205/123), and as a result, delivered preterm via an uncomplicated primary low transverse cesarean section with about 500–600 cc blood loss. Best-corrected visual acuity at presentation was 20/400 in the right eye and 20/300 in the left eye, with intraocular pressures of 16 and 15 in the right and left eyes respectively. Anterior segment examination was unremarkable with no rubeosis seen. Examination of her retina revealed extensive proliferative retinopathy with neovascularization of the disc (NVD) and neovascularization elsewhere (NVE) in both eyes. The maculae appeared unusually blunted in both eyes. A fluorescein angiogram was performed which confirmed neovascularization of the disc and neovascularization elsewhere, while also demonstrating profound ischemia of the macular and peripheral retinal circulation OU (Figs. 1–3). A laboratory workup was negative for sickle cell trait/disease. Her diabetes was poorly controlled prior to delivery, with her Hemoglobin A1c levels ranging from 9.0 to 10.4%.

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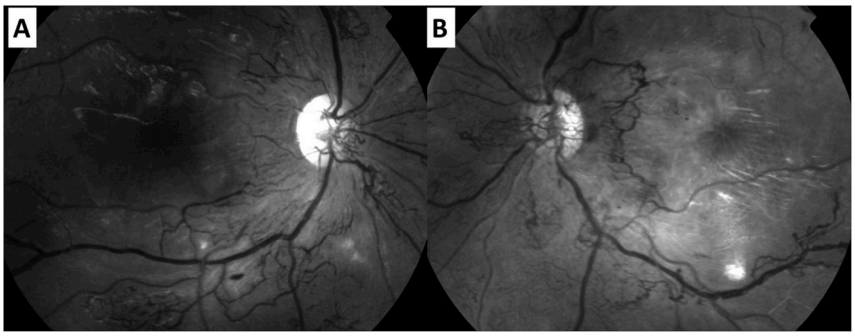

Fig. 1. 1A and 1B. Red free photos of right and left eye at presentation, showing significant neovascularization and blunted foveal reflexes.

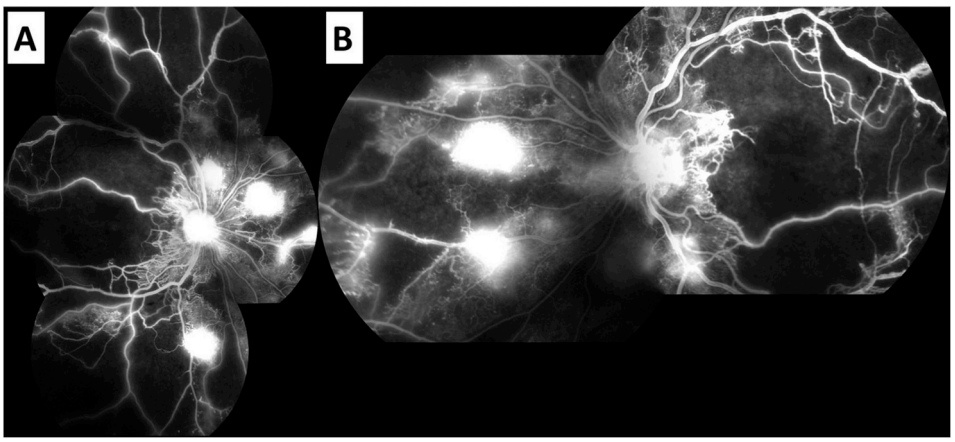

Fig. 2. 2A and 2B. Fluorescein angiogram montage of both eyes at presentation, showing marked macular and peripheral capillary loss and multiple areas of neovascularization in both eyes.

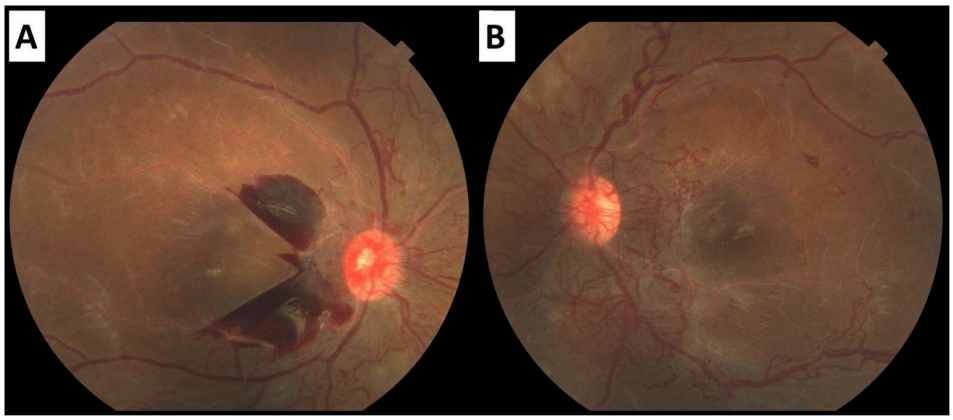

Fig. 3. 3A and 3B. Colored Fundus Photos 3 weeks after presentation. Right eye with Pre retinal hemorrhage after initialing Pan-retinal Photocoagulation (PRP), both eyes have significant neovascularization.

1.2. Case 2

A 26-year-old African American female with a history of Insulin-dependent diabetes since age 11, presented to the ophthalmology clinic for evaluation of postpartum decreased vision, 8 weeks after delivery. The patient's pregnancy was complicated by preeclampsia with a recorded peak blood pressure of 176/110, which resulted in the preterm delivery of a baby boy during the 7th month of gestation via an uncomplicated primary low transverse cesarean section. She was previously followed by a local optometrist with a best-corrected visual acuity of 20/20 in both eyes (OU) during multiple visits ranging from 2007 to 2012. There was no retinopathy documented during these visits, and her intraocular pressure (IOP) was within normal limits with noted increased optic disc cupping OU. Upon her presentation to us in 2014, best-corrected visual acuity was 20/250 in the right eye and 20/800 in the left eye. Her intraocular pressures and anterior segment examination were within normal limits. The fundoscopic exam revealed bilateral NVD with sclerotic blood vessels and a blunted foveal reflex. Her optic nerves had enlarged cup to disc (C/D) ratio with the left being greater than right. A fluorescein angiogram revealed marked ischemia of the retinal circulation in both eyes (Figs. 4,5). Laboratory work-up prompted by a brief episode of lost consciousness, including antiphospholipid antibodies, cardiolipin antibodies, lupus anticoagulant, MTHFR (methylenetetrahydrofolate reductase) mutation, and Factor V Leiden as well as sickle cell screen were all negative. Computer tomography imaging including angiography of the head was negative for

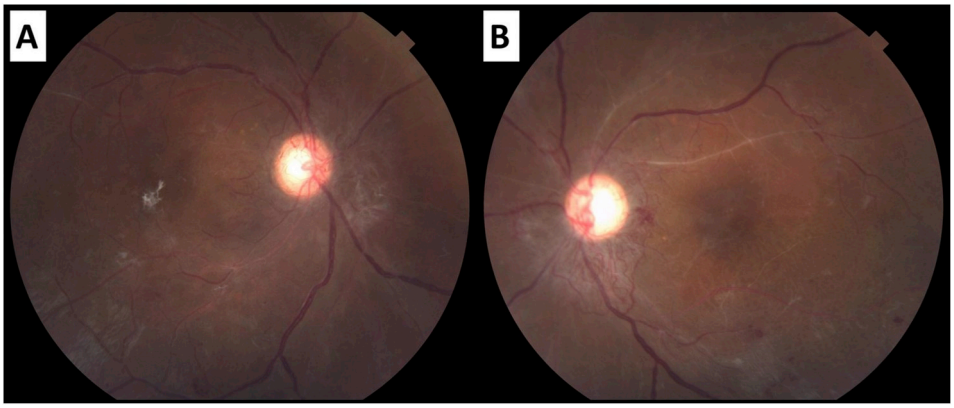

Fig. 4. 4A and 4B. Colored photos at presentation, showing blunted maculae with neovascularization of disc (NVD) OU.

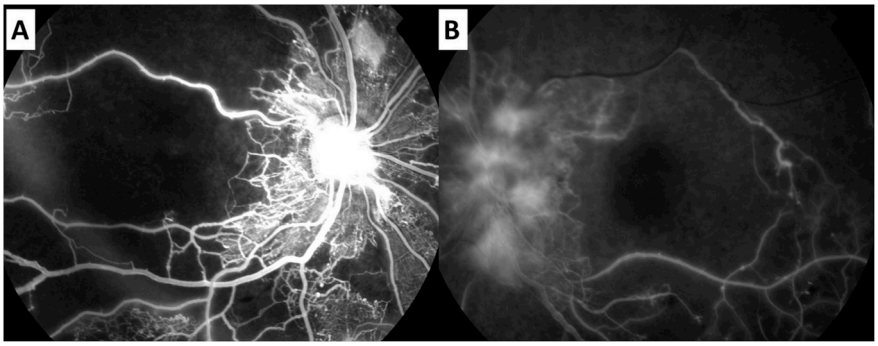

Fig. 5. 5A and 5B. Fluorescein angiogram at presentation, with marked macular circulation loss and NVD in both eyes.

acute stroke or carotid disease. Ultrasound Dopplers of the lower extremity and renal arteries were negative for any vascular thrombosis. Her diabetes was under fairly good control at the time of vision loss, with a glycosylated hemoglobin at the time of admission of 6.7%.

2. Discussion

Little is published about the combined effects of diabetes and pre-eclampsia/eclampsia on the retina. Reports of serous detachment and reversible cortical amaurosis have been associated with pre-eclampsia/eclampsia,[3] and it is well known that pregnancy can worsen diabetic retinopathy,[2] however, there is very little information in the literature about the possible effects on the retinal circulation of a diabetic mother who subsequently develops pre-eclampsia/eclampsia. Women with a history of diabetes are at increased risk of developing pre-eclampsia in the peripartum period. Both disease processes share common risk factors including pre-pregnancy obesity, advanced maternal age, African American race, and nulliparity.[4] The specific etiology of preeclampsia remains elusive, though it is thought that abnormal placental vascular remodeling and placental ischemia together with maternal endothelial dysfunction and intense vasospasm contribute to the systemic vascular damage. The damaged placenta is believed to release factors that cause angiogenic imbalance, leading to angiogenic remodeling.[5] The etiology of profound retinal ischemia seen in our patients is unclear but potentially may be due to the angiogenic imbalance.

Pre-eclampsia has been established as a potent, yet independent risk factor for developing severe diabetic retinopathy versus normotensive diabetics.[6–8] Type 1 diabetics are particularly susceptible to the effects of pre-eclampsia on pre-existing retinopathy.[8] There is a linear correlation between the severity of pre-eclampsia and the prevalence of future ophthalmic morbidities.[7] It is interesting to note that the level of diabetic control during pregnancy and in the post-partum period does not relate to the incidence of severe diabetic retinal changes. In a study by Gordon et al., the association between a hypertensive pregnancy and incident severe diabetic retinopathy did not change after inclusion of mean HbA1c measured during pregnancy (all 3 trimesters) and serial HbA1c measurements during follow-up.[6] This finding corroborates with our two cases, as HgbA1c levels in the post-partum period were well controlled in case 2 and poorly controlled in case 1 with both developing similarly advanced retinal ischemia.

The number of women of childbearing age with diabetes is increasing, and as demonstrated by these cases, the combination of diabetes mellitus and pre-eclampsia/eclampsia, in addition to systemic risks to mother and baby, can also be disastrous to the retinal circulation. It is imperative that women with a known history of diabetes be referred to an ophthalmologist for evaluation throughout the course of their pregnancy, and especially important that these women receive a thorough eye exam if they happen to develop pre-eclampsia/eclampsia. It is crucial to stress the importance of strict blood pressure control to avoid potentially irreversible damage to the retinal circulation.

Irreversible post-partum blindness is both devastating and disabling, especially to a young mother with the additional responsibility of caring for a newborn, let alone herself. We are hopeful these cases will increase the knowledge and awareness of the tragic effects that can result from the combination of diabetes and pre-eclampsia/eclampsia. It is imperative that obstetricians and ophthalmologists work in collaboration for monitoring the young pregnant mothers with combined diabetes and preeclampsia to possibly prevent similar morbidity and save vision.

2.1. Patient consent

Consent to publish the case report was not obtained. This report does not contain any personal information that could lead to the identification of the patients.

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Conflicts of interest

The following authors have no financial disclosures: BK, CO, AP.

Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

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