Chronic kidney disease and retinal manifestations and repercussions

Doença renal crônica e manifestações e repercussões retinianas

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ABSTRACT

The objective of this study was to report a case of bilateral hypertensive retinopathy in a female child with chronic renal disease caused by focal segmental glomerulosclerosis, highlighting an exceptional presentation in this age group and reviewing its treatment and challenges. An 18-year-old female with a history of focal segmental glomerulosclerosis presented with progressive loss of vision. Ophthalmological examination of the right eye revealed a bilateral visual acuity of 20/400. Fundoscopic examination showed peripapillary retinal flame hemorrhage in the inferior temporal quadrant, central vessel emergency, a normal neural ring, and cotton wool exudates in the 180° perimacular region extending two-disc diameters from the fovea, with adjacent macular edema. A diagnosis of bilateral severe hypertensive retinopathy was made, and the patient was deferred for urgent metabolic control. Treating patients with hypertensive retinopathy is challenging when metabolic control affects ocular vasculature. Here, we present an exceptional case of a female child with advanced bilateral hypertensive retinopathy caused by severe focal segmental glomerulosclerosis.

RESUMO

O objetivo deste estudo foi relatar um caso de retinopatia hipertensiva bilateral em uma criança do sexo feminino com doença renal crônica causada por glomeruloesclerose segmentar e focal, destacando uma apresentação excepcional nesta faixa etária e revisando seu tratamento e desafios. Uma paciente de 18 anos, com histórico de glomeruloesclerose segmentar e focal, apresentou perda progressiva da visão. O exame oftalmológico do olho direito revelou acuidade visual bilateral de 20/400. O exame fundoscópico mostrou hemorragia retiniana em chama de vela na região peripapilar do quadrante temporal inferior, emergência dos vasos centrais, anel neural normal e exsudatos algodonosos na região perimacular de 180°, estendendo-se por dois diâmetros de disco a partir da fóvea, com edema macular adjacente. Foi diagnosticada retinopatia hipertensiva bilateral grave, e a paciente foi encaminhada para controle metabólico urgente. O tratamento de pacientes com retinopatia hipertensiva é desafiador quando o controle metabólico afeta a vasculatura ocular. Aqui, apresentamos um caso excepcional de uma criança do sexo feminino com retinopatia hipertensiva bilateral avançada causada por glomeruloesclerose segmentar e focal severa.

INTRODUCTION

Patients with chronic kidney disease (CKD) are particularly vulnerable to retinal abnormalities, including microvascular complications such as calcification, macular edema, exudation, and chronic vision loss.[1] When the damage becomes moderate to severe, microvascular changes lead to an exaggerated bleeding tendency. This is compounded by 'non-traditional' risk factors for microvascular disease, such as inflammation, calcification, and endothelial dysfunction.[2] It is important to highlight that diabetic retinopathy is the leading cause of CKD worldwide.[3] In inherited renal diseases, there are characteristic retinal alterations because the inner retina and the glomerular filtration barrier share developmental pathways.[4] Many studies have reported associations between more severe retinopathy and worse levels of CKD.[5]

There is a scarcity of reports on bilateral hypertensive retinopathy in female children with chronic renal disease, and no prior cases have been reported in Colombia, which creates a significant knowledge gap in diagnosing and accurately treating these cases.

The objective of this study was to report a case of bilateral hypertensive retinopathy in a female child with chronic renal disease caused by focal segmental glomerulosclerosis, highlighting an exceptional presentation in this age group and reviewing its treatment and challenges.

Case report

An 18-year-old patient with stage V chronic renal disease secondary to focal segmental glomerulosclerosis, diagnosed in 2019 and requiring peritoneal dialysis in the same year, experienced secondary headaches, posterior reversible encephalopathy syndrome, and self-limited right oculocephalic versive motor focal onset seizures with alert breakdown. Managed by the Nephrology Service, the patient was admitted to the Emergency Department due to elevated arterial pressure. An assessment was requested from the ophthalmology service due to complaints of blurry vision.

She received therapy with cyclosporine and prednisolone in addition to the renal replacement therapy mentioned previously, achieving a glomerular filtration rate (GFR) of 34mL/min/1.73m² CKD Epidemiology Collaboration (CKD EPI). She did not have medical follow-up after this therapy. The patient presented to the emergency service due to an intense headache and blurred vision, indicating an emergency hypertensive crisis and debuting with posterior reversible encephalopathy syndrome, with a GFR of 5mL/min/1.73m². She reported having experienced blurred vision for the past 5 days.

In the initial ophthalmological examination, bilateral visual acuity of 20/400 was observed, without correction using a stenopeic hole. Pupils were normal and normoreactive to light, with a central Hirschberg reflex. Ocular movements were normal bilaterally, and biomicroscopy revealed no abnormalities. The intraocular pressure was 14mmHg in both eyes. Fundoscopy of the OD (RO) under pharmacological dilation revealed adequate pupil dilation of 8mm, clear vitreous, regular disc edges with a cup-disc ratio (CDR) of 0.3. Additionally, there was evidence of peripapillary retinal flame hemorrhage in the inferior temporal quadrant, central vessel emergency, normal neural ring, cotton wool exudates in the 180° perimacular region, extending two-disc diameters from the fovea, with adjacent macular edema.

In the left fundoscopy performed without pharmacological agents, the only abnormality observed was cotton wool exudates along 180° nasal in the paramacular area, extending two-disc diameters from the fovea with adjacent macular edema. The diagnosis of bilateral hypertensive retinopathy and vasculopathy was made, along with bilateral macular edema. Fundus photography was performed using smartphones (Figure 1).

The patient was managed by both the nephrology and internal medicine services. The nephrology team assessed the patient, considering the possibility of CKD *versus* acute kidney injury. While there were no criteria for dialytic urgency, there was an indication for the initiation of renal support therapy. Laboratory results showed creatinine at 10.1, blood urea nitrogen at 82.3, serum sodium at 137, potassium at 4.4, calcium at 9, magnesium at 2.1, and phosphorus at 4.7. Kidney assessment with biopsy and immunosuppression was deferred due to the advanced stage of kidney disease and the presence of small echogenic kidneys. A peritoneal catheter was placed by the General Surgery team, and renal support therapy was initiated. After the normalization of renal function, the patient was discharged. She did not receive any additional management from the Ophthalmology team.

DISCUSSION

Hypertensive retinopathy is one of the markers for cardiovascular disease[6] along with CKD. The lower the estimated GFR (eGFR), the more severe the retinopathy. Hypertensive retinopathy indicates systemic vascular damage due to hypertension. The prevalence of retinopathy in CKD patients without concomitant diabetes is

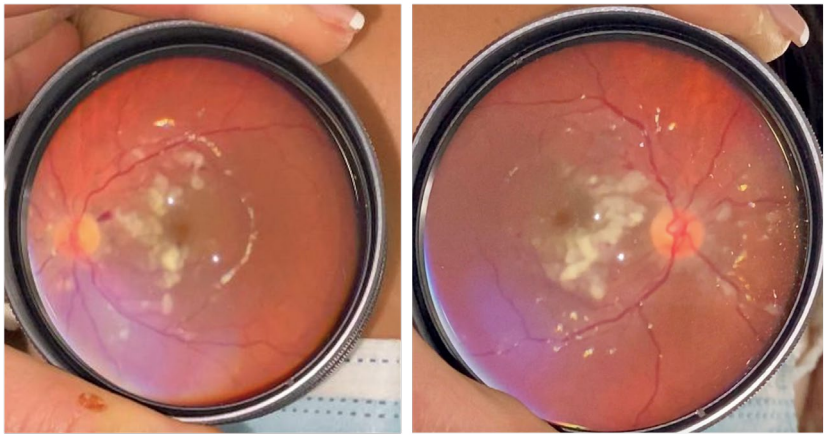

Figure 1. Bilateral hypertensive retinopathy and vasculopathy with macular edema.

11%, while the prevalence of hypertensive retinopathy is 70.1%.[6] It is established that patients with CKD stages 3 to 5 exhibit greater pathological changes in the retina compared to those in stages 1 to 2.[2] Retinal abnormalities are often diagnosed incidentally, as in the case we presented.[2] The most common abnormalities include retinal hemorrhage, microvascular and diabetic retinopathy, and macular degeneration.[5] Other ocular effects of systemic hypertension include hypertensive choroidopathy, hypertensive retinopathy, and hypertensive ocular neuropathy.[5] Regarding the case presented, it is evident that hypertensive retinopathy was the first sign of chronic hypertension and vascular disease, which developed alongside advanced CKD. Although the patient presented with a hypertensive crisis, the changes observed in the retina corresponded with chronic disease, indicating that the damage worsened along with the eGFR. Fundoscopy may reflect systemic vascular changes and damage, providing a noninvasive method for assessing the condition of the kidneys and blood vessels.[2]

The treatment approach for patients with hypertensive retinopathy is challenging when metabolic control affects ocular vasculature. Emphasis should be placed on achieving proper metabolic control to stabilize ocular comorbidities.

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