



UREMIC RETINOPATHY COMPLICATED BY PERIPAPILLARY SEROUS RETINAL DETACHMENT IN A PATIENT WITH END-STAGE RENAL DISEASE: THE ROLE OF SYSTEMIC FACTORS AND THE IMPORTANCE OF MULTIDISCIPLINARY MANAGEMENT

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ABSTRACT

Uremic retinopathy is a rare but clinically significant ocular manifestation of chronic kidney disease, reflecting systemic microvascular injury. It is frequently associated with systemic conditions such as hypertension and anemia, which may aggravate retinal damage. We report the case of a 27-year-old woman with end-stage renal disease undergoing dialysis who presented with preserved visual acuity but abnormal fundus findings, including retinal hemorrhages, cotton-wool spots, and peripapillary serous retinal detachment detected by optical coherence tomography. Laboratory investigations revealed elevated blood urea levels, severe normocytic normochromic anemia with a hemoglobin level of 6.3 g/dL, and poorly controlled arterial hypertension. This case highlights the possible interaction between uremia, anemia, and hypertension in the pathophysiology of retinal lesions. It also emphasizes the importance of systemic treatment and close collaboration between nephrologists and ophthalmologists.

KEYWORDS: uremic retinopathy; chronic kidney disease; end-stage renal disease; dialysis; hypertension; anemia; retinal hemorrhages; cotton-wool spots; serous retinal detachment; optical coherence tomography.

INTRODUCTION

Chronic kidney disease is a systemic disorder associated with multiple vascular complications affecting several organs, including the eye. The retina and the kidney share

important microvascular and embryological characteristics; consequently, retinal abnormalities may reflect systemic microvascular injury and may be associated with renal disease.

Several studies have demonstrated an association between chronic kidney disease and retinal microvascular abnormalities, including retinopathy lesions, retinal hemorrhages, cotton-wool spots, and vascular caliber changes. These associations have been reported in patients both with and without diabetes, supporting the role of retinal findings as markers of

generalized microvascular disease.

Patients with chronic kidney disease may also develop ocular complications related to hypertension, anemia, hemodynamic instability, and dialysis. Hypertension can produce retinal and choroidal vascular injury, whereas severe anemia may contribute to retinal hypoxia and hemorrhagic lesions.

Serous retinal detachment is an uncommon ocular manifestation that may occur in patients with severe hypertension or end-stage renal disease. Published reports have described improvement after correction of blood pressure abnormalities and optimization of dialysis.^[7-9] We report a case of uremic retinopathy complicated by peripapillary serous retinal detachment in a young woman with end-stage renal disease. We discuss the possible pathophysiological mechanisms and the

importance of systemic and multidisciplinary management.

CASE REPORT

A 27-year-old woman with end-stage renal disease undergoing maintenance dialysis was referred for ophthalmic evaluation. The patient had no documented history of diabetes mellitus. The duration and modality of dialysis should be specified in the final manuscript if these data are available.

Best-corrected visual acuity was 20/20 in both eyes. The anterior segment examination was unremarkable, and intraocular pressure was within the normal range in both eyes.

Fundus examination of the left eye revealed retinal hemorrhages, predominantly in the inferotemporal region, associated with cotton-wool spots suggestive of retinal nerve fiber layer ischemia. No significant macular edema was observed. The right eye showed no significant fundus abnormalities.

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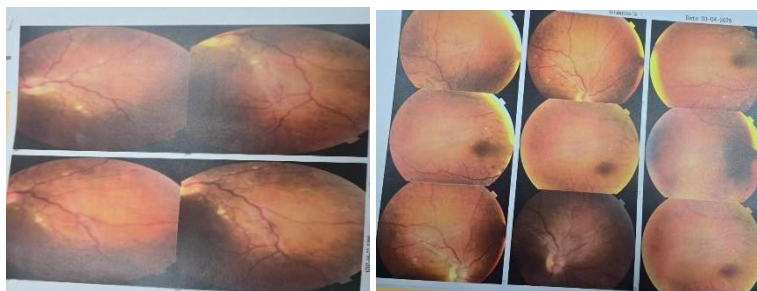
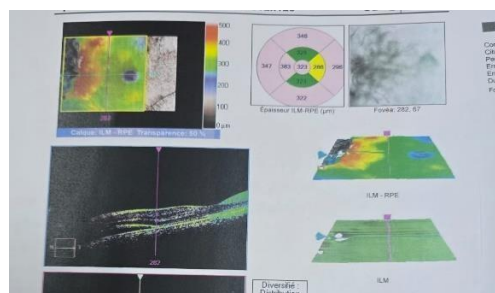


Figure 1: Color fundus photographs of the right and left eyes. The left eye shows inferotemporal retinal hemorrhages and cotton-wool spots.

Optical coherence tomography revealed peripapillary serous retinal detachment in the left eye, without

evidence of intraretinal edema.



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Figure 2: Optical coherence tomography of the left eye showing peripapillary subretinal fluid consistent with serous retinal detachment, without significant intraretinal edema.

Laboratory investigations revealed elevated blood urea levels, severe normocytic normochromic anemia with a hemoglobin level of 6.3 g/dL, and poorly controlled arterial hypertension. The exact blood pressure value(17/10), serum creatinine level(170mg/l, estimated glomerular filtration rate(3 ml/min/1.73m2), serum albumin level, and dialysis parameters should be added if available. Based on the clinical, ophthalmic, and biological findings, a diagnosis of uremic retinopathy with hypertensive and anemic components was made.

The patient was admitted to the nephrology department for dialysis optimization, blood pressure control, and correction of anemia. The ophthalmic outcome after systemic treatment should be reported if follow-up data are available, particularly visual acuity, fundus findings, and OCT changes.

DISCUSSION

Uremic retinopathy may be considered an ocular manifestation of systemic microvascular injury associated with advanced chronic kidney disease. Retinal abnormalities described in patients with renal disease include retinal hemorrhages, cotton-wool spots, microaneurysms, vascular caliber abnormalities, and macular or choroidal changes.

The pathophysiology is probably multifactorial. Uremia may induce endothelial dysfunction and alter the integrity of the blood-retinal barrier, thereby increasing vascular permeability and promoting retinal ischemia. However, the term “uremic retinopathy” should be used cautiously because the retinal lesions observed in patients with renal failure may also result from associated hypertension, anemia, diabetes, or dialysis-related hemodynamic changes.

In the present case, the retinal hemorrhages and cotton-wool spots were probably related to the combined effects of severe anemia, poorly controlled hypertension, and advanced renal disease. Severe anemia may cause chronic tissue hypoxia and increase the risk of retinal ischemic lesions and hemorrhages. Retinopathy has been reported in patients with anemia, particularly when anemia is severe or associated with thrombocytopenia.

Hypertension is another important contributing factor. Chronic or severe blood pressure elevation may cause retinal arteriolar narrowing, vascular leakage, ischemic lesions, and choroidal vascular dysfunction. The association between hypertensive chorioretinopathy and serous retinal detachment has been described, particularly in young patients with severe systemic hypertension and renal disease.

The peripapillary serous retinal detachment observed in our patient may reflect dysfunction of the retinal pigment epithelium and increased choroidal or retinal vascular permeability. Changes in hydrostatic pressure, plasma oncotic pressure, fluid balance, and choroidal perfusion may contribute to the accumulation of subretinal fluid in patients with end-stage renal disease.

Serous retinal detachment has been reported in patients undergoing dialysis. A population-based study found an increased risk of serous retinal detachment among patients with end-stage renal disease receiving dialysis, supporting a possible relationship between renal failure, dialysis-related hemodynamic changes, and retinal fluid accumulation.

In a reported case of massive bilateral serous retinal detachment associated with hypertensive chorioretinopathy, the retinal detachment improved after restoration of dialysis and antihypertensive treatment. This observation supports the importance of correcting systemic abnormalities before considering an ocular intervention.

Another accessible case report described bilateral serous retinal detachment associated with end-stage renal disease and reported anatomical and visual improvement after adjustment of dialysis management. These observations are consistent with the clinical approach used in our patient.

The differential diagnosis includes hypertensive retinopathy, diabetic retinopathy, anemia-related retinopathy, central serous chorioretinopathy, nephrotic syndrome-related exudative retinal detachment, and other causes of exudative retinal detachment. The clinical context, renal history, blood pressure measurement, biological assessment, and OCT findings are essential for establishing the most likely diagnosis.

Management should primarily target the underlying systemic abnormalities. In this case, treatment consisted

of dialysis optimization, blood pressure control, and correction of severe anemia. Current kidney disease guidelines emphasize individualized assessment and management of chronic kidney disease, while blood pressure and anemia guidelines support appropriate correction of these major systemic risk factors.

A specific ophthalmic treatment may not be necessary when the retinal abnormalities are secondary to systemic disease and there is no persistent macular edema, neovascularization, or irreversible structural damage. However, regular ophthalmic follow-up with fundus examination and OCT is recommended to document anatomical and functional evolution.

This case has several limitations. First, it is a single case and therefore cannot establish a causal relationship between uremia and the retinal findings. Second, the absence of detailed follow-up limits assessment of the response to dialysis, antihypertensive treatment, and anemia correction. Third, additional investigations, such as fluorescein angiography or OCT angiography, were not performed and therefore the retinal and choroidal microvascular changes could not be characterized in detail.

CONCLUSION

Uremic retinopathy is an uncommon ocular manifestation of advanced chronic kidney disease and may be associated with retinal hemorrhages, cotton-wool spots, and serous retinal detachment. In this patient, the retinal abnormalities were probably related to the combined effects of uremia, severe anemia, and uncontrolled hypertension.

The management of such patients should focus on correction of systemic abnormalities, including optimization of dialysis, strict blood pressure control, and treatment of anemia. Ophthalmic monitoring with fundus examination and OCT is important to assess the evolution of retinal lesions. Close cooperation between ophthalmologists and nephrologists is essential for appropriate diagnosis, treatment, and follow-up.

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