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Editorial Comment

The eye: a window on kidney diseases

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Ocular involvement, which causes significant morbid lesions of the eyes, induces obvious, perceptible symptoms for patients and can serve as a useful indicator of underlying systemic diseases. Systemic processes can affect almost any part of the eye and visual pathway. Ocular pain and visual impairment require urgent assessment by an ophthalmologist. Early recognition and treatment of both the ocular manifestations and the systemic condition can lead to an improved visual prognosis and a reduction in severe complications and morbidity.

Richard Bright, an early pioneer in morbid anatomy and clinical signs and symptoms of kidney disease first reported the association between renal disease and blindness in 1836 [1]. We now know that the period of organogenesis for both the eyes and the kidneys spans the fourth to sixth weeks of gestation. Therefore, any disturbances in embryogenesis during this period can cause anatomic and functional abnormalities in the two organs. Of more common interest to the renal physician are the ocular findings related to renal insufficiency. Lid oedema, conjunctival pallor and degenerative changes as well as corneal calcification and retinopathies tend to be more severe as renal disease progresses. Likewise, although rarely, exudative retinal detachment (ERD) can occur due to underlying systemic conditions. As an example, a high level of suspicion should lead to an examination of the eyes in order to detect end-stage renal disease (ERD) in renal and gastroenterological diseases. Retinal detachments often occur due to traction forces within the eye, a stress that results in tears or breaks in the retina, through which the liquefied vitreous leaks into the subretinal space. However, ERD can lead to a build-up of subretinal fluid in conditions unrelated to traction or rents. In this issue, Wong *et al.* [2] report on three cases that presented with blurred and decreased vision, secondary to an underlying systemic disease. Interestingly, in their patients, the systemic diseases were only diagnosed after the onset of ocular lesions.

This illustrates the importance of making a distinction between the possible aetiologies of ERD, such as an isolated ocular disorder or conversely a vision impairment secondary to a systemic disease. The management of these patients differs in many ways. Neurosensory retinal detachment, secondary to nephrotic syndrome, responds well to oral steroids. However, not all nephrologists know that if the ERD was caused by a central serous chorioretinopathy, systemic steroids would worsen the eye condition and cause further vision loss [4]. The authors point out that hypoalbuminaemia resulting from systemic diseases, such as a protein-losing enteropathy or the nephrotic syndrome is a rare cause of exudative retinal detachment. This has been rarely reported in the literature, but was present in all three of their cases. Blindness due to proliferative retinopathy or maculopathy is approximately five times more common in diabetic patients with a glomerulopathy compared with non-albuminuric patients.

Hypertensive retinopathic changes can be particularly severe in renal failure and have been ascribed to the effects of retained nitrogen products. Accelerated hypertension can result in optic disc oedema. Alternatively, patients treated with maintenance haemodialysis may experience hypotension, a common side effect of ultrafiltration. The ability to easily visualize the arteries and veins of the retina often indicates the condition of small blood vessels throughout the body, a time-honoured way of monitoring blood pressure and assessing the efficacy of antihypertensive therapy.

Also, in the issue of the Clinical Kidney Journal, Bansal and colleagues report two cases of dialysed patients who suffered severe longstanding hypotension with bilateral non-arteritic anterior ischaemic optic neuropathy (NA AION) [5]. NA-AION is an acute ischaemic disorder of the optic nerve head with an incidence rate of ∼2–10 per 100 000 [6]. Hypotension is one of the most commonly encountered complications of haemodialysis, with a rapid decrease in blood volume which occurs during ultrafiltration. NA-AION occurring as a result of haemodialysis is rare and Bansal provides a review of the literature, which includes fewer than 20 episodes since its initial report in 1986. Both patients in this report had bilateral, painless vision loss and benefited from blood pressure stabilization, which resulted in visual acuity improvement, with a residual visual field defect in one patient. Management strategies for NA-AION in dialysis patients have not been well established and in most cases measures are taken to raise the patient's blood pressure, although neuroprotection studies involving *N*-methyl-D-aspartate receptor antagonists in animal models are currently under way [7].

These two articles demonstrate the importance of recognizing ocular symptoms in patients as a marker of

systemic disease and identifying significant visual changes in those patients already known to have nephrotic proteinuria undergoing treatment. A comprehensive eye examination should be carried out in patients with chronic or end-stage kidney disease as was demonstrated by the CRIC study group [8]. They examined retinal photographs of 1936 individuals with varying stages of kidney disease and found that 45% had pathologies that required ophthalmologic follow-up, while 3% had serious eye lesions that required urgent treatment. This group determined further associations from this cohort, including the fact that an estimated glomerular filtration rate (GFR) <30 mL/min per 1.73 m^2 was associated with a risk three times greater for suffering from a retinopathy than in patients with a normal GFR. Retinopathy is often asymptomatic in its most treatable stage, and delay in diagnosis can result in a significant increase in the risk of visual loss.

The current publications by Wong *et al.* and Bansal *et al.* add interesting data to the literature. Their cases highlight the relationship between ocular manifestations of systemic diseases and also the importance of ocular examination and screening of patients for any potential visual threat. With this in mind, treatment can be applied or advice provided before the patient becomes irreversibly visually impaired. Wong and Bansal and their co-authors demonstrate that ocular conditions are good indicators of the metabolic control of the disease processes, and they make a good point about cases of chronic renal failure that first present to an ophthalmologist with an ocular complication that reveals the renal insufficiency.

(See related articles by Bansal *et al.* Hypotension-induced blindness in haemodialysis patients. *Clin Kidney J* 2014; 7: 387–390 and by Wong *et al.* Exudative detachment as a masquerader in hypoalbuminaemic patients. *Clin Kidney J* 2014; 7: 406–410)

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