Retinal microvascular changes may be a marker of kidney function in patients with known nephropathy as well as an indicator of systemic microvascular damage, according to a cross-sectional study.\(^1\)

After previously noting a high incidence of fundus pathology associated with chronic kidney disease factors,\(^2\) researchers sought to expand on those findings and evaluate whether retinopathy status was predictive of kidney function. Investigators enrolled patients from the larger Chronic Renal Insufficiency Study (CRIC; NCT00304148)—a multicenter study of chronic kidney disease.\(^1\) The 2,605 enrolled patients were offered participation in the Retinopathy in Chronic Renal Insufficiency Study (RCRIC), and 1,936 participants eventually underwent fundus photography examinations.

The fundus photographs were reviewed by masked investigators, evaluated for retinopathy, and the diameter of the major retinal arterioles and venules was measured. Grading of the severity of retinopathy was ultimately successful in 1,820 participants, and measurement of retinal vessel caliber was achieved in 1,599 participants.

Overall, there was a statistically significant association between the presence of retinopathy and estimated glomerular filtration rate (eGFR) \((P = .005)\). Lower eGFR was found in patients with more severe retinopathy and vice versa. This trend was also seen among 925 patients with concomitant type 2 diabetes \((P < .007)\), but “there was no significant interaction of diabetes mellitus on the association of retinopathy and eGFR \((P = .75)\),” the authors wrote.

The investigators also found an association between features of retinopathy that are considered in determining its severity, which remained statistically significant for most features after adjusting for traditional and nontraditional risk factors. According to the authors, “the number of retinal hemorrhages and intraretinal microvascular abnormalities were identified through stepwise multiple regression as independently associated with eGFR.”

On the other hand, there was no association found between the average arteriole diameter, venular diameter, or arteriole-venular ratio and eGFR on multivariate analysis after adjustment for traditional and nontraditional risk factors.

The findings signal a potential need to monitor patients with known kidney disease for retinopathy. Conversely, the severity of retinopathy may serve as an additional marker of the severity of chronic kidney disease. According to the study, the interplay between chronic kidney disease and retinopathy is even more salient among patients with type 2 diabetes.

Numerous participants in the study had hypertension, which may complicate the interpretation of the resulting data. For instance, the authors noted that underlying hypertension might have damaged the retinal vasculature irrespective of the nephropathy. Although current systolic pressure was used as a covariate in the data analysis, history of hypertension was not reviewed, therefore the retinopathy may have been driven by prior events.

Still, the findings in the RCRIC study suggest a common pathway in microvascular changes that can yield retinal and renal vascular pathology. Noting that both retinopathy and nephropathy feature basement membrane and muscular layer thickening and increased leakage, the authors wrote that, “these pathologic and hemodynamic abnormalities may occur throughout the body, and their effects on the retinal vasculature may be useful indicators of cumulative microvascular damage from hypertension, inflammation, diabetes mellitus, and other processes.”

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