Seeing the Light: Improving Diabetic Retinopathy Outcomes by Bringing Screening to the Dialysis Clinic

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Diabetic retinopathy (DR) is the leading cause of preventable blindness in the developed world, with an estimated 103 million people (22% of all people with diabetes) affected by DR (1). With the rapidly increasing worldwide prevalence of diabetes, this number is projected to rise to 160 million by 2045, along with a concomitant rise in other microvascular diseases such as diabetic nephropathy (1,2). In 2019, nearly half of all new dialysis-dependent kidney failure cases were attributed to diabetes, and more than two-thirds of people treated with dialysis had comorbid diabetes (3,4). Small studies suggest that >70% of people receiving dialysis who have comorbid diabetes have DR (5). Annual eye examinations, at a minimum, are considered standard of care for all people with diabetes because early detection, treatment, and regular follow-up of DR can prevent blindness (6,7).

Since the early 2000s, there has been robust uptake of DR screening programs worldwide, driving 2019 screening rates to >80% in the United Kingdom and >70% in Denmark (8,9). Screening rates in the United States are lower, with just 65% of individuals with diabetes undergoing annual DR screening in 2019 (10). Although limited global data are available, patients with dialysis-dependent kidney failure fare worse: estimates suggest that <50% of Canadian hemodialysis patients and <60% of Japanese hemodialysis patients have up-to-date eye examinations (11,12). Barriers such as the burdensome nature of thrice-weekly hemodialysis, competing medical priorities, limited personal resources, and lack of awareness of their elevated risk of DR progression likely contribute to these poor DR screening rates. Performing routine foot checks at dialysis clinics has been shown to reduce the risk of major lower-limb amputations in patients with comorbid diabetes (13), but to date, there has been less emphasis on DR screening. Bringing additional aspects of diabetes-related care to the patient at the dialysis clinic has the potential to improve diabetes-related morbidity and mortality meaningfully, including DR outcomes, among people receiving hemodialysis.

In this issue of Kidney360, Cushley et al. describe adherence to annual DR screening in patients receiving hemodialysis and examine the severity of retinopathy detected via a screening program instituted at hemodialysis clinics in Northern Ireland (14). All patients receiving hemodialysis with comorbid diabetes were invited to participate in the DR screening program, and 132 (89%) of eligible patients enrolled and attended screening. Unsurprisingly, screening rates before implementation of the dialysis clinic-based screening program were low, with 34% of individuals having no screening eye examination within 3 years and 15% of individuals never having a screening. However, the results of the dialysis clinic-based DR screenings were striking. Of the 132 enrolled patients, 17 (13%) required urgent referral to hospital eye services—a staggering proportion compared with the Irish national average of 0.4%.

Although this report does have limitations (e.g., modest sample size and limited data on participant comorbid disease severity, glycemic control, and duration of diabetes), as acknowledged by the authors, these findings are sobering. Moreover, they align with reports from other countries showing poor DR screening rates among individuals receiving dialysis. For example, another recent Kidney360 publication examining gaps in care among patients receiving maintenance in-center hemodialysis in Canada between 2016 and 2018 found that 53% of patients had no evidence of annual DR screening (11). Given the poor adherence to DR screening in the general United States diabetes population, it is likely that screening rates among people receiving dialysis in the United States are even more dismal.

These data, along with evidence suggesting that such gaps in diabetes care are not limited to annual eye exams (11), highlight the vulnerability of patients with dialysis-dependent kidney disease and comorbid diabetes and underscore the need to identify strategies to deliver diabetes care optimally to this population. This need is particularly pressing given that, compared with patients without diabetes, patients with dialysis-dependent kidney disease and comorbid diabetes suffer worse morbidity and mortality, including higher risks for hyper- and hypoglycemic crises, amputations, and cardiovascular disease (15–17). The medical complexity of these individuals is compounded by care fragmentation, where the burden of

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RRT can interfere with attendance at nondialysis subspecialty care appointments such as endocrinology visits (18). Further, communication challenges between dialysis and nondialysis clinicians can make coordinated care difficult and may result in either redundant or insufficient care (18). Nevertheless, as evidenced by dialysis clinic–based DR and foot infection screening programs, there is great opportunity for improvement.

Optimization of diabetes care in the dialysis population will require a multigrounded approach aimed not only at increasing standard of care screenings but also at developing, and then supporting the uptake of, population-specific guidelines for the management of diabetes. Currently, lack of evidence about glycemic monitoring, optimal glycemic targets, and the safety and effectiveness of diabetes therapies, particularly the newer incretin therapies, limits the application of current diabetes management guidelines to the hemodialysis population.

Glycated hemoglobin (HbA1c) is widely used to monitor glycemia, but kidney failure–related factors such as uremia, anemia, and metabolic acidosis can affect the accuracy of HbA1c measurement in hemodialysis patients, leading to falsely high or low HbA1c values (4). International guidelines still recommend the measure of HbA1c in people receiving dialysis, but definitive HbA1c targets remain unknown (19,20). Other measures of glycemia have not been well validated in the dialysis population, and further research is needed (4). Although alternative glycemic monitoring approaches (e.g., continuous glucose monitoring) do exist, they may require more advanced technology and, typically, oversight by an endocrinologist (21,22). Yet, data from the United States Renal Data System suggest that few patients with dialysis-dependent kidney disease receive endocrinology care (23). Identifying innovative ways to engage diabetologists in glycemic management for dialysis patients is critical. As shown by the success of dialysis clinic–based DR and foot infection screening programs, offering such consultative care (in person or via telehealth) in the dialysis clinic may be a patient-centered strategy to improving glycemic outcomes in the dialysis population.

Finally, and perhaps even more importantly, newer anti-hyperglycemic therapies, such as the glucagon-like peptide 1 receptor agonists (GLP-1 RA), an incretin therapy, have revolutionized type 2 diabetes care for the general diabetes population, but these advances have not been extended to people treated with dialysis. In the general diabetes population, GLP-1 RA not only improve glycemia but confer cardiorenal benefits, decrease adiposity, and reduce mortality (24). Several of these agents require no dose adjustment for kidney failure, and there are additional such agents in development (25–27). Incretin therapies thus expand the limited pharmacotherapies therapies available for the treatment of diabetes in the setting of kidney failure. Yet, data from the United States Renal Data System show that <2% of eligible patients were prescribed GLP-1 RA in 2019 (3). This low use may result from the dearth of clinical trials examining the safety, glycemic efficacy, and cardiovascular benefit of incretin therapies in people with dialysis-dependent kidney failure. There is an enormous need to test these agents and additional novel diabetes pharmacotherapies in the dialysis population.

As the dialysis-dependent kidney failure population increases, an unfortunate byproduct of the growing diabetes epidemic (28), the importance of establishing evidence-based, population-specific diabetes guidelines grows. The development of such guidelines will require not only the conduct of population-specific trials, but also the creation of new processes of care that make it easier for patients receiving dialysis to access state-of-the-art diabetes therapies. Clearly, bringing interventions to the patient at the dialysis clinic is one patient-centered strategy that holds great promise, shedding light on how we can improve diabetes outcomes in the dialysis population.

Disclosures
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K.R. Klein: wrote the original draft of the manuscript, and both authors were responsible for conceptualization and reviewed and edited the manuscript.

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See related article, “The Integration of Diabetic Eye Screening into Haemodialysis Units in Northern Ireland,” on pages 1542–1544.