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Value-Based Dialysis Access Realized Via Early Cannulation

Dr. David Kingsmore discusses the methods for achieving dialysis access and the challenges in obtaining better outcomes.

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What is currently the most prevalent method of renal access for patients with end-stage renal disease undergoing dialysis?

Currently, most units around the world aspire to use native arteriovenous fistulas (AVFs) for both long-term and incident patients requiring vascular access. However, the success of this strategy varies by unit and country, with some units achieving up to 90% prevalence rates of AVFs. Worryingly, the most recent data for the United States suggest that 83% of patients initiate hemodialysis through a catheter despite 25% to 35% better survival if catheters are avoided.[1]

Do you favor this method? If not, what method do you prefer, and what experience led you to this?

Without doubt, a native AVF that is established has the best longevity and lowest complication rate. However, in order to achieve this, an average of two procedures or interventions are required with a primary failure rate of around 30% in most studies. Clearly, crude incidence rates do not really show how clinical decisions affect the incorporation of available options (including peritoneal dialysis), the urgency for immediate access, and the long-term need (including survival and likelihood of transplantation). It is my belief that blindly striving to achieve an AVF in every patient can be to the detriment of many patients who end up with a prolonged period of dialysis through a catheter. Ultimately, the aim for every patient should be to achieve a method of vascular access that is sufficient to meet their individual need: a personal access solution. Avoiding peripheral prosthetic grafts at all costs guarantees central venous catheters and a slower attainment of a personal access solution. Currently, we struggle with two cohorts: (1) legacy patients with numerous failed access procedures, a long exposure to catheters, and subsequent central vein stenosis; and (2) older patients who are increasingly frail with diabetes, obesity, and a long history of venesection that leaves little venous capital from which to construct native AVFs. Both of these could be avoided with a more rational approach to a personal access solution that includes all options.

What is the current perception of arteriovenous grafts (AVGs) versus AVFs in terms of patency, infection, and costs for intervention? Which study results guide this thinking?

In general, vascular surgeons' experience of bypass surgery in patients with peripheral vascular disease and intermittent claudication has led to a healthy skepticism of prosthetic grafts. However, the evidence of three randomized trials and many observational studies of large databases like the United States Renal Data System has shown that prosthetic grafts for arteriovenous access have a useful role. These trials consistently showed that grafts are comparable to fistulas but require more interventions. However, AVGs and AVFs are not equally considered in the literature. For example, the patency of AVGs is far superior to AVFs by intention-to-treat analysis for the first few years, and based on a cost model, the increased use of tunneled central venous catheters (TCVCs) in patients in whom AVFs are pursued have significantly higher costs

due to the cost of treating line infection. Perhaps most importantly, the personal cost to patients of repeated admissions and failed procedures far outweighs the increased number of interventions required to maintain graft patency.

What is the current role of TCVCs?

Currently, TCVCs are used as the primary immediate solution for patients requiring hemodialysis in whom there is no native access. For most patients with no native access at initiation of renal replacement therapy, TCVCs will remain in use for the first year, with only 40% of patients graduating to an AVF at 6 months. The saying "start with a line, keep the line" remains true.

Do you believe that arteriovenous access using TCVCs can be improved? If so, how?

Many trials have looked at improving catheter patency rates and reducing line infections—as evidenced by the 30-odd meta-analyses and reviews! That in itself says something. Perhaps the most important data come from knowing your own unit's outcomes, not data from a trial. Many units struggle to obtain accurate data on outcomes related to catheters (eg, delays, rates of replacement, complications, bacteremia), but it is only in knowing these data that the true cost to patients and the service can be rationalized and balanced against the alternatives.

How would you summarize the design and results of the randomized controlled trial evaluating immediate-access AVGs versus TCVCs?

Our trial was relatively straightforward and sought to be inclusive and not select out the most problematic patients nor choose only those initiating dialysis. We wanted to look at whether the strategy of TCVC replacement with early cannulation AVG was feasible and worthwhile. We randomized 121 patients referred for a catheter to either standard care (TCVC) or an early cannulation AVG. The results were very clear—over a 6-month follow-up period, the early cannulation AVG group had a significantly reduced initial hospital stay, half the number of readmissions, half the number of hospital days, and one-fifth the number of culture-positive bacteremic events, at a nonsignificantly lower cost and significantly higher quality of life. The downside to the improved patient outcomes was a shift in work to interventions to maintain graft patency.

In what ways might this trial represent a change in current practice patterns, and what guidance would you offer those who may be considering this change in strategy?

The entire practice of vascular access really needs to reconsider the patient pathway. There are effective alternatives to TCVCs that are cheaper or cost-neutral and have better and lower overall maintenance costs than TCVCs. In addition to these direct benefits, there is the indirect benefit of initiating non-TCVC dialysis. To do this requires a significant shift in the nature of work from medically treating line infections to maintaining graft patency rather than an escalation in work itself, which is a significant benefit to patients with prophylactic treatment rather than therapeutic. ■

1. Malas MB, Canner JK, Hicks CW, et al. Trends in incident hemodialysis access and mortality. JAMA Surg. 2015;150:441-448.