KDOQI Q&A: How the New Vascular Access Guideline Update Affects Interventional Practices

Lead author Charmaine E. Lok, MD, discusses trends in the field, the guideline-writing process, essential elements to a comprehensive care plan, and KDOQI in the COVID-19 era.

First, congratulations on completing the updated KDOQI guidance, the first since 2006. Looking back, what have been some of the biggest trends or paradigm shifts in the field since then?

Thank you—the congratulations goes out to the entire multidisciplinary work group that worked so tirelessly with me to complete this important project. A wave of changes has occurred in over a decade since the last version of the Kidney Disease Outcomes Quality Initiative (KDOQI) vascular access guidelines were published in 2006. Those guidelines were highly influential in promoting a "fistula first" approach to access choice and encouraging the use of arteriovenous access (fistula and graft) surveillance. Indeed, the impact of those guidelines was seen in the first wave of changes, with a positive trend in increasing fistula creation and the uptake of surveillance. Concurrently or shortly thereafter, there was a wave of reporting of new, more rigorous studies to inform practice. These studies, along with the realization that successful fistula maturation and use were more variable than anticipated after its creation, brought a trend of increasing intervention (particularly endovascular) to improve outcomes, an initial increase in catheter use, and stimulus to innovate to improve all vascular access types.

How does the KDOQI process of evidence review and guideline writing work?

The process is very comprehensive. There are two separate groups—the KDOQI work group and an independent evidence review team (ERT). The work group comprises multidisciplinary experts in vascular access. The ERT is a seasoned team from the Minneapolis VA Center for Chronic Disease Outcomes Research. The work group develops a "scope of work" document that contains important topics and questions to be addressed in the guidelines. These are structured using a series of PICOTs–whereby the Population, Intervention, Comparator, Outcomes, and Time frames of each question or topic are given to the ERT to search. The ERT provides the work group with the evidence and quality of the evidence to use to write the guideline statements (previously known as guideline recommendations) using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) Evidence to Decision frameworks.[1] The work group determines the strength of the recommendations based on a matrix that includes not only the quality of the evidence but also the clinical importance, pros, cons, implications, and other factors. Work group members worked in teams, and individual members developed the statements. All statements were reviewed in a transparent and iterative process whereby the entire work group was involved in finalizing each statement. The frequencies of meetings ranged from weekly to monthly until the guidelines were completed.

The 2019 guideline emphasizes individualized plans for each patient. Can you tell us more about how the committee arrived at this as a central theme? What variable elements are essential to a comprehensive care plan?

The work group considered the end-stage kidney disease (ESKD) and dialysis "landscape" and realized that population metrics may not necessarily be the most fitting for an individual patient who would benefit from individualized care of their vascular access. For example, although fistulas are preferred and catheters should be avoided in the majority of people, this is not the case for all and not

the intent of previous guidelines. Thus, the work group developed an overarching goal that would focus on the patient yet achieve outcomes desirable on a population basis. The overarching goal of these guidelines is to help patients achieve reliable, functioning, complication-free dialysis access to provide prescribed dialysis while preserving future dialysis access site options as required by the individual patient's ESKD life plan.[2] This goal first requires knowledge and understanding of the patient's medical conditions, their personal goals and preferences for kidney replacement therapy (hemodialysis, peritoneal dialysis, transplant, or optimal nondialytic care), and the corresponding dialysis access based on these factors. This requires a coordinated multidisciplinary approach to plan for the most imminent and subsequent accesses for the patient's life plan. For each access, there must be a creation plan, contingency plan, and succession plan, with an underlying vessel preservation plan.[2]

How did the writing committee mitigate the paradox of formalizing generalizable guidance based on the need for developing individualized care?

We took an approach of "individualization of best care with standardized processes." Perhaps the best way to describe this is with an everyday analogy. Most people need a motor vehicle to travel from point A to point B. That vehicle can be likened to the patient's vascular access through their journey with ESKD. Although one person's goals and preferences can be met by one type of car, it may not be suitable for another. For example, an adventurous youth may prefer and need a sports car (such as a radiocephalic fistula) to meet his or her needs, while a parent of three children may need a van (such as a graft). Grandpa may just need a rental car temporarily (such as a catheter). Regardless, standardized processes to prepare for and maintain that vehicle to keep the individual safe in their journey is required. Individuals need to be eligible for a car (vascular access) and prepare for and get their driver's license (have the appropriate preoperative assessments). A good car (vascular access) should be bought from a reputable dealer (a skilled, knowledgeable, and committed surgeon/interventionalist in a qualified facility). Once purchased (created), processes are in place to keep the car working well and the patient safe (use of seat belts, oil changes, etc), with a regular maintenance schedule for longevity (regular access monitoring, careful cannulation is required, etc). If a car problem is detected (eg, flat tire or access stenosis), a plan to rectify it should be in place (access contingency plan such as angioplasty of stenosis). Care is taken to plan ahead (access succession plan). The next car (vascular access) is already in mind and plans are in place to obtain it, before the current one fails. For example, the pace of that youth's life and work circumstance changes and as the sports car gains more mileage and wears down, a different car may be more appropriate. Rather than waiting until the sports car is nondrivable (access loss), the youth has put funds aside and shopped for that new car already, rather than needing a rental car (catheter). The work group recognizes that the best access for each individual patient and their access needs is best determined by the patient and their health care team (rather than a one-size-fits-all statement from the guidelines). However, the guidelines provide the standardized processes to help guide the individual patient and the team in the most optimal creation, maintenance, and salvage of the accesses that they choose.

Which changes or recommendations are most likely to affect interventional practices?

Guideline 1 discusses the ESKD life plan, which is a new concept worth reviewing and understanding for all clinicians involved with dialysis access. Table 1 outlines some select statements that may specifically impact interventional practices.

The last several years have seen considerable development in interventional options for creating and treating accesses. How does the guidance approach the use of newer technologies?

The guidelines are highly supportive of the use of newer technologies. Given the rigorous and high standards set by the ERT, the work group recognized that many newer technologies lack sufficient evidence for recommendation. However, the guidelines were very careful not to recommend against new technologies in this situation but encourage further study to inform the next set of guidelines. Thus, many statements have wording to the effect of "…based on the operator's discretion and best clinical judgment, as there is insufficient evidence…." The work group was very mindful that the guidelines should encourage and not limit new technologies, their development, and rigorous study.

How do you recommend teams dedicated to dialysis access management approach absorbing and implementing the new guidance?

A good initial approach is to read the introduction section of the guidelines (pages S17-S24). The introduction is then followed by a summary of guidelines statements that start on page S25; this allows the reader to become familiar with the range of topics covered. A guideline statement or topic of interest can then be selected for further review. Each guideline section or topic can be read independently, as each is accompanied by a rationale/background, detailed justification, special discussions, implementation considerations, monitoring and evaluation, and future

TABLE 1. SELECT STATEMENTS FROM THE 2019 KDOQI GUIDELINES THAT MAY IMPACT INTERVENTIONAL PRACTICES

Guideline No.	Statement
Vascular access choice and creations	
2.10	KDOQI considers it reasonable to use tunneled CVC in preference to nontunneled CVC due to the lower infection risk with tunneled CVC (Expert Opinion)
3.1.A	3.1 KDOQI considers it reasonable to choose the site (location) of the AV access (AVF or AVG) after careful consideration of the patient's ESKD life plan, potentially following the below paths (Expert Opinion). See Guideline Statement 3.2 for CVC locations: (A) A patient's ESKD life plan includes an anticipated long duration (eg, > 1 year on HD): ▪ Forearm AVF (snuffbox or distal radiocephalic or transposed radiobasilic) ▪ Forearm loop AVG or proximal forearm AVF (eg, proximal radiocephalic, proximal vessel, and perforator combinations) or brachiocephalic, per operator discretion ▪ Brachiobasilic AVF or upper arm AVG, per operator discretion
3.1.D	(D) A patient urgently starts HD without prior sufficient time to plan for and/or create an AV access and has an anticipated long duration (eg, > 1 year) on HD: ▪ PD catheter, and follow above algorithm (3.1.A) if PD not a long-term option or ▪ Forearm early cannulation loop graft; when AVG fails, follow above algorithm (3.1.A) or ▪ CVC if high likelihood of rapid AVF maturation and usability success, then follow above algorithm (3.1.A)
4.2	KDOQI considers it reasonable to use early cannulation grafts as a CVC-sparing strategy in appropriate patients, considering their ESKD life plan (Expert Opinion)
9.1	KDOQI recommends the use of image-guided CVC insertions to improve success of insertions (Conditional Recommendation, Moderate Quality of Evidence)
9.2	KDOQI considers it reasonable that if fluoroscopy is not used to insert a tunneled CVC, alternative imaging is used to ensure that the CVC tip has been correctly placed (Expert Opinion)
Vascular access maintenance and salvage	
13.6 and 13.7	KDOQI does not recommend preemptive angioplasty of AVFs or AVGs with stenosis, not associated with clinical indicators, to improve access patency (Conditional Recommendation, Moderate Quality of Evidence)
13.9	KDOQI considers it reasonable for patients with consistently persistent clinical indicators and underlying AV access stenosis to undergo preemptive angioplasty of their AV access to reduce the risk of thrombosis and AV access loss (Expert Opinion)
15.5	KDOQI considers it reasonable to use balloon angioplasty (with high pressure as needed) as primary treatment of AVF and AVG stenotic lesions that are both clinically and angiographically significant (Expert Opinion)
15.12	KDOQI considers it reasonable to avoid the use of bare-metal stents for the treatment of clinically and/or angiographically significant AVG and AVF stenotic lesions (Expert Opinion)

Abbreviations: AV, arteriovenous; AVF, arteriovenous fistula; AVG, arteriovenous graft; CVC, central venous catheter; ESKD, end-stage kidney disease; HD, hemodialysis; KDOQI, Kidney Disease Outcomes Quality Initiative; PD, peritoneal dialysis.

research subsections. Therefore, the reader will have a more thorough understanding of the statements and their implications. Such an approach will enable the reader to use the guidelines in a digestible but comprehensive way.

The updated KDOQI guidelines were in progress for years before the world knew of the COVID-19 pandemic. With chronic kidney disease and ESKD patients representing a particularly susceptible population that requires regular, frequent health care contact, how would you briefly summarize a KDOQI P-L-A-N–like approach to their care during this time?

Each patient should have their P-L-A-N (Patient Life plan and Access Needs) established, since a patient with ESKD may far outlive the pandemic. Nevertheless, the P-L-A-N should consider the impact of the COVID-19 pandemic and what local services are practically available to the patient. Of note, on March 26, 2020, the Centers for Medicare & Medicaid Services stated, "We have received feedback that providers are experiencing difficulties scheduling for placement or repair of arteriovenous fistulas, arteriovenous grafts, peritoneal dialysis catheters, and intravenous catheters. We wish to clarify that these planned procedures are essential in that establishing vascular

	Comment
	Tunneled CVC should only be used in short durations (< 2 weeks) (2.11). This may impact the type of CVC placed by interventionalists
	This statement (3.1.A) assists the clinician/interventionalist with choosing the appropriate vascular access for patients with expected long-term survival (> 1 year). A distal native vessel option is the preferred option. However, if this is not possible, a forearm graft option or proximal forearm option is possible, including endovascular creations of proximal forearm AVFs (relevant for interventionalists)
	This statement (3.1.D) assists the clinician/interventionalist with choosing the appropriate dialysis access for patients who urgently start dialysis and with expected long-term survival (> 1 year). PD catheter insertions can be placed by knowledgeable, skilled, and committed interventionalists
	In appropriately chosen patients, use of an early cannulation graft may reduce CVC use; however, the patient's circumstances and ESKD life plan must be carefully considered
	Whenever possible, CVC insertions should not be performed in a blinded fashion
	Postinsertion imaging to ensure that the tip of the CVC is properly placed (mid right atrium) is important if the CVC is not fluoroscopically placed (eg, confirmation of CVC tip placement by X-ray can be used)
	Preemptive angioplasties of AVFs or AVGs based solely on angiographically detected stenosis, in the absence of clinical indicators, is discouraged. See Table 13.2 for clinical indicators. Angioplasty causes endothelial injury, often leading to recurrent stenosis, which may lead to a reduction in the lifespan of the access
	In the presence of clinical indicators, angioplasty is the preferred primary treatment of angiographically significant AVF and AVG stenotic lesions
	At the time of writing the guidelines, there was inadequate evidence to make recommendations on the use of specialized balloons (drug-coated or cutting) versus standard high-pressure balloons or balloon inflation time in the primary treatment of AVF and AVG stenosis. Thus, a careful patient-individualized approach to the choice of balloon type and inflation time is based on the operator's best clinical judgment and expertise
	Guideline statements 15.9-15.11 give guidance on when to use stent grafts and the considerations required. Bare-metal stents should be used in limited situations given their higher rate of restenosis (see Table 15.1 for evidence to use stent grafts)
	Adapted from Lok CE, Huber TS, Lee T, et al; KDOQI Vascular Access Guideline Work Group. KDOQI clinical practice guideline for vascular access: 2019 update. Am J Kidney Dis. 2020;75(suppl 2):S1-S164. https://www.ajkd.org/article/S0272-6386(19)31137-0/fulltext#articleInformation

access is crucial for [ESKD] patients to receive their life-sustaining dialysis treatments." Fortunately, the P-L-A-N is intended to be (and should be) regularly reviewed; consequently, it can be updated based on progress in overcoming the COVID-19 pandemic. The P-L-A-N was specifically designed to accommodate changes in the patient's clinical and life circumstances, including the impact of the COVID-19 pandemic. ■

1. Alonso-Coello P, Schunemann HJ, Moberg J, et al. GRADE Evidence to Decision (EtD) frameworks: a systematic and transparent approach to making well informed healthcare choices. 1: Introduction. BMJ. 2016;353:i2016. doi: 10.1136/bmj.i2016
2. Lok CE, Huber TS, Lee T, et al; KDOQI Vascular Access Guideline Work Group. KDOQI clinical practice guideline for vascular access: 2019 update. Am J Kidney Dis. 2020;75(suppl 2):S1-S164. https://www.ajkd.org/article/S0272-6386(19)31137-0/fulltext#articleInformation

Charmaine E. Lok, MD, MSc, FRCP(C)
Chair, KDOQI Vascular Access Guidelines
Professor of Medicine, University of Toronto
Director of Multi-Care Kidney Clinics and Hemodialysis Program
University Health Network
Senior Scientist
Toronto General Research Institute
Toronto, Canada
charmaine.lok@uhn.ca
Disclosures: None.