“Interventional Nephrology: Evolution, Challenges, and Opportunities” is the theme of this special issue of Kidney News. The field of interventional nephrology covers an area that is common to nephrologists, vascular surgeons, and interventional radiologists. In 2000, the American Society of Diagnostic and Interventional Nephrology (ASDIN) was founded, with the mission of promoting excellence in dialysis access care and improving outcomes for patients with kidney disease.

We have gathered here articles by several interventional nephrologists who share their thoughts and experiences in this growing and exciting field. In looking at the recently published KDOQI Vascular Access Guidelines, we have included the viewpoints of a clinician and a patient, as well as thoughtful consideration of the guidelines’ application in the international arena as written by Dr. Dalia Dawoud, Mr. Evan Coaker, and Dr. Vivekanand Jha, respectively. Dr. Vandana Niyyar gives a primer on hemodialysis access. And with the recent development of percutaneous AVF, Dr. Umar Waheed discusses the current understanding of and experiences with the available pAVF technologies.

Also included are discussions of common problems and dilemmas in dialysis access for the general nephrologist. Dr. Bhavnish Bucktawarsing tackles a common problem of high flow AVF that interventional nephrologists typically encounter, while Dr. Aisha Shaikh and Dr. Loay Salman debate the controversial topic of ligating AV accesses when they are no longer in use. Last but not least, a topic that is germane to all nephrologists—as we all get the call no matter what the time of day, “Doctor, can we put a PICC line in your patient?”

We hope you enjoy and benefit from these concise discussions of very practical topics.

—Anil Agarwal, MD, FASN, FASDIN, and Edgar V. Lerma, MD, FASN, FASDIN, Editors

INTERVENTIONAL NEPHROLOGY
EVOLUTION, CHALLENGES, AND OPPORTUNITIES

By Anil Agarwal

Until a couple of decades ago, nephrology was extensively dependent for its procedural needs on other specialties, including surgery and radiology. Although nephrologists commonly performed kidney biopsies and nontunneled dialysis catheter placements, the non-nephrologists were mostly creating and maintaining arteriovenous and peritoneal dialysis (PTD) accesses. With relatively minimal to modest communication, a multidisciplinary coordinated approach was lacking, leading to a fragmented approach to the care of dialysis access. Further, despite over half a century of tireless efforts to innovate, dialysis access was (and has been) an unrivaled challenge for patients with ESKD. As we look for perfection in achieving a consistent, reliable, inexpensive, and simple-to-use access, recent progress in the field of interventional nephrology (IN) has widened the options and choices for our patients. There is a noticeable glimmer of hope on the horizon, both for patients requiring kidney replacement therapy by dialysis and for those who remain in the midst of their daunting journey through kidney disease.

Evolution of interventional nephrology

The advent of IN in the United States about two decades ago was the product of accumulating frustration about the difficulty in provision of appropriate and timely creation and maintenance of dialysis access. A desire to improve outcomes led nephrologists to learn invasive techniques that were not taught in nephrology fellowships. This change in paradigm of care was instantly appealing, especially to younger nephrologists, who then managed to learn access procedures from willing surgeons and interventionalists. An organized effort of a handful of these “interventional nephrologists” resulted in the formation of the American Society of Diagnostic and Interventional Nephrology (ASDIN), which over the years has become the world leader in IN and has influenced patient care around the globe.

The debate about the pros and cons of IN has largely subsided over the years, owing to a wide acceptance of this specialty (1). The impacts of IN are multidimensional. A few of the important positive impacts of IN are as follows:

Improvement in ESKD patient care

As the primary provider for patients across the spectrum of pre-ESKD care to providing care in the dialysis unit, the nephrologist is the natural care provider who truly understands the dilemmas and challenges of dialysis patients. The IN practitioner has the comprehensive tools to provide holistic care, from the management of underlying kidney disease and its complications to taking care of vascular access. Proactive planning, execution of an ESKD life plan, and seamless communication with the multidisciplinary team is implicit when the IN specialist is in charge of access. Several early articles alluded not only to the safety and efficacy but also to improved patient outcomes when interventional nephrologists provided care of dialysis access (2–4).

Reduction in inpatient resource utilization

Freestanding vascular access centers free up precious and expensive hospital beds by avoiding hospital admissions for access-related procedures.

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Reduction in exposure of patients to the healthcare environment
In the COVID-19 era, keeping the patient out of the hospital is a goal worth pursuing. Leading in the midst of crisis, ASDIN was instrumental in publishing a joint statement with the Vascular Access Society of America to ensure the uninterrupted performance of dialysis access procedures (5). ASDIN has also advocated for appropriate reimbursement for care and has created opportunities for education and training.

Reduction in healthcare expenditures
Prompt outpatient management, avoidance of unnecessary temporary dialysis catheter placements, and prevention of access thrombosis by timely intervention can save costs.

Impact on patient care worldwide
ASDIN educational programs have inspired the evolution of multiple other interventional nephrology societies specific to countries and regions. This has significantly affected the care of dialysis patients worldwide.

Challenges
The early challenges for IN were enormous, starting with difficulty in obtaining training, turf wars with established providers, and acceptance by other healthcare professionals of their unfamiliar role. Diligence and the wisdom of early interventional nephrologists in publishing the results of their interventions soon established the safety and efficacy of IN procedures done by nephrologists (2).

Now, IN faces new challenges. Interventional training, though more accessible now, is still freely available. There is a relatively small workforce of interventionalists. The scarcity of academic IN programs and a lack of focus on dialysis access has resulted in a lack of fellowship training in dialysis access. Drastic reimbursement cuts for interventional nephrology have resulted in a lack of fellowship training for many interventional nephrologists from learning these techniques. The dearth of organized research efforts in dialysis access has resulted in a lack of fellowship training and a lack of focus on dialysis access better. Cannulation of access would also become more accessible now, is still freely available. There is a relatively small workforce of interventionalists. The scarcity of academic IN programs and a lack of focus on dialysis access has resulted in a lack of fellowship training in dialysis access. Drastic reimbursement cuts for interventional nephrology have resulted in a lack of fellowship training for many interventional nephrologists from learning these techniques. The dearth of organized research efforts in dialysis access has resulted in a lack of fellowship training and a lack of focus on dialysis access.

Opportunities
There are exciting opportunities in the field of dialysis access. Special areas with new approaches are as follows:

Technological advancements
AV access: In the past, many interventional nephrologists learned traditional surgical arteriovenous (AVF) creation with success rates second to none. The very recent innovations in percutaneous endovascular AVF (endo AVF, eAVF) creation use two different devices that place AVF creation squarely in the hands of interventional nephrologists. Bioengineered vessels have become available for AVF creation. Percutaneous graft creation is in advanced stages of development (6).

PD catheter insertion: Initially, nephrologists used blindly insert PD catheters at the bedside. This technique then evolved to laparoscopic and peritoneoscopic placement and also in open surgical placement in appropriate cases. Fluorescent PD catheter placement has become common in the past decade and can be performed in the interventional suite without a need for extra equipment (7). With greater emphasis on home dialysis owing to the Advancing American Kidney Health executive order, this technique has the potential to become even more widespread.

Noninvasive techniques in patient care
Traditionally, nephrologists used ultrasonography to examine the urinary tract. Progress in technology has brought about the availability of bedside handheld ultrasounds, often known as POCUS (Point Of Care Ultrasound), which has become a multifunctional tool. POCUS is destined to shorten the differential diagnosis of acute kidney failure (e.g., assessment of volume status and cardiac function and diagnosis of urinary obstruction) at the bedside. Examination of vascular access and measurement of flow at the bedside would also become a matter of minutes and help in understanding vascular access better. Cannulation of access would also become easier with the use of POCUS. This discipline is certain to become the modern attraction for trainees to nephrology, besides becoming an integral part of patient examination for many subspecialties. The ASDIN Ultrasound Committee is spearheading the POCUS certification process, which should become available very soon.

Focus on the patient, rather than on technology or procedures
A life plan—not only for ESKD patients but also for patients with CKD—is extremely important (8). The prevention and management of kidney disease by the use of new technologies should remain an essential part of care.

Globalization of access care
Access issues are prevalent worldwide. As a leader through its Global Access Workgroup, the ASDIN is collaborating with international partners to create a concerted focus on access care.

Research opportunities
To improve research in dialysis access, the ASDIN started giving research grants several years ago. There is an ongoing effort in this area to make additional short-term clinical project funding available to multiple candidates every year to help solve the common clinical problems of our patients.

In summary, the scope of IN is widening. This discipline is on the rise, and the peak of the incline is not even close! The future is bright for our patients, and the days of desolation are over for dialysis access.

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References

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