Training in Dialysis Access: Where to Get It and Why We Need It

Society meetings, live conferences, simulated training, and online resources are invaluable tools for patient-centered and value-based care.

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The evolving field of dialysis access demands a mirrored response in training. The ongoing evolution of training in dialysis access retains the value of traditional textbooks[1-4] for the baseline principles while simultaneously adopting modern, technologically advanced modalities to foster the acquisition of knowledge and skills to improve performance and patient outcomes.

Textbooks and didactic lectures are the basic building blocks of traditional teaching.[1-4] However, incorporating online platforms and simulation enhances retention of the information and the ability to instantaneously apply recent technical advances in clinical practice. Data on adult learning suggest that e-learning platforms have higher retention rates than traditional classroom lectures because students have more control over the learning process as well as the opportunity to review the material as needed. Web-based, self-paced curriculum in dialysis access care can prepare physicians for live conferences, raising the collective knowledge base of the audience, resulting in a greater level of engagement at the live event, and enhancing the interaction and discussion among colleagues.

In recent years, simulation training has become widespread in different areas of medicine due to social expectations, political accountability, and professional regulation. Different types of simulation environments foster improvement in decision-making, technical skills, communication, and team behavior. Simulation sessions have been proven to shorten the learning curve and allow education in a safe environment (see the *Dialysis Access Skill Sets Appropriate for Simulation Training* sidebar).[5,6]

Dry laboratory (ie, simulators) and wet laboratory (ie, animal and cadaveric models) ensure a grasp of basic surgical technique before the actual clinical exposure. The concept of "see one, do one, teach one" is no longer relevant in advanced litigious environments that have patient care as a priority. Although technical competence requires log books that show assistance and performance of procedures under supervision, the rapid emergence of new technologies does not favor such an approach. An example is the use of the HeRO graft (Merit Medical Systems, Inc.) in central vein occlusion. The number of suitable cases is low, and therefore, technical training opportunities are limited. Yet, this lifesaving procedure is a valuable tool in the right circumstances and should be learned. New teaching modalities such as simulation and animal and cadaveric laboratory models are excellent supporting tools for clinicians to learn how to use new technologies.

SOCIETIES SUPPORT EDUCATION

Various societies that support the medical specialties performing access offer dialysis access training opportunities to bring colleagues together to learn via didactic

DIALYSIS ACCESS SKILL SETS APPROPRIATE FOR SIMULATION TRAINING

- Dual lumen cuffed central vein catheter placement
- Ultrasound vascular mapping
- Ultrasound-guided access cannulation
- Peritoneal dialysis catheter placement
- Lessons from the flight deck
- Suture station (beginner)
- Dialysis access arm simulator (advanced)
- Computerized interventional arm
- Dialysis access tool station
- Communication skills
- Assessment and evaluation of training

presentations, interactive discussions, and simulation (see *Upcoming Live Meetings With Dialysis Access Training* sidebar for more information on these meetings).

The Vascular Access Society of the Americas (VASA) offers one event each year, alternating between the VASA practicum and the VASA symposium. The 2019 VASA practicum was held earlier this year in Houston, Texas, and it allowed physicians to gain hands-on experience with surgical and interventional procedures for creating and maintaining vascular access for hemodialysis, including the opportunity to practice skills in a live animal laboratory. The VASA symposium will take place in 2020.

The Vascular Access Society (VAS) organizes an international congress every 2 years in a European country and hosts at least one vascular access course per year. VAS is an international, interdisciplinary society of nephrologists, surgeons, interventional radiologists, and adjunct health care professionals. VAS also endorses the Brighton Vascular Access fellowship, an intensive program to prepare trainees in the full range of renal access procedures. VAS recognizes that renal access surgery is a specialized skill set that requires investment and focused training.

The Vascular Society for Great Britain and Ireland (VASBI) is hosting a joint meeting with the United Kingdom Annual Dialysis Conference this year. This year, following the joint session, VASBI is endorsing a 2-day practical, comprehensive, hands-on cadaveric course geared toward vascular and transplant trainees with a special interest in access surgery. Earlier this year, VASBI held their annual meeting in conjunction with VAS in Rotterdam, the Netherlands.

The American Society of Diagnostic and Interventional Nephrology (ASDIN) hosts a scientific meeting each year addressing an array of topics related to vascular access and includes abstract presentations and a focus on recent innovations in arteriovenous (AV) access. ASDIN supports a high standard of performance for the entire dialysis access treatment team via an associate certification for nurses, technologists, and physicians. ASDIN also supports education through an accreditation process for training programs that develop expertise in three areas: (1) endovascular procedures on AV fistulas, AV grafts, and chronic central venous catheters for dialysis; (2) percutaneous insertion of peritoneal dialysis catheters; and (3) sonography of the kidneys and urinary bladder.

The Asian Society for Vascular Surgery is hosting this year's meeting in conjunction with the Asian Venous Forum and the Indonesian Vascular Conference, and it will include a precongress workshop in dialysis access.

The Vascular Society of Malaysia hosts a biannual meeting called the Kuala Lumpur Vascular Access Conference. The Malaysian Society of Nephrology (MSN) is also active in access training. "Enhancing Dialysis Access Performance & Patient Empowerment" is the theme of the upcoming meeting, which is organized in a joint effort with the Asian Pacific Society of Dialysis Access (APSDA), Asian Society of Nephrology, and MSN.

CONFERENCES: THE MELTING POT OF NEW IDEAS

Live conferences support training in dialysis access by bringing together colleagues in the field to learn from experts and interact with other stakeholders. The true value of a live conference is the chance to connect face-

UPCOMING LIVE MEETINGS WITH DIALYSIS ACCESS TRAINING

American Society of Diagnostic Interventional Nephrology Annual Scientific Meeting
February 21–23, 2020
Las Vegas, Nevada
www.asdin.org

Charing Cross Symposium
April 21–24, 2020
London, United Kingdom
www.cxsymposium.com

4th Congress of Asian Pacific Society of Dialysis Access 2019
July 12–14, 2019
Kuala Lumpur, Indonesia
apsda.info

20th Congress of Asian Society of Vascular Surgery
October 23–26, 2019
Bali, Indonesia
www.asvs2019.com

Controversies in Dialysis Access/ Simulation of Dialysis Access
October 30–November 1, 2019
San Diego, California
www.dialysiscontroversies.org

Controversies in Dialysis Asia Pacific
November 15–16, 2019
Gurugram, India
www.lets-cidaap.com

Dialysis Access Synergy
Date to be determined
Taipei, Taiwan
www.dialysisaccesssynergy.com

24th European Vascular Course
March 22–24, 2020
Maastricht, the Netherlands
www.vascular-course.com

12th International Congress of Vascular Access Society (Europe)
April 7–10, 2021
Berlin, Germany
www.vascularaccesssociety.com

International Society for Peritoneal Dialysis–European Peritoneal Dialysis
Joint Congress
May 2–5, 2020
Glasgow, Scotland
www.ispd.org

Japanese Society for Dialysis Access
Date and location to be determined
www.jsda.net

Lucerne European Vascular Master Class 2020
January 29–31, 2020
Lucerne, Switzerland
vascular-international.org

2020 Vascular Access for Hemodialysis Symposium
May 28–30, 2020
Charleston, South Carolina
www.vasamd.org

Vascular Access Society of Britain and Ireland–Annual Dialysis Conference 2019
September 25–27, 2019
Manchester, United Kingdom
www.vasbi.org.uk

VEITHsymposium
November 19–23, 2019
New York, New York
www.veithsymposium.org

to-face with people involved in dialysis access, including physicians, adjunct members of the dialysis team, and industry representatives who can demonstrate the tools used in procedures. Advancements in communication technology have made it possible for the conference audience to connect with physicians in different regions who can share a local perspective on access or demonstrate a live technical procedure during a live

operating room case. New societies and conferences are emerging across the world. The focus of this article is to provide an overview of current and future opportunities in training in dialysis access. A more comprehensive report will be compiled in the near future as the focus on training evolves.

The major vascular conferences—European Vascular Course in Maastricht, the Netherlands; Charing Cross in London, England; and VEITHsymposium in New York, New York—have a focus on dialysis access embedded into their broader programs. Charing Cross offers a deep dive approach into the detailed area of vascular access with its 1-day Vascular Access Masterclass. Previous areas of focus have been aneurysms, steal syndrome, and end-stage access. A hands-on vascular access workshop exposes clinicians to all areas of access. Starting at preoperative mapping and preparation, the attendees walk through a 20-station route that follows the pathway of patients on dialysis. This takes the clinician through everything from dialysis cannulation and the workings of a dialysis machine to techniques for maintaining access. The basis of this "interactive museum" approach is to allow one-on-one discussion with experts in the crossover areas of service delivery. The VEITHsymposium covers vascular access–related issues in a 1-day embedded program through a series of short talks by experts followed by a panel discussion. The latest developments in hemodialysis is one area covered in the program.

Controversies in Dialysis Access (CiDA) is a 2.5-day conference focusing exclusively on issues related to dialysis access. CiDA offers high-quality, comprehensive, interactive education for all clinicians involved in the care and treatment of dialysis patients. Preceeding CiDA, Simulation of Dialysis Access (SoDA) is an intensive half-day, hands-on dialysis access course that explores best practices in dialysis access. The SoDA course aims to reduce complications and build confidence in physician decision-making. It teaches improved surgical and interventional skills and is modeled in part after airlines' approaches to improving flight safety. Registration is now open for the upcoming CiDA/SoDA meeting.

The European Vascular Course offers a focus on vascular access within their broader curriculum over the course of a 3-day meeting, with opportunities to practice technical skills and engage in small group discussions about complex cases.

Vascular International Foundation (VIF) recognizes that medical innovation and the respective training of physicians in new tools and technology are essential to care for patients and increase life expectancy. For more than 28 years, VIF has offered innovative training for physicians and operating room teams using lifelike simulator models, and they regularly hold vascular master classes. VIF teaches a variety of vascular surgery techniques and skills that incorporate anatomy simulators. Vascular access surgery, which is taught using artificial arms with removable vessels, addresses the needs of both beginners and experienced surgeons.

In recent years, meetings including CiDA Asia Pacific, Dialysis Access Synergy, and APSDA have emerged throughout Asia. These meetings are led by multidisciplinary physicians with a focus on dialysis access. The Japanese Society of Dialysis Access (JSDA) foresaw the need for multidisciplinary care in the late 1990s and continue to maintain a collaborative effort between access surgeons and nephrologists today. Asian meetings have a keen focus on collaborative care, with an emphasis on patient education, primary care, early diagnosis and management, prolonging the patency of native fistulas by monitoring and surveillance, and early referral for endovascular management. The technical focus of the meeting's content has shifted from AV access creation to access maintenance and management of complications.

FROM THE PAST TO THE FUTURE

Although books dedicated to dialysis access[1-4] are still relevant for foundational knowledge, technology has largely taken their place. A report from 2011 noted that physicians in 1950 could expect the total amount of medical knowledge to double every 50 years; however, the report estimated that by 2020, the doubling of knowledge to be learned occurs in just 73 days.[7] As the paradigm of managing end-stage renal disease (ESRD) and dialysis shifts to become patient-centric and value-based, the importance of appropriate and tailored training of all stakeholders will rise. Through continuous training, evaluation, and collaboration, a systems approach to ESRD and access can lead us toward embracing a high-reliability mindset in which potential issues are identified early and appropriate responses are initiated, resulting in the best possible outcome for the patient. Those most resilient with training are positioned to achieve the greatest success. Contributing to the evolving dialysis access field are several digital resources and organizations that are developing new innovations in training.

The *Journal of Vascular Access* (*JVA*) is the main global source of up-to-date information in the dialysis access field. *JVA* has published information on access-related issues and dialysis since 2000 and offers new content six times per year. The policy of the journal is to connect dialysis access health personnel from different specialties (surgeons, radiologists, nephrologists, nurses) as well as scientific societies from different parts of the world (VAS, VASA, ASDIN, JSDA, VASBI). More recently, *JVA* has attracted interest from Asian countries, reaching an affiliation in India with the Association of Vascular Access and Interventional Renal Physicians. *JVA* also publishes nondialysis vascular access articles in the oncologic area in affiliation with World Congress Vascular Access, the Association for Vascular Access, and the Australian Vascular Access Society. To maintain clinical competence, reading and writing scientific articles are key activities, and *JVA* is a pivotal resource to stay up to date in the dialysis-related clinical domain.

Vascupedia is a unique online project that offers education in the challenging field of vascular medicine, including vascular access.[8] The mission of Vascupedia is to help physicians worldwide perfect their interventions. As a registered Vascupedian, physicians can upload their scientific presentations, case reports, vascular images, reviews, or questions to their colleagues; vote on controversial issues through the polling functionality; and access information about relevant products in the exhibition area.

The Kidney Academy is a nonprofit entity offering Accreditation Council for Continuing Medical Education (ACCME)–accredited training in two educational divisions: online[9] and onsite.[10] Kidney Academy Online is the first and only web-based ACCME-accredited education platform dedicated to dialysis access and available 24/7 to a global audience. This project is still in development, but at completion, there will be 15 available modules that will provide a foundation for a comprehensive understanding of dialysis access. The modules are geared toward the educational needs of vascular surgeons, interventional radiologists, nephrologists, general surgeons, and physicians who perform open and/or interventional dialysis access procedures across the globe. Before creating the modules, a needs assessment was compiled using targeted literature searches and guidelines data. The focus throughout the modules is on decision-making for treatment and management to optimize the outcome for each individual patient. Subject areas addressed by the Kidney Academy curriculum include physical examination, algorithms, native AV fistulas, grafts, peritoneal dialysis, thoracic central vein obstruction, hand ischemia, steal syndrome, radiation safety, vascular access aneurysms, complex dialysis access case reports, *International Classification of Diseases* (10th revision) coding for the United States audience, dialysis access catheters, ultrasound, cannulation, and dialysis delivery. Several societies that recognize the value of this online educational resource will soon have links to the Kidney Academy on the member areas of their websites.

Kidney Academy Onsite[10] offers an opportunity to learn hands-on techniques in dialysis access in the operating room with real patients. Kidney Academy Onsite schedules quarterly week-long training sessions in collaboration with the Dialysis Access Institute in Orangeburg, South Carolina.

As technology evolves, the training of physicians and management of patients will evolve as well. In support of optimizing surgical skills while performing vascular anastomosis, ME3D Innovations Inc. has developed a novel skill training opportunity for vascular surgery, applying objective feedback for more effective training in dialysis access.[11] Using three-dimensional virtual models during hands-on training, attendees get morphologic and functional analysis and feedback after every vascular anastomosis performed.

With an increase in the number of patients requiring access and a lag in the number of specialized service providers, the issue of transdisciplinary skill competence will emerge. It will be important to approach the future through a lens of collaboration, teamwork, and shared knowledge in regard to training and education. The systems mentality highlights the need to train other key team members such as nurses, dialysis technicians, and radiographers. These critical members of the treatment team have different skill sets, such as use of ultrasound, the ability to recognize failing fistulas or fistula complications, and knowledge of different cannulation techniques and fistula flow monitoring. Dedicated access courses for nurses and technicians are being conducted across the world.

DON'T JUST TREAT THE PATIENT, INVOLVE THE PATIENT

Patient-centered and value-driven dialysis care must not only be fancy phrases used in publications; these principles need to be put into action. Although it is the

responsibility of the medical professionals to inform patients, patients themselves also have a primary responsibility in their care and prognosis. The striking suggestion that approximately 50% of all deaths are caused by poor personal decisions certainly applies to the ESRD population.[12,13] The most obvious and correctable decisions affecting many patients with ESRD are lifestyle habits, including smoking, lack of exercise, and obesity. In response to record high rates of obesity and inactivity in the United States, some health insurance companies are initiating innovative strategies to encourage behavior modification by incorporating wearable devices that track individual activity levels and offering discounts on insurance premiums.[14]

A similar wearable device from Graftworx is being designed for patients who are already on dialysis, but the device is not yet available.[15] A remote monitoring platform will aim to improve management of patient populations with chronic conditions, including those on dialysis or heart failure. This continuous sensing technology will capture clinically actionable cardiovascular metrics and alert the physician and clinical teams about vascular access or fluid management issues, per existing protocols and workflows that enable optimal care of the patient. With recent emphasis on home dialysis, including both hemodialysis and peritoneal dialysis, new technology is evolving that will result in new training needs for the entire treatment team, including patients.

GUIDELINES

Algorithms provide a framework for decision-making in complex environments. Embracing the patient-centric model in dialysis access, algorithms aim to guide the selection of the most appropriate mode of therapy for patients with ESRD and offer a structured, evidence-based evaluation of the many options. Accepted algorithms must be objective, free from personal bias and external or economic influence, clinically sound, and backed by evidence, with patient safety and health outcomes at the center. When data are missing or are weak, decision-making falls back to opinion based on personal or group expert experience. A strategy that spans the progression of the disease includes prevention of ESRD progression, consideration of several types of renal transplantation and modes of dialysis before it is needed, and the type and site of dialysis access at the appropriate time. This big-picture strategy requires foresight, planning, preparation, and continual education and evaluation to achieve the best possible outcome for that individual patient. The treatment team and the patient must work synergistically as a team with high-level cooperation and trust. An overarching dialysis access algorithm reads as follows: Do what is best or appropriate for the informed patient every time.[16,17] The new Kidney Disease Outcomes Quality Initiative clinical practice guidelines for vascular access, currently submitted in draft form with *American Journal of Kidney Diseases* as well as under public review, follow the theme of doing the right thing for each individual patient at all times, recognizing the great individuality and complexity of dialysis access. One size does not fit all.

CONCLUSION

In dialysis access, the number of patients who need care is increasing. New devices and technologies are coming to the market at a rapid pace, and intense thought and debate surround the decision-making model of how patients should be handled at various stages and depending on specific factors. Different modes of dialysis, types of access, and devices must not be viewed as competitive but rather as complementary. Patients will need several, if not all, of these during their lifetime as the disease circumstances evolve across the ESRD continuum. Although the various medical specialties serving this patient population view solutions through different lenses, as a collective group, we continue to learn and share with one another in this multilayer complex system with the patient at the central focus of decision-making. With these complex factors characterizing dialysis access, one thing is clear: Training is our common ground and unifying force. ■

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