ASSOCIATION FOR VASCULAR ACCESS

POSITION PAPER

Ultrasound Guidance for Vascular Access Procedures by Qualified Vascular Access Specialists or Other Applicable Healthcare Clinicians

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Position Paper

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Introduction / Summary

Ultrasound guidance for vascular access procedures has now been used in clinical practice among a variety of healthcare practitioners for more than 30 years. The ability to visualise underlying structures of the upper and lower extremities, chest, and neck provides for improved success, speed, patient safety, and patient satisfaction. Ultrasound not only aids in superior procedural advantages, it also provides a platform to perform a thorough assessment of the vascular structures to evaluate vessel health, viability, size, and patency, locating other important and best avoided anatomical structures, and venous and arterial abnormalities.

Recommendations for the use of ultrasound is now supported by many professional organizations* for vascular access procedures and has become widely accepted to promote safe and accurate insertion of vascular devices. To ensure procedural safety and high success rates, there are recommendations for the use of a systematic approach for ultrasound-guided vascular access procedures. A standardized approach minimizes variability in clinical practice, provides a framework for education and training, facilitates implementation, and enables quality analysis.

Background / Problem

In the last 2 decades, there have been multiple publications demonstrating significantly increased safety, effectiveness, and efficiency of ultrasound-guided vascular access as compared to cannulation by anatomical landmarks and/or acoustic Doppler[1,2,3]. A systematic review[4] looking at internal jugular vein (IJV) cannulation highlighted that the use of two-dimensional ultrasound reduced the rate of total complications overall by 71%, that overall success rates were modestly increased in all groups combined at 12%, and similar benefit was noted across all subgroups. Not only does this confirm that ultrasound use is superior in IJV cannulation, it also had flow-on effect for other cannulated vessels with appropriate training and experience. The use of two-dimensional ultrasound increased the chance of success at the first attempt by 57% and reduced the chance of hematoma formation[4]. The authors concluded two-dimensional ultrasound offers gains in safety and quality when compared to an anatomical landmark technique[4].

Use of ultrasound is also strongly supported by an expert review of ultrasound guidance[5] recommending its use not only for central venous cannulation, but also for peripheral and arterial device placement. The authors also state ultrasound can be utilized to check for immediate and life-threatening complications, as well as confirming catheter tip position[5].

Regardless of its increasing use, there is still some avoidance in the successful and safe implementation of ultrasound into vascular access clinical practices. This is often due to various reasons of which will not be discussed here, but this valuable tool does require additional training and experience for ALL practitioners who plan to utilize it in their clinical practice. Local competencies must be in place for practitioner compliance.

Healthcare professionals involved in the placement of vascular access devices (VADs) using ultrasound guidance need appropriate education and simulation training to ensure patient safety and avoid major complications with the insertion of VADs[6,7,8,9,10,11,12,13,14,15,16,17,18]. Knowledge of anatomy, ultrasound physics, and imaging techniques, as well as infection prevention strategies, are proposed for standard didactic education[5,19,20,21,22,23,24,25,26,27,28,29]. These recommended topics are necessary for adequate understanding and safe use of ultrasound technology for all vascular access procedures.

The Association for Vascular Access (AVA) recommendations:

POSITION STATEMENT

It is the position of the Association for Vascular Access that a properly qualified vascular access specialist or other applicable healthcare clinician use real-time ultrasound for all vascular access procedures.

- The Association for Vascular Access supports the practice of ultrasound for all vascular access specialists and applicable healthcare clinicians who are qualified to perform advanced vascular access procedures. This includes insertion of peripheral, arterial, and centrally inserted catheters.

- Minimum competency requirements include a detailed documented training process and preceptorship for the use of ultrasound and imaging technologies being utilized.

- Detailed outline of training plan and commitment to ongoing competency assessment.

- Approved hospital policy and procedure which includes the discipline, procedure, education, minimum requirements and device disinfection processes are addressed.

- The vascular access specialist or applicable healthcare clinician, must meet the education and clinical practice requirements by the designated professional board within their state of practice.

Practice Recommendations

Given the diversity and variability of healthcare facilities, personnel, organizational capabilities, and practices, AVA recommends the following for the use of ultrasound for vascular access:

1. Vascular Access Specialists and applicable healthcare clinicians who insert Vascular Access Devices (VADs) must use visualization technology as a standard procedural component in the promotion of safe and optimal insertion of all VADs. Ultrasound or visualization technology is recommended for midline, central, and arterial device placement.
2. Established competency in ultrasound imaging for all vascular access procedures to include knowledge of all peripheral and central venous pathways (venous and arterial), and clear proficiency of vessel and patient assessment.
3. Ultrasound guidance improves catheter insertion success rates, reduces the occurrence of multiple insertion attempts, and reduces complications associated with VAD insertion.
4. Recommendations are made by a number of professional organizations* that support the promotion and established use of ultrasound guidance as the standard of care for the placement of VADs.
5. When used to guide VAD insertion, ultrasound is safe, affordable, non-invasive, and does not involve radiation exposure to patients or the clinicians performing the procedure.
6. Competency for Vascular Access Specialists and applicable healthcare clinicians when performing ultrasound procedures need to be established. Promotion of best practices and development of stronger clinical governance ensures an ongoing commitment to continued professional development.
7. Competency in sterile field awareness, including the donning/doffing of sterile probe/transducer cover, maintaining maximal barrier precautions and correct disinfection of the transducer.
8. Detailed outline of training plan and commitment to ongoing competency assessment.
9. Recommend successful completion of a minimum of ten (10) peripheral and ten (10) central device placements supervised by a qualified mentor or preceptor. Recommend that as soon as ten (10) observations/placements are demonstrated successfully and completed for the procedure, the Vascular Access Specialist or applicable healthcare clinician may then perform these procedures independently of supervision. (The minimum number may vary based on each organizational policy and procedure).
10. Approved hospital policy and procedure which includes the discipline, procedure, education, minimum requirements and device disinfection processes are addressed.

11. Recommend vascular access board certification (VA-BC™) by the Vascular Access Certification Corporation (VACC).

Summary:

The recommendation for individual ultrasound accreditation currently is unresolved and is based upon each healthcare systems accreditation requirements. International consensus concluded that such accreditation is not mandatory and should be left to each healthcare organisations policy and procedure process, endorsed with current clinical evidence. Clearly, once competency is achieved, there must be active engagement by the individual healthcare practitioner to ensure these competencies are maintained and continual professional development and assessment is ongoing.

Conclusion:

The use of ultrasound by Vascular Access Specialists and applicable healthcare clinicians provides a standardized technology platform for impacting key areas in healthcare, highlighting the benefits in patient safety, minimization of device-related trauma, as well as decreasing insertion-related complications. There is a need to clearly define the required competencies which constitute vascular access ultrasound for Vascular Access Specialists and applicable healthcare clinicians, and these competencies need to be detailed and specific for the specialty.

***International Organizations Endorsing and/or Recommending the Use of Ultrasound-Guided Technologies for Intravascular Device Insertion**

1. Agency for Healthcare Research and Quality (AHRQ) American Academy of Physician Assistants (AAPA)
2. American Association of Critical Care Nurses (AACN)
3. American Association of Nurse Anesthetists (AANA) American Cardiology Association (ACA)
4. American College of Emergency Physicians (ACEP)
5. American Institute of Ultrasound in Medicine (AIUM)
6. American Society of Anesthesiologists (ASA)
7. American Society of Diagnostic and Interventional Nephrology (ASDIN)
8. American Society of Echocardiography (ASE)
9. Association for Professionals in Infection Control and Epidemiology (APIC)
10. Association for Vascular Access (AVA)
11. Association of Anaesthetists of Great Britain and Ireland (AAGBI)
12. Association of Physician Assistants in Cardiovascular Surgery (APACS)
13. Australian and New Zealand Intensive Care Society (ANZICS)

14. Australasian Society for Ultrasound in Medicine (ASUM)
15. Canadian Vascular Access Association (CVAA)
16. Cancer Nurses Society of Australia (CNSA)
17. Centers for Disease Control and Prevention (CDC)
18. European Society for Parenteral and Enteral Nutrition (ESPEN)
19. Infusion Nurses Society (INS)
20. Institute for Healthcare Improvement (IHI)
21. Intravenous Nursing New Zealand Incorporated Society (IVNNZ)
22. Italian Group of Central Venous Access (GAVeCeLT)
23. National Institute for Health and Care Excellence (NICE)
24. National Kidney Foundation (NKF)
25. Oncology Nursing Society (ONS)
26. Registered Nurses' Association of Ontario (RNAO)
27. The Royal College of Anaesthetists (RCA)
28. Royal College of Nursing (RCN)
29. The Joint Commission (TJC)
30. Society for Healthcare Epidemiology of America (SHEA)
31. World Interactive Network Focused on Critical Ultrasound (WINFOCUS)
32. World Congress on Vascular Access (WoCoVA)

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Additional Reading

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About the authors: Timothy R. Spencer is a Vascular Access Specialist for almost 30 years and is currently the Director for Global Vascular Access, LLC. His clinical background and qualifications are in Intensive Care Nursing, Vascular Ultrasound, and Advanced Clinical Nutrition. Tim was the Clinical Nurse Consultant of the Central Venous Access and Parenteral Nutrition Service at the Liverpool Hospital, Australia, which he established and led from 1996–2014 (21 years). He has been instrumental in progressing the scope of advanced vascular access practices for clinicians globally, including contributions in clinical research and evidence,

the promotion of patient safety, and best practices. He is fully trained in vascular ultrasound and facilitates the progressive role of ultrasound-guided vascular access procedures. He is a member of 3 editorial boards; JVA, JAVA, Vascular Access, as well as a reviewer for JIN, Scientific Reports (Springer Nature) and The Journal of Hospital Medicine. His PhD dissertation is in catheter-related thrombosis in cancer patients. Global Vascular Access, LLC also provides consultancy services for Teleflex Inc., FUJIFILM Sonosite and Interrad Medical Inc.

Amy J. Bardin-Spencer is a Vascular Access Specialist with over 20 years of critical care and ultrasound-guided device insertion experience. Through her career, Amy has been on vascular access teams inserting and educating on vascular devices which include peripheral arterial catheters, peripheral and central venous catheters, acute hemodialysis catheter insertion, and IABP catheter monitoring. Amy believes that all patients deserve access to the right line using a "no blind stick" approach when vascular access is required. She has been instrumental in progressing the scope of vascular access practices for all clinician types which include team development and the promotion of patient safety and best practices. Today, Amy shares her knowledge and passion with clinicians around the world as an international speaker and by developing vascular access curriculum and overseeing vascular access simulation training courses for physicians and non-physician clinicians. Her EdD dissertation is in vascular access speciality teams and their impact on hospital acquired conditions. Amy is a full time employee of Teleflex Incorporated.

Both Tim (2019) and Amy (2016) are recipients of the Herbst Award for Excellence in Vascular Access from the Association for Vascular Access.

Disclaimer: This document is meant to serve as a basis for evidence-based decision making. Nothing contained within this position paper should take the place of following a medical devices approved instructions for use provided by the manufacturer.

The Association for Vascular Access (AVA) was founded in 1985 to promote the emerging vascular access specialty. Today, AVA stands at the forefront of protecting and saving lives via establishing best practices and promoting patient advocacy. AVA's multidisciplinary membership advances research, provides professional and public education to shape practice and enhance patient outcomes, and partners with the device manufacturing community to bring about evidence-based innovations in vascular access. To learn more or join, visit www.joinAVAnow.com.

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