

The Vascular Access RAND Appropriateness Study: Current Status. Future Plans

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Disclosures

- None
- VAPS Mobile App
 - Initially free
 - Future commercialization?

NKF- DOQI Guidelines

Fistula First Breakthrough Initiative



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- Vascular access outcome improvements have stalled
 - AV fistula failure/nonmaturation increased
 - TDC increased
 - Benefits of AV fistula negated in some cases
- Approach moving forward?

Focus on Surgical Technique



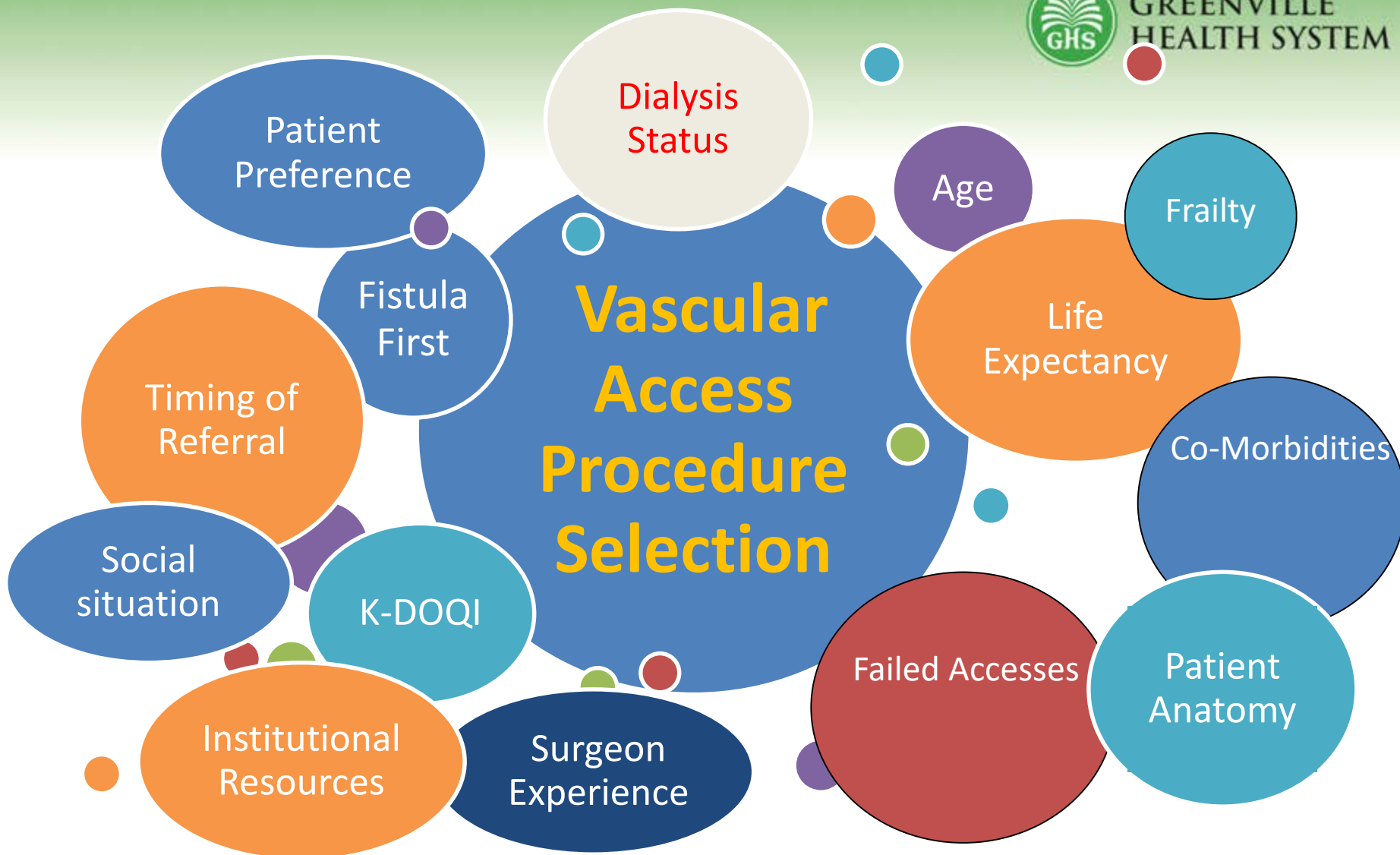
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- Hypothesis
 - Surgeons don't know how to do the procedure correctly
- Solution
 - Training programs by experts
 - Vascular access certification
- Barriers
 - Resistance from surgery organizations/accrediting agencies
 - Cost-
 - Quit vs. train
 - Proof it will work?

Focus on Patient Selection



- Hypothesis
 - AVF outcomes are influenced by patient factors. Efforts to push AVF can result in outcomes equivalent to or worse than AVG.
- Solution
 - Procedure selection based on patient factors influencing AVF outcomes
 - Standardize procedure selection





RAND/UCLA Appropriateness Method

- Consensus process like K-DOQI
 - Combines evidence with expert opinion
 - RCTs not feasible
- Provides patient-specific recommendations
- Standardized technique
- High re-test reliability, predictive validity

Appropriateness criteria have been developed for many procedures



- CABG
- Carotid endarterectomy
- AAA
- Bariatric procedures
- Low back surgery
- Cholecystectomy
- Hysterectomy
- Nephrectomy
- Colonoscopy
- Upper GI endoscopy
- Cataracts
- Tonsillectomy
- Myringotomy
- Sinus procedures
- Sentinel lymph node bx for melanoma
- Carpal tunnel syndrome

RAND Appropriateness Method



- Systematic review of literature- Mayo Clinic
 - Factors influencing vascular access outcomes
- Develop patient-specific clinical scenarios
 - Approximately 3700 scenarios
- Panel of eleven experts
 - International team of surgeons and nephrologists
- Grade appropriateness for each scenario

UCLA/RAND Appropriateness Method Team



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Expert Panelists

- Michael Allon MD
- Eric Chemla MD
- Tom Huber MD
- Jeff Lawson MD
- Erik Peden MD
- Anton Sidawy MD

Christopher Carsten MD
Mitch Henry MD
Tip Jennings MD
Charmaine Lok MD
Larry Scher MD



Outcomes of vascular access for hemodialysis: A systematic review and meta-analysis

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Background: The decision about the type and location of a hemodialysis vascular access is challenging and can be affected by multiple factors. We explored the effect of several a priori chosen patient characteristics on access outcomes.

Methods: We searched MEDLINE, Embase, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, and Scopus through November 13, 2014. We included studies that evaluated patency, mortality, access infection, and maturation of vascular access in adults requiring long-term dialysis. Pairs of reviewers working independently selected the studies and extracted the data. Outcomes were pooled across studies using the random-effects model.

Results: Two hundred studies met the eligibility criteria reporting on 875,269 vascular accesses. Overall, studies appeared to have provided incidence rates at low to moderate risk of bias. The overall primary patency at 2 years was higher for fistulas than for grafts and catheters (55%, 40%, and 50%, respectively). Patency was lower in individuals with diabetes, coronary artery disease, older individuals, and in women. Mortality at 2 years was highest with catheters, followed by grafts then fistulas (26%, 17%, and 15%, respectively).

Conclusions: The current evidence remains in support of autogenous access as the best approach when feasible. We provide incidence rates in various subgroups to inform shared decision making and facilitate the conversation with patients about access planning. (*J Vasc Surg* 2016;64:236-43.)



Establishing patient-specific criteria for selecting the optimal upper extremity vascular access procedure

Karen Woo, MD,^a Jesus Ulloa, MD,^b Michael Allon, MD,^c Christopher G. Carsten III, MD,^d Eric S. Chemla, MD,^e Mitchell L. Henry, MD,^f Thomas S. Huber, MD,^g Jeffrey H. Lawson, MD,^h Charmaine E. Lok, MD,ⁱ Eric K. Peden, MD,^j Larry Scher, MD,^k Anton Sidawy, MD,^l Melinda Maggard-Gibbons, MD,^m and David Cull, MD,^d *Los Angeles and San Francisco, Calif; Birmingham, Ala; Greenville, SC; London, United Kingdom; Columbus, Ohio; Gainesville, Fla; Durham, NC; Toronto, Ontario, Canada; Houston, Tex; Bronx, NY; and Washington, D.C.*

ABSTRACT

Objective: The Kidney Disease Outcome Quality Initiative and Fistula First Breakthrough Initiative call for the indiscriminate creation of arteriovenous fistulas (AVFs) over arteriovenous grafts (AVGs) without providing patient-specific criteria for vascular access selection. Although the U.S. AVF rate has increased dramatically, several reports have found that this singular focus on increasing AVFs has resulted in increased AVF nonmaturation/early failure and a high prevalence of catheter dependence. The objective of this study was to determine the appropriateness of vascular access procedures in clinical scenarios constructed with combinations of relevant factors potentially influencing outcomes.

Methods: The RAND/UCLA Appropriateness Method was used. Accordingly, a comprehensive literature search was performed and a synthesis of results compiled. The RAND/UCLA Appropriateness Method was applied to 2088 AVF and 1728 AVG clinical scenarios with varying patient characteristics. Eleven international vascular access experts rated the appropriateness of each scenario in two rounds. On the basis of the distribution of the panelists' scores, each scenario was determined to be appropriate, inappropriate, or indeterminate.

Results: Panelists achieved agreement in 2964 (77.7%) scenarios; 860 (41%) AVF and 588 (34%) AVG scenarios were scored appropriate, 686 (33%) AVF and 480 (28%) AVG scenarios were scored inappropriate, and 542 (26%) AVF and 660 (38%) AVG scenarios were indeterminate. Younger age, larger outflow vein diameter, normal or obese body mass index (vs morbidly obese), larger inflow artery diameter, and higher patient functional status were associated with appropriateness of AVF creation. Older age, dialysis dependence, and smaller vein size were associated with appropriateness of AVG creation. Gender, diabetes, and coronary artery disease were not associated with AVF or AVG appropriateness. Dialysis status was not associated with AVF appropriateness. Body mass index and functional status were not associated with AVG appropriateness. To simulate the surgeon's decision-making, scenarios were combined to create situations with the same patient characteristics and both AVF and AVG options for access. Of these 864 clinical situations, 311 (36%) were rated appropriate for AVG but inappropriate or indeterminate for AVF.

Conclusions: The results of this study indicate that patient-specific situations exist wherein AVG is as appropriate as or more appropriate than AVF. These results provide patient-specific recommendations for clinicians to optimize vascular access selection criteria, to standardize care, and to inform payers and policy. Indeterminate scenarios will guide future research. (J Vasc Surg 2017;65:1089-103.)

Results



AVF creation- 2095 clinical scenarios

832 (40%) appropriate

708 (34%) inappropriate

555 (26%) indeterminate

AVG placement- 1,728 clinical scenarios

589 (34%) appropriate,

469 (27%) inappropriate

670 (39%) indeterminate.

AGE

<60 yr

60-75 yr

75 yr



Vascular Access Procedure Selection Mobile App



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- Input patient characteristics
- Generate panelists' ratings
 - Appropriate
 - Indeterminate
 - Inappropriate

Please enter the following patient information

Patient Age	☐ 59 yrs or less	Dialysis Imminent?	☐ No
	☐ 60 to 75 yrs		☐ Yes
	☐ 76 yrs or more		
Cephalic Vein	-----	Vein Size Guidelines	
		Poor	<1.9 mm
Basilic Vein	-----	Intermediate	>2.0mm & <2.5mm
		Good	>2.5 mm

CONTINUE

VAPS Mobile App



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Please enter the following patient information

Patient Age

- ☒ 59 yrs or less
☐ 60 to 75 yrs
☐ 76 yrs or more

Dialysis Imminent?

- ☐ No
☒ Yes

Cephalic Vein

Poor

Basilic Vein

Intermediate

Vein Size Guidelines

Poor	<1.9 mm
Intermediate	>2.0mm & <2.5mm
Good	>2.5 mm

CONTINUE

VAPS Mobile App



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Functional status is an assessment of an individual's
dependence on help for medical functions

Facility

Dependent (Home) ▼

BMI

Normal ▼

Artery

<2mm ▼

PREVIOUS

CONTINUE

VAPS Mobile App



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Vascular Access Options Ranking

Forearm Loop AV Graft	★★★★★★
Upper Arm Basilic Vein Transposition	★★★★★★
Upper Arm AV Graft	★★★★☆☆
Brachial-cephalic Fistula	★☆☆☆☆
Catheter	★☆☆☆☆
Forearm Basilic Vein Transposition	★☆☆☆☆
Radial-cephalic Fistula	★☆☆☆☆

VAPS ID: 47
Cepahlic: Poor
BMI: Normal

Age: 59 yrs or less
Basilic: Intermediate
Artery: <2mm

Dialysis: Yes
Facility: Dependent (Home)

User: Aaron Emery

Date: Mar 15, 2018

Time: 01:11 p.m. EST



Open PDF



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Home

VAPS Tool Validation Study



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- Retrospective study 201 consecutive patients
- VAPS mobile app recommended AVF as “most appropriate” in 85% of patients
- Maturation rate for AVF recommended by VAPS mobile app was 78%

VAPS Tool Validation Study

Conclusion



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The VAPS mobile app should improve outcomes by standardizing vascular access procedure selection and by guiding the surgeon toward AVF in situations where AVF are likely to be successful and toward AVG in situations where AVF failure is likely.

VAPS Mobile App



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Resources

Video Tutorials

VAPS

AV Fistula
Thrombectomy

VAPS

Arterial Inflow
for Access

Manuscripts

Almasri J, Alsawas M, Mainou M, Mustafa RA, Wang Z, Woo K, Cull DL, Murad MH. Outcomes of vascular access for hemodialysis: A systematic review and meta-analysis. J Vasc Surg 2016;64:236-43.

Woo K, Ulboa J, Allon M, Carsten CG 3rd, Chemla ES, Henry ML, Huber TS, Lawson JH, Lok CE, Peden EK, Scher L, Sidawy A, Maggard-Gibbons M, Cull DL. Establishing patient-specific criteria for selecting the optimal upper extremity vascular access procedure. J Vasc Surg 2017;65:1089-1103.

NKF-K/DOQI clinical practice guidelines for vascular access: update 2006.

http://kidneyfoundation.org/cache/fly_net/professionals/KDOQI/guideline_upHD_PD_VA/index.htm

VAPS Mobile App Current Status & Future Plans



An iterative (open source) tool that will improve with use/research

Current Status

- VAPS mobile app is fully functional
- Includes procedure videos- expert “tips/tricks”
- Includes key vascular access reference site

Future Plans

- Interested in developing a platform for wide distribution to nephrologists and surgeons
- Outcome database (FDA issues) or community forum?