PICC nel paziente con insufficienza renale cronica: sempre controindicato?

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Insufficienza renale cronica: una definizione non scontata

CKD is classified based on: • Cause (C) • GFR (G) • Albuminuria (A)				Albuminuria categories Description and range		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				< 30 mg/g < 3 mg/mmol	30–299 mg/g 3–29 mg/mmol	≥ 300 mg/g ≥ 30 mg/mmol
GFR categories (ml/min/1.73 m²) Description and range	G1	Normal or high	≥ 90	Screen 1	Treat 1	Treat 3
	G2	Mildly decreased	60–89	Screen 1	Treat 1	Treat 3
	G3a	Mildly to moderately decreased	45–59	Treat 1	Treat 2	Treat 3
	G3b	Moderately to severely decreased	30–44	Treat 2	Treat 3	Treat 3
	G4	Severely decreased	15–29	Treat* 3	Treat* 3	Treat 4+
	G5	Kidney failure	< 15	Treat 4+	Treat 4+	Treat 4+

Low risk (if no other markers of kidney disease, no CKD) · Moderately increased risk · High risk · Very high risk

Figure 10. Frequency of glomerular filtration rate (GFR) and albuminuria in people with chronic kidney disease (CKD). Albuminuria and GFR grid reflects the risk of progression by intensity of coloring (green, yellow, orange, red, deep red). The numbers in the boxes are a guide to the frequency of monitoring (number of times per year). Reproduced from de Boer IH, Khunti K, Sadusky T, et al. Diabetes management in chronic kidney disease: a consensus report by the American Diabetes Association (ADA) and Kidney Disease: Improving Global Outcomes (KDIGO). Kidney Int 2022; 102: 974-989.[303]

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Mild to moderate chronic kidney disease and functional disability in community-dwelling older adults. The Cardiovascular risk profile in Renal patients of the Italian Health Examination Survey (CARHES) study

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Di recente, lo STUDIO CARHES[9,10] (*Cardiovascular risk in Renal patients of the Health Examination Survey*) della Società Italiana di Nefrologia, in collaborazione con l'Istituto Superiore di Sanità e l'Associazione Nazionale Medici Cardiologi Ospedalieri, ha reso disponibili, per la prima volta in Italia, dati di prevalenza della MRC su scala nazionale. La prevalenza di MRC (VFG <60 e/o Ualb/Ucreat ≥30 mg/g) è risultata del 7,5% negli uomini e 6,5% nelle donne con una prevalenza maggiore degli stadi iniziali (±60%) 1 e 2 della MRC, rispetto agli stadi 3-5 con MRC (pari al 40%) (Tab. 5).

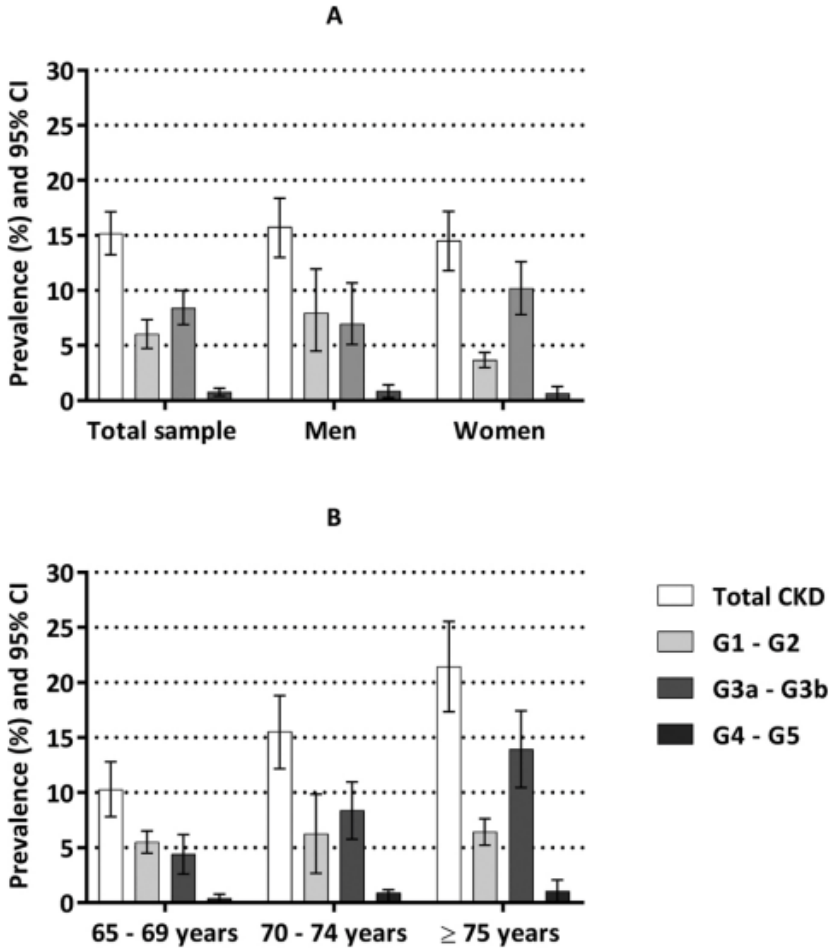

Fig. 1. Crude prevalence estimates and 95% confidence intervals of chronic kidney disease (CKD) by disease stage, gender and age.

Prevalenza dell'insufficienza renale nel mondo

Studio	Periodo	Paese	Campione	Prevalenza%
NANHES III [1]	1988-94	USA	15.488	11,0 (MRC 1-5)
PREVEND [2]	1997	Olanda	8.459	11,6 (MRC 1-5)
HUNT [3]	1995-97	Norvegia	65.181	10,2 (MRC 1-4)
NANHES IV [4]	1999-04	USA	13.233	13,1 (MRC 1-4)
NHI [5]	2003	Taiwan	176.365	9,8 (MRC 1-5)
EPIRCE [6]	2004-08	Spagna	2.746	9,2 (MRC 1-5)

1. Coresh J, Astor BC, Greene T, et al. *Prevalence of chronic kidneys disease and decreased kidney function in the adult US population: Third NANHES.* Am J Kidney Dis 2003; 41: 1-12.
2. De Zeeuw D, Hillage HL, de Jong PE. *The kidney, a cardiovascular risk marker and a new target for therapy*. Kidney Int 2005; 68 (Suppl 98): S25-9; PREVEND study.
3. Hallan SI, Dahl K, Oien CM, et al..*Screening strategies for chronic kidneys disease in the general population: follow-up of cross sectional health survey*. BMJ 2006; 18: 1047-52.
4. Coresh J, Selvin E, Stevens LA, *Prevalence of chronic kidneys disease in the USA*. et al. JAMA 2007; 298: 2038-47.
5. Kuo HV, Tsai SS, Tiao MM, Yang CV. *Epidemiological features of MRC in Taiwan*. Am J Kidney Dis 2006; 49: 46.55.
6. Otero A, de Francisco A, Gayoso P, Garcia F. *Prevalence of MRC in Spain: results of the EPIRCE study.* Nefrologia 2010; 30: 78-86.

Insufficienza renale e rischio di progressione a dialisi

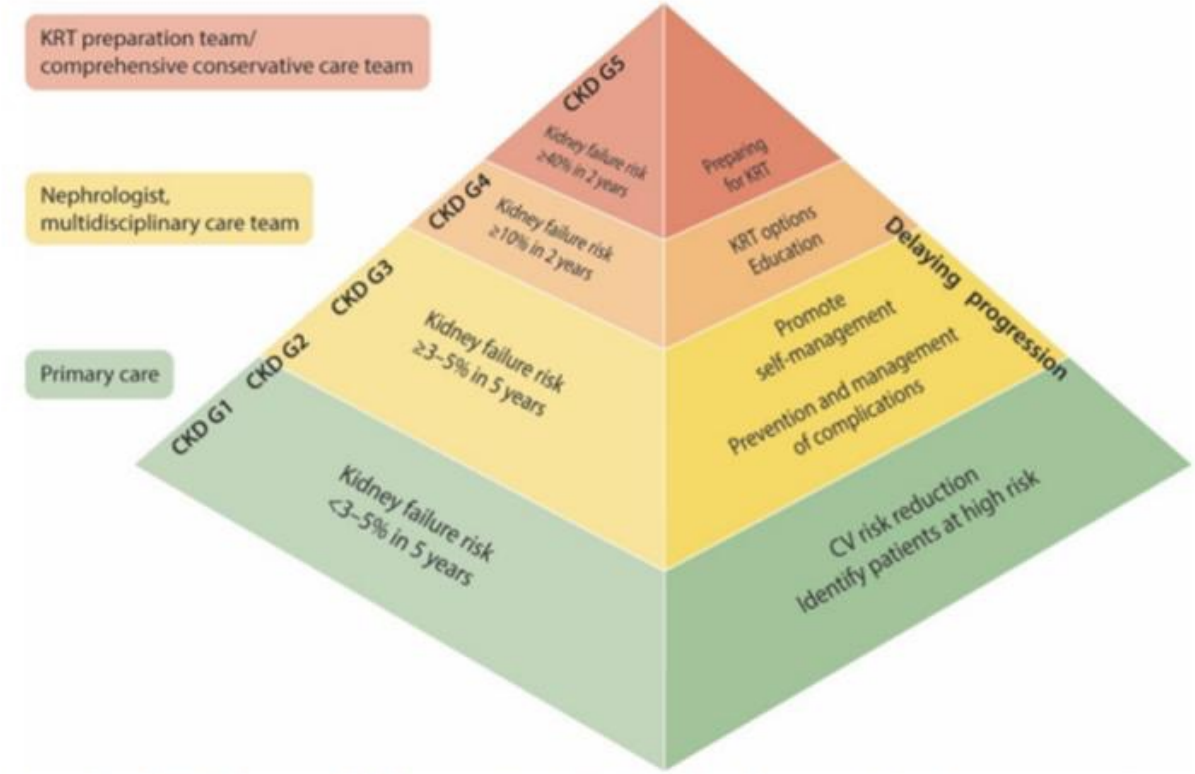

Figure 46. Optimal care model by severity of chronic kidney disease (CKD). CV, cardiovascular; KF, kidney failure; KRT, kidney replacement therapy

Dialisi peritoneale…non ci tocca ma meglio sapere che…

Figura 32: prevalenza pmp della DP in rapporto a quella totale (HD + DP) riportata dal Registro Italiano di Dialisi e Trapianto. Le percentuali indicano il rapporto tra le due prevalenze. Si ricorda che il Censimento NON comprende paziente pediatrici al contrario del RIDT.

https://giornaleitalianodinefrologia.it/2023/06/40-03-2023-02/

Dialisi peritoneale…non ci tocca ma meglio sapere che…

Figura 33: andamento della prevalenza percentuale della DP riportata dai principali registri Internazionali.

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Dialisi peritoneale…non ci tocca ma meglio sapere che…

GRUPPO di PROGETTO di DIALISI PERITONEALE
SOCIETA' ITALIANA di NEFROLOGIA

CENSIMENTO GPDP 2022

FINE DELLA DP

	EVENTI				EPISODI /100 ANNI PZ			
	HD	MORTE	Tx	TOT	HD	MORTE	Tx	TOT
2005	512	565	263	1340	11,8	13,0	6,1	30,9
2008	498	516	299	1313	12,4	12,8	7,4	32,7
2010	504	481	290	1275	12,4	11,8	7,1	31,3
2012	511	485	288	1284	12,3	11,7	6,9	30,9
2014	528	502	329	1359	12,4	11,8	7,7	32,0
2016	554	521	311	1386	12,5	11,8	7,0	31,3
2019	426	325	220	971	11,6	8,9	6,0	26,5
2022	464	400	296	1160	11,7	10,1	7,5	29,3

NOTE – Nel 2019 la raccolta dati è risultata incompleta (198 Centri).

Figura 19: cause di cessazione della DP negli anni. Nel 2019 il Censimento è stato incompleto.

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KDOQI®

KIDNEY DISEASE OUTCOMES QUALITY INITIATIVE

National Kidney Foundation

KDOQI CLINICAL PRACTICE GUIDELINE FOR VASCULAR ACCESS: 2019 UPDATE

Charmaine E. Lok, Thomas S. Huber, Timmy Lee, Surendra Shenoy, Alexander S. Yevzlin, Kenneth Abreo, Michael Allon, Arif Asif, Brad C. Astor, Marc H. Glickman, Janet Graham, Louise M. Moist, Dheeraj K. Rajan, Cynthia Roberts, Tushar J. Vachharajani, and Rudolph P. Valentini

Statement: Vessel Preservation

6.10 KDOQI considers it reasonable to protect all central and peripheral arteries and veins from damage whenever possible, including the avoidance of peripherally inserted catheters and unnecessary venipunctures, for patients on dialysis or with CKD where dialysis access is expected in the future (CKD G3-G5). *(Expert Opinion)*

Note: Other scenarios where vessel (artery or vein) damage may occur that should be avoided include (1) radial artery access for coronary interventions and (2) venous cardiovascular implantable electronic devices; alternatives such as epicardial/leadless pacing should be considered whenever possible.

In citing this document, the following format should be used: 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(4)(suppl 2):S1-S164.

Box 1. Grade for Strength of Recommendation

Evidence Base	Grade	Implications		
		Patients	**Clinicians**	**Policy**
ERT derived	Strong recommendation: "We recommend"	Most people in your situation would want the recommended course of action, and only a small proportion would not.	Most patients should receive the recommended course of action.	The recommendation can be adopted as policy in most situations.
ERT derived	Conditional recommendation/ suggestion: "We suggest"	The majority of people in your situation would want the recommended course of action, but many would not.	Different choices will be appropriate for different patients. Each patient needs help to arrive at a management decision consistent with her or his values and preferences.	The recommendation is likely to require substantial debate and involvement of stakeholders before policy can be determined.
ERT derived	There is inadequate evidence	The quality of the evidence was insufficient to make a suggestion or recommendation (to support or not to support the intervention or topic) but important enough to acknowledge as an area for future study		
Work Group derived	Ungraded "KDOQI considers it reasonable"	Ungraded recommendations are based on Work Group consensus and the literature[a] not found through the formal ERT literature review.		

Note: When a statement indicates, "There is inadequate evidence for KDOQI to make a recommendation," the Work Group cannot make any recommendation, suggestion, or other evidence-based guidance (in either direction) based on the very low, low, or inadequate quality of evidence amassed by the ERT. The word "recommendation" is used for simplicity and encompasses both "recommendations" and "suggestions" (in either direction). Also, expert opinion statements that allow for the use of "the clinician's discretion and best clinical judgment" means that there is currently no rigorous evidence to recommend a therapy, device, or strategy over another. The Work Group expects that ERT-derived evidence-based statements will ultimately replace expert opinion-based statements once such rigorous evidence becomes available.

Abbreviations: ERT, evidence review team; KDOQI, Kidney Disease Outcomes Quality Initiative.

Adapted from Uhlig et al[14] with permission of Elsevier; original version of table © 2006 International Society of Nephrology.

[a]Many important topics, such as vein preservation, did not have accompanying studies that met the strict ERT search, retrieval, and analysis criteria (above). However, if the Work Group believed the topic was important enough to be included in the Clinical Practice Guideline, statements were made on these important topics with the Work Group's best attempts to support the statements with the most relevant evidence available through August 2018.

Detailed Justification

A case-control study (N = 120) demonstrated that the prior placement of a PICC was associated with a subsequent lower frequency of AVF use[144] (odds ratio, 3.2; $P < 0.001$,) even after adjustment for patient sex, artery and vein diameters, and prior CVC insertion. An observational study using USRDS data found that of 6,487 HD patients with PICCs placed within 2 years before and after AV access creation were independently associated with lower likelihoods of transition to any working AV access.[142]

One study examining the presence of central vein stenosis (CVS) in association with PICCs reported a 7% rate of overall CVS.[145] However, this is likely an underestimation of the true incidence of CVS associated with PICCs, because the study was limited to patients undergoing serial extremity venography. In a prospective study examining thrombosis associated with PICC placement, all patients underwent ultrasound examination of the arm at 28 days after PICC insertion or at time of PICC removal and found an overall thrombosis rate of 71.9% (partial or complete obliteration of vessel lumen).[146] Unfortunately, the national effort to reduce the use of PICCs among CKD and ESKD patients has not achieved its objective. Notably, McGill et al[147] reported from their urban teaching hospital that >30% of patients with CKD have had a PICC and that >50% were placed in their nondominant arm.

Angiographic comparisons of stenosis rates between subclavian and jugular HD CVC insertions found that both were associated with stenosis, with 42% of subclavian veins stenosed after CVC insertion.[148] Finally, the use of a CVC (including PICCs and catheters inserted at the subclavian and jugular veins) was found to be associated with a 14-fold increased risk of an upper extremity DVT.[149] Vein loss may be extrapolated from DVT formation.

In a consensus statement regarding cardiovascular implantable devices in CKD and ESKD patients, it was noted that such patients derive a reduced survival benefit from implantable cardioverter defibrillator treatment compared with patients with normal kidney function, with a 2.7-fold higher risk of mortality.[150] With regard to CVS, 64% of patients developed stenosis.[151] Options to avoid upper body central veins include femoral vein placement (with its own risks of infradiaphragmatic venous damage), epicardial placement, subcutaneous implantable cardioverter defibrillator placement, leadless pacers, and possibly wearable defibrillators.[152,153]

Finally, with regard to radial artery access for cardiac interventions, a meta-analysis of the literature noted a radial artery occlusion rate of <1% to 33%. The conclusion was that radial artery occlusion was common.[154] Given the fact that radial artery patency is integral to future radiocephalic AVF creation, femoral arterial access for coronary interventions should be strongly considered.

Am J Kidney Dis. 2012 October ; 60(4): 601–608. doi:10.1053/j.ajkd.2012.05.007.

Association Between Prior Peripherally Inserted Central Catheters and Lack of Functioning Arteriovenous Fistulas: A Case-Control Study in Hemodialysis Patients

Mireille El Ters, MD[1], Gregory J. Schears, MD[2], Sandra J. Taler, MD[1], Amy W. Williams, MD[1], Robert C. Albright, DO[1], Bernice M. Jenson, RN[1], Amy L. Mahon, RN[3], Andrew H. Stockland, MD[4], Sanjay Misra, MD[4], Scott L. Nyberg, MD, PhD[5], Andrew D. Rule, MD[1,6], and Marie C. Hogan, MD, PhD[1]

One potential barrier may be the contribution of prior vascular injury (vascular sclerosis, thrombosis, and stenosis) from previously placed peripherally inserted central catheters (PICCs). Studies that examined complications related to PICC use have reported venous thrombosis rates as high as 58%, with a propensity for thrombosis in the cephalic and basilic veins (both used for AVF creation).[17–19] Central vein stenosis also may occur, although less frequently.[20]

These studies have formed the basis for recommendations by renal societies to avoid PICC placement in patients with advanced chronic kidney disease (CKD).[10,21] However, evidence that PICCs lead to AVF failure in long-term hemodialysis patients is lacking. PICCs continue to be used in this medically complicated population due to their perceived cost-effectiveness and ease of use.[22] We hypothesized that a previous PICC would associate with lack of a functioning AVF independent of characteristics associated with poor vein quality. To our knowledge, this is the first study to systematically examine the association of a history of prior PICC placement and the presence of a functioning AVF in a hemodialysis population.

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Exposure Variable

Two separate electronic databases were queried for the date, location, and indication for each PICC placed by nurses (2002–2011) and interventional radiology (1997–2011) at the Mayo Clinic in Rochester, MN. We identified any PICC placed prior to AVF surgery, any PICC placed prior to long-term hemodialysis therapy initiation, and any PICC placed as of January 31, 2011. Medical records were reviewed to confirm specific indications for PICC placement.

Am J Kidney Dis. 2012 October ; 60(4): 601–608. doi:10.1053/j.ajkd.2012.05.007.

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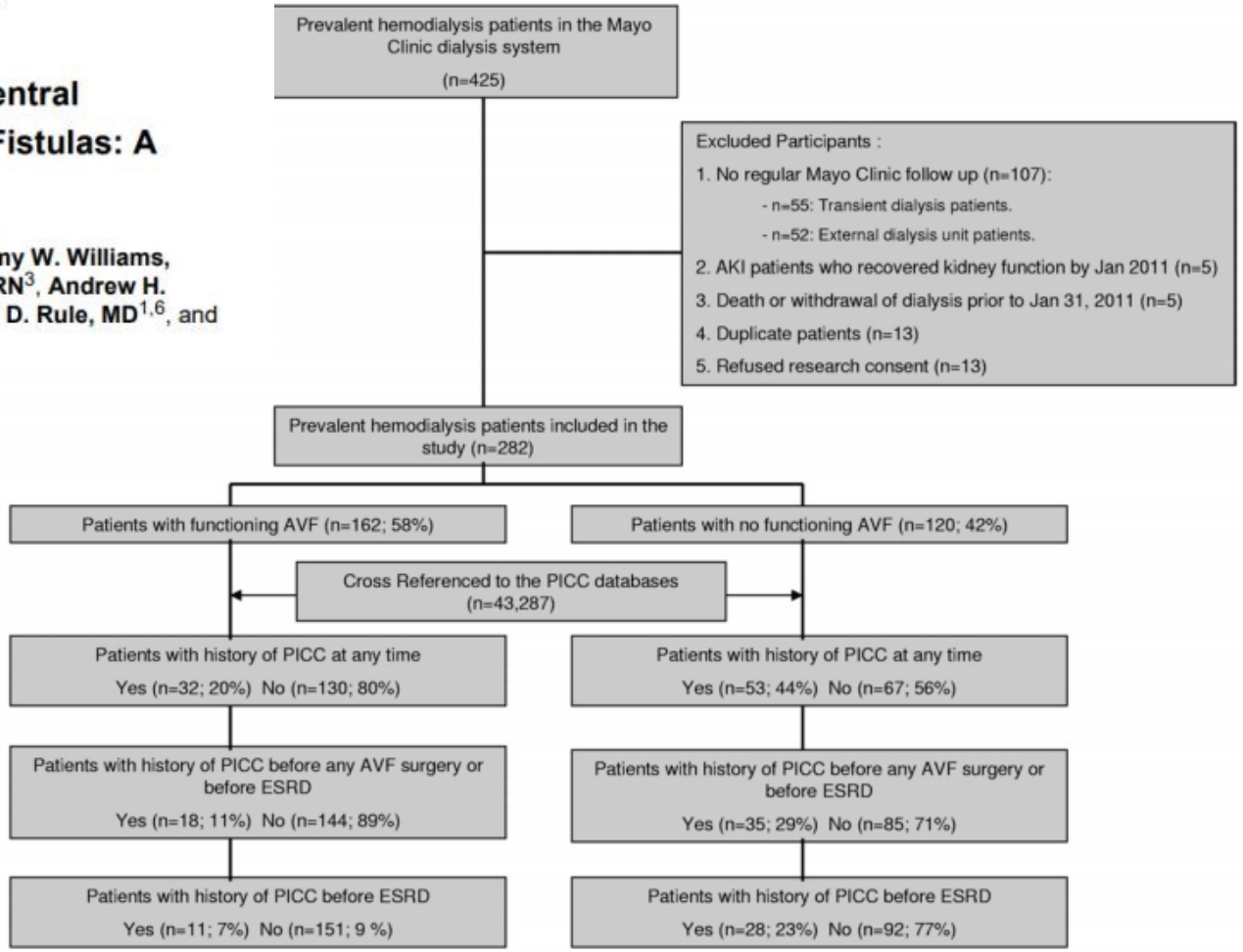

Figure 1.
Study flowchart. Abbreviations: AKI, acute kidney injury; AVF, arteriovenous fistula; ESRD, end-stage renal disease; PICC, peripherally inserted central catheter.

Table 2

Logistic Regression Analysis of Lack of Functioning AVF in Patients With History of PICC

Adjustment	PICC Anytime	PICC Before AVF or ESRD	PICC Before ESRD
Unadjusted	3.21 (1.91–5.50)	3.29 (1.78–6.29)	4.18 (2.04–9.14)
Adjusted for sex	3.24 (1.89–5.59)	3.32 (1.77–6.41)	3.93 (1.89–8.67)
Adjusted for vein size[a]	3.32 (1.79–6.28)	3.00 (1.49–6.23)	3.54 (1.53–8.72)
Adjusted for artery size[b]	2.80 (1.54–5.17)	2.70 (1.35–5.56)	3.46 (1.50–8.55)
Adjusted for tunneled dialysis catheter	2.52 (1.43–4.54)	2.28 (1.18–4.55)	3.39 (1.55–8.03)
Adjusted for any CVC	2.70 (1.55–4.79)	2.64 (1.38–5.23)	3.80 (1.76–8.93)
Adjusted for sex, vein/artery size, and any CVC	2.79 (1.45–5.50)	2.49 (1.19–5.43)	3.08 (1.26–8.20)

Note: Values given as odds ratio (95% confidence interval).

Abbreviations: AVF, arteriovenous fistula; CVC, central venous catheter; ESRD, end-stage renal disease; PICC, peripherally inserted central catheter.

[a] n = 222.

[b] n = 220.

Peripherally Inserted Central Catheters and Hemodialysis Outcomes

Rita L. McGill, Robin Ruthazer,† Klemens B. Meyer,* Dana C. Miskulin,* and Daniel E. Weiner**

Abstract

Background and objectives Use of peripherally inserted central catheters has expanded rapidly, but the consequences for patients who eventually require hemodialysis are undefined.

Design, setting, participants, & measurements Our national, population–based analysis included 33,918 adult Medicare beneficiaries from the US Renal Data System who initiated hemodialysis with central venous catheters as their sole vascular access in 2010 and 2011. We used linked Medicare claims to identify peripherally inserted central catheter exposures and evaluate the associations of peripherally inserted central catheter placement with transition to working arteriovenous fistulas or grafts and patient survival using a Cox model with time-dependent variables.

Results Among 33,918 individuals initiating hemodialysis with a catheter as sole access, 12.6% had received at least one peripherally inserted central catheter. Median follow-up was 404 days (interquartile range, 103–680 days). Among 6487 peripherally inserted central catheters placed, 3435 (53%) were placed within the 2 years before hemodialysis initiation, and 3052 (47%) were placed afterward. Multiple peripherally inserted central catheters were placed in 30% of patients exposed to peripherally inserted central catheters. Recipients of peripherally inserted central catheters were more likely to be women and have comorbid diagnoses and less likely to have received predialysis nephrology care. After adjustment for clinical and demographic factors, peripherally inserted central catheters placed before or after hemodialysis initiation were independently associated with lower likelihoods of transition to any working fistula or graft (hazard ratio for prehemodialysis peripherally inserted central catheter, 0.85; 95% confidence interval, 0.79 to 0.91; hazard ratio for posthemodialysis peripherally inserted central catheter, 0.81; 95% confidence interval, 0.73 to 0.89).

Conclusions Peripherally inserted central catheter placement was common and associated with adverse vascular access outcomes. Recognition of potential long–term adverse consequences of peripherally inserted central catheters is essential for clinicians caring for patients with CKD.

Clin J Am Soc Nephrol 11: 1434–1440, 2016. doi: 10.2215/CJN.01980216

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Table 2. Relationships of peripherally inserted central catheter with first working arteriovenous fistula, first working arteriovenous fistula or graft, and death

Exposure Variables	First AV Fistula	First AV Fistula or Graft	Death
Standard Cox models			
Pre-HD PICC (95% CI)	0.77 (0.71 to 0.85)	0.85 (0.79 to 0.92)	1.15 (1.09 to 1.21)
Time–dependent Cox models			
Pre-HD PICC (95% CI)	0.78 (0.71 to 0.85)	0.85 (0.79 to 0.91)	1.05 (0.99 to 1.11)
Post-HD PICC (95% CI)	0.81 (0.72 to 0.90)	0.81 (0.73 to 0.89)	2.26 (2.13 to 2.39)

Adjusted for age, sex, race, predialysis nephrology care, predialysis erythropoietin, primary diagnosis for kidney failure, body mass index, hemoglobin, albumin, creatinine, and all comorbid conditions. AV, arteriovenous; HD, hemodialysis; PICC, peripherally inserted central catheter; 95% CI, 95% confidence interval.

Table 1. Baseline patient characteristics at hemodialysis initiation by peripherally inserted central catheter status

Characteristic	All	Any PICC[a]	No PICC	*P* Value
N	33,918	4257	29,661	
Age, yr, mean (SD)	72.6 (11.3)	71.2 (11.9)	72.8 (11.2)	<0.001
Women, %	47.1	51.8	46.5	<0.001
Race				<0.001
White	73.2	71.5	73.5	
Black	22.5	25.4	22.1	
Other	4.3	3.1	4.4	
Body mass index, kg/m^2, mean (SD)	28.8 (7.8)	29.8 (8.3)	28.7 (7.7)	<0.001
Pre–ESRD vascular imaging, %	7.4	8.2	7.3	0.04
Pre–ESRD nephrology care, %	47.3	41.2	48.2	<0.001
Pre–ESRD erythropoietin use, %	15.2	14.3	15.3	0.002
Primary ESRD diagnosis				<0.001
Diabetes	41.7	42.7	41.6	
Hypertension	32.5	29.6	32.9	
Primary GN	3.2	2.3	3.3	
Other	22.6	25.4	22.2	
Comorbid conditions, %				
Atherosclerotic heart disease	49.6	59.4	48.2	<0.001
Congestive heart failure	45.7	55.7	44.3	<0.001
Other cardiac conditions	31.1	40.7	29.7	<0.001
Arrhythmia	29.8	37.8	28.6	<0.001
Peripheral vascular disease	28.6	38.5	27.2	<0.001
Pulmonary disease	26.9	35.3	25.7	<0.001
Diabetes not cause of ESRD	23.8	27.8	23.2	<0.001
Inability to ambulate	12.5	19.1	11.6	<0.001
Stroke	14.4	17.5	14.0	<0.001
Cancer	11.7	12.9	11.5	<0.01
Gastrointestinal disease	5.3	8.9	4.7	<0.001
Liver disease	4.2	6.3	3.9	<0.001
Pre–ESRD laboratory work, mean (SD)				
Serum albumin, mg/dl	3.0 (0.7)	2.9 (0.7)	3.0 (0.7)	<0.001
Serum creatinine, mg/dl	5.3 (2.7)	4.8 (2.5)	5.4 (2.7)	<0.001
Hemoglobin, g/dl	9.8 (1.5)	9.7 (1.5)	9.8 (1.5)	0.004

PICC, peripherally inserted central catheter.
[a]Any PICC includes all patients receiving any PICC either before or after hemodialysis initiation or both.

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Incidence of Central Vein Stenosis and Occlusion Following Upper Extremity PICC and Port Placement

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Abstract

The purpose of this study was to determine the incidence of central vein stenosis and occlusion following upper extremity placement of peripherally inserted central venous catheters (PICCs) and venous ports. One hundred fifty-four patients who underwent venography of the ipsilateral central veins prior to initial and subsequent venous access device insertion were retrospectively identified. All follow-up venograms were interpreted at the time of catheter placement by one interventional radiologist over a 5-year period and compared to the findings on initial venography. For patients with central vein abnormalities, hospital and home infusion service records and radiology reports were reviewed to determine catheter dwell time and potential alternative etiologies of central vein stenosis or occlusion. The effect of catheter caliber and dwell time on development of central vein abnormalities was evaluated. Venography performed prior to initial catheter placement showed that 150 patients had normal central veins. Three patients had central vein stenosis, and one had central vein occlusion. Subsequent venograms ($n = 154$) at the time of additional venous access device placement demonstrated 8 patients with occlusions and 10 with stenoses. Three of the 18 patients with abnormal follow-up venograms were found to have potential alternative causes of central vein abnormalities. Excluding these 3 patients and the 4 patients with abnormal initial venograms, a 7% incidence of central vein stenosis or occlusion was found in patients with prior indwelling catheters and normal initial venograms. Catheter caliber showed no effect on the subsequent development of central vein abnormalities. Patients who developed new or worsened central vein stenosis or occlusion had significantly ($p = 0.03$) longer catheter dwell times than patients without central vein abnormalities. New central vein stenosis or occlusion occurred in 7% of patients following upper arm placement of venous access devices. Patients with longer catheter dwell time were more likely to develop central vein abnormalities. In order to preserve vascular access for dialysis fistulae and grafts and adhere to Dialysis Outcomes Quality Initiative guidelines, alternative venous access sites should be considered for patients with chronic renal insufficiency and end-stage renal disease.

Key words: Central venous catheter—Peripherally inserted central catheter—Venous infusion port—Central venography

The number of upper extremity peripherally inserted central catheters (PICCs) and venous infusion ports placed by interventional radiologists has grown substantially over the past several years. In many institutions, these devices are replacing neck or chest wall central venous catheters (CVC) as the access of choice for intermediate and long-term intravenous therapy.

There are several reasons for the growing popularity of these devices. Most importantly, peripherally inserted venous access devices (VAD) offer a safe, efficient, and cost-effective alternative to surgically placed CVCs [1, 2]. They not only provide reliable and convenient venous access for in-hospital use, but for home therapy as well. VADs are ideal for infusion of toxic, viscous, and irritating substances such as chemotherapeutic agents, total parenteral nutrition, and antibiotics, respectively. These devices are well tolerated by patients and widely accepted throughout the medical community.

JOURNAL ARTICLE

Post Catheterisation Vein Stenosis in Haemodialysis: Comparative Angiographic Study of 50 Subdavian and 50 Internal Jugular Accesses

F. Schillinger ✉, D. Schillinger, R. Montagnac, T. Milcent

Nephrology Dialysis Transplantation, Volume 6, Issue 10, 1991, Pages 722–724,
https://doi.org/10.1093/ndt/6.10.722
Published: 01 January 1991 **Article history** ▾

Abstract

From January 1986 to December 1990 we studied angiographically the subclavian-brachiocephalic vein of 100 patients dialysed by subdavian catheter for 50 (first group) and by internal jugular catheter forthe 50 others (second group). These two groups were not statistically different as regards age (61.6 ± 11.3 years in the first and 61 ± 11.1 in the second), sex (48% and 56% were women), duration of catheter insertion (31 ± 21.8 and 31.7 ± 16 days), andthe number of dialysis sessions (13.5 ± 9.1 and 13.6 ± 7.1). The type of catheters, the frequency of removal for poor flow (16% in both groups) or infections (6% in both groups), and localnursing were similar in the two groups. The only difference was the side of cannulation: the right side in 58%of cases in group 1 and 78% in group 2. The giographic study revealed a stenosis of the vein in 42% of the subdavian group and in 10% of the internal jugular group: a dramatic difference in favour of the internal jugular route, whose superiority over the subdavian route is asserted in respect of venous access ofdialysed patients

Review

JVA The Journal of Vascular Access

PICC line management among patients with chronic kidney disease

The Journal of Vascular Access
2023, Vol. 24(2) 329–337

DOI: 10.1177/1129729821025897
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SAGE

Bharvi P Oza-Gajera[1], James A Davis[2], Crystal Farrington[3], Edgar V Lerma[4], Shahriar Moossavi[5], Mohamed A Sheta[6], Amy Dwyer[7] and Ammar Almehmi[3]

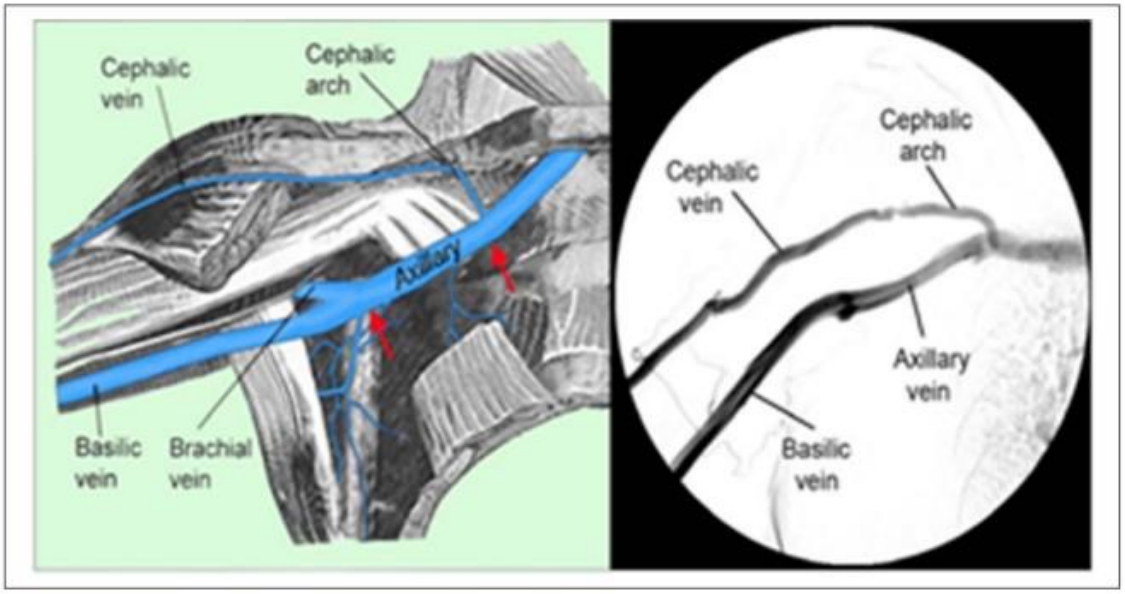
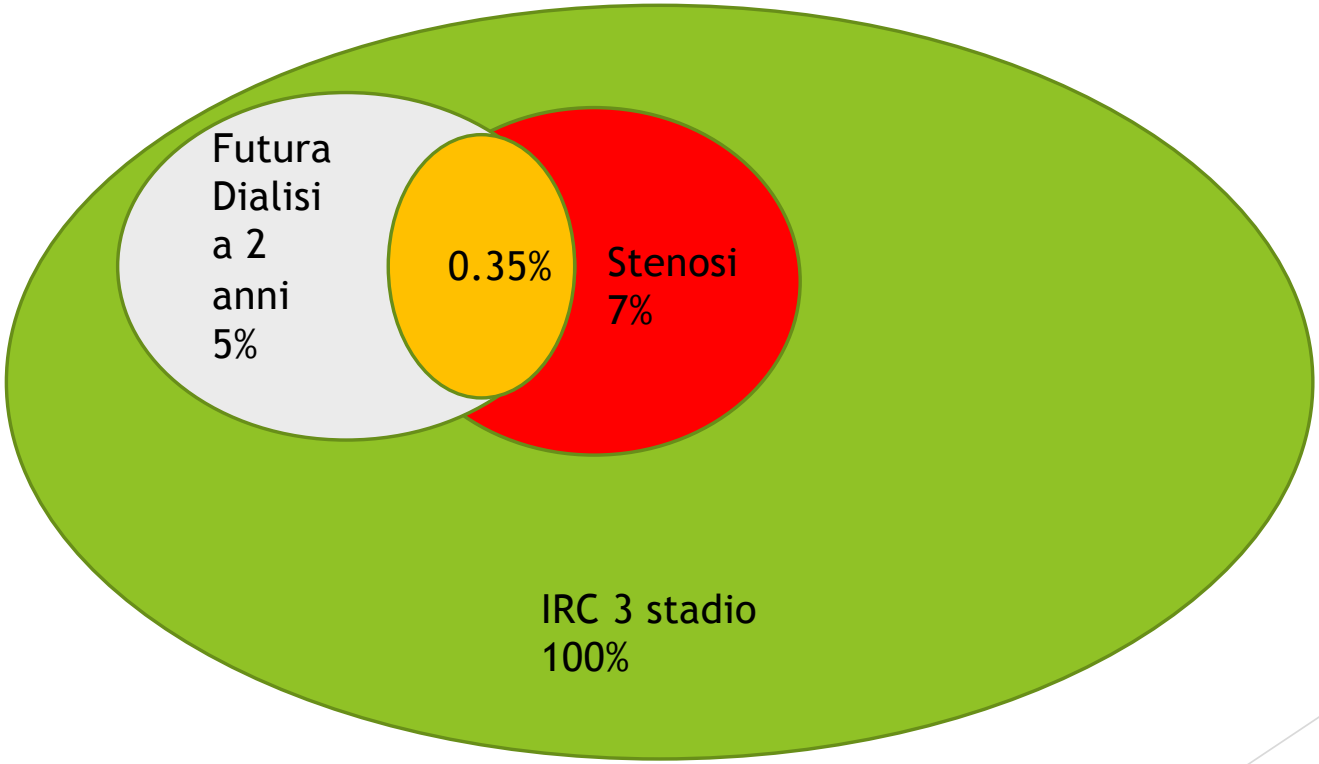


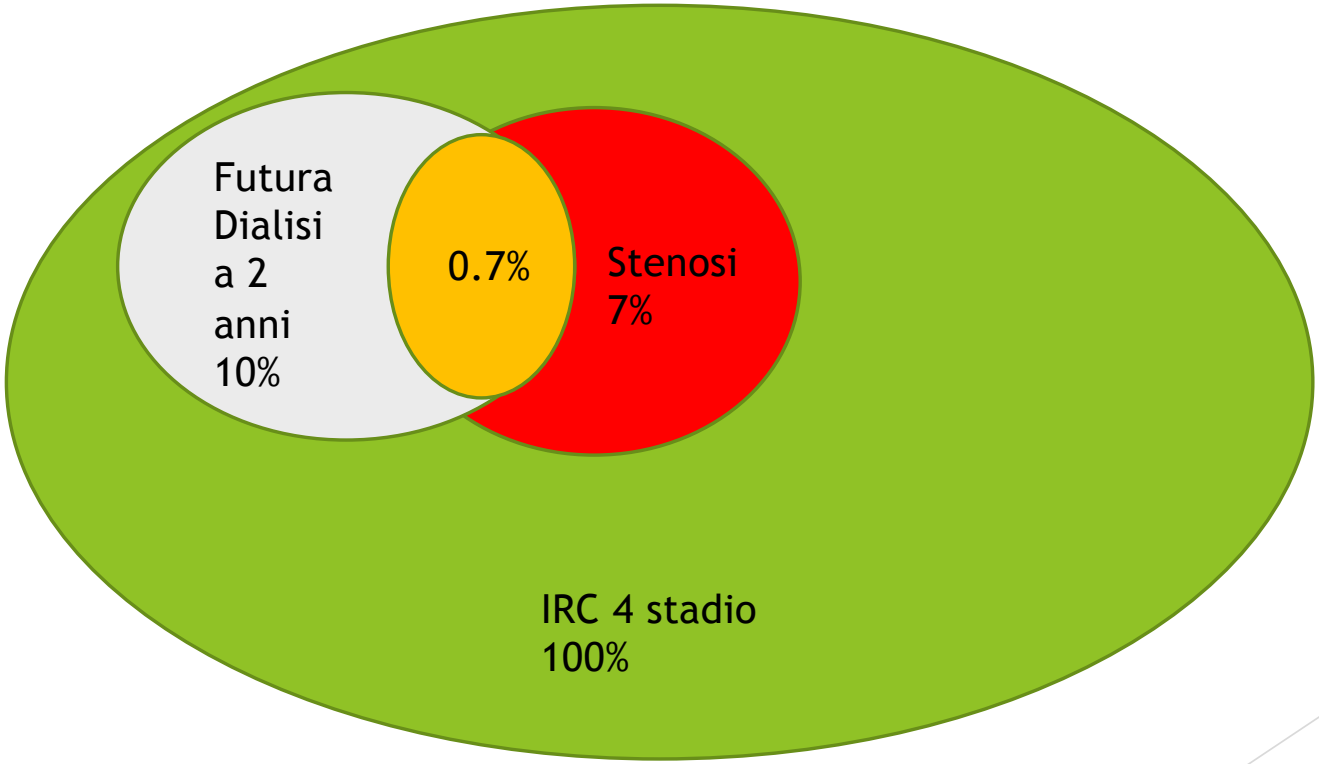
Figure 2. Cephalic arch, basilic vein and axillary vein[31] *Angiogram Photo courtesy of Dr. Sheta.*

Figure 3. Right and left subclavian vein joining to form superior vena cava. Note that the right subclavian vein here is stenosed.
Photo courtesy of Dr. Sheta, November 2018.

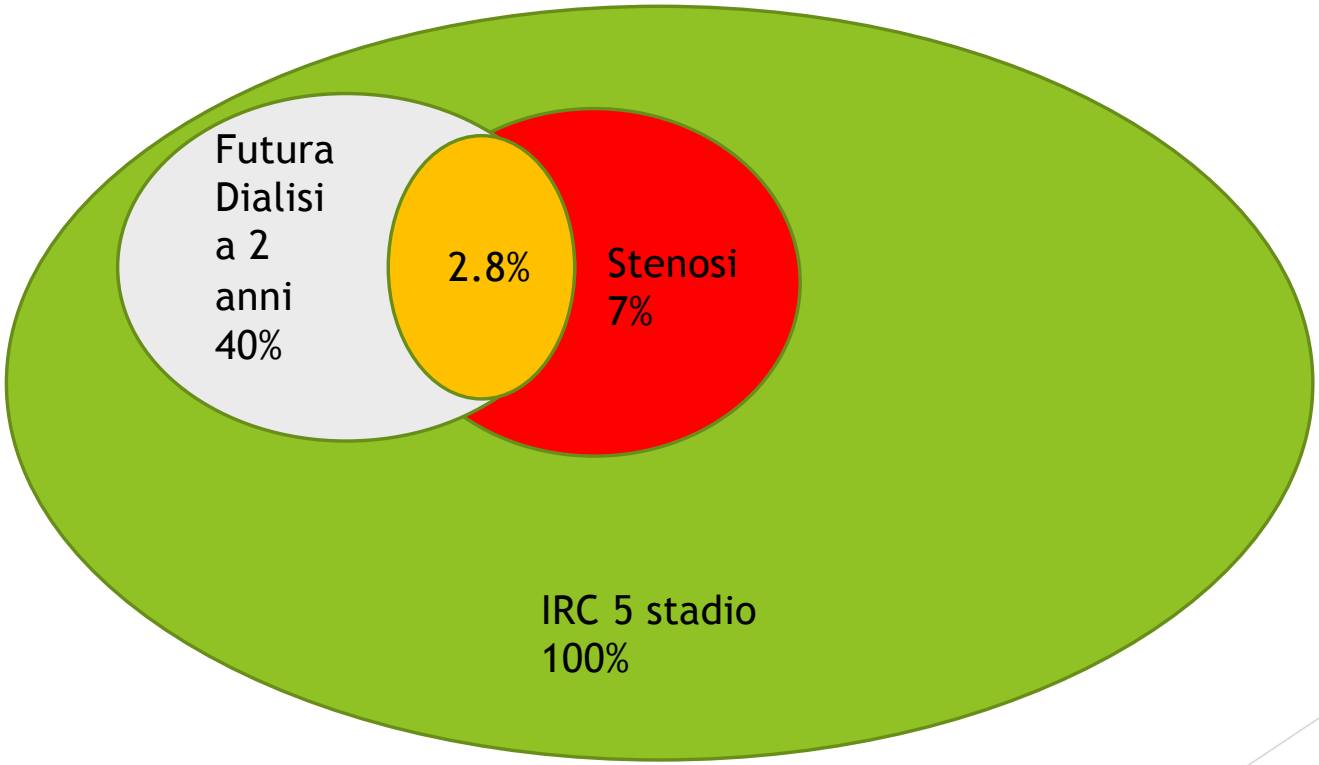
Rischio teorico di stenosi nei pazienti che faranno dialisi con IRC di grado 3 (GFR 59-30)



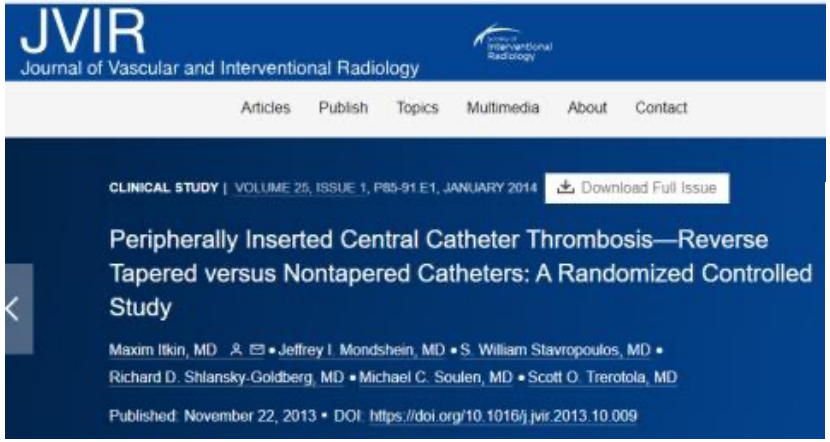
Rischio teorico di stenosi nei pazienti che faranno dialisi con IRC di grado 4(GFR 29-15)



Rischio teorico di stenosi nei pazienti che faranno dialisi con IRC di grado 5 (GFR <15)



Trombosi venosa come rischio di fallimento del graft futuro?



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CLINICAL STUDY | VOLUME 25, ISSUE 1, P85-91.E1, JANUARY 2014 Download Full Issue

Peripherally Inserted Central Catheter Thrombosis—Reverse Tapered versus Nontapered Catheters: A Randomized Controlled Study

Maxim Itkin, MD • Jeffrey I. Mondshein, MD • S. William Stavropoulos, MD • Richard D. Shlansky-Goldberg, MD • Michael C. Soulen, MD • Scott O. Trerotola, MD

Published: November 22, 2013 • DOI: https://doi.org/10.1016/j.jvir.2013.10.009

Purpose

To compare the thrombosis rate, ease of insertion, bleeding rate, and complications of a nontapered peripherally inserted central catheter (PICC) versus a reverse tapered PICC.

Methods

This was a prospective randomized, controlled trial conducted in single center. All patients 18–90 years old requiring PICC insertion were considered for the study. All patients were followed until PICC removal. Ultrasound examination of the arm was performed at PICC removal or at 28 days. There were 332 patients randomly assigned—164 to the nontapered PICC group and 168 to the reverse tapered PICC group.

Results

The overall thrombosis rate was 71.9%. The thrombosis rate was 70.4% in the nontapered PICC group and 73.4% in the reverse tapered PICC group (P = .58). The symptomatic thrombosis rate was 4.3% in the nontapered PICC group and 3.6% in the reverse tapered PICC group (P = .75). The complete thrombosis rate was 15.6% in the nontapered PICC group compared with 20.8% in the reverse tapered PICC group (P = .44). There was a statistically significantly higher thrombosis rate in patients with cancer (71.9% vs 66.7%, P = .002).

Conclusions

This study showed a high incidence of thrombosis of peripheral veins used for PICC insertion. The implication of this thrombosis is significant in light of the morbidity and potential mortality associated with this condition. A difference in thrombosis rate between devices could not be detected in this study.

J Vasc Access 2012; 13 (2): 231-238
DOI: 10.5301/jva.5000039

ORIGINAL ARTICLE

Risk factors for upper extremity venous thrombosis associated with peripherally inserted central venous catheters

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ABSTRACT

Purpose: **To identify clinically important risk factors associated with upper extremity venous thrombosis following peripherally inserted central venous catheters (PICC).**

Methods: **A retrospective case control study of 400 consecutive patients with and without upper extremity venous thrombosis post-PICC insertion was performed. Patient data included demographics, body mass index (BMI), ethnicity, site of insertion, size and lumen of catheter, internal length, infusate, and co-morbidities, such as diabetes mellitus, congestive heart failure, and renal failure. Additional risk factors analyzed were active cancer, any history of cancer, recent trauma, smoking, a history of prior deep vein thrombosis, and recent surgery, defined as surgery within three months prior to PICC insertion.**

Results: **The prevalence of trauma, renal failure, and infusion with antibiotics and total parenteral nutrition (TPN) was higher among patients exhibiting upper extremity venous thrombosis (UEVT), when compared to controls. Patients developing UEVT were also more likely to have PICC line placement in a basilic vein and less likely to have brachial vein placement (*P*<.001). Left-sided PICC line sites also posed a greater risk (*P*=.026). The rate of standard DVT prophylaxis with low molecular weight heparin and unfractionated heparin and the use of warfarin was similar in both groups. Average length of hospital stay was almost double among patients developing UEVT, 19.5 days, when compared to patients undergoing PICC line insertion without thrombosis, 10.8 days (t=6.98, *P*<.001).**

Conclusions: **In multivariate analysis, trauma, renal failure, left-sided catheters, basilic placement, TPN, and infusion with antibiotics, specifically vancomycin, were significant risk factors for UEVT associated with PICC insertion. Prophylaxis with low molecular weight heparin, unfractionated heparin or use of warfarin did not prevent the development of venous thrombosis in patients with PICCs. Length of hospital stay and cost are markedly increased in patients who develop PICC-associated upper extremity venous thrombosis.**

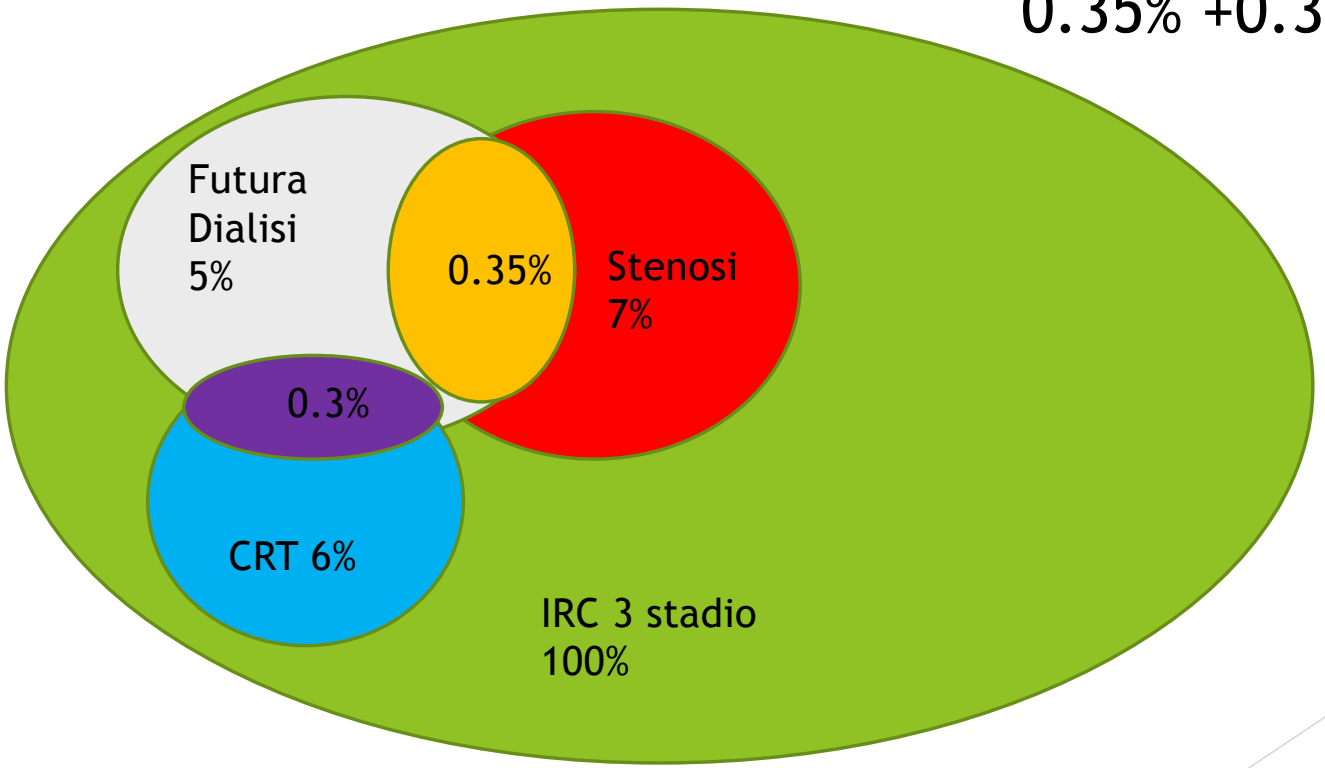
TABLE V - UNADJUSTED AND ADJUSTED ODDS RATIOS FOR RISK OF UEVT

Risk Factor	Unadjusted OR	*P* Value	Adjusted OR	*P* Value
Left Site (vs. right)	1.53	.072	2.340	.009
Placement				
Axillary	∞	.061	∞	1.000
Basilic	2.524	<.001	2.950	.003
Brachial	0.559	.007	1.230	.480
French 5 (vs. 4)	1.588	.030	1.148	.724
Lumen	2.097	.043	2.058	.159
Male sex	1.325	.193	0.967	.901
Hyperlipidemia	0.676	.142	0.798	.494
Trauma	1.610	.123	2.766	.011
Recent surgery	1.493	.083	1.269	.403
History of DVT	1.866	.049	1.819	.159
Renal Failure	1.400	.139	2.095	.010
Antibiotic infused	2.299	.003	3.438	.001
TPN infused	3.395	.001	4.442	.001
Chemotherapeutic infused	0.242	.105	0.118	.087
CVA	0.645	.214	0.252	.615

CVA, cerebrovascular accident; DVT, deep vein thrombosis; OR, odds ratio; TPN, total parenteral nutrition
In the multivariate logistic regression model, the value of the intercept, B_0, was 0.065 (P<.001).

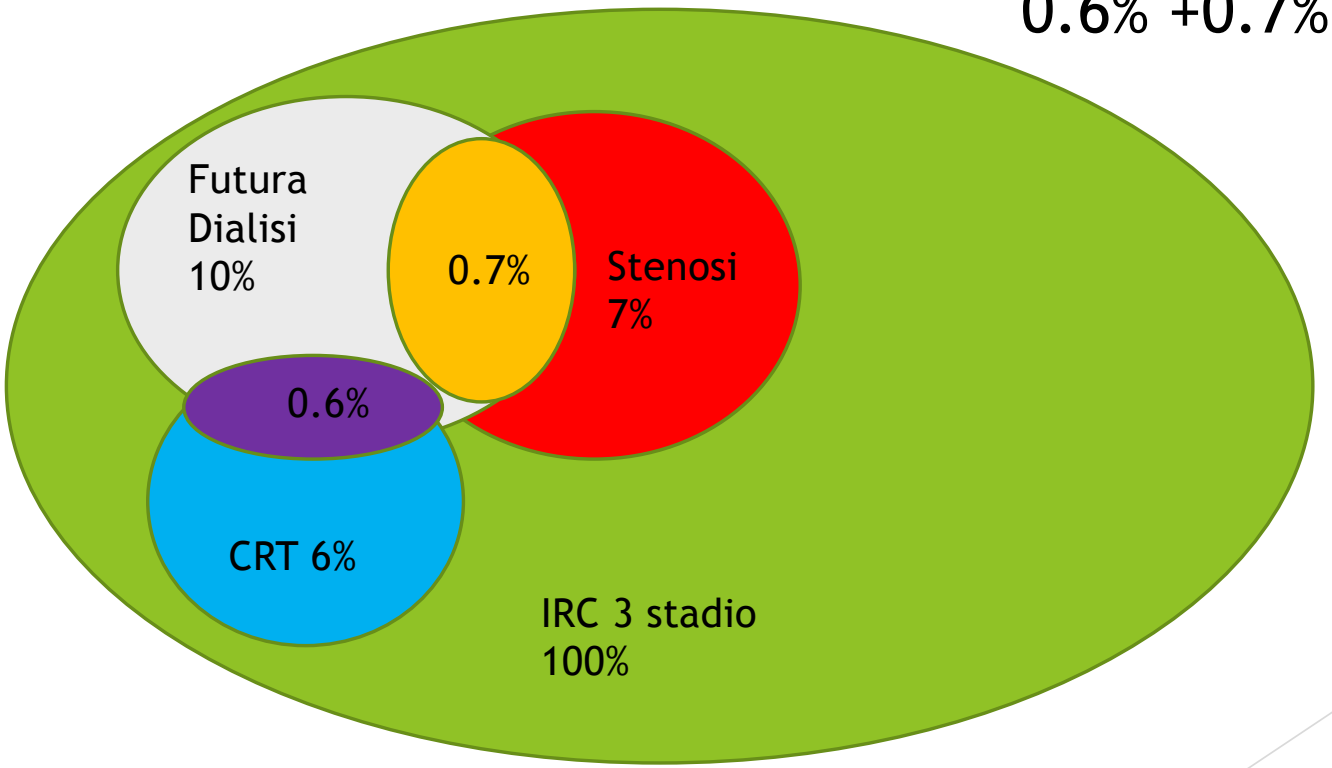
Rischio teorico di danno da PICC(per singolo catetere) nei pazienti che faranno dialisi con IRC di grado 3(GFR 59-30)

0.35% +0.3%= 0.65%

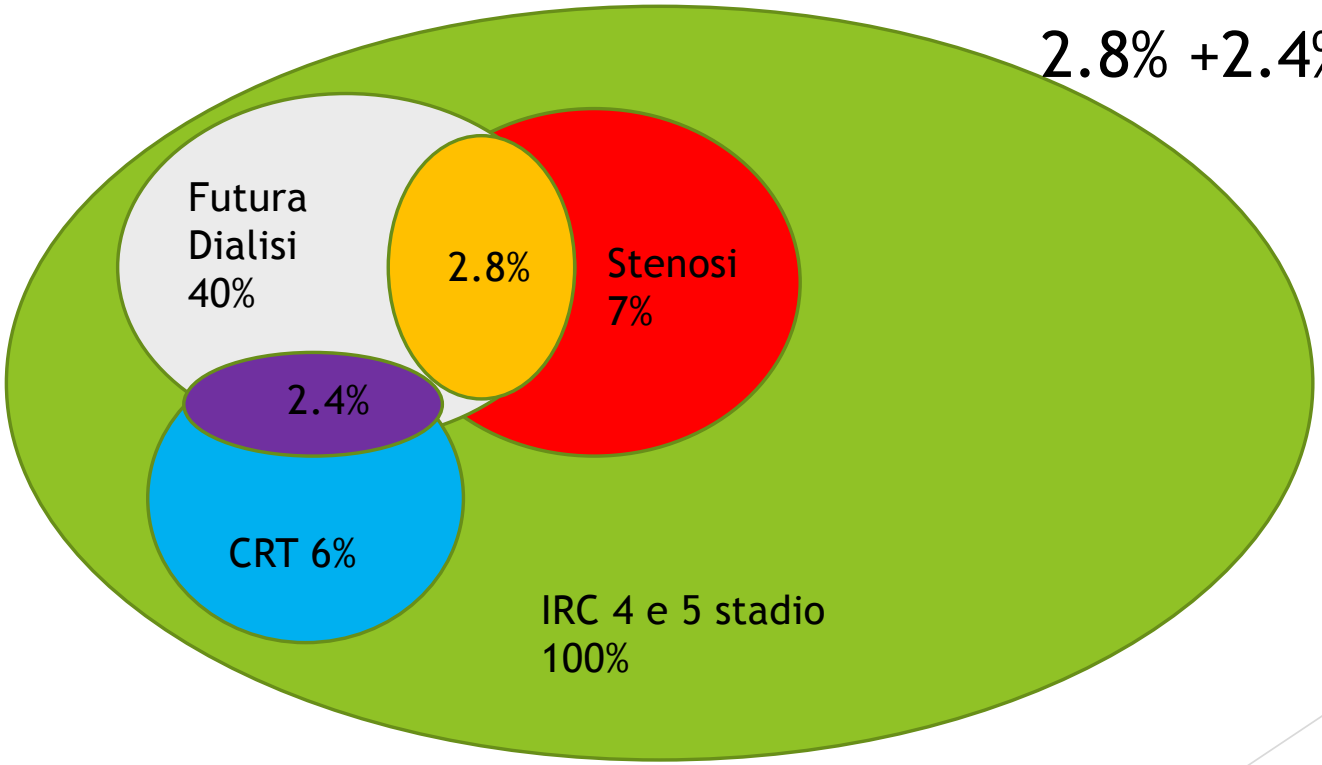


Rischio teorico di danno da PICC(per singolo catetere) nei pazienti che faranno dialisi con IRC di grado 4 (GFR 29-15)

0.6% +0.7%= 1.3%



Rischio teorico di danno da PICC(per singolo catetere) nei pazienti che faranno dialisi con IRC di grado 5 (GFR <15)



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ORIGINAL ARTICLE

Inpatient venous access practices: PICC culture and the kidney patient

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[2] Division of Nephrology, University of Iowa Hospitals and Clinics, Iowa City, Iowa - USA
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[4] Department of Medicine, Allegheny General Hospital, Pittsburgh, Pennsylvania - USA

ABSTRACT

Purpose: Depleted venous access is frequently cited as a reason for low fistula achievement. These quality assurance studies were designed to clarify the interactions between kidney disease, acuity of care and vascular access practices, and define the impact of nephrology intervention.

Methods: The inpatient population at an urban teaching hospital was surveyed three times between May 2010 and May 2012. Data were collected on limb protection and vascular access practices, as well as level of kidney function and level of care.

Results: Peripherally inserted central catheter (PICC) insertion consistently exceeded 30% in patients with chronic kidney disease; reasons for insertion were often poorly defined. More than 50% of patients had devices in the nondominant arm; use of limb protection bracelets was rare. An educational intervention designed to increase nephrologist awareness increased limb protection slightly, but did not affect the distribution of vascular access devices.

Conclusions: PICC placement and invasion of the nondominant arm are both frequent in patients with abnormal kidney function, in spite of guidelines discouraging their use. The rate of PICC is higher than that of patients with normal kidney function. Current vascular access practices have substantial potential to affect future fistula rates. Effective vein protection may require participation of the entire medical community.

Keywords: Chronic kidney disease (CKD), Fistulas, Hemodialysis, Peripherally inserted central catheter (PICC), Vascular access

JAMA Network | Open

Original Investigation | Health Policy

Association of Infectious Disease Physician Approval of Peripherally Inserted Central Catheter With Appropriateness and Complications

Valerie M. Vaughn, MD, MSc; Megan O'Malley, PhD; Scott A. Flanders, MD; Tejal N. Gandhi, MD; Lindsay A. Petty, MD; Anurag N. Malani, MD; Allison Weinmann, MBBS; Jennifer K. Horowitz, MA; Vineet Chopra, MD, MSc

- total of 21 653 PICCs were placed for intravenous antimicrobials
- with a median age of 64.5 years (interquartile range, 53.4-75.4 years)
- those with ID physician approval were more likely to be placed in patients without CKD (87.1% [8914 of 10 238] vs 83.3% [9503 of 11 415]; P < .001)

Table 1. Characteristics of PICCs With or Without ID Physician Approval

Characteristic	PICCs, No. (%)		P value
	With approval (n = 10 238)	Without approval (n = 11 415)	
Patient characteristics			
Race/ethnicity			
White	8127 (79.4)	8324 (72.9)	<.001
Black	1597 (15.6)	2478 (21.7)	<.001
Asian	61 (0.6)	63 (0.6)	.67
Other	184 (1.8)	222 (1.9)	.42
Unknown	163 (1.6)	189 (1.7)	.71
Sex			
Male	5856 (57.2)	6104 (53.5)	
Female	4382 (42.8)	5311 (46.5)	<.001
Age, median (IQR), y	64.5 (53.4-75.3)	64.6 (53.4-75.5)	.23
Charlson Comorbidity Index, median (IQR)	3 (1-5)	3 (1-5)	<.001
eGFR ≥45 mL/min/1.73 m^2	1230 (12.0)	1755 (15.4)	<.001
In intensive care unit at the time of PICC insertion	345 (3.4)	2360 (20.7)	<.001
PICC characteristics			
Antimicrobial is only indication	9411 (91.9)	8493 (74.4)	<.001
Multiple indications for PICC placement	827 (8.1)	2922 (25.6)	<.001
Single-lumen device	8908 (87.0)	6820 (59.7)	<.001
Dwell time, median (IQR), d	20 (12-34)	13 (7-25)	<.001
Hospital characteristics			
Number of beds, median (IQR)	310 (217-458)	383 (255-573)	<.001
Hospital profit type			
For profit	561 (5.5)	800 (7.0)	<.001
Nonprofit	9007 (88.0)	9621 (84.3)	<.001
Academic hospital	5394 (52.7)	6868 (60.2)	<.001
ID physician consultation availability[a]			
On site	7691/8834 (87.1)	8719/10 501 (83.0)	<.001
Visiting or available for remote consultation	955/8834 (10.8)	1479/10 501 (14.1)	<.001
Unavailable	188/8834 (2.1)	303/10 501 (2.9)	<.001

ORIGINAL RESEARCH

Appropriateness of peripherally inserted central catheter use among general medical inpatients: an observational study using routinely collected data

Amol A Verma ,[1,2,3] Alexander Kumachev,[2] Sonam Shah,[2] Yishan Guo,[1] Hae Young Jung,[1] Shail Rawal ,[2,4] Lauren Lapointe-Shaw,[2,4] Janice L Kwan,[2,5] Adina Weinerman,[2,6] Terence Tang,[2,7] Fahad Razak[1,2,3]

Verma AA, *et al*. *BMJ Qual Saf* 2020;**0**:1–7. doi:10.1136/bmjqs-2019-010463

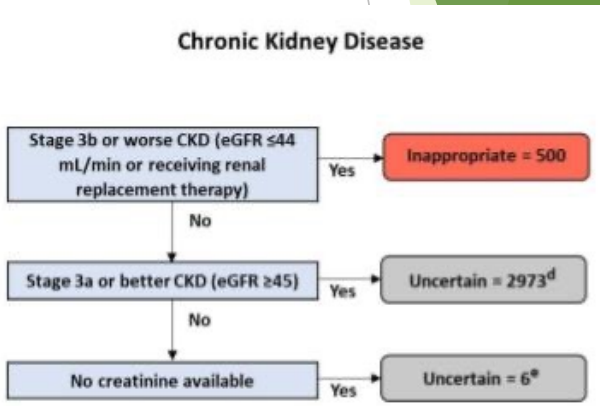
ABSTRACT

Background Peripherally inserted central catheters (PICC) are among the most commonly used medical devices in hospital. This study sought to determine the appropriateness of inpatient PICC use in general medicine at five academic hospitals in Toronto, Ontario, Canada, based on the Michigan Appropriateness Guide for Intravenous Catheters (MAGIC).

Methods This was a retrospective, cross-sectional study of general internal medicine patients discharged between 1 April 2010 and 31 March 2015 who received a PICC during hospitalisation. The primary outcomes were the proportions of appropriate and inappropriate inpatient PICC use based on MAGIC recommendations. Hospital administrative data and electronic clinical data were used to determine appropriateness of each PICC placement. Multivariable regression models were fit to explore patient predictors of inappropriate use.

Results Among 3479 PICC placements, 1848 (53%, 95% CI 51% to 55%) were appropriate, 573 (16%, 95% CI 15% to 18%) were inappropriate and 1058 (30%, 95% CI 29% to 32%) were of uncertain appropriateness. The proportion of appropriate and inappropriate PICCs ranged from 44% to 61% (p<0.001) and 13% to 21% (p<0.001) across hospitals, respectively. The most common reasons for inappropriate PICC use were placement in patients with advanced chronic kidney disease (n=500, 14%) and use for fewer than 15 days in patients who are critically ill (n=53), which represented 14% of all PICC placements in the intensive care unit. Patients who were older, female, had a Charlson Comorbidity Index score greater than 0 and more severe illness based on the Laboratory-based Acute Physiology Score were more likely to receive an inappropriate PICC.

Conclusions Clinical practice recommendations can be operationalised into measurable domains to estimate the appropriateness of PICC insertions using routinely collected hospital data. Inappropriate PICC use was common and varied substantially across hospitals in this study, suggesting that there are important opportunities to improve care.



ORIGINAL RESEARCH

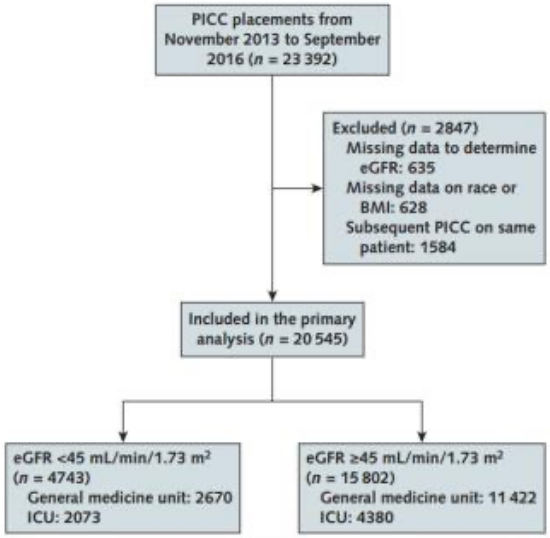
Annals of Internal Medicine

Use of Peripherally Inserted Central Catheters in Patients With Advanced Chronic Kidney Disease

A Prospective Cohort Study

David Paje, MD, MPH; Mary A.M. Rogers, PhD, MS; Anna Conlon, PhD; Scott A. Flanders, MD; Steven J. Bernstein, MD, MPH; and Vineet Chopra, MD, MSc

Figure 1. Flow diagram for cohort selection.



Patients with missing data for eGFR (n = 635) or for race or BMI (n = 628) were excluded from the analysis. For patients with multiple PICC placements, only the first insertion was used; subsequent insertions were not included in the analysis (n = 1584). We calculated eGFR using the MDRD (Modification of Diet in Renal Disease) study equation. BMI = body mass index; eGFR = estimated glomerular filtration rate; PICC = peripherally inserted central catheter.

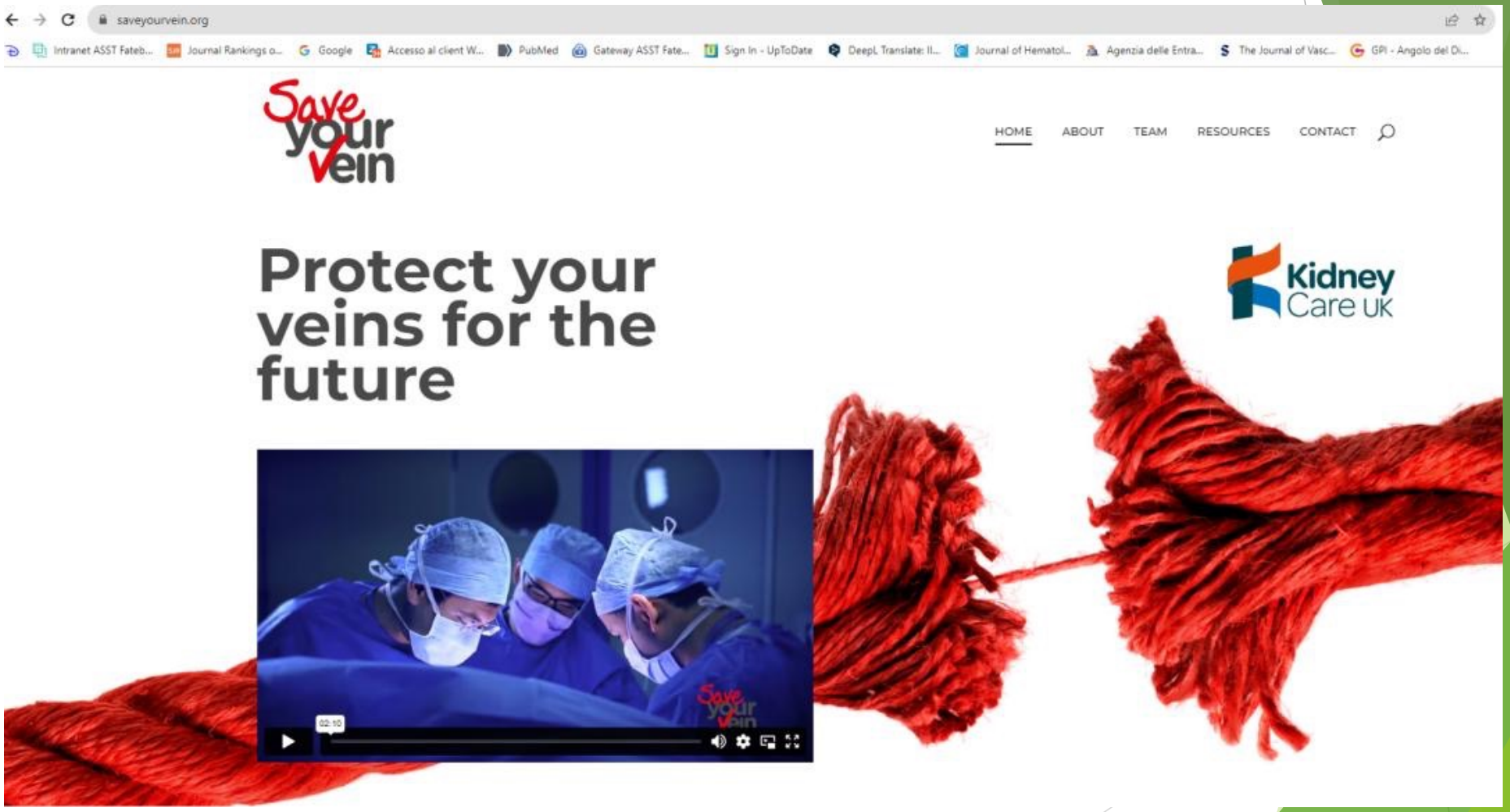
Table 2. Complications Associated With PICC Use, Stratified by eGFR

Complications	ICUs			General Medicine Units (Wards)		
	eGFR <45 mL/min/1.73 m^2 (*n* = 2073), *n* (%)*	eGFR ≥45 mL/min/1.73 m^2 (*n* = 4380), *n* (%)*	Adjusted Difference in Complications (95% CI), %†	eGFR <45 mL/min/1.73 m^2 (*n* = 2670), *n* (%)*	eGFR ≥45 mL/min/1.73 m^2 (*n* = 11 422), *n* (%)*	Adjusted Difference in Complications (95% CI), %†
Major complications	117 (5.6)	239 (5.5)	0.4 (−0.9 to 1.7)	94 (3.5)	412 (3.6)	−0.2 (−1.0 to 0.7)
Confirmed deep venous thrombosis	90 (4.3)	175 (4.0)	0.4 (−0.7 to 1.6)	72 (2.7)	268 (2.3)	0.1 (−0.5 to 0.8)
Confirmed pulmonary embolism	8 (0.4)	30 (0.7)	−0.5 (−1.0 to 0.1)	11 (0.4)	45 (0.4)	0.1 (−0.4 to 0.5)
Confirmed deep venous thrombosis or pulmonary embolism	95 (4.6)	195 (4.4)	0.2 (−0.9 to 1.3)	79 (3.0)	294 (2.6)	0.2 (−0.5 to 0.9)
Confirmed CLABSI	25 (1.2)	48 (1.1)	0.4 (−0.4 to 1.2)	15 (0.6)	123 (1.1)	−0.5 (−0.9 to 0.07)
Minor complications	380 (18.3)	873 (19.9)	−1.0 (−3.1 to 1.1)	332 (12.4)	1424 (12.5)	0.6 (−0.8 to 2.1)
Occlusion or occlusive thrombosis	307 (14.8)	700 (16.0)	−0.5 (−2.4 to 1.5)	248 (9.3)	1065 (9.3)	0.4 (−0.8 to 1.7)
Tip migration	90 (4.3)	176 (4.0)	0.3 (−0.8 to 1.5)	74 (2.8)	310 (2.7)	0.2 (−0.7 to 1.0)
Superficial thrombophlebitis	9 (0.4)	27 (0.6)	−0.4 (−1.0 to 0.3)	12 (0.4)	75 (0.7)	−0.2 (−0.6 to 0.3)
Exit site problems	4 (0.2)	22 (0.5)	−0.7 (−1.6 to 0.2)	8 (0.3)	29 (0.2)	0.3 (−0.3 to 0.9)
Difficulty infusing	5 (0.2)	10 (0.2)	0.4 (−0.8 to 1.6)	8 (0.3)	41 (0.4)	0.0 (−0.4 to 0.4)
Kinking, coiling, or breakage	1 (0.05)	6 (0.1)	−0.4 (−1.0 to 0.3)	9 (0.3)	20 (0.2)	0.4 (−0.2 to 0.9)
Difficulty with blood collection	2 (0.1)	12 (0.3)	−0.5 (−1.3 to 0.3)	5 (0.2)	35 (0.3)	−0.1 (−0.6 to 0.3)
Total major or minor complications	464 (22.4)	1047 (23.9)	−0.7 (−3.0 to 1.5)	408 (15.3)	1740 (15.2)	0.5 (−1.0 to 2.1)
Major or minor complications in single-lumen PICCs	8 (12.5)	30 (12.5)	−2.2 (−14.8 to 10.4)	121 (10.3)	597 (9.8)	1.4 (−0.7 to 3.4)
Major or minor complications in multilumen PICCs	454 (22.7)	1015 (24.6)	−1.1 (−3.4 to 1.2)	286 (19.3)	1138 (21.7)	−1.7 (−4.1 to 0.7)

CLABSI = central line–associated bloodstream infection; eGFR = estimated glomerular filtration rate; ICU = intensive care unit; PICC = peripherally inserted central catheter.

* eGFR was calculated using the MDRD (Modification of Diet in Renal Disease) study equation.

† The percentage of patients with eGFR <45 mL/min/1.73 m^2 and complications minus the percentage of patients with eGFR ≥45 mL/min/1.73 m^2 and complications, with adjustment for hospital, age, sex, race, and body mass index.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Perché così tanti picc vengono posizionati nei pazienti in IRC?

For healthcare professionals

99%

of healthcare staff are unaware of vein preservation*

**From a study of 80 staff doctors (n=40), nurses (n=10), medical students (n=22) and phlebotomists (n=8)*

Patients

The ‘Save Your Vein’ campaign is simple and highly effective in increasing knowledge and awareness amongst patients and healthcare groups. We aim to increase knowledge and improve practice of vein preservation.

69%

of patients are unaware of vein preservation*

97%

of those aware of vein preservation do not practice it*

**From a study of 136 patients attending Low Clearance Clinic or undergoing haemodialysis*

Perché così tanti picc vengono posizionati nei pazienti in IRC?

Open access Original research

BMJ Open

Prevalence of undiagnosed stage 3 chronic kidney disease in France, Germany, Italy, Japan and the USA: results from the multinational observational REVEAL-CKD study

Navdeep Tangri ,[1] Toshiki Moriyama,[2] Markus P Schneider,[3] Jean Blaise Virgitti,[4] Luca De Nicola,[5] Matthew Arnold,[6] Salvatore Barone,[7] Emily Peach,[8] Eric Wittbrodt,[9] Hungta Chen,[10] Krister Järbrink,[11] Pamela Kushner[12]

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Table 1 Overall patient characteristics at study index (date of second eGFR measurement) according to country and database

Country	France	Germany	Italy	Japan	USA	
Database	THIN cegedim n=20 012	Disease analyzer n=26 767	LPD n=65 676	Japan RWD n=90 902	LCED n=22 470	TriNetX n=250879
CKD status*, n (%)						
Diagnosed	892 (4.5)	4210 (15.7)	15 129 (23.0)	7209 (7.9)	8625 (38.4)	89 625 (35.7)
Undiagnosed	19 120 (95.5)	22 557 (84.3)	50 547 (77.0)	83 693 (92.1)	13 845 (61.6)	161 254 (64.3)
Age, y, median (IQR)	80 (72–86)	79 (72–84)	80 (74–85)	76 (69–83)	74 (64–82)	71 (64–78)
Age groups, y (%)						
<45	67 (0.3)	66 (0.2)	188 (0.3)	791 (0.9)	243 (1.1)	5523 (2.2)
45–64	1677 (8.4)	2431 (9.1)	3780 (5.8)	13 286 (14.6)	5991 (26.7)	63 726 (25.4)
65–74	4641 (23.2)	6032 (22.5)	14 264 (21.7)	25 627 (28.2)	5592 (24.9)	87 880 (35.0)
≥75	13 627 (68.1)	18 238 (68.1)	47 444 (72.2)	51 198 (56.3)	10 644 (47.4)	93 750 (37.4)
Male, n (%)	9091 (45.4)	11 216 (41.9)	27 728 (42.2)	48 123 (52.9)	10 051 (44.7)	105 112 (41.9)

Implementation Considerations

- Strategies to avoid PICCs and vessel damage, such as venipuncture in the back of the wrist and use of small-bore internal jugular CVCs should be studied
- Avoid PICCs for <7 days of infusion—use a peripheral intravenous line, preferably on the back of the hand
- Consider femoral venous access for central vein access
- Continuous quality improvement within/across institutions
- PICC placement in CKD patients in hospital requires approval by nephrology department

Monitoring and Evaluation

- Use of PICCs only when there are no other options

Future Research

- Feasibility and use of other options for blood access
- Radial access impact on future VA creation
- Midline catheter insertion effect on future VA creation
- Does use of small-bore internal jugular CVC reduce central venous stenosis?
- Determine if use of small-bore internal jugular CVCs instead of PICCs is practically feasible and effective for patient care
- Rigorously evaluate the impact of radial artery access for cardiovascular and other procedural interventions on the creation and outcomes of AV access for HD

In caso di trapianto il rene donato ha un graft venoso sull'iliaca!!!
Bisogna evitare le trombosi!!!!

Review

JVA The Journal of Vascular Access

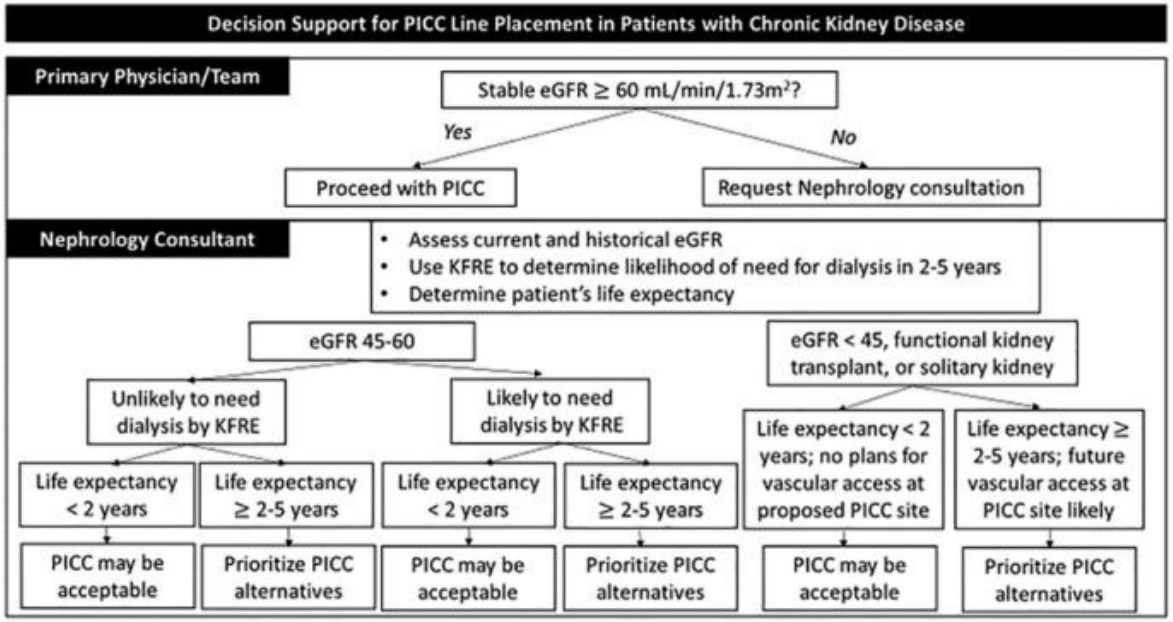
PICC line management among patients with chronic kidney disease

The Journal of Vascular Access
2023, Vol. 24(2) 329–337

DOI: 10.1177/11297298211025897
journals.sagepub.com/home/jva
SAGE

Bharvi P Oza-Gajera[1], James A Davis[2], Crystal Farrington[3], Edgar V Lerma[4], Shahriar Moossavi[5], Mohamed A Sheta[6], Amy Dwyer[7] and Ammar Almehmi[3]

Table 2. Algorithm to determine PICC line placement in CKD.



Original research article

JVA The Journal of Vascular Access

Peripheral central catheter insertion in low eGFR patients: Retrospective single institution study

The Journal of Vascular Access
1–4

DOI: 10.1177/11297298211023284
journals.sagepub.com/home/jva
SAGE

Mortalità nell'anno seguente il posizionamento del PICC **38,7%**

- eGFR>45 mL/min/1.73 m2: 31,8%
- eGFR<45 mL/min/1.73 m2: **57%**

Solo **8,1%** dei pazienti con IRC 3B o superiore iniziano la dialisi nell'anno successivo l'inserzione del PICC.

K. Othman et al., "Peripheral central catheter insertion in low eGFR patients: Retrospective single institution study," *Journal of Vascular Access*, 2021, doi: 10.1177/11297298211023284.

Journal of Nephrology (2022) 35:993–1004
https://doi.org/10.1007/s40620-021-01180-1

ORIGINAL ARTICLE

Low performance of prognostic tools for predicting death before dialysis in older patients with advanced CKD

Julien Prouvot[1,2] · Emilie Pambrun[2] · Valery Antoine[1,3] · Cecile Couchoud[4,5] · Cecile Vigneau[6] · Sophie Roche[7] · Maud Francois[8] · Christophe Mariat[9] · Daniela Babici[10] · Camelia Prelipcean[2] · Olivier Moranne[1,2] · For the PSPA Investigators

Received: 4 June 2021 / Accepted: 6 October 2021 / Published online: 17 November 2021

Table 2 Predictors used by the scores retrieved by the review (references from top to bottom: [15, 16, 22, 30, 34, 35])

1st author	Characteristics				Biology		Geriatric				Comorbidity	
	Age	Sex	Race	Smoking	eGFR	Proteinuria	BMI	Albumin	Mobility	Cognitive disorders	Diabetes	HBP
Schmidt	X											
Weiss	X	X		X	X		X					X
Goldfarb	X	X		X	X	X						
Grams	X	X	X	X	X	X					X	X
Landray	X			X								
Bansal	X	X	X	X	X	X					X	

eGFR estimated glomerular filtration rate, *BMI* body mass index, *HBP* high blood pressure

Original research article

JVA The Journal of Vascular Access

The Journal of Vascular Access
1–7

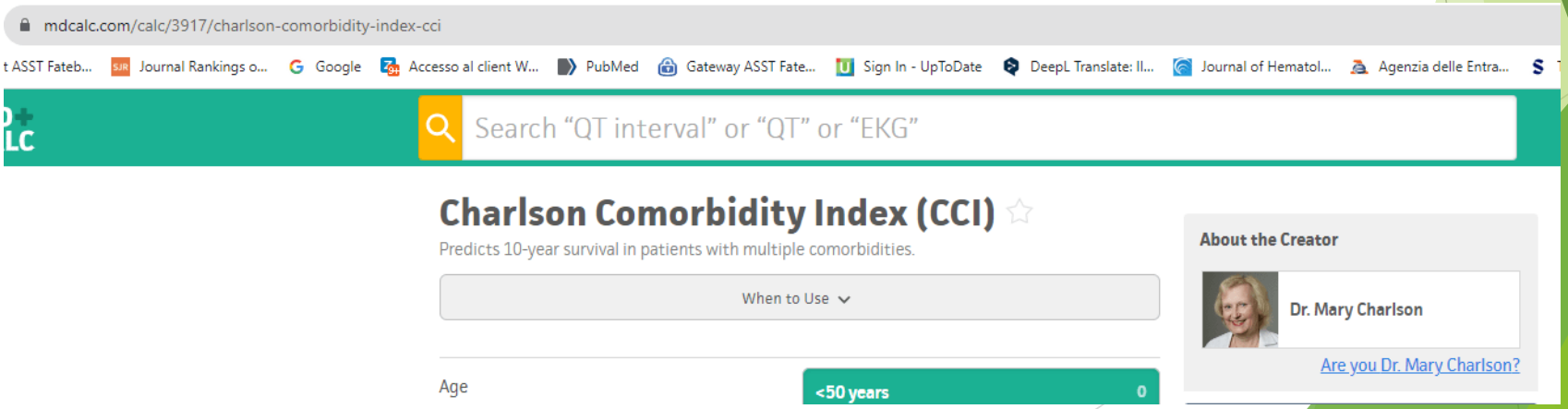
DOI: 10.1177/11297298231152499
journals.sagepub.com/home/jva
SAGE

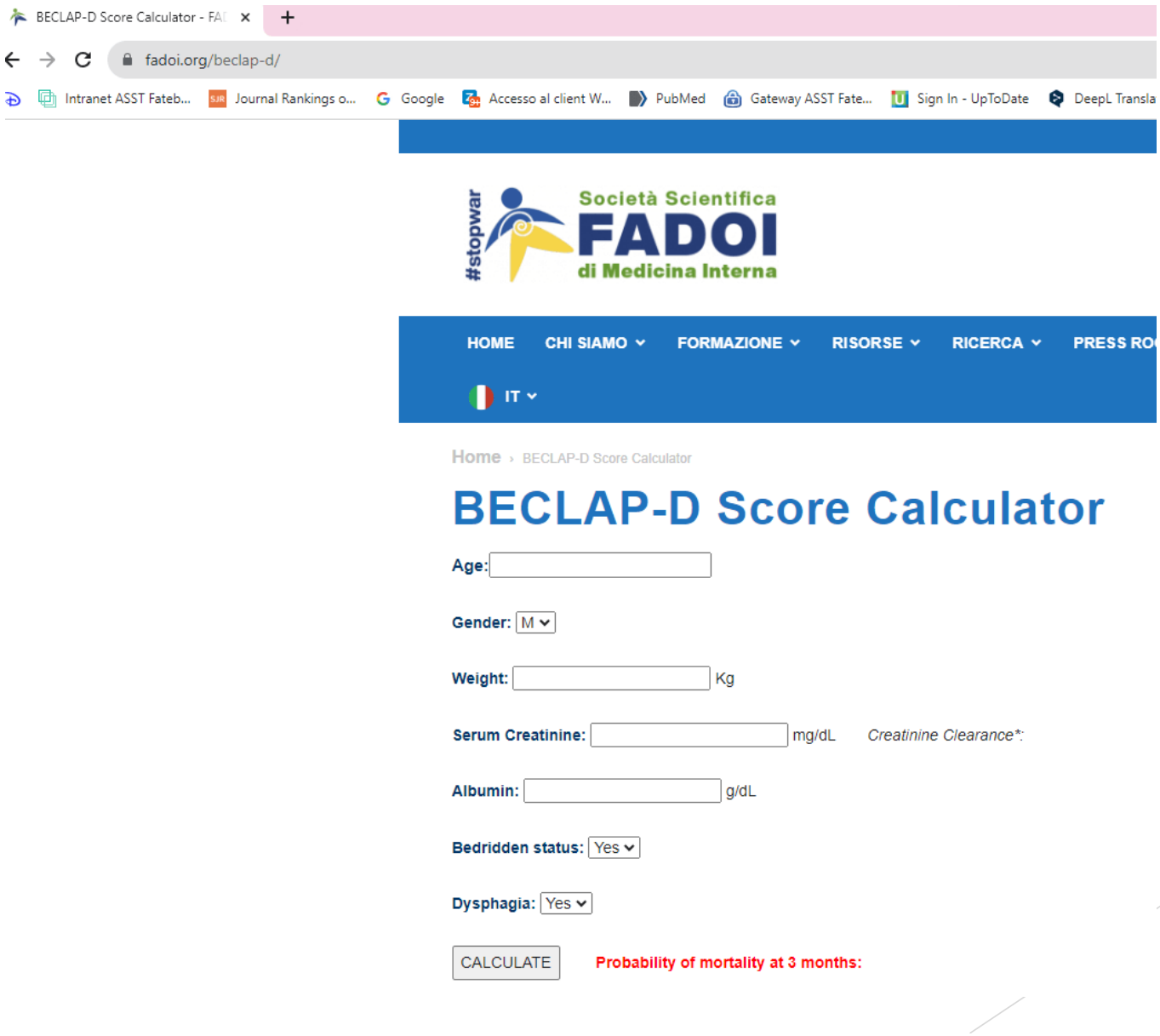
A decision-making algorithm proposal for PICCs and midlines insertion in patients with advanced kidney disease: A pilot study

Arianna Bartoli[1], Maurizio Gallieni[1,2], Chiara Cogliati[1], Francesco Casella[1], Maria Calloni[1], Chiara Melchionda[1], Marco Heidempergher[2], Antonella Foschi[3], Antonio Luca Brucato[1], Giulia Rizzi[1], Massimiliano Quici[1] and Antonio Gidaro[1]

Unfortunately, none of these scores could be used in our study because they were only tested in a specific age or eGFR group or because they include laboratory parameters that are not routinely requested.

Many other mortality risk score are reported in the literature, the most commonly used is the Charlson Comorbidity Index (CCI)[13] that calculates the estimated mortality risk at 10 and 2 years; a newer and promising score is the Beclap score[14] assessing mortality of non-oncological patients at 3 and 6 months.




BECLAP-D Score Calculator - FA
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Journal Rankings o...
Google
Accesso al client W...
PubMed
Gateway ASST Fate...
Sign In - UpToDate
DeepL Transla
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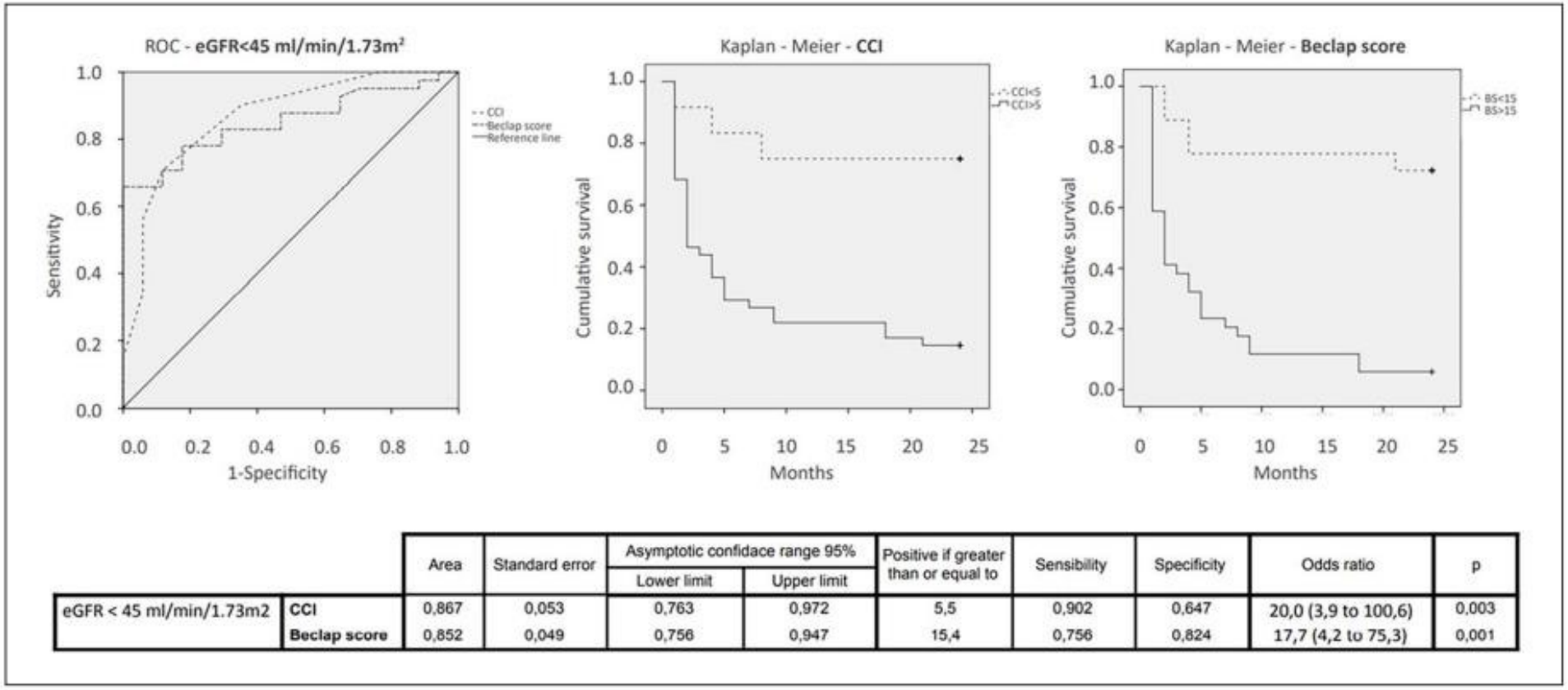
Società Scientifica
FADOI
di Medicina Interna
HOME
CHI SIAMO
FORMAZIONE
RISORSE
RICERCA
PRESS RO
IT
Home › BECLAP-D Score Calculator
BECLAP-D Score Calculator
Age:
Gender: M
Weight: Kg
Serum Creatinine: mg/dL Creatinine Clearance*:
Albumin: g/dL
Bedridden status: Yes
Dysphagia: Yes
CALCULATE
Probability of mortality at 3 months:



		Area	Standard error	Asymptotic confidace range 95%		Positive if greater than or equal to	Sensibility	Specificity	Odds ratio	p
				Lower limit	Upper limit					
eGFR < 45 ml/min/1.73m2	**CCI**	0,867	0,053	0,763	0,972	5,5	0,902	0,647	20,0 (3,9 to 100,6)	0,003
	Beclap score	0,852	0,049	0,756	0,947	15,4	0,756	0,824	17,7 (4,2 to 75,3)	0,001

Figure 3. ROC and Kaplan Meier curves evaluates patients with eGFR <45 m/min/1.73 m^2.

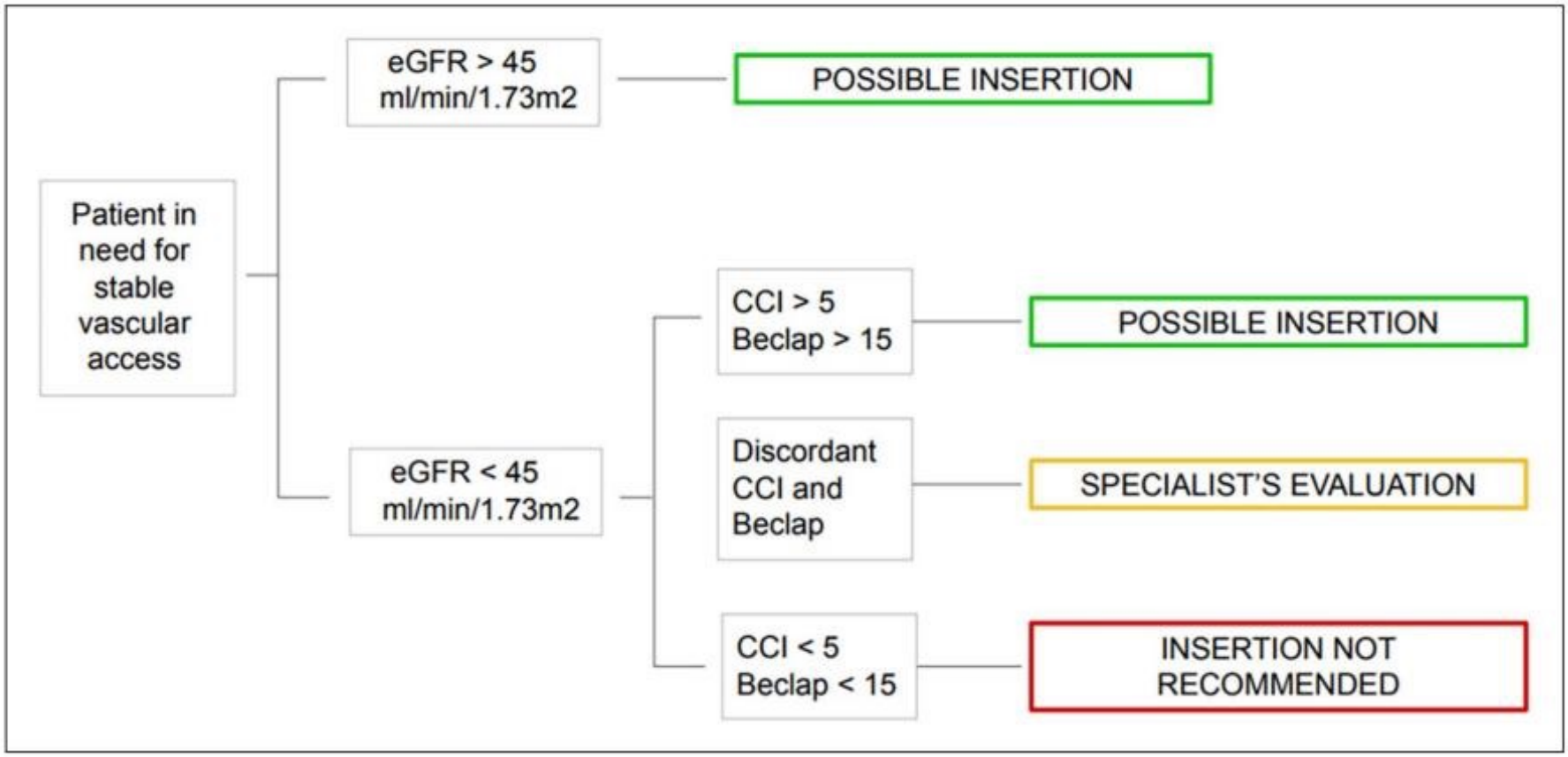


Figure 4. The proposed algorithm tries to determine the possibility to place a vascular access line given the patient's renal function, Beclap score, and CCI.

Grazie per l’attenzione!