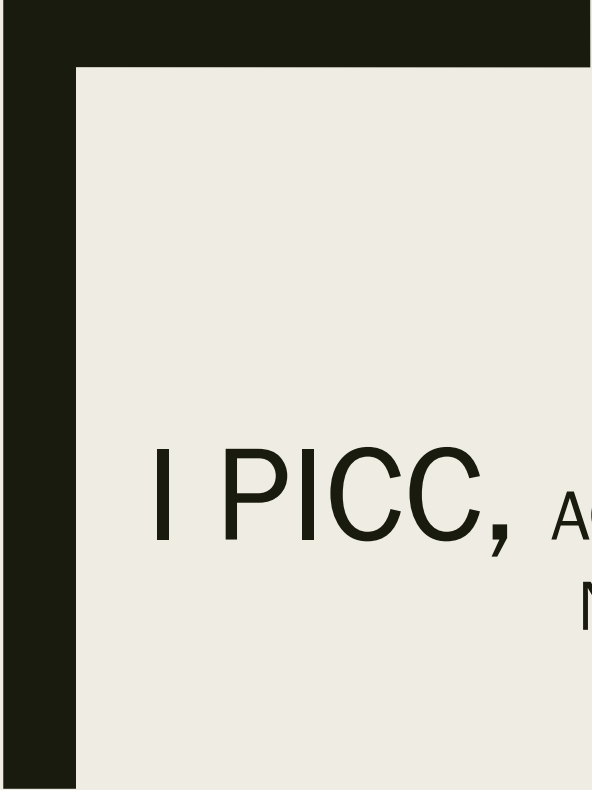




I PICC, ACCESSO VENOSO DI PRIMA SCELTA NEL PAZIENTE PEDIATRICO

Davide Celentano
Fondazione Policlinico Gemelli Roma



Cateteri venosi centrali

Neonato

CVO

ECC

CICC

FICC

PICC

Bambino

The NAVIGATE project: A GloVANet–WoCoVA position statement on the nomenclature for vascular access devices

The Journal of Vascular Access
1–8
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S Sage

Matheus (Roland) van Rens¹ , Robin van der Lee¹,
Timothy R Spencer² , Ton van Boxtel³ , Giovanni Barone⁴ ,
Alessandro Crocoli⁵ , Fulvio Pinelli⁶ , Mauro Pittiruti⁷ , on behalf of the WoCoVA
Foundation (World Conference on Vascular Access) and of the Global Vascular
Access Network (GloVANet)

Epicutaneo-cavali



PICC

Neonati

Bambini e adulti

Inserzione diretta o NIR

Ecoguida



Vene superficiali

Vene profonde del braccio

Calibro < 3Fr

Calibro 3 Fr o >

Basso flusso

Alto flusso (power inject.)

Prelievi: KO

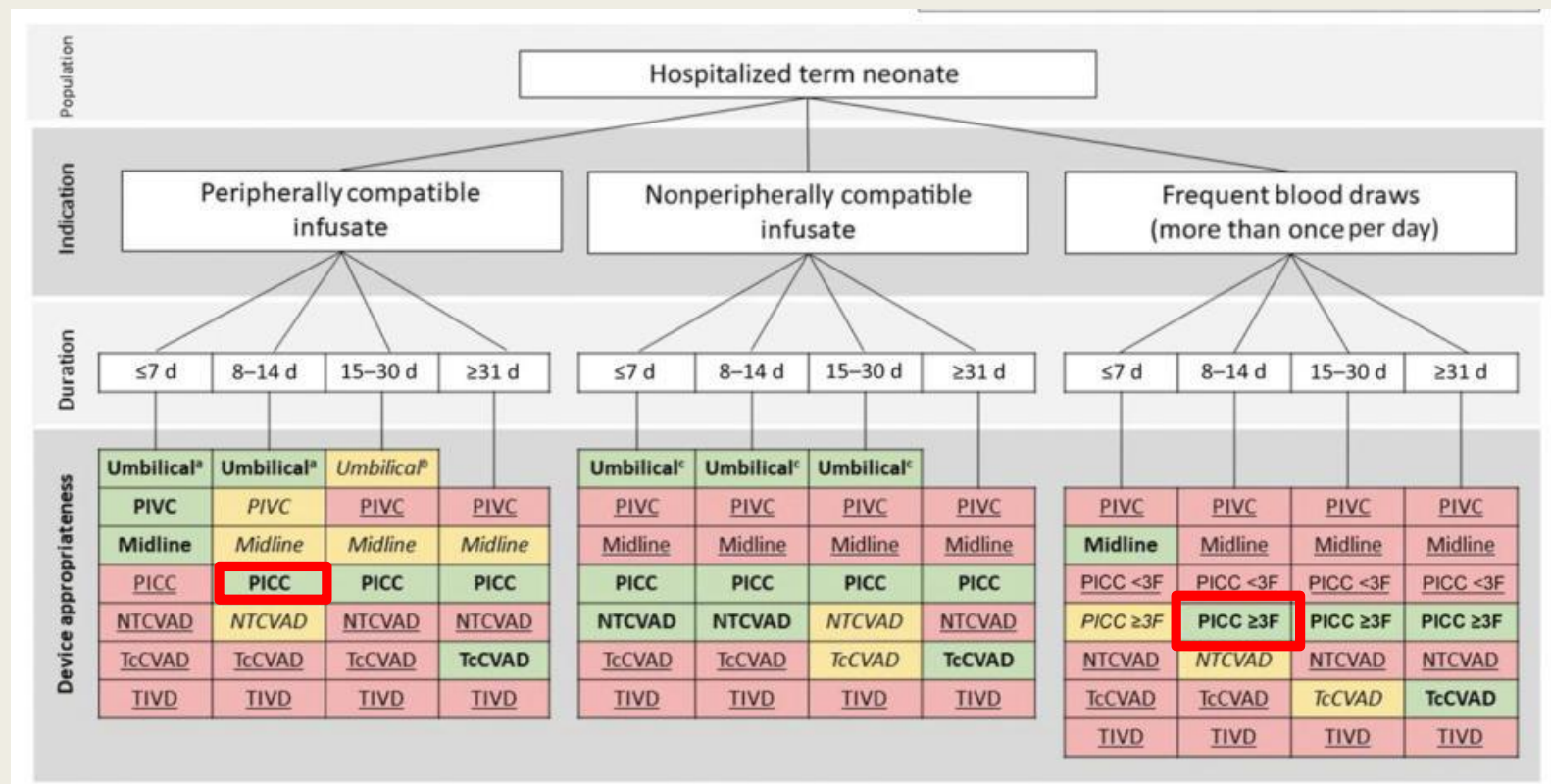
Prelievi: OK



The Michigan Appropriateness Guide for Intravenous Catheters in Pediatrics: miniMAGIC

Amanda J. Ullman, RN, PhD,^{a,b,c} Steven J. Bernstein, MD, MPH,^{d,e} Erin Brown, PhD,^{a,f} Ranjit Aiyagari, MD, FACC,^g Darcy Doellman, MSN, RN, CRNI, VA-BC,^h E. Vincent S. Faustino, MD, MHS,^{i,j} Beth Gore, PhD,^k Jeffrey P. Jacobs, MD, FACS, FACC, FCCP,^l Julie Jaffray, MD,^l Tricia Kleidon, RN, MNursPrac,^{k,o} Prashant V. Mahajan, MD, MPH, MBA,^m Craig A. McBride, FRACS,^{n,o} Kayce Morton, DO,ⁿ Stephanie Pitts, MSN, RN, CPN, VA-BC,^{o,p} Elizabeth Prentice, MBBS, FANZCA,^q Douglas C. Rivard, DO,^{r,s} Erin Shaughnessy, MD, MSHCM,^t Marc Stranz, PharmD,^u Joshua Wolf, MBBS, PhD, FRACP,^{v,w} David S. Cooper, MD, MPH,^x Marie Cooke, RN, PhD,^{x,y} Claire M. Rickard, RN, PhD,^{z,aa} Vineet Chopra, MD, MSc^{ab}

?????????

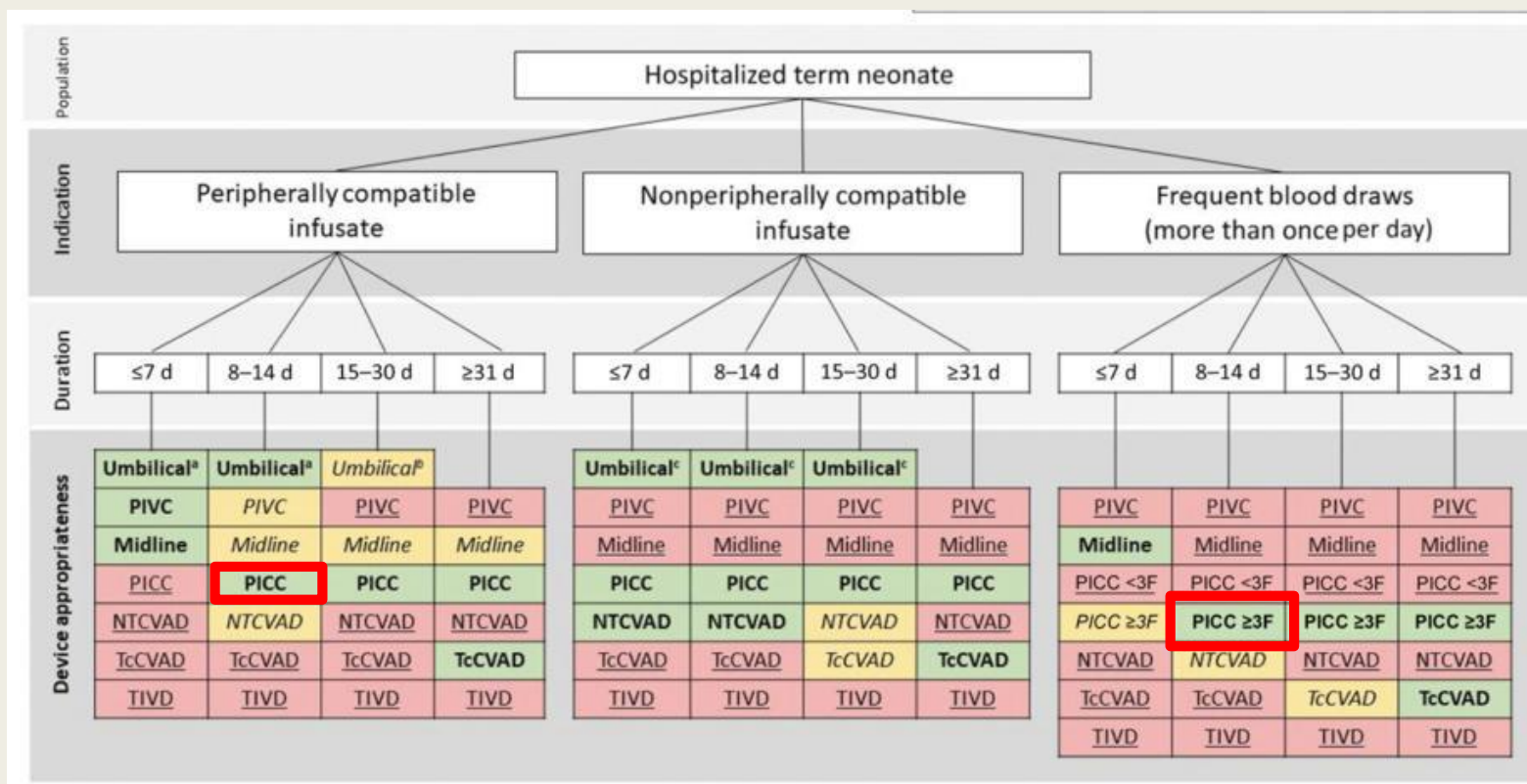


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Why the mini-Magic is not magic – a neonatologist's point of view

Giovanni Barone, Vito D'Andrea, Mauro Pittiruti



E ancora...

THROMBOSIS AND HEMOSTASIS

CME Article

Peripherally inserted central catheters lead to a high risk of venous thromboembolism in children

Julie Jaffray,¹ Char Witmer,² Sarah H. O'Brien,³ Rosa Diaz,⁴ Lingyun Ji,⁵ Emily Krava,¹ and Guy Young¹

Confronto tra PICC & TL (Tunneled Lines di tipo CICC)

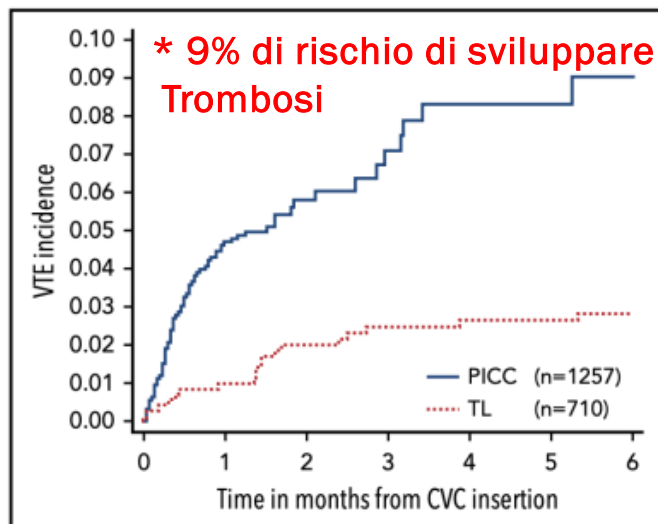


Figure 2. Comparison of CVC-related VTE events in PICCs vs TLs within 6 months after CVC insertion.

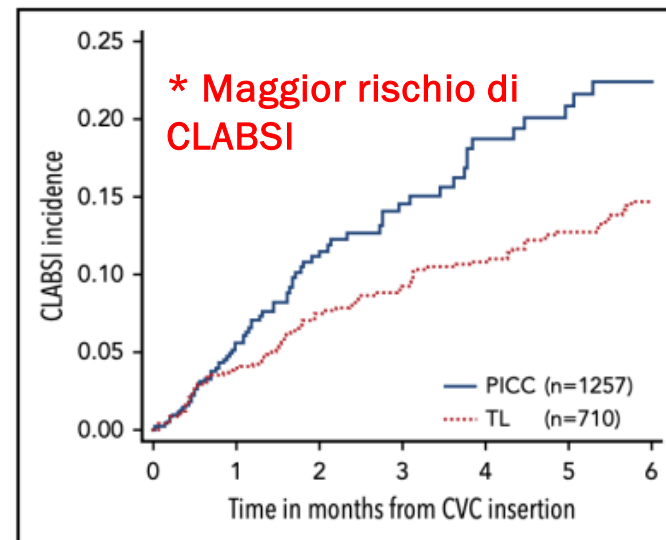


Figure 3. Comparison of CLABSI events in PICCs vs TLs within 6 months after CVC insertion.

Analizziamo bene...

Table 1. Comparison of demographic information on subjects with either a PICC or TL at the time of catheter placement

Variables	PICC group, n = 1257	TL group, n = 710
	Median (range) or n (%)	Median (range) or n (%)
Age at CVC insertion, y	7 (0.5-17.9)	5.3 (0.5-17.9)
Age group, y		
0.5-1	101 (8)	36 (5)
>1-5	398 (32)	312 (44)
>5-10	300 (24)	148 (21)
>10-18	458 (36)	214 (30)

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>10-18	458 (36)	214 (30)

In defense of the use of peripherally inserted central catheters in pediatric patients

Alessandro Crocoli¹ ID, Simone Cesaro² ID, Monica Cellini³,
Francesca Rossetti⁴, Luca Sidro⁵, Fulvio Pinelli⁶
and Mauro Pittiruti⁷ ID

- Inclusione degli ECC come PICC (< 1 anno di età)
- PICC posizionati:
 - senza ECO
 - senza rispettare il rapporto di 1/3 calibro del vaso
 - alla piega del comito alla vena antecubitale
 - senza nessun chiaro controllo della punta
- Incidenza di CLABSI falsata poiché
30 % dei TL sono PORT e i restanti sono CICC TUNNELLIZZATI
 - uso continuo VS uso discontinuo,
 - ospedaliero VS extraospedaliero,
 - presenza del tunnel

**Catheter-related complications in
onco-hematologic children:
A retrospective clinical study on
227 central venous access devices**

**Maria Giuseppina Annetta¹ , Davide Celentano²,
Lucrezia Zumstein³, Giorgio Attinà³, Antonio Ruggiero³,
Giorgio Conti¹ and Mauro Pittiruti⁴ **

- 227 CVAD Totali
- 175 PICC, 50 CICC, 2 FICC
- **NESSUNA** differenza statistica di
Complicanze tra PICC e CICC

A GAVeCeLT bundle for central venous catheterization in neonates and children: A prospective clinical study on 729 cases

**Mauro Pittiruti¹ , Davide Celentano², Giovanni Barone³ ,
Vito D'Andrea⁴ , Maria Giuseppina Annetta⁵ and Giorgio Conti²**

- 488 CVAD Totali nel Bambino
- 279 PICC
- 196 CICC
- 13 FICC

**ACCESSO VENOSO
DI PRIMA SCELTA**

VANTAGGI DEI PICC

- No rischio PNX, Emotorace, Embolia Gassosa
- Inserzione e Rimozione semplice e senza rischi
- No Anestesia (nei pazienti complianti)
- Minor Impatto Estetico
- Maggior Accettazione e Coping
- Uguali performance rispetto a CICC/FICC utilizzati per lo stesso scopo

- Algoritmo di Scelta del VAD
- Utilizzare Globale dell'ecografia (*Valutazione preliminare della Vena, Venipuntura Ecoguidata, Tip Navigation e Location, Valutazione Complicanze Precoci e Tardive*)
- Scelta del sito di Emergenza Cutanea
- Adozione di BUNDLE di Impianto e Gestione

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- Adozione di BUNDLE di Impianto e Gestione

The pediatric DAV-expert algorithm: A GAVeCeLT/GAVePed consensus for the choice of the most appropriate venous access device in children

Guidelines of the Italian Association of Pediatric Hematology and Oncology for the management of the central venous access devices in pediatric patients with onco-hematological disease

DAV EXPERT & AIEOP

- Scelta tra CICC, FICC e PICC deve essere basata su:
 - VENA DISPONIBILE (*rapporto 1/3 vena e catetere*)
 - RISCHIO LEGATO ALLA VENIPUNTURA (*pnx, emotorace*)
 - POSIZIONE DEL SITO DI EMERGENZA (*tunnellizzazione*)

DAV-EXPERT PED Intra-Ospedaliero

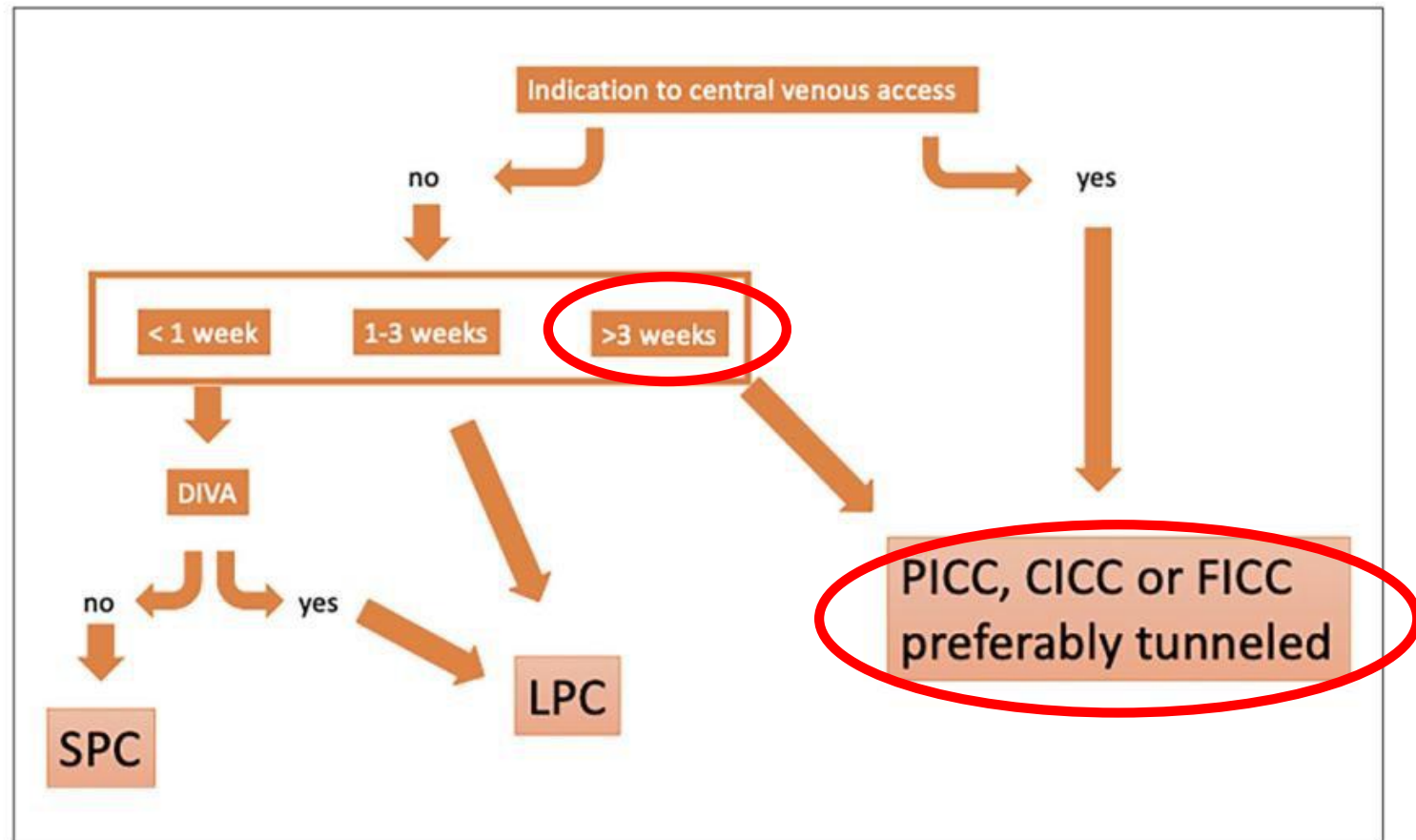


Figure 1. Choice of venous access device in hospitalized pediatric patients.

DAV-EXPERT PED Extra-Ospedaliero

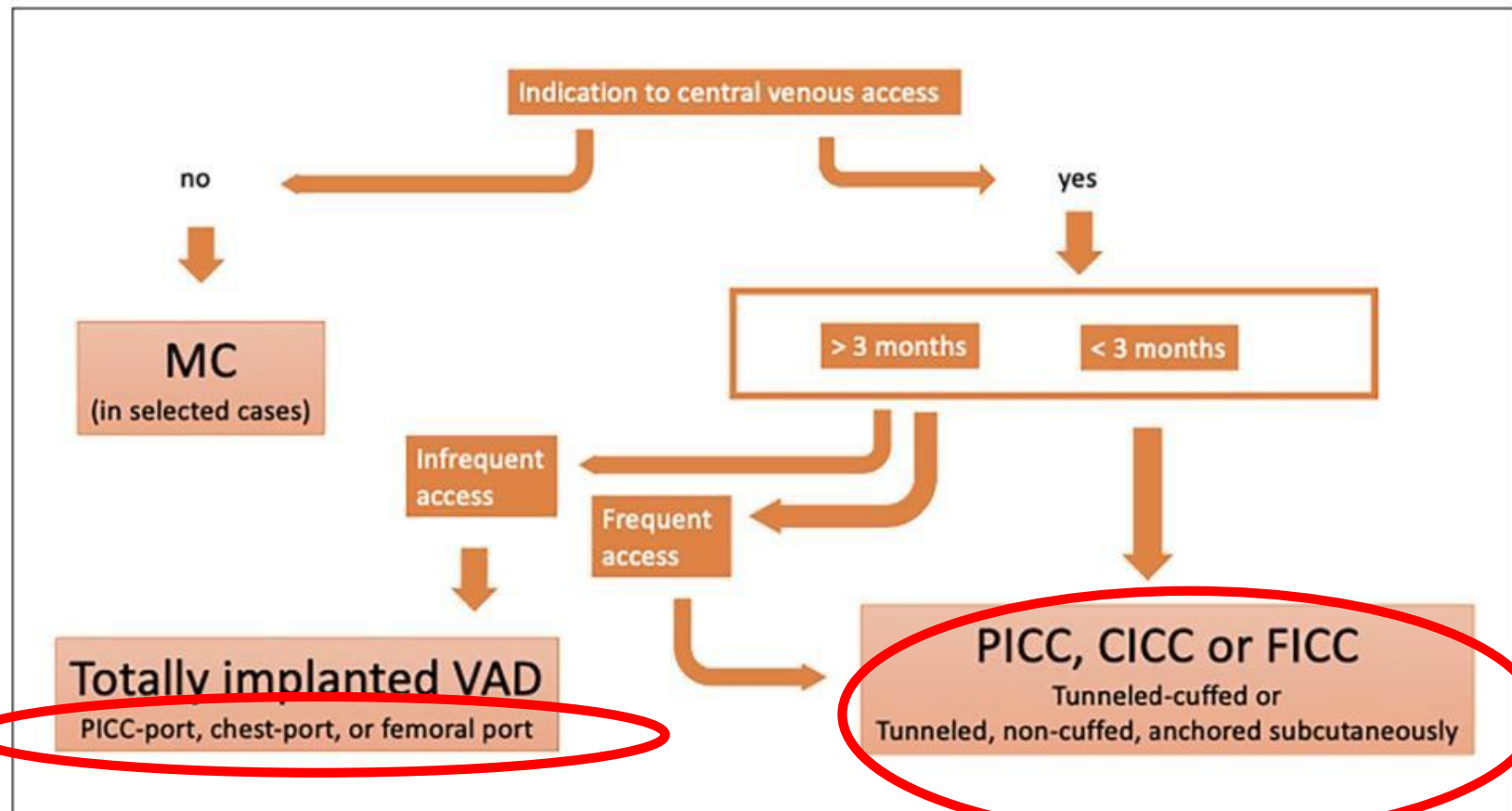


Figure 2. Choice of venous access device in non-hospitalized pediatric patients.

Caliber of the deep veins of the arm in infants and neonates: The VEEIN study (Vascular Echography Evaluation in Infants and Neonates)

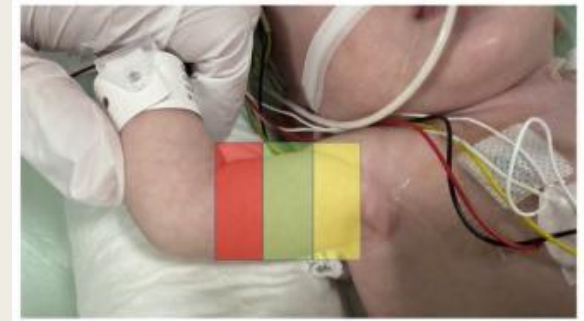


Table 1. Patients included in the study.

	Group 1	Group 2	Group 3	Group 4	Group 5
	2.5–4 kg	4.1–7 kg	7.1–10 kg	10.1–15 kg	15.1–20 kg

Table 4. Veins with internal diameters >3 mm in the different groups of children.

	Brachial vein (scan 1)		Basilic vein (scan 1)		Cephalic vein (scan 1)		Axillary vein (scan 2)	
	Right	Left	Right	Left	Right	Left	Right	Left
Group 1 (n=51)	–	–	–	–	–	–	3 (5.8%)	2 (3.9%)
Group 2 (n=49)	–	–	–	–	–	–	15 (30.6%)	14 (28.5%)
Group 3 (n=52)	–	–	7 (13.4%)	4 (7.6%)	–	–	35 (67%)	35 (67%)
Group 4 (n=50)	–	–	13 (26%)	14 (28%)	–	–	41 (82%)	41 (82%)
Group 5 (n=50)	4 (8%)	8 (16%)	27 (54%)	27 (54%)	5 (10%)	3 (6%)	47 (94%)	47 (94%)

(Zanaboni et al., 2023)

Peripherally inserted central catheters can be an alternative to tunneled central venous catheters in chemotherapy for hematological and oncological pediatric patients

Yuko Kamata¹ · Yuki Mizuno¹ · Kentaro Okamoto¹ · Shota Okamoto¹ · Yoshifumi Ito¹ · Aya Nishigata¹

Results Within the observation period, 133 catheters (73 PICCs and 60 TCVs) were inserted. The median indwelling time was 99 days for PICCs and 182 days for TCVs, with TCVs being significantly longer ($p < 0.001$). There were no significant differences in the incidence of complications, such as infections, thrombosis, obstruction, or mechanical accidents. Comparing patients treated with PICC (PICC group) versus those with TCV (TCV group), the time from diagnosis to insertion was significantly shorter in the PICC group ($p < 0.001$). In the PICC group, none of the patients required general anesthesia, and chemotherapy was completed with PICC only.

NEL GRUPPO PICC :

- MINOR TEMPO INTERCORSO TRA DIAGNOSI E INIZIO TRATTAMENTO ($p < 0.001$)
- No Anestesia Necessaria per Impianto
- Unico VAD inserito per completare chemioterapia

- Algoritmo di Scelta del VAD
- Utilizzare Globale dell'ecografia (*Valutazione preliminare della Vena, Venipuntura Ecoguidata, Tip Navigation e Location, Valutazione Complicanze Precoci e Tardive*)
- Scelta del sito di Emergenza Cutanea
- Adozione di BUNDLE di Impianto e Gestione

- Algoritmo di Scelta del VAD
- **Utilizzare Globale dell'ecografia** (*Valutazione preliminare della Vena, Venipuntura Ecoguidata, Tip Navigation e Location, Valutazione Complicanze Precoci e Tardive*)
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- Adozione di BUNDLE di Impianto e Gestione



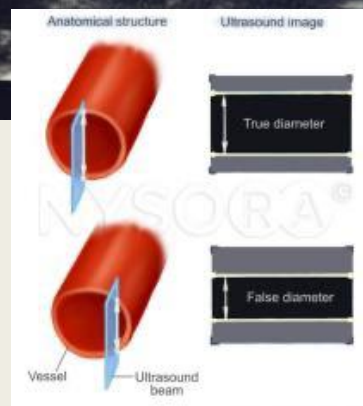
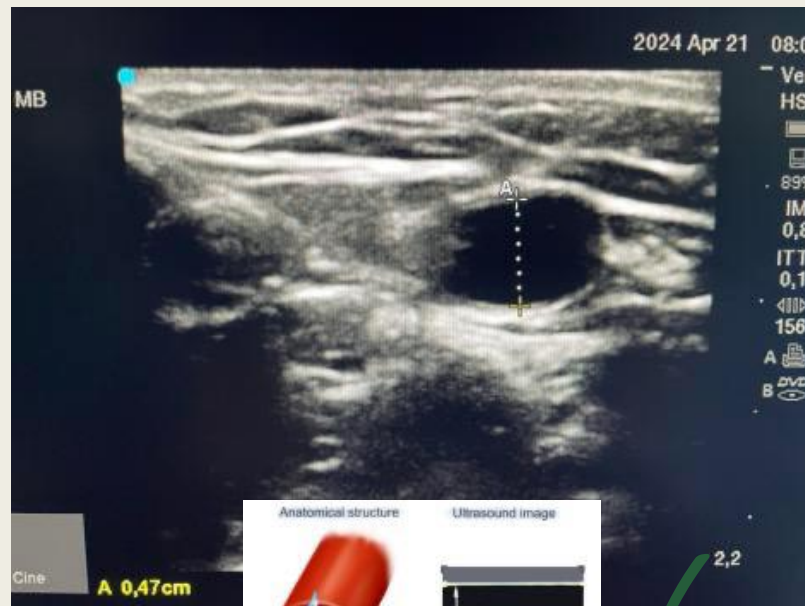
Point-of-care ultrasound for vascular access in neonates and children

Mauro Pittiruti¹ · Maria Giuseppina Annetta² · Vito D'andrea³

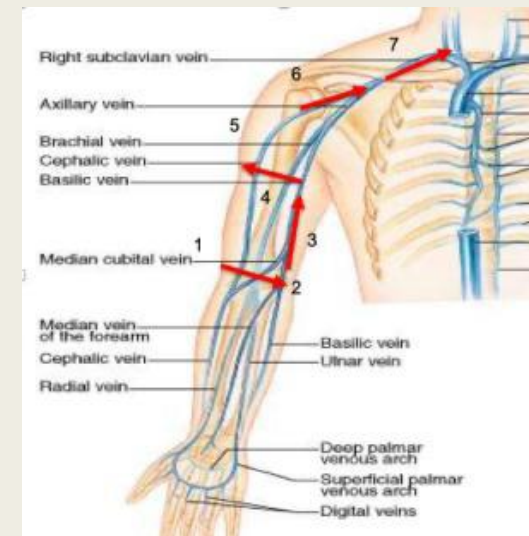
- Valutazione preliminare della Vena (RaPeVA-RaCeVA)
- Venipuntura Ecoguidata
- Tip Navigation e Location (ECHO-TIP PED)
- Valutazione Complicanze Precoci e Tardive

Valutazione Preliminare della Vena

Misurare le Vene



2,2 ✓

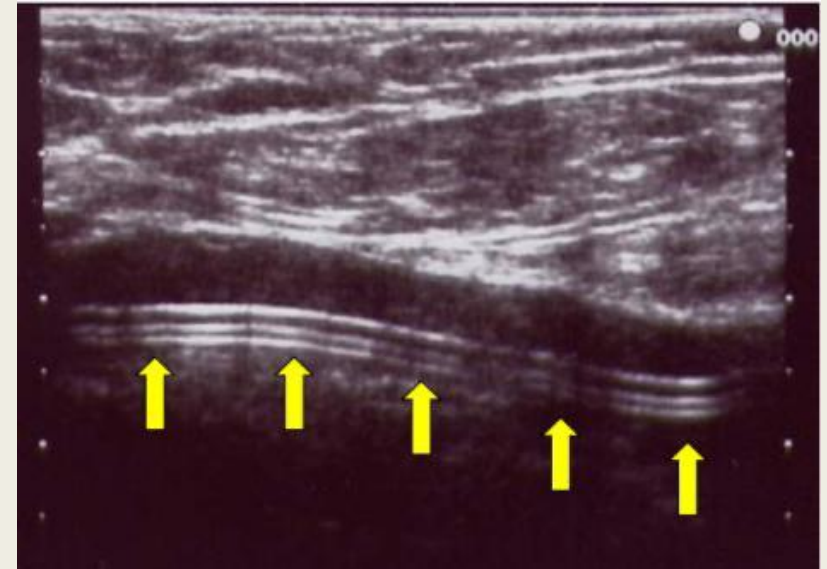
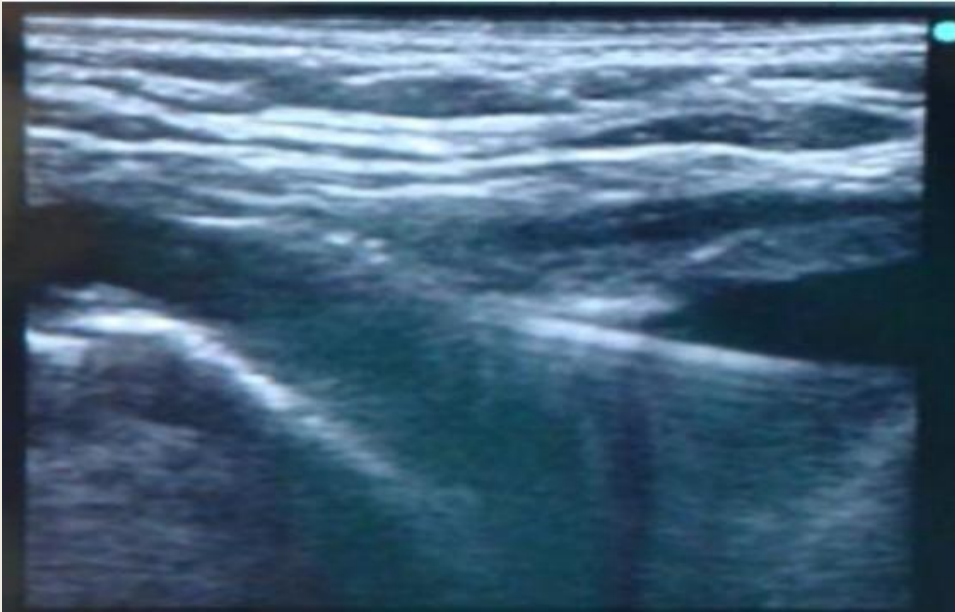


(RaPeVA-RaCeVA)

Venipuntura ecoguidata



Tip Navigation



Tip Location

**ECG-
Intracavitario**

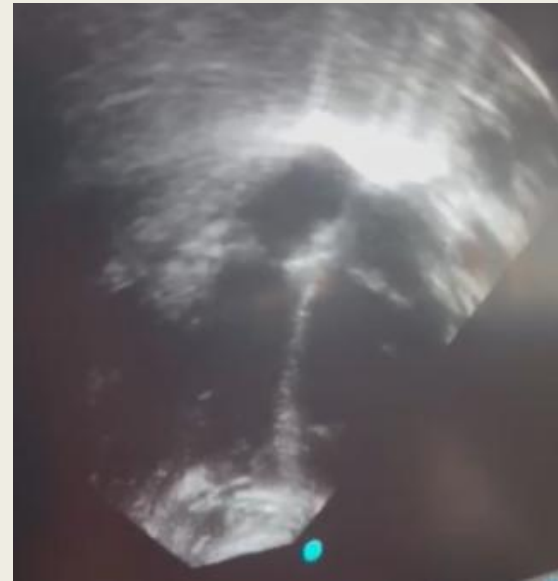
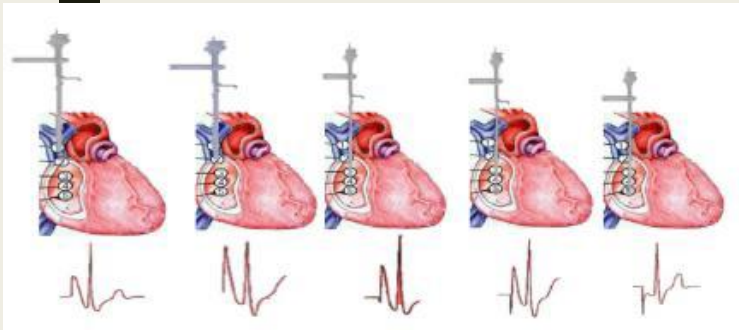
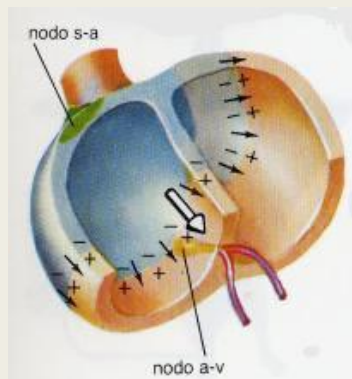


**Ecografia con
Bubble Test**



ECHOTIP-Ped: A structured protocol for ultrasound-based tip navigation and tip location during placement of central venous access devices in pediatric patients

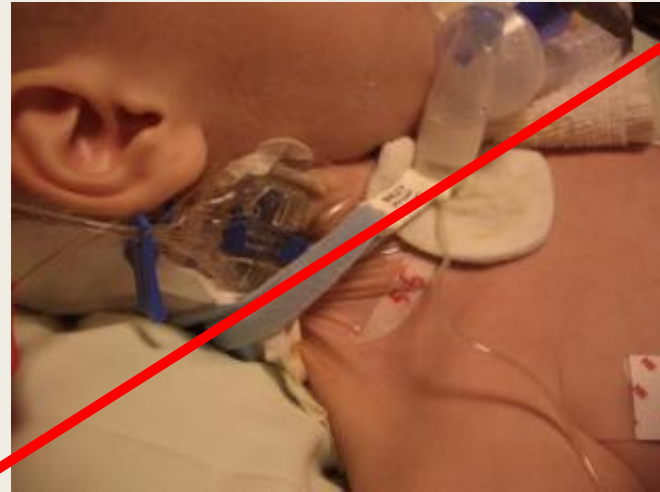
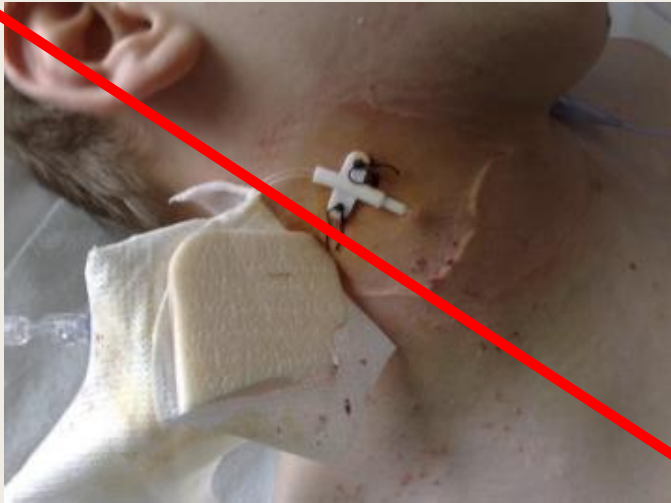
Geremia Zito Marinosci^{1*}, Daniele Guerino Biasucci^{2*} , Giovanni Barone³, Vito D'Andrea⁴ , Daniele Elisei⁵, Emanuele Iacobone⁵ , Antonio La Greca⁶ and Mauro Pittiruti⁶ 



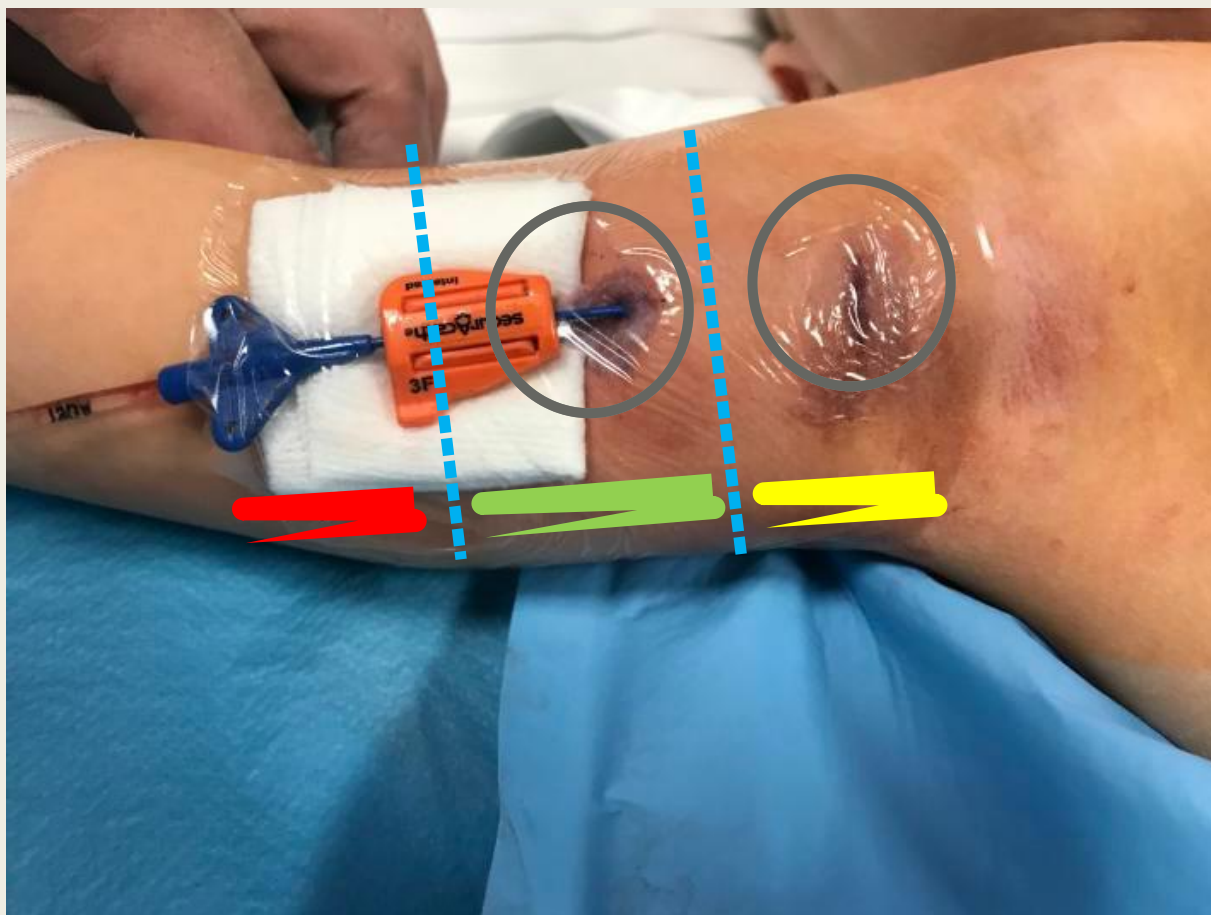
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Indicazione alla Tunnellizzazione

Question 5: Which are the appropriate indications to tunneling a central VAD in a hospitalized child?

Panel recommendation. In hospitalized children requiring a central VAD (PICC, CICC o FICC), we recommend to tunnel the catheter any time the exit site is not appropriate in terms of stability, easiness of dressing change, and risk of extraluminal contamination. (Strong agreement: 20 agree, 0 uncertain, 0 disagree)

DAV EXPERT PED

Recommendations about positioning and selecting CVADs

- 1) A tunneled catheter is recommended for continuous use. (AI r)

AIEOP

Evaluation of Skin Colonisation And Placement of vascular access device Exit sites (ESCAPE Study)

Journal of Infection Prevention
2019, Vol. 20(1) 51–59
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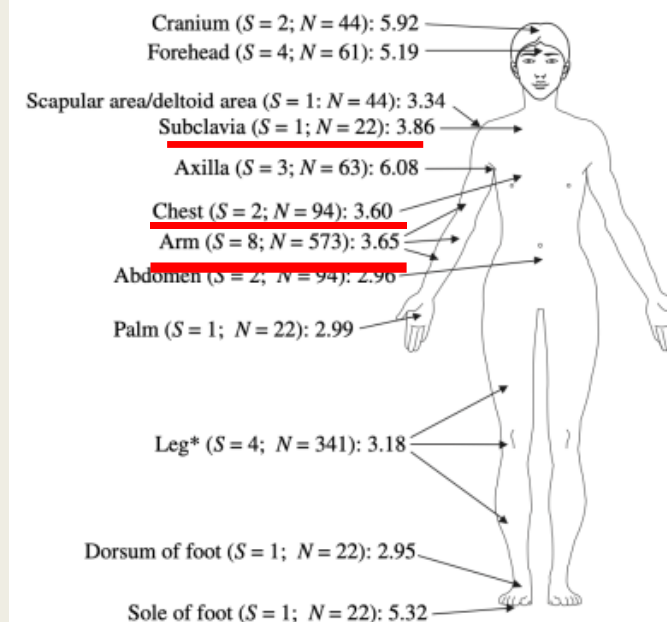
Table 3. Microorganism load (CFU) by participant group and sampling site.

	Medical/surgical				Intensive care				Healthy volunteers			
	0	1–29	30–299	≥ 300	0	1–29	30–299	≥ 300	0	1–29	30–299	≥ 300
Base neck	6 (25)	9 (38)	2 (8)	7 (29)	3 (12)	9 (38)	5 (21)	7 (29)	0 (0)	6 (60)	3 (30)	1 (10)
Chest	8 (33)	6 (25)	4 (17)	6 (25)	11 (46)	8 (33)	4 (17)	1 (4)	0 (0)	8 (80)	1 (10)	1 (10)
Mid-neck	6 (25)	7 (29)	4 (17)	7 (29)	7 (29)	6 (25)	5 (21)	6 (25)	0 (0)	2 (20)	5 (50)	3 (30)
Upper arm	5 (21)	15 (62)	1 (4)	3 (12)	11 (46)	10 (42)	3 (12)	0 (0)	3 (30)	5 (50)	1 (10)	1 (10)
Lower arm	–	–	–	–	–	–	–	–	1 (11)	7 (78)	1 (11)	0 (0)
Around dressing	0 (0)	8 (80)	2 (20)	0 (0)	16 (62)	7 (27)	2 (8)	1 (4)	–	–	–	–
Under dressing	5 (50)	4 (40)	0 (0)	1 (10)	16 (62)	6 (23)	0 (0)	4 (15)	–	–	–	–

Values are presented as n (%).

Identification of variables for aerobic bacterial density at clinically relevant skin sites[☆]

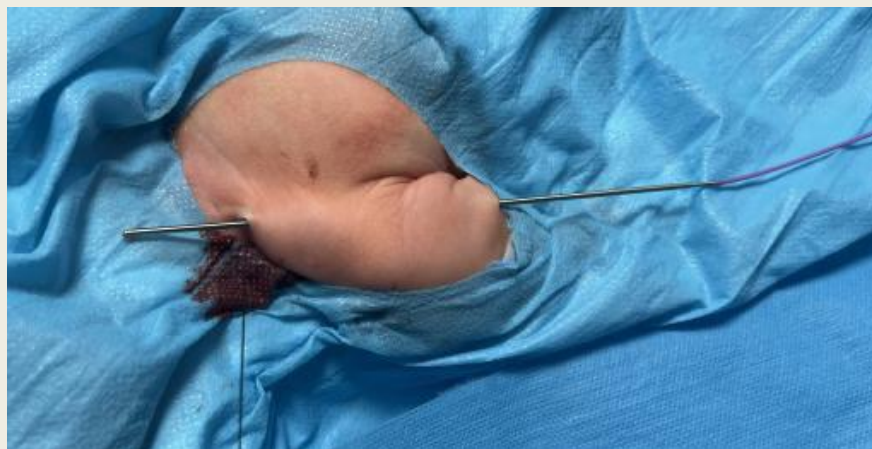
M. Reichel^{a,b,*}, P. Heisig^b, G. Kampf^{a,c}



Rapid Assessment of Vascular Exit Site and Tunneling Options (RAVESTO): A new decision tool in the management of the complex vascular access patients

Matthew D Ostroff¹ , Nancy Moureau² and Mauro Pittiruti³ 





Chest-to-arm tunneling: A novel technique for medium/long term venous access devices

**Maria Giuseppina Annetta¹, Matt Ostroff² , Bruno Marche¹,
Alessandro Emoli¹, Andrea Musarò¹, Davide Celentano¹,
Cristina Taraschi¹, Laura Dolcetti¹,
Antonio La Greca¹, Giancarlo Scoppettuolo¹
and Mauro Pittiruti¹ **

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- Utilizzare Globale dell'ecografia (*Valutazione preliminare della Vena, Venipuntura Ecoguidata, Tip Navigation e Location, Valutazione Complicanze Precoci e Tardive*)
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The SIP protocol update: Eight strategies, incorporating Rapid Peripheral Vein Assessment (RaPeVA), to minimize complications associated with peripherally inserted central catheter insertion

Fabrizio Brescia¹ , Mauro Pittiruti² ,
Timothy R Spencer³  and Robert B Dawson⁴

A GAVeCeLT bundle for central venous catheterization in neonates and children: A prospective clinical study on 729 cases

Mauro Pittiruti¹ , Davide Celentano², Giovanni Barone³ ,
Vito D'Andrea⁴ , Maria Giuseppina Annetta⁵ and Giorgio Conti²

1. Valutazione Pre Procedurale
2. Appropriata Antisepsi della Cute e Asepsi della Procedura
3. Scelta del calibro della vena e dell'exit-site
4. Identificazione Nervo Mediano e Arteria Brachiale
5. Puntura Ecoguidata
6. Tip Navigation e Location IntraProcedurale
7. Stabilizzazione del Catetere
8. Protezione del Catetere

In conclusione

In ambito pediatrico i picc garantiscono ottime prestazioni e versatilità,
specialmente in termini di sicurezza di impianto e di complicanze, pur mantenendo un impatto poco invasivo per il paziente



Grazie per l'attenzione