Gemelli

Fondazione Policlinico Universitario A. Gemelli
Università Cattolica del Sacro Cuore

UNIVERSITÀ CATTOLICA del Sacro Cuore

ACCESSI VASCOLARI NEL NEONATO E NEL BAMBINO: IL FUTURO È ADESSO

MAURO PITTIRUTI

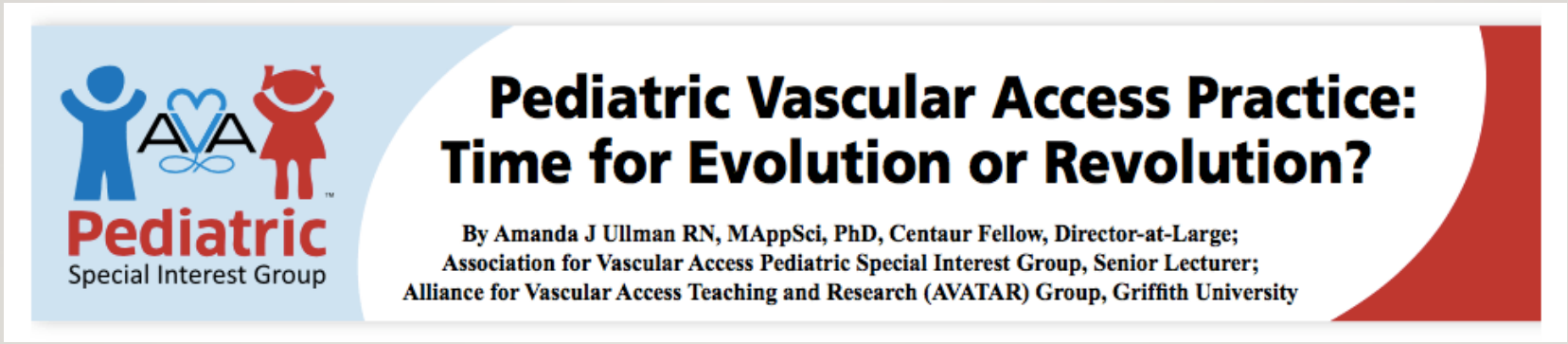
FONDAZIONE POLICLINICO UNIVERSITARIO 'A. GEMELLI'

ROMA

GAVePed
Gruppo Accessi Venosi Pediatrici

GAVeCeLT
Gli Accessi Venosi Centrali a Lungo Termine

ERA IL 2017…


AVA
Pediatric
Special Interest Group
Pediatric Vascular Access Practice:
Time for Evolution or Revolution?
By Amanda J Ullman RN, MAppSci, PhD, Centaur Fellow, Director-at-Large;
Association for Vascular Access Pediatric Special Interest Group, Senior Lecturer;
Alliance for Vascular Access Teaching and Research (AVATAR) Group, Griffith University

2017

Pediatric Vascular Access Practice: Time for Evolution or Revolution?

By Amanda J Ullman RN, MAppSci, PhD, Centaur Fellow, Director-at-Large;
Association for Vascular Access Pediatric Special Interest Group, Senior Lecturer;
Alliance for Vascular Access Teaching and Research (AVATAR) Group, Griffith University

1. **We need to <u>improve central venous access in the neonates</u>, the main issues being:**
   - Define the role of ultrasound (US) -guided central venous catheters (3Fr, PUR, power injectable, high performance) in premature newborns if compared to the use of epicutaneo-caval catheters (ECC) (1-2.7Fr, silicone or PUR, non-power, low performance)
   - Verify the cost-effectiveness and the indication of Near Infra Red Technology in visualizing and cannulating the superficial veins for insertion of ECC
   - Improve the training of health care specialists so to implement the use of new technology for insertion (US, NIR) and for tip location (echocardio, intracavitary EKG) of central access in neonates

2. **The world of <u>pediatric central venous access needs an update</u>, by implementing materials and methods which have become (or are becoming) the standard of care in adults:**
   - Consistent adoption of US-guidance for all central venous access devices (PICC, CICC, FICC, ports)
   - Adoption of tip location by intracavitary EKG and/or echocardio
   - Shift to power injectable polyurethane for all external catheters (the reason for still using fragile silicon catheters like Broviac and Hickman is mysterious)
   - Increased use of PICCs as first option central line in all children
   - Increased adoption of tunneling for all external catheters (even if non-cuffed)

3. **<u>Eliminate the problem of dislodgment</u> (the main cause of loss of the central line in pediatrics) by an extensive use of subcutaneously anchored securement devices.**

2017

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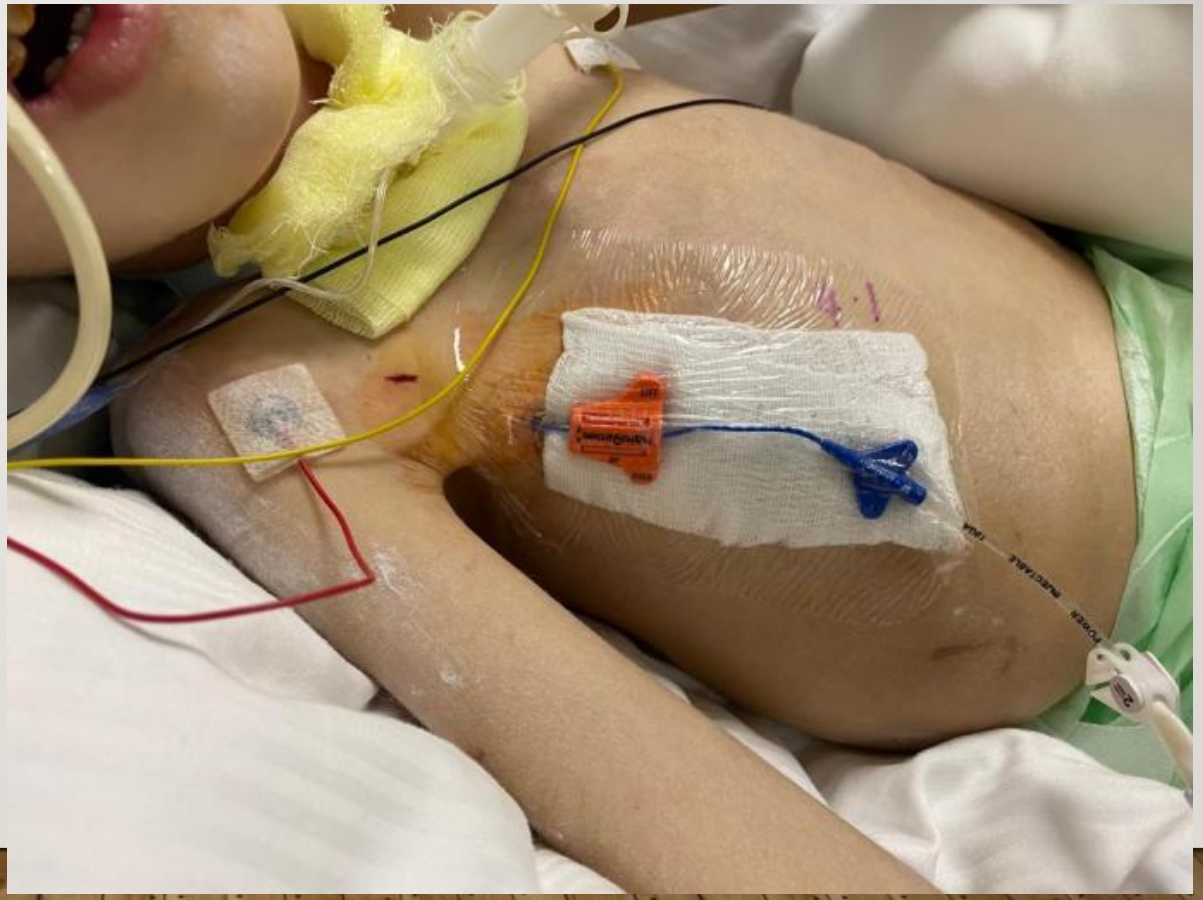
CATETERI VENOSI CENTRALI NEL NEONATO OGGI

IMPIANTO DI CICC/FICC ECOGUIDATI NEL NEONATO OGGI

- Esiste un '*insertion bundle*' ben definito e ottimizzato (ISAC-Ped)
  1. Scelta del sito di venipuntura mediante esame eco preprocedurale (RaCeVA/RaFeVA)
  2. Asepsi appropriata (igiene delle mani; CHG 2% in IPA 70%; MPB)
  3. Venipuntura ecoguidata con controllo eco post-puntura (r/o PNX; *tip navigation*)
  4. *Tip location* intra-procedurale mediante IC-ECG e/o ECHOTIP
  5. Tunnellizzazione
  6. Stabilizzazione con ancoraggio sottocutaneo
  7. Protezione del sito di emergenza: cianoacrilato e membrane trasparenti semipermeabili


PowerPICC SOLO
securacath



PRIME DESCRIZIONI DEL BUNDLE ISAC-PED (10 ANNI FA)

Current Drug Targets, 2012, *13*, 961-969

Ultrasound Guided Central Vascular Access in Neonates, Infants and Children

Mauro Pittiruti*

Department of Surgery, Catholic University, Largo Francesco Vito 1, 00168 Roma, Italy

2012

J Vasc Access 2013; 14 (4): 318-319
DOI: 10.5301/jva.5000158

EDITORIAL

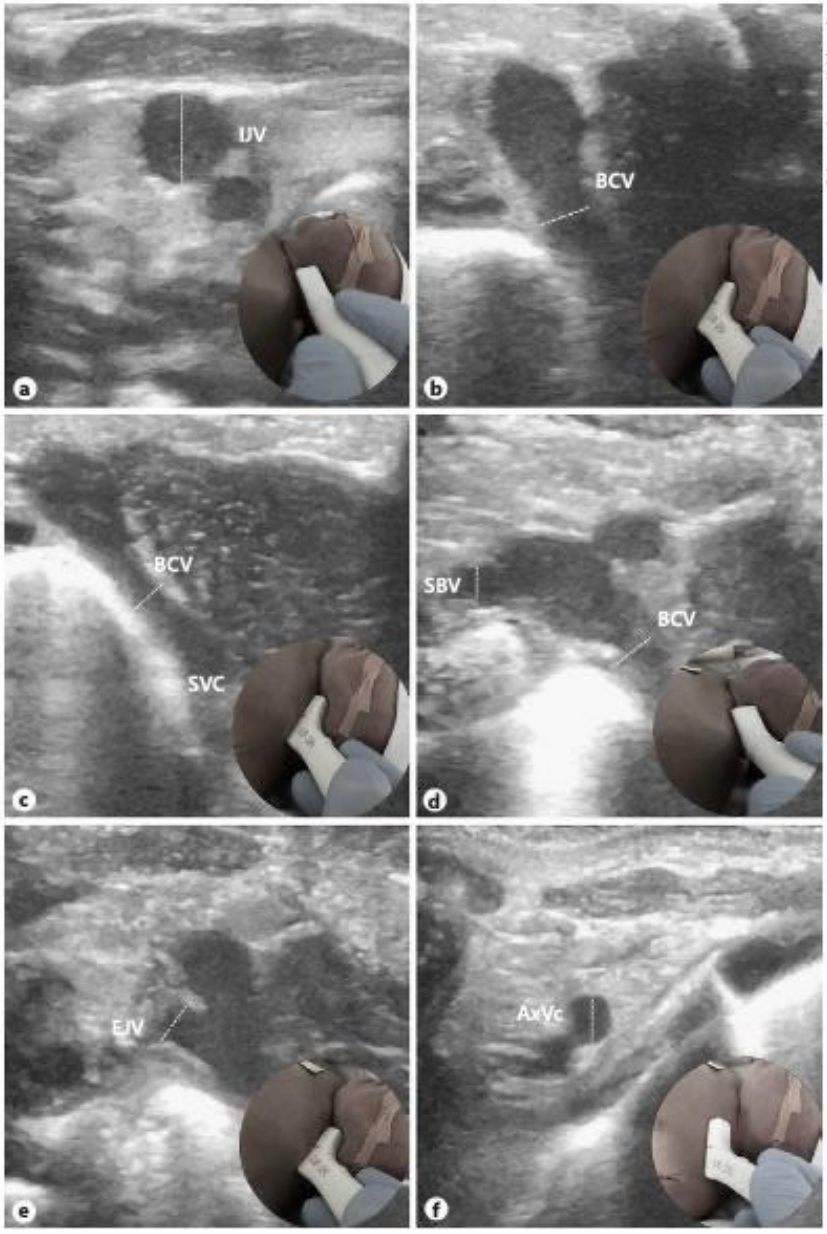
Central venous catheters in neonates: old territory, new frontiers

Invited commentary to *Peripherally inserted central venous catheters in critically ill premature neonates*, by Ozkiraz et al, J Vasc Access 2013;14(4):320-324

Mauro Pittiruti

Department of Surgery, Catholic University Hospital, Rome - Italy

2013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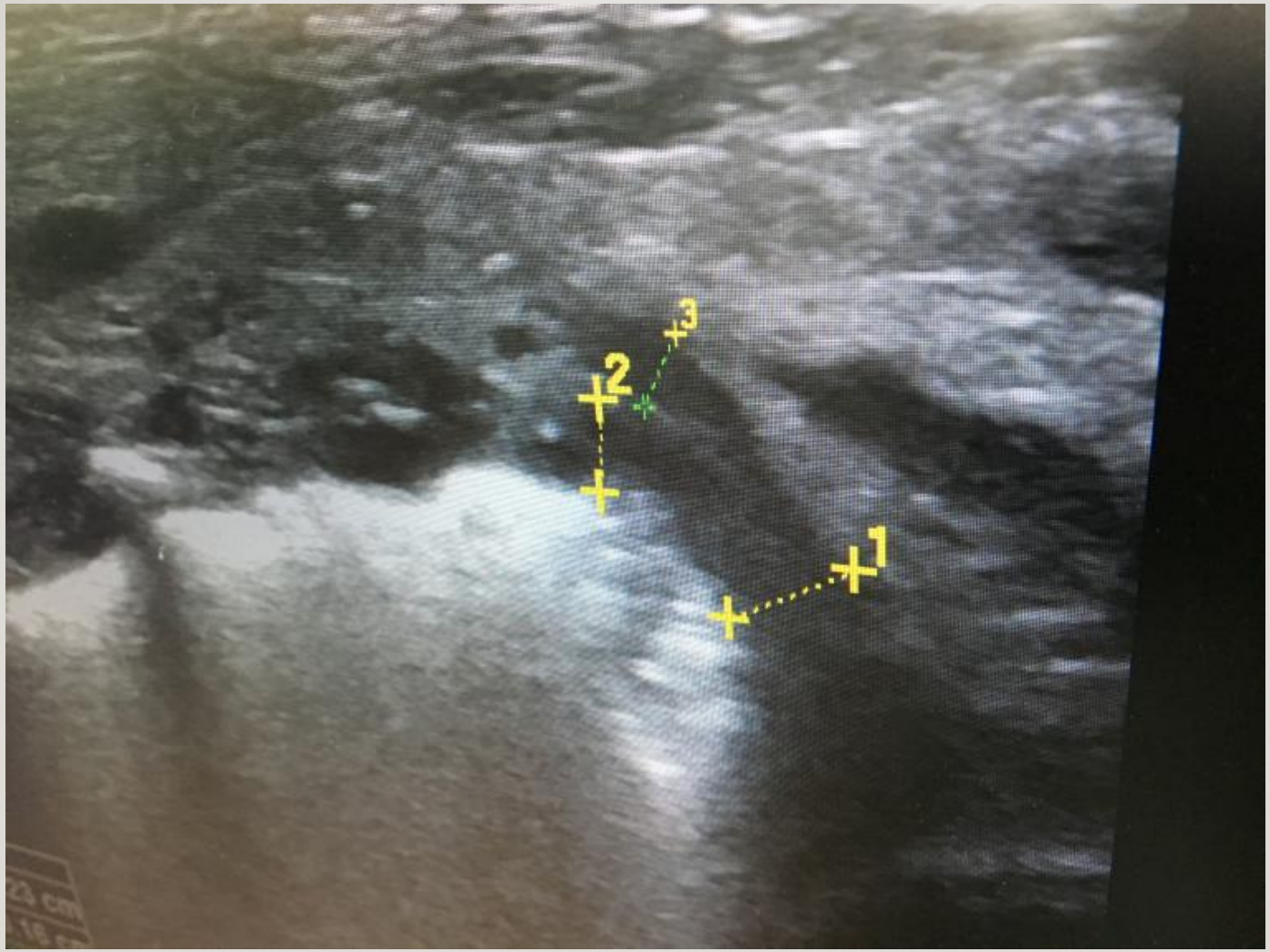
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Original Paper

Neonatology

Neonatology 2019;115:335–340
DOI: 10.1159/000496848

Received: October 20, 2018
Accepted after revision: January 11, 2019
Published online: March 15, 2019

A Systematic Ultrasound Evaluation of the Diameter of Deep Veins in the Newborn: Results and Implications for Clinical Practice

2018

Giovanni Barone[a] Vito D'Andrea[a] Giovanni Vento[a] Mauro Pittiruti[b]

[a]Neonatal Intensive Care Unit, Fondazione Policlinico A. Gemelli IRCSS, Rome, Italy; [b]Department of Surgery, Fondazione Policlinico A. Gemelli IRCSS, Rome, Italy

Vein	Whole cohort (n = 100)	500–1,000 g (n = 20)	1,001–1,500 g (n = 20)	1,501–2,000 g (n = 20)	2,001–2,500 g (n = 20)	2,501–3,000 g (n = 20)	ICC
R IJV	3.1±0.8 (1.8–6.0)	2.4±0.5 (1.8–3.1)	2.8±0.5 (2.0–3.3)	3.0±0.6 (2.1–4.2)	3.2±0.3 (2.8–3.6)	4.2±0.7 (3.2–6.0)	0.85
L IJV	3.2±0.8 (1.9–7.0)	2.5±0.4 (1.9–3.1)	2.7±0.5 (2.0–3.4)	3.2±0.6 (2.2–4.4)	3.2±0.2 (2.8–3.6)	4.4±0.9 (3.3–7.0)	0.87
R BCV	3.6±0.6 (2.6–5.7)	3.0±0.3 (2.6–3.6)	3.3±0.3 (2.7–3.7)	3.4±0.3 (2.7–3.6)	3.8±0.4 (3.1–4.2)	4.5±0.6 (3.7–5.7)	0.96
L BCV	3.5±0.8 (2.0–7.5)	3.0±0.3 (2.2–3.3)	2.9±0.4 (2.0–3.6)	3.4±0.5 (2.4–4.2)	3.5±0.3 (2.9–4.1)	4.6±0.9 (3.5–6.5)	0.97
R SBV	1.8±0.6 (0.8–3.0)	1.1±0.3 (0.8–1.7)	1.5±0.3 (1.2–2.2)	1.8±0.3 (1.3–2.3)	2.0±0.3 (1.5–2.4)	2.5±0.4 (2.0–3.0)	0.91
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R EJV	1.3±0.3 (0.8–2.2)	1.0±0.2 (0.8–1.3)	1.3±0.2 (0.9–1.5)	1.2±0.2 (0.9–1.5)	1.3±0.2 (1.0–1.5)	1.7±0.3 (1.1–2.2)	0.89
L EJV	1.4±0.4 (0.6–2.4)	0.9±0.2 (0.6–1.2)	1.2±0.3 (0.8–1.5)	1.4±0.2 (1.1–1.7)	1.5±0.2 (1.2–1.7)	1.8±0.2 (1.5–2.4)	0.90
R AxVc	1.9±0.5 (1.2–3.5)	1.5±0.1 (1.2–2.0)	1.7±0.4 (1.3–2.3)	1.8±0.3 (1.3–2.2)	2.0±0.3 (1.5–2.3)	2.5±0.5 (1.9–3.5)	0.91
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R BrV	1.0±0.3 (0.5–2.1)	0.9±0.2 (0.7–1.2)	0.8±0.2 (0.5–1.0)	0.8±0.2 (0.6–1.1)	1.1±0.1 (0.9–1.3)	1.5±0.2 (1.2–2.1)	0.89
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R FeV	2.3±0.7 (1.1–3.5)	1.4±0.2 (1.1–1.8)	2.1±0.4 (1.3–2.7)	2.2±0.3 (1.8–2.6)	2.8±0.4 (2.1–3.4)	3.2±0.2 (2.9–3.5)	0.89
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Original research article

JVA | The Journal of Vascular Access

Centrally inserted central catheters in preterm neonates with weight below 1500 g by ultrasound-guided access to the brachio-cephalic vein

The Journal of Vascular Access
1–9

DOI: 10.1177/1129729820940174
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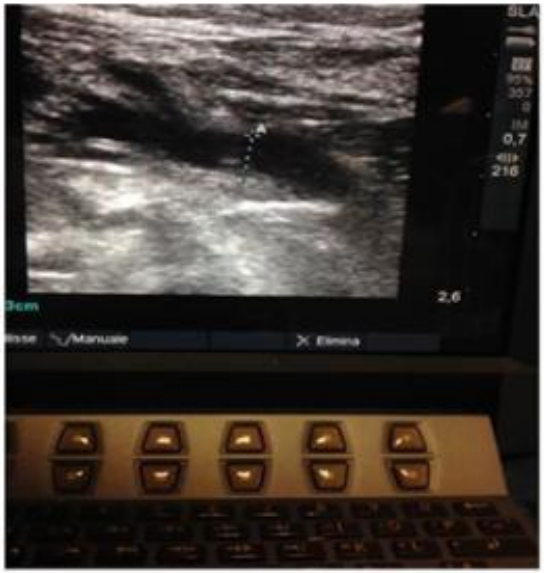
2020

Giovanni Barone[1], Mauro Pittiruti[2], Gina Ancora[1], Giovanni Vento[3], Francesca Tota[4] and Vito D'Andrea[3]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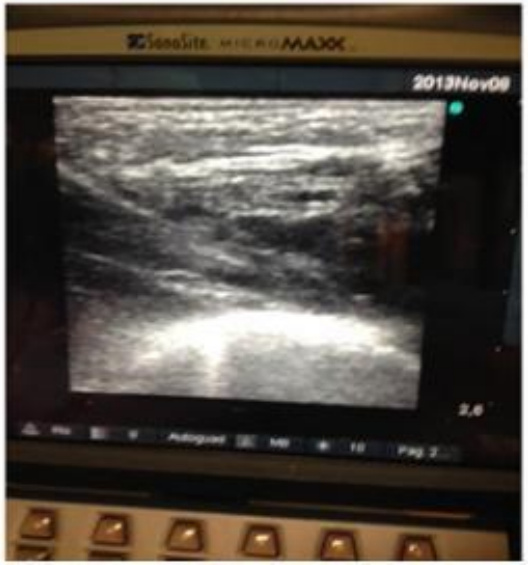
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CORRESPONDENCE

Retrospective evaluation of 599 brachiocephalic vein cannulations in neonates and preterm infants

Christian Breschan[1,*], Gudrun Graf[1], Christoph Arneitz[2], Haro Stettner[3], Stefan Neuwersch[1], Christian Stadik[4], Markus Koestenberger[1], Sandra Holasek[5] and Rudolf Likar[1]

[1]Department of Anaesthesia, Klinikum Klagenfurt, Klagenfurt, Austria, [2]Department of Pediatric Surgery, Klinikum Klagenfurt, Klagenfurt, Austria, [3]Department of Statistics, University of Klagenfurt, Klagenfurt, Austria, [4]Department of Neurorehabilitation, Krankenhaus Hermagor, Klagenfurt, Austria and [5]Institute of Pathophysiology, Medical University of Graz, Graz, Austria

*Corresponding author. E-mail: christian.breschan@kabeg.at

BJA 2022

Keywords: brachiocephalic vein; central venous catheter; intravenous cannula; neonates; preterm infants; ultrasound

APPLICAZIONE SISTEMATICA DEL BUNDLE ISAC-PED: **ZERO COMPLICANZE ALL'INSERZIONE**

Original research article

JVA The Journal of Vascular Access

Centrally inserted central catheters in preterm neonates with weight below 1500 g by ultrasound-guided access to the brachio-cephalic vein

The Journal of Vascular Access
1–9

DOI: 10.1177/1129729820940174
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Giovanni Barone[1], Mauro Pittiruti[2], Gina Ancora[1], Giovanni Vento[3], Francesca Tota[4] and Vito D'Andrea[3]

2020

30 procedure
Successo 100%
No punture arteriose
No pneumotorace

APPLICAZIONE SISTEMATICA DEL BUNDLE ISAC-PED: **ZERO COMPLICANZE ALL'INSERZIONE**

Original research article

JVA The Journal of Vascular Access

Ultrasound-guided cannulation of the brachiocephalic vein in newborns: A novel approach with a supraclavicular view for tip navigation and tip location

The Journal of Vascular Access
1–9

DOI: 10.1177/11297298211001159
journals.sagepub.com/home/jva
SAGE

2021

Ferdinando Spagnuolo and Teresa Vacchiano

40 procedure
Successo 100%
No punture arteriose
No pneumotorace

APPLICAZIONE SISTEMATICA DEL BUNDLE ISAC-PED: **ZERO COMPLICANZE ALL'INSERZIONE**

Clinical trial protocol

JVA The Journal of Vascular Access

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

The Journal of Vascular Access
1–12

DOI: 10.1177/11297298221074472
journals.sagepub.com/home/jva
SAGE

Mauro Pittiruti[1], Davide Celentano[2], Giovanni Barone[3], Vito D'Andrea[4], Maria Giuseppina Annetta[5] and Giorgio Conti[2]

2022

68 procedure
Successo 100%
No punture arteriose
No pneumotorace

APPLICAZIONE SISTEMATICA DEL BUNDLE ISAC-PED: **ZERO COMPLICANZE TARDIVE**

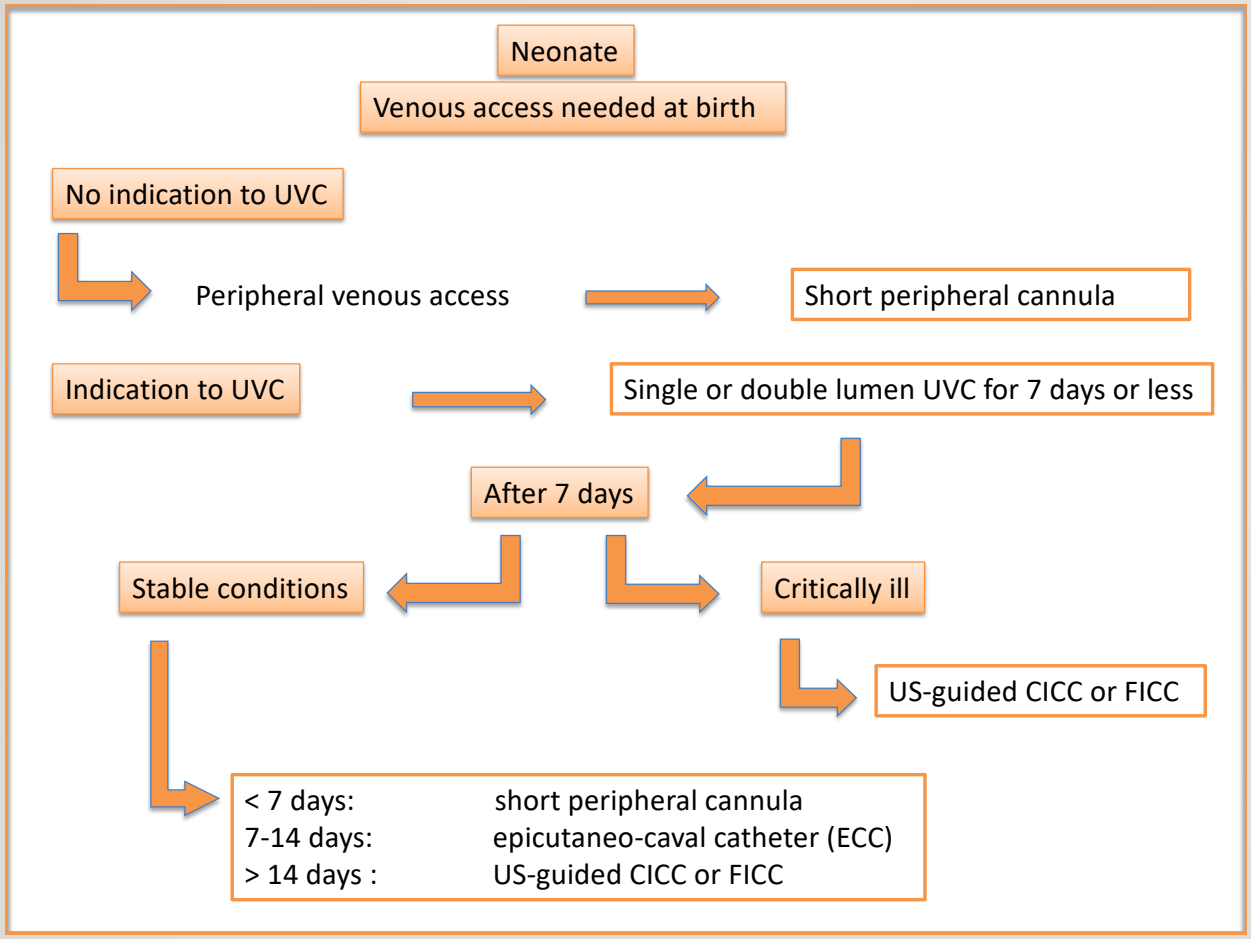
- *Follow up* a due settimane (68 neonati - Pittiruti, JVA 2022)
  e a tre mesi (30 neonati - Barone, JVA 2020):

  nessuna infezione catetere-correlata

  nessuna trombosi catetere-correlata

  nessuna dislocazione

  nessuna occlusione del catetere


Neonate
Venous access needed at birth
No indication to UVC
Peripheral venous access
Short peripheral cannula
Indication to UVC
Single or double lumen UVC for 7 days or less
After 7 days
Stable conditions
Critically ill
US-guided CICC or FICC
< 7 days: short peripheral cannula
7-14 days: epicutaneo-caval catheter (ECC)
> 14 days : US-guided CICC or FICC

Neonate

Venous access needed > 24 hrs after birth

Stable conditions, not preterm

→ < 7 days : short peripheral cannula
→ > 7 days : epicutaneo-caval catheter

Stable conditions, preterm

→ < 7 days : short peripheral cannula
→ 7-14 days : epicutaneo-caval catheter
→ > 14 days : US-guided CICC or FICC

Critically ill

→ US-guided CICC or FICC

2017

1. **We need to <u>improve central venous access in the neonates</u>, the main issues being:**

- Define the role of ultrasound (US) -guided central venous catheters (3Fr, PUR, power injectable, high performance) in premature newborns if compared to the use of epicutaneo-caval catheters (ECC) (1-2.7Fr, silicone or PUR, non-power, low performance)
- Verify the cost-effectiveness and the indication of Near Infra Red Technology in visualizing and cannulating the superficial veins for insertion of ECC
- Improve the training of health care specialists so to implement the use of new technology for insertion (US, NIR) and for tip location (echocardio, intracavitary EKG) of central access in neonates

NEAR INFRA-RED TECHNOLOGY - OGGI

British Journal of Anaesthesia **110** (6): 888–91 (2013)
doi:10.1093/bja/aet078

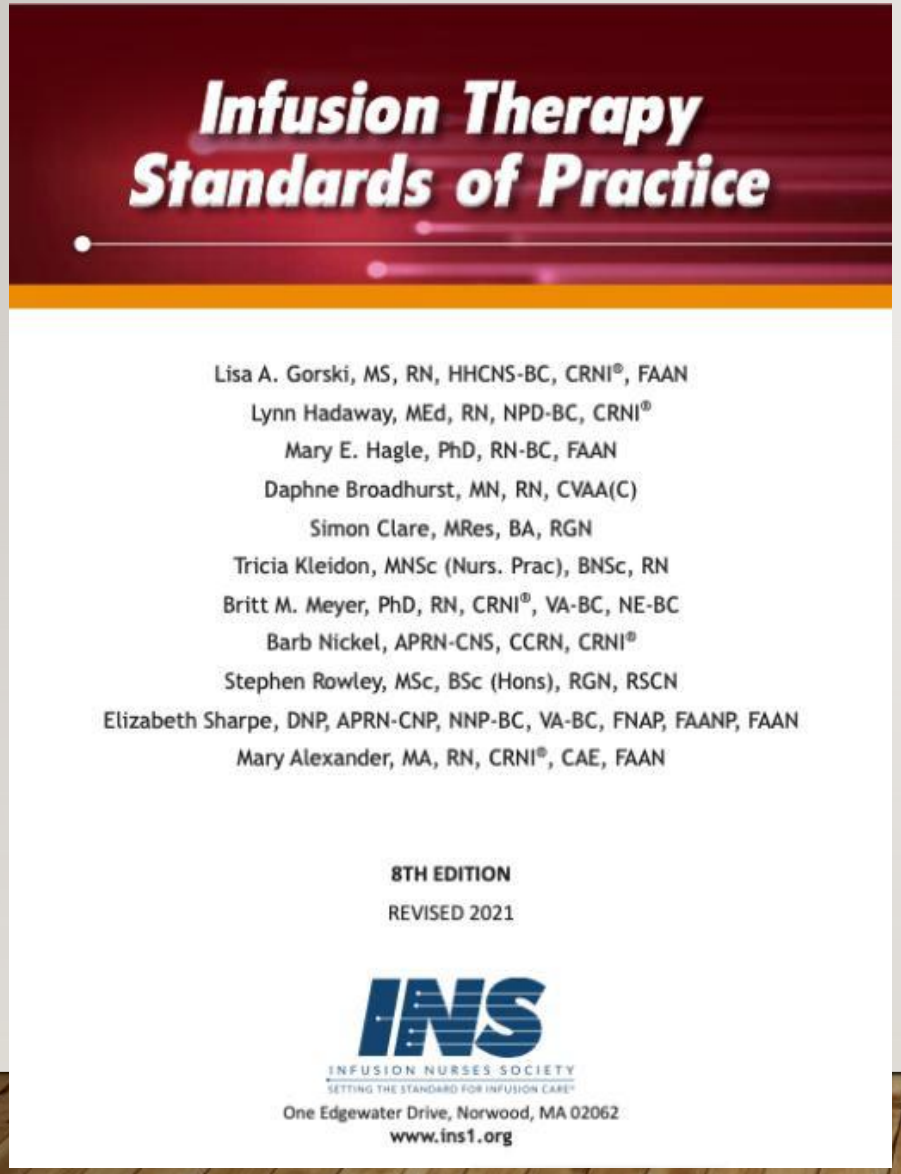
EDITORIAL II

Difficult peripheral veins: turn on the lights

M. Lamperti[1]* and M. Pittiruti[2]

[1] Department of Neuroanaesthesia, National Neurological Institute Besta, Via Celoria, 11, 20136 Milan, Italy
[2] Department of Surgery, Catholic University, Rome, Italy

* Corresponding author. E-mail: doclampmd@gmail.com



Use near infrared (nIR) light technology to aid in locating viable superficial peripheral venous sites and decreasing procedure time for peripheral intravenous catheter (PIVC) insertion.

1. Available technology includes hands-free devices that capture an image of the veins and reflect it back to the skin's surface or to a screen.
2. Use nIR light technology to assess peripheral venous sites and facilitate more informed decisions about vein selection (ie, bifurcating veins, tortuosity of veins, palpable but nonvisible veins, location of venous valves). The use of nIR technology has been associated with enhanced first-time insertion success and decreased procedural time compared to traditional visual assessment and palpation in some populations, such as neonates.[12-14] (II)

NIR TECHNOLOGY

RASUVA

Esame sistematico delle vene superficiali del neonato
(con e senza tecnologia NIR, con e senza laccio)

Malleolo mediale (MM)	Vd
	Fd
	Vs
	Fs
Malleolo laterale (ML)	Vd
	Fd
	Vs
	Fs
Retropoplitea (RP)	Vd
	Fd
	Vs
	Fs
Mano e polso (MP)	Vd
	Fd
	Vs
	Fs
Antecubitale (AC)	Vd
	Fd
	Vs
	Fs
Preauricolare (PR)	Vd
	Fd
	Vs
	Fs
Postauricolare (PO)	Vd
	Fd
	Vs
	Fs

Techniques in vascular access

JVA | The Journal of Vascular Access

Rapid Superficial Vein Assessment (RaSuVA): A pre-procedural systematic evaluation of superficial veins to optimize venous catheterization in neonates

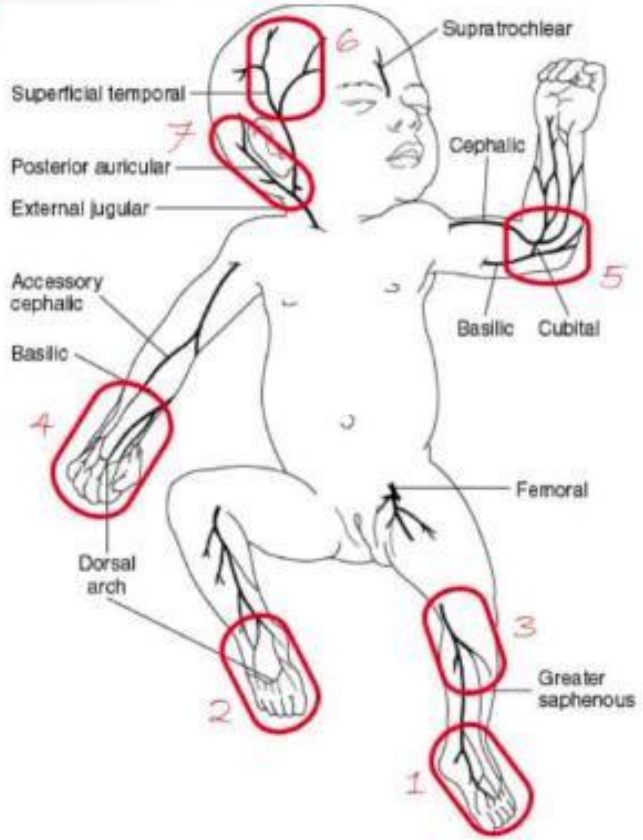
The Journal of Vascular Access
1–5

DOI: 10.1177/11297298221098481
journals.sagepub.com/home/jva
SAGE

Vito D'Andrea[1], Giorgia Prontera[1], Lucilla Pezza[1], Giovanni Barone[2], Giovanni Vento[1] and Mauro Pittiruti[3]

2022

RaSuVA



(1) medial malleolus,
(2) lateral malleolus,
(3) popliteal fossa,
(4) back of the hand and wrist,
(5) antecubital fossa,
(6) anterior scalp veins,
(7) posterior scalp veins.

Gemelli

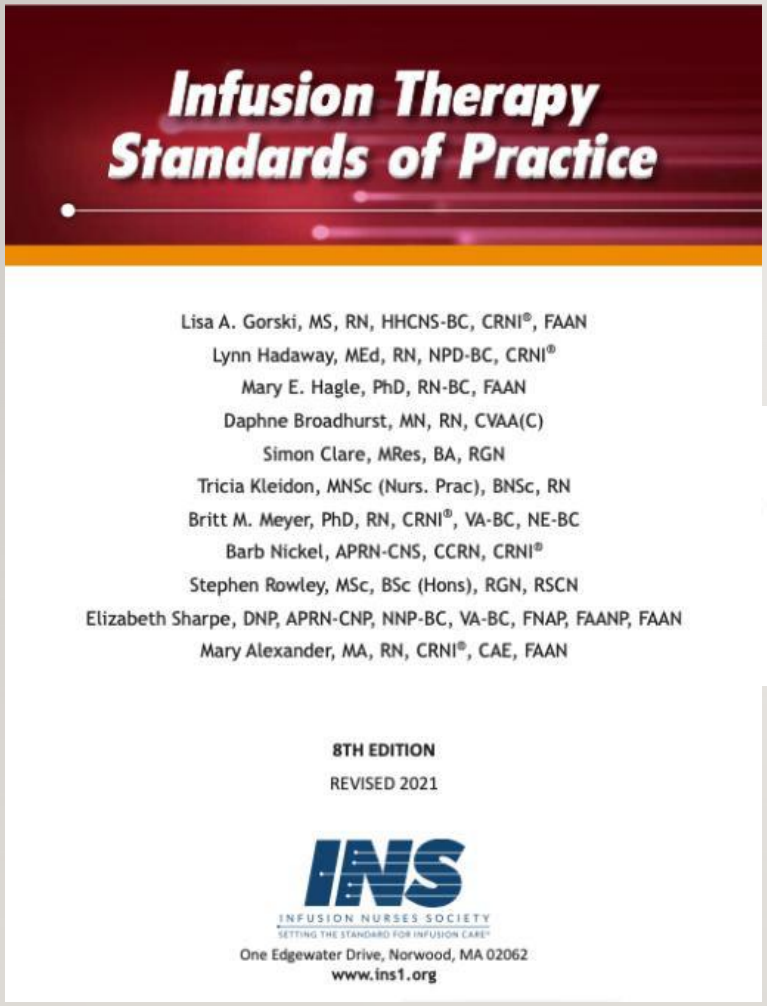
GAVeCeLT

2017

1. **We need to <u>improve central venous access in the neonates</u>, the main issues being:**

- Define the role of ultrasound (US) -guided central venous catheters (3Fr, PUR, power injectable, high performance) in premature newborns if compared to the use of epicutaneo-caval catheters (ECC) (1-2.7Fr, silicone or PUR, non-power, low performance)
- Verify the cost-effectiveness and the indication of Near Infra Red Technology in visualizing and cannulating the superficial veins for insertion of ECC
- Improve the training of health care specialists so to implement the use of new technology for insertion (US, NIR) and for tip location (echocardio, intracavitary EKG) of central access in neonates

TIP LOCATION MEDIANTE ECG INTRACAVITARIO NEL NEONATO OGGI



2021

Use methods for identifying CVAD tip location during the insertion procedure (ie, "real-time") due to greater accuracy, more rapid initiation of infusion therapy, and reduced costs.[38-47] (III)

2020

JVA The Journal of Vascular Access

Review

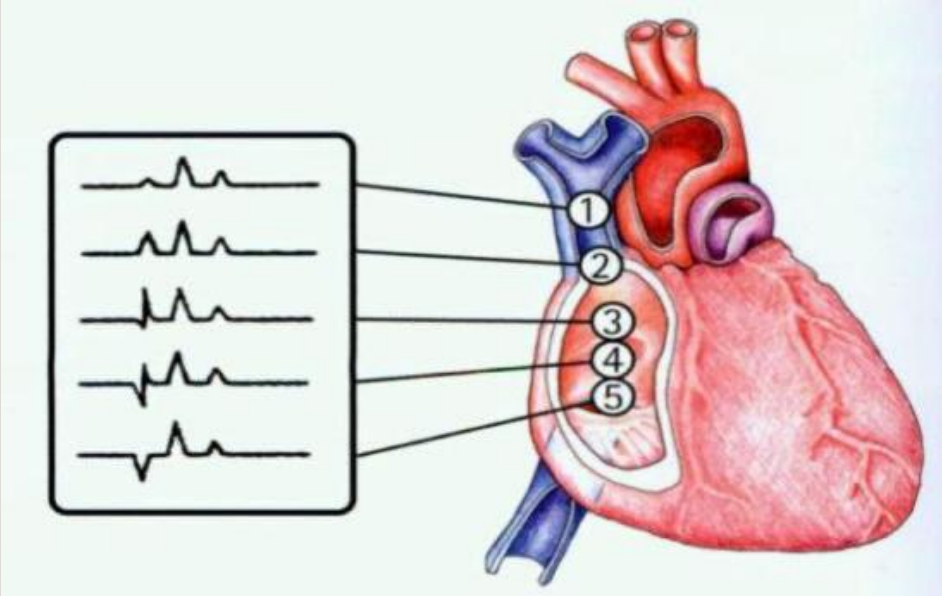
Intracavitary electrocardiography for tip location during central venous catheterization: A narrative review of 70 years of clinical studies

Mauro Pittiruti[1], Filippo Pelagatti[2] and Fulvio Pinelli[3]

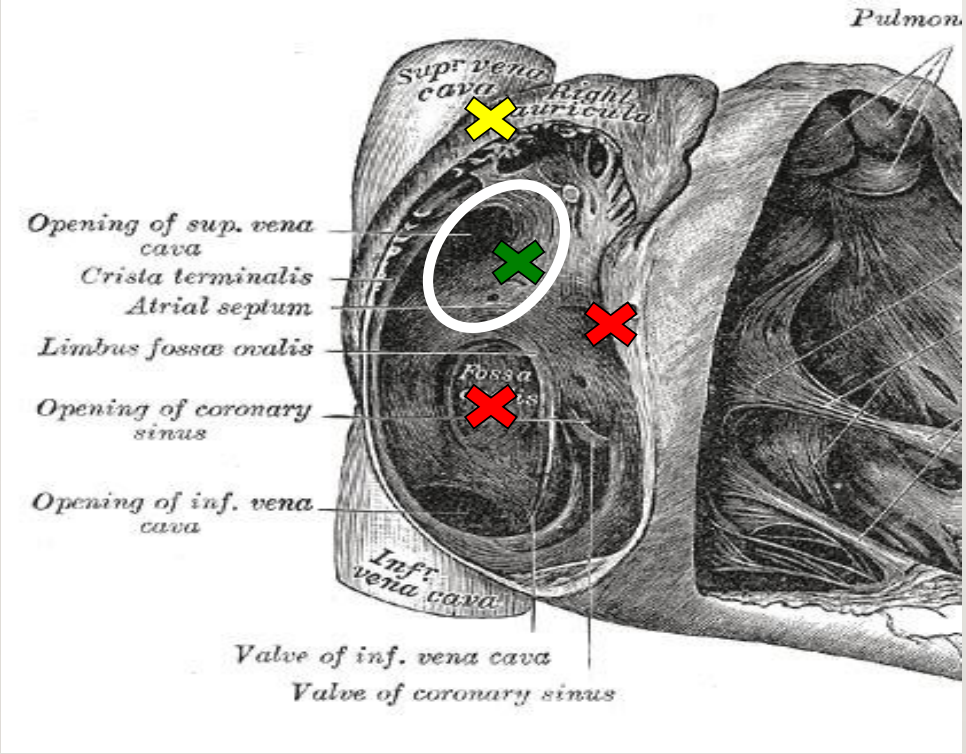
The Journal of Vascular Access
1–8

DOI: 10.1177/1129729820929835
journals.sagepub.com/home/jva
SAGE

IC-ECG METHOD



- Intracavitary ECG (lead II)
- The intracavitary electrode is the tip of the catheter
- Based on changes of P wave during the progression of the catheter into the central veins
- CAVO-ATRIAL JUNCTION: maximal peak of the P wave (Stas, Yeon, Schummer, Pittiruti/La Greca, etc,) (= CRISTA TERMINALIS)



P increasing

Maximal P

P decreasing and/or diphasic

Original research article

2018

JVA The Journal of Vascular Access

The intracavitary electrocardiography method for positioning the tip of epicutaneous cava catheter in neonates: Pilot study

The Journal of Vascular Access
2018, Vol. 19(6) 542–547

DOI: 10.1177/1129729818761292
journals.sagepub.com/home/jva
SAGE

Antonella Capasso[1], Rossella Mastroianni[1], Annalisa Passariello[2,3], Marta Palma[2], Francesco Messina[4], Antonella Ansalone[1], Italo Bernardo[1], Daniela Brescia[1], Francesco Crispino[1], Carolina Grassia[1], Attilio Romano[1] and Gaetano Ausanio[1]

Original research article

2018

JVA | The Journal of Vascular Access

The intracavitary electrocardiography method for tip location of jugular internal vein access device in infants of less than 5 kg: A pilot study

The Journal of Vascular Access
1–5

DOI: 10.1177/1129729818769028
journals.sagepub.com/home/jva
SAGE

Rossella Mastroianni, Antonella Capasso and Gaetano Ausanio

Original research article

2022

JVA The Journal of Vascular Access

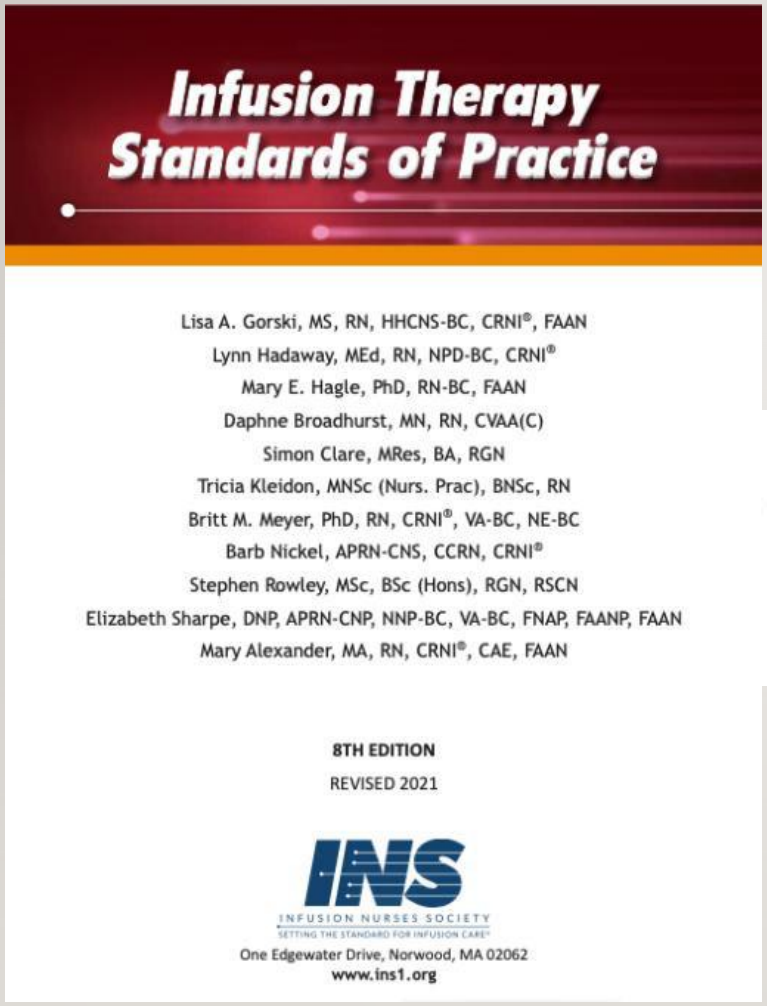
The intracavitary ECG method for tip location of ultrasound-guided centrally inserted central catheter in neonates

The Journal of Vascular Access
1–6

DOI: 10.1177/11297298211068302
journals.sagepub.com/home/jva
SAGE

Vito D'Andrea[1], Lucilla Pezza[1], Giorgia Prontera[1], Gina Ancora[2], Mauro Pittiruti[3], Giovanni Vento[1] and Giovanni Barone[2]

TIP NAVIGATION E TIP LOCATION MEDIANTE ECOGRAFIA NEL NEONATO – OGGI



2021

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Singh *et al. Critical Care* (2020) 24:65
https://doi.org/10.1186/s13054-020-2787-9

2020

Critical Care

RESEARCH **Open Access**

International evidence-based guidelines on Point of Care Ultrasound (POCUS) for critically ill neonates and children issued by the POCUS Working Group of the European Society of Paediatric and Neonatal Intensive Care (ESPNIC)

Yogen Singh[1,2*†], Cecile Tissot[3†], María V. Fraga[4], Nadya Yousef[5], Rafael Gonzalez Cortes[6], Jorge Lopez[6], Joan Sanchez-de-Toledo[7], Joe Brierley[8], Juan Mayordomo Colunga[9], Dusan Raffaj[10], Eduardo Da Cruz[11], Philippe Durand[12], Peter Kenderessy[13], Hans-Joerg Lang[14], Akira Nishisaki[15], Martin C. Kneyber[16], Pierre Tissieres[12], Thomas W. Conlon[15] and Daniele De Luca[5,17]

2021

JVA The Journal of Vascular Access

Editorial

The Journal of Vascular Access
1–10

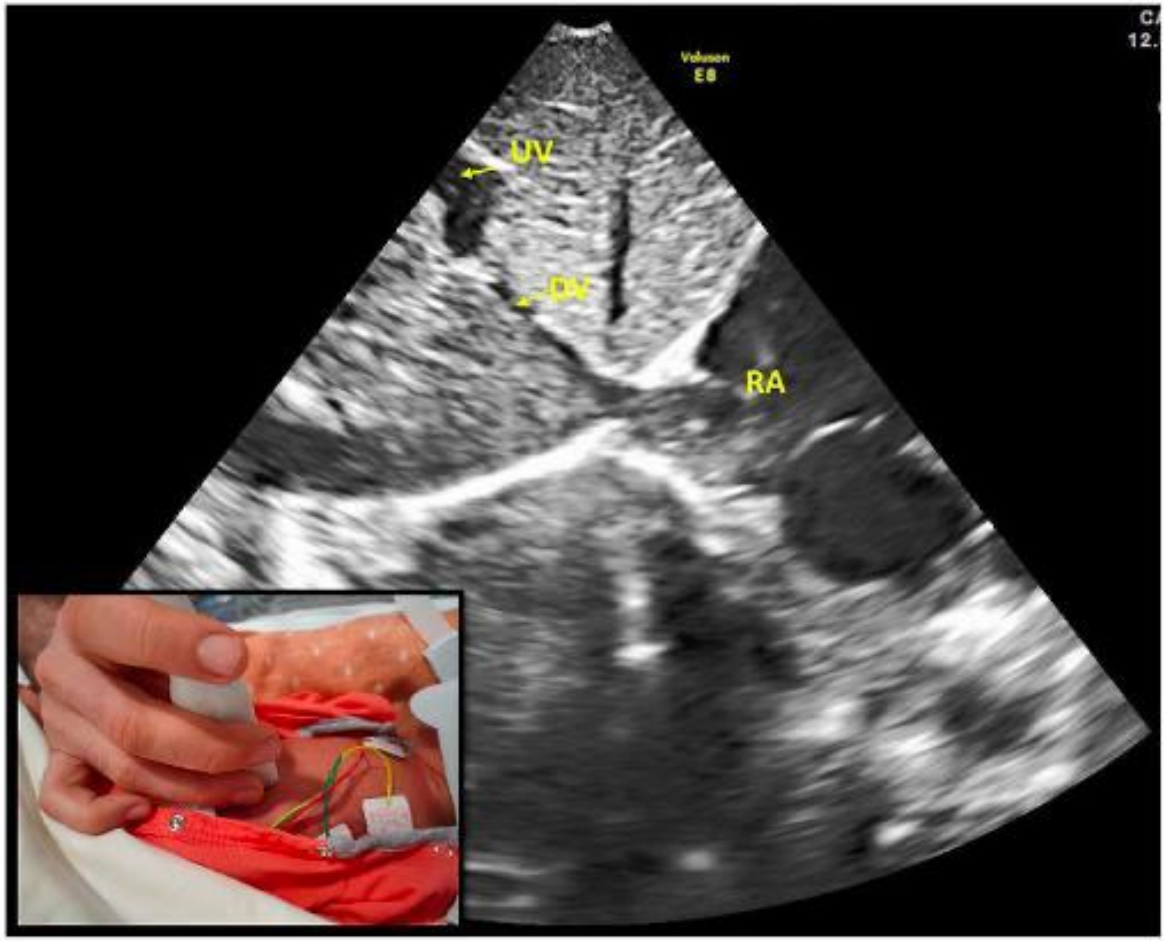
DOI: 10.1177/11297298211007703
journals.sagepub.com/home/jva
SAGE

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

Giovanni Barone[1], Mauro Pittiruti[2], Daniele G Biasucci[3], Daniele Elisei[4], Emanuele Iacobone[4], Antonio La Greca[2], Geremia Zito Marinosci[5] and Vito D'Andrea[6]

Table 1. Summary of Neo-ECHO tip.

Catheter	Protocol	Probe	Windows
UVC	Tip navigation	Small sectorial probe, 7–8 MHz	Low subcostal longitudinal view
	Tip location	Small sectorial probe, 7–8 MHz	Subcostal longitudinal view
ECCs inserted via veins of the scalp or of the upper limbs	Tip navigation	Linear "hockey stick" probe, 10–14 MHz	Acoustic windows of RaCeVA and RaPeVA
	Tip location	Small sectorial probe, 7–8 MHz	Bi-caval view; four-chamber apical view; long axis view of SVC
ECCs inserted via veins of the lower limbs	Tip navigation	Linear "hockey stick" probe, 10–14 MHz	Short and long axis view of the femoral vein
	Tip location	Small sectorial probe, 7–8 MHz	Subcostal longitudinal view
CICC	Tip navigation	Linear "hockey stick" probe, 10–14 MHz	Acoustic windows of RaCeVA
	Tip location	Small sectorial probe, 7–8 MHz	Bi-caval view; four-chamber apical view; long axis view of SVC
FICC	Tip navigation	Linear "hockey stick" probe, 10–14 MHz and small sectorial probe	Short and long axis view of the femoral vein and subcostal longitudinal view
	Tip location	Small sectorial probe, 7–8 MHz	Subcostal longitudinal view


Voluson
E8
UV
DV
RA

frontiers in Pediatrics

MINI REVIEW
published: 31 January 2022
doi: 10.3389/fped.2021.774705

Check for updates

2022

Umbilical Venous Catheter Update: A Narrative Review Including Ultrasound and Training

Vito D'Andrea[1], Giorgia Prontera[1], Serena Antonia Rubortone[1], Lucilla Pezza[1], Giovanni Pinna[1], Giovanni Barone[2], Mauro Pittiruti[3] and Giovanni Vento[1]*

[1] Division of Neonatology, Department of Woman and Child Health and Public Health, University Hospital Fondazione Policlinico Gemelli Istituto di Ricovero e Cura a Carattere Scientifico (IRCCS), Rome, Italy, [2] Neonatal Intensive Care Unit, Infermi Hospital, Rimini, Italy, [3] Department of Surgery, University Hospital Fondazione Policlinico Gemelli Istituto di Ricovero e Cura a Carattere Scientifico (IRCCS), Rome, Italy

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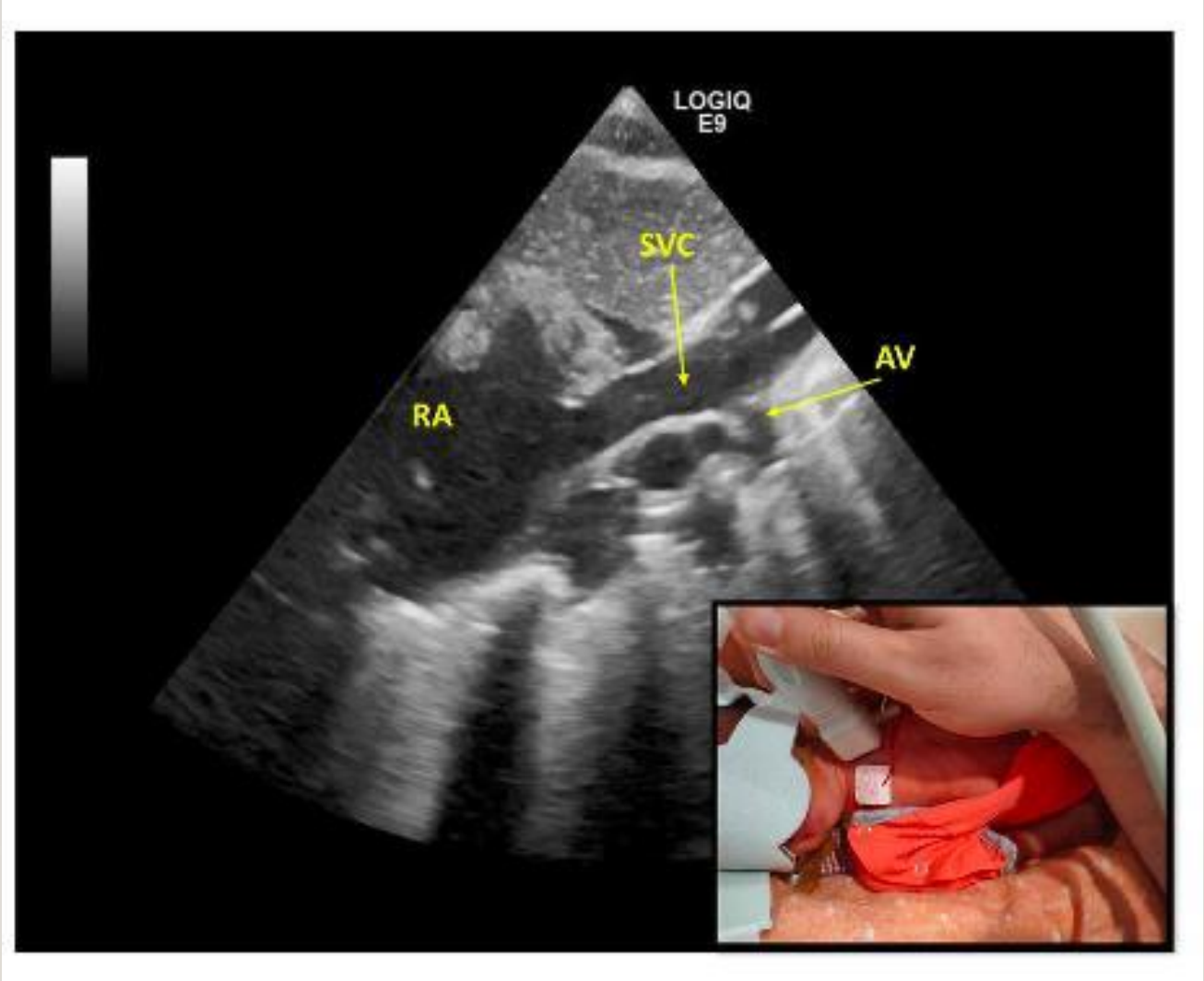
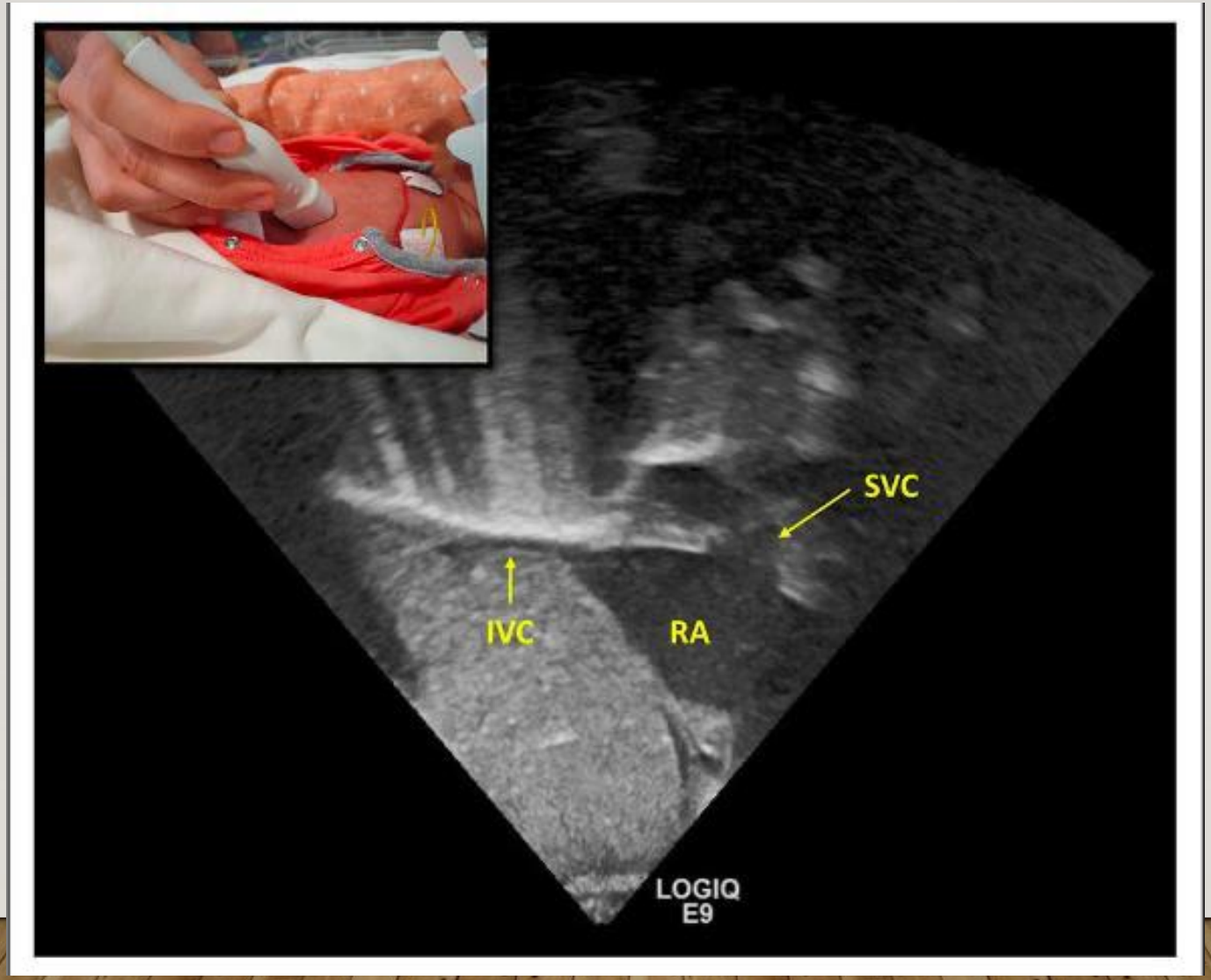
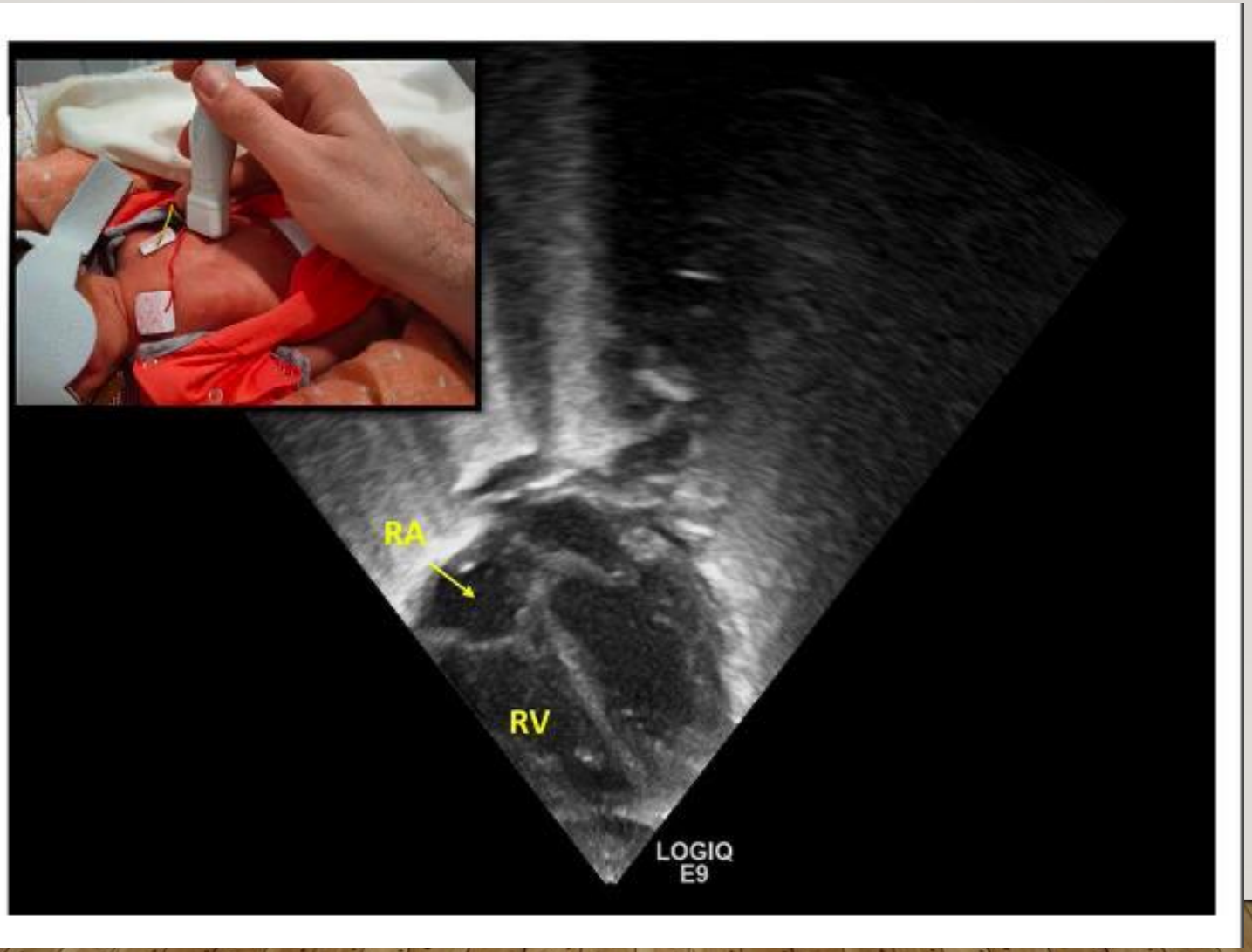
CICC	Tip navigation	Linear "hockey stick" probe, 10–14 MHz	Acoustic windows of RaCeVA
	Tip location	Small sectorial probe, 7–8 MHz	Bi-caval view; four-chamber apical view; long axis view of SVC
FICC	Tip navigation	Linear "hockey stick" probe, 10–14 MHz and small sectorial probe	Short and long axis view of the femoral vein and subcostal longitudinal view
	Tip location	Small sectorial probe, 7–8 MHz	Subcostal longitudinal view


LOGIQ
E9
SVC
AV
RA


SVC
IVC
RA
LOGIQ
E9


RA
RV
LOGIQ
E9

Ped 2022

Ultrasound guided catheter tip location in neonates: a prospective cohort study

Fiorentino Grasso MD[1], Antonella Capasso MD[1], Daniela Pacella PhD[2], Francesco Borgia MD[3], Serena Salomè MD[1], Letizia Capasso MD PhD[1], Francesco Raimondi MD PhD[1]

[1]Section of Neonatology, Department of Translational Medical Sciences, Federico II University, Naples, Italy
[2]Department of Public Health, Federico II University, Naples, Italy
[3]Section of Cardiology, Department of Advanced Biomedical Sciences, Federico II University, Naples, Italy

2019

JVA The Journal of Vascular Access

Editorial

Epicutaneo-caval catheters in neonates: New insights and new suggestions from the recent literature

The Journal of Vascular Access
2020, Vol. 21(6) 805–809

DOI: 10.1177/1129729819891546
journals.sagepub.com/home/jva
SAGE

Giovanni Barone[1] and Mauro Pittiruti[2]

2017

2. The world of <u>pediatric central venous access needs an update</u>, by implementing materials and methods which have become (or are becoming) the standard of care in adults:

- Consistent adoption of US-guidance for all central venous access devices (PICC, CICC, FICC, ports)
- Adoption of tip location by intracavitary EKG and/or echocardio
- Shift to power injectable polyurethane for all external catheters (the reason for still using fragile silicon catheters like Broviac and Hickman is mysterious)
- Increased use of PICCs as first option central line in all children
- Increased adoption of tunneling for all external catheters (even if non-cuffed)

VENIPUNTURA ECOGUIDATA PER TUTTI GLI ACCESSI VENOSI CENTRALI NEL BAMBINO

2012

Intensive Care Med
DOI 10.1007/s00134-012-2597-x

CONFERENCE REPORTS AND EXPERT PANEL

Massimo Lamperti
Andrew R. Bodenham
Mauro Pittiruti
Michael Blaivas
John G. Augoustides
Mahmoud Elbarbary
Thierry Pirotte
Dimitrios Karakitsos
Jack LeDonne
Stephanie Doniger
Giancarlo Scoppettuolo
David Feller-Kopman
Wolfram Schummer
Roberto Biffi
Eric Desruennes
Lawrence A. Melniker
Susan T. Verghese

International evidence-based recommendations on ultrasound-guided vascular access

2014

JVA
ISSN 1129-7298

J Vasc Access 2014; 00 (00): 000-000
DOI: 10.5301/jva.5000314

ORIGINAL ARTICLE

Central venous access devices in pediatric malignancies: a position paper of Italian Association of Pediatric Hematology and Oncology

Alessandro Crocoli[1], Assunta Tornesello[2], Mauro Pittiruti[3], Angelica Barone[4], Paola Muggeo[5], Alessandro Inserra[1], Angelo Claudio Molinari[6], Valeria Grillenzoni[7], Viviana Durante[8], Maria Pia Cicalese[9], Giulio Andrea Zanazzo[10], Simone Cesaro[7]

JVA
ISSN 1129-7298

J Vasc Access 2014; 00 (00): 000-000
DOI: 10.5301/jva.5000314

ORIGINAL ARTICLE

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Ultrasound should be used for diagnosis of local pathologic conditions before the procedure and for diagnosis of procedure-related complications.

Ultrasound is necessary to assess vein patency before the procedure and to choose the vein most appropriate in terms of caliber, depth and position.

The internal diameter of the vein to be cannulated—as assessed by ultrasound—should be at least three times the external diameter of the catheter, so as to reduce the risk of venous thrombosis.

2020

EJA

Eur J Anaesthesiol 2020; **37**:344–376

GUIDELINES

European Society of Anaesthesiology guidelines on peri-operative use of ultrasound-guided for vascular access (PERSEUS vascular access)

Massimo Lamperti, Daniele Guerino Biasucci, Nicola Disma, Mauro Pittiruti, Christian Breschan, Davide Vailati, Matteo Subert, Vilma Traškaitė, Andrius Macas, Jean-Pierre Estebe, Regis Fuzier, Emmanuel Boselli and Philip Hopkins

2020

Ultrasound-guided cannulation in children

(1) For vascular access device placement in paediatric patients, we suggest the global use of ultrasound to assist all steps of the procedure that include preprocedural ultrasound evaluation of all possible options; recognition of possible local disease; ultrasound-guided real-time puncture; verification of the direction of guidewires and catheters in the vessel, and onwards towards the superior vena cava for centrally inserted central catheters, or onwards towards the inferior vena cava for femoral or groin catheters; verification of the correct position of the catheter tip; detection of possible postprocedural early and late complications (**2B**).

EJA

Eur J Anaesthesiol 2020; **37**:344–376

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European Society of Anaesthesiology guidelines on peri-operative use of ultrasound-guided for vascular access (PERSEUS vascular access)

Massimo Lamperti, Daniele Guerino Biasucci, Nicola Disma, Mauro Pittiruti, Christian Breschan, Davide Vailati, Matteo Subert, Vilma Traškaitė, Andrius Macas, Jean-Pierre Estebe, Regis Fuzier, Emmanuel Boselli and Philip Hopkins

2020

JVA The Journal of Vascular Access

Editorial

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

Monica Cellini[1], Anna Bergadano[2], Alessandro Crocoli[3], Clara Badino[4], Francesca Carraro[2], Luca Sidro[5], Debora Botta[6], Alessia Pancaldi[7], Francesca Rossetti[8], Federica Pitta[9] and Simone Cesaro[10]

The Journal of Vascular Access
1–15

DOI: 10.1177/1129729820969309
journals.sagepub.com/home/jva
SAGE

2020

Singh *et al. Critical Care* (2020) 24:65
https://doi.org/10.1186/s13054-020-2787-9

Critical Care

RESEARCH Open Access

International evidence-based guidelines on Point of Care Ultrasound (POCUS) for critically ill neonates and children issued by the POCUS Working Group of the European Society of Paediatric and Neonatal Intensive Care (ESPNIC)

Yogen Singh[1,2*†], Cecile Tissot[3†], María V. Fraga[4], Nadya Yousef[5], Rafael Gonzalez Cortes[6], Jorge Lopez[6], Joan Sanchez-de-Toledo[7], Joe Brierley[8], Juan Mayordomo Colunga[9], Dusan Raffaj[10], Eduardo Da Cruz[11], Philippe Durand[12], Peter Kenderessy[13], Hans-Joerg Lang[14], Akira Nishisaki[15], Martin C. Kneyber[16], Pierre Tissieres[12], Thomas W. Conlon[15] and Daniele De Luca[5,17]

2018

JVA | The Journal of Vascular Access

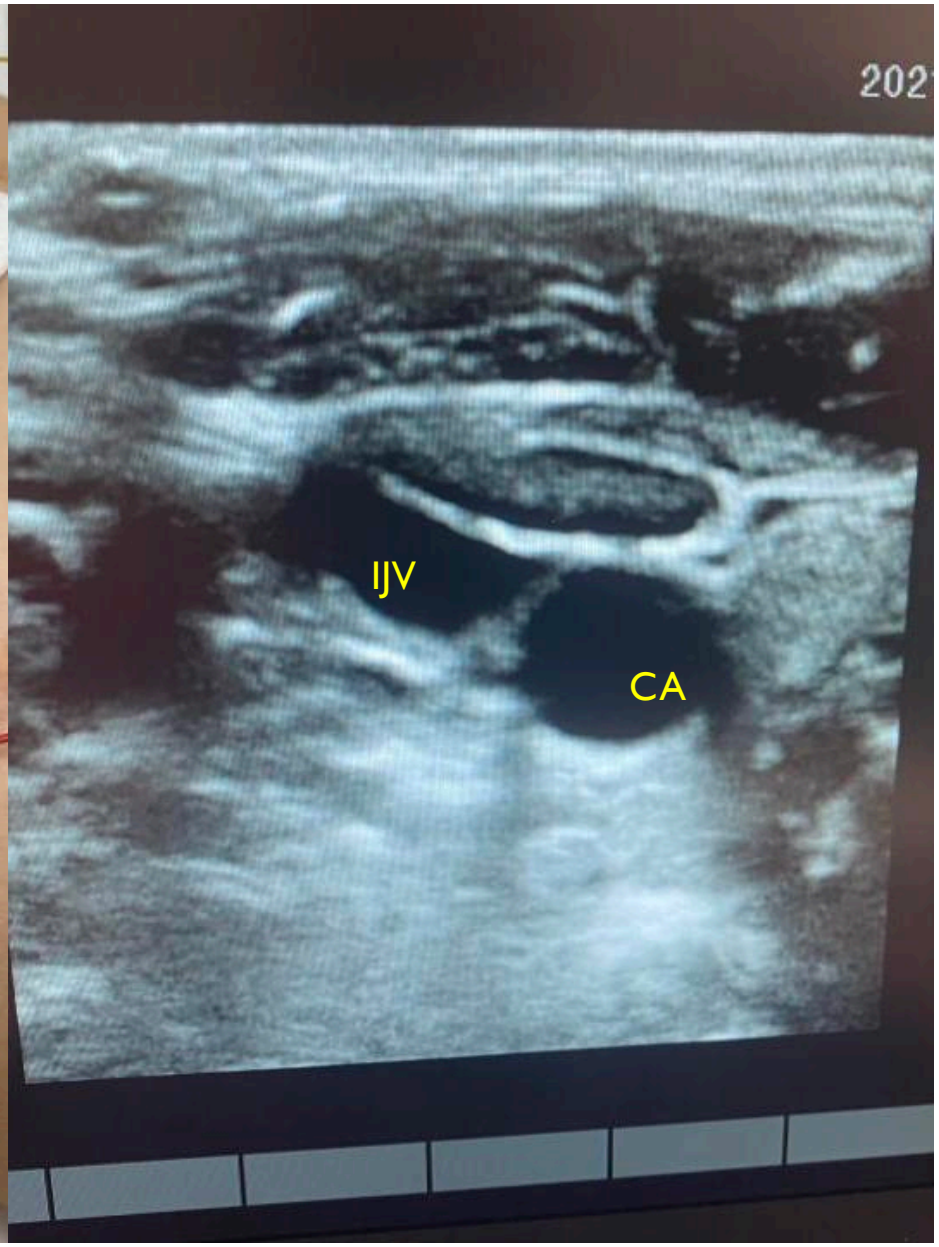
Review

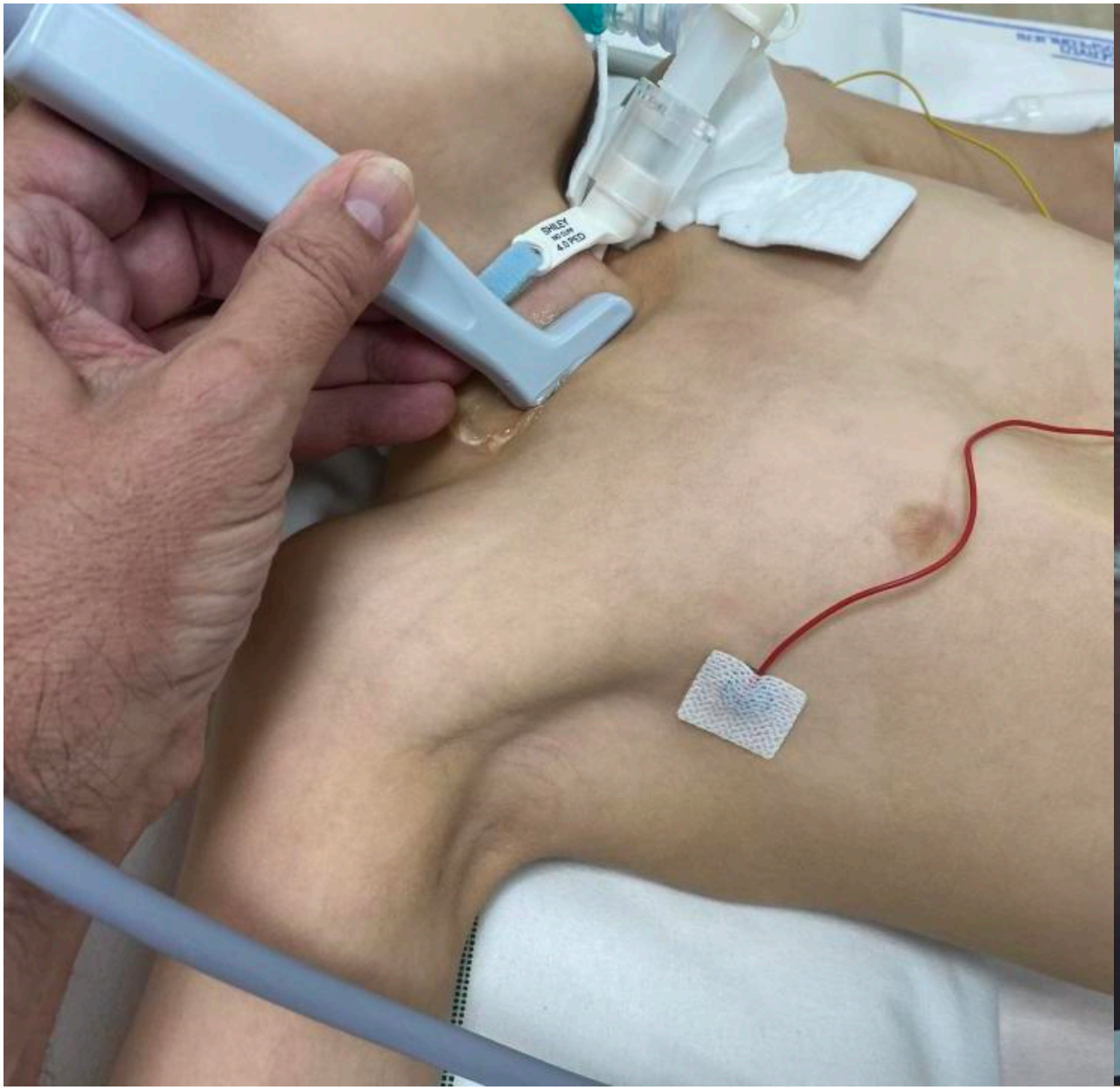
Rapid Central Vein Assessment (RaCeVA): A systematic, standardized approach for ultrasound assessment before central venous catheterization

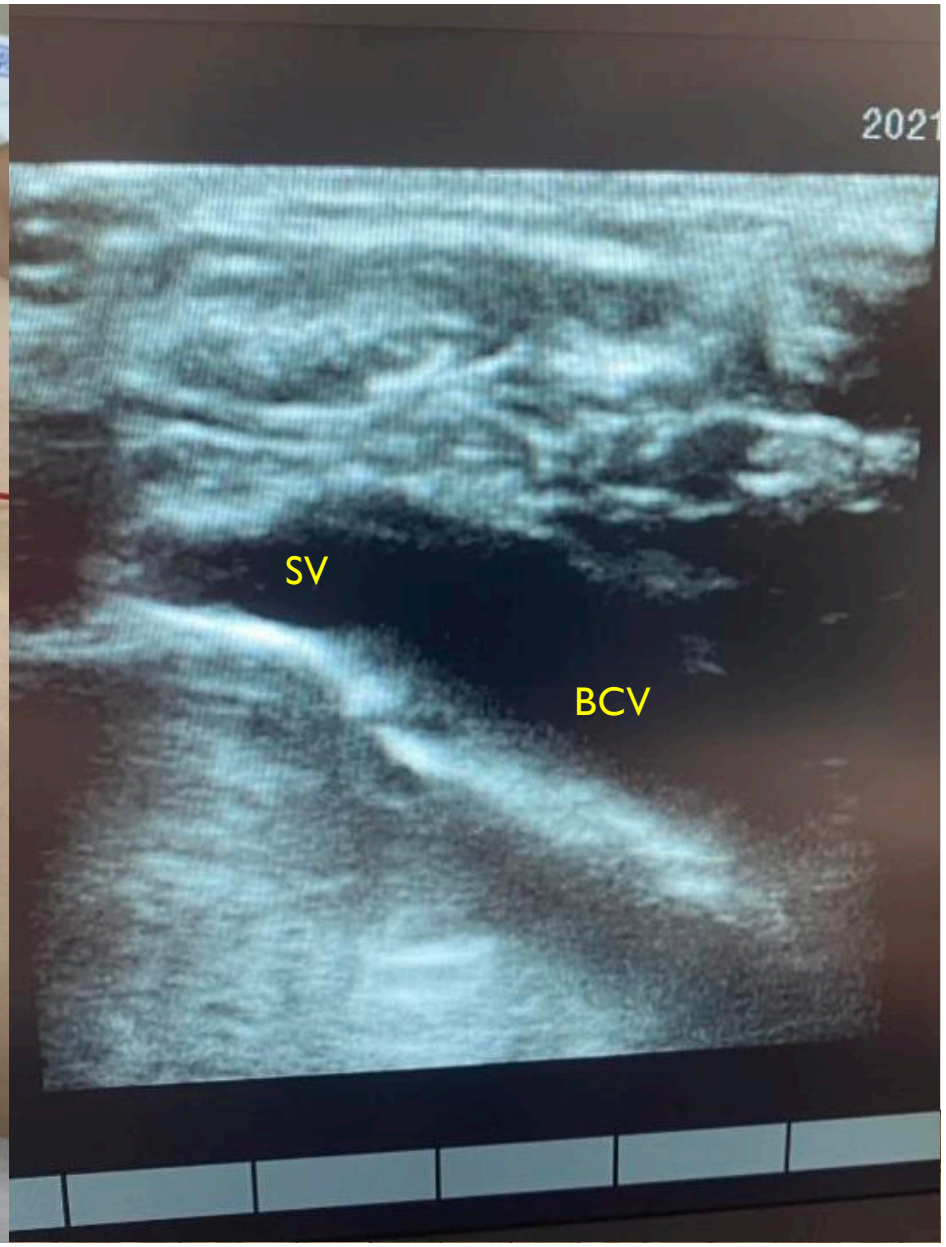
The Journal of Vascular Access
2019, Vol. 20(3) 239–249

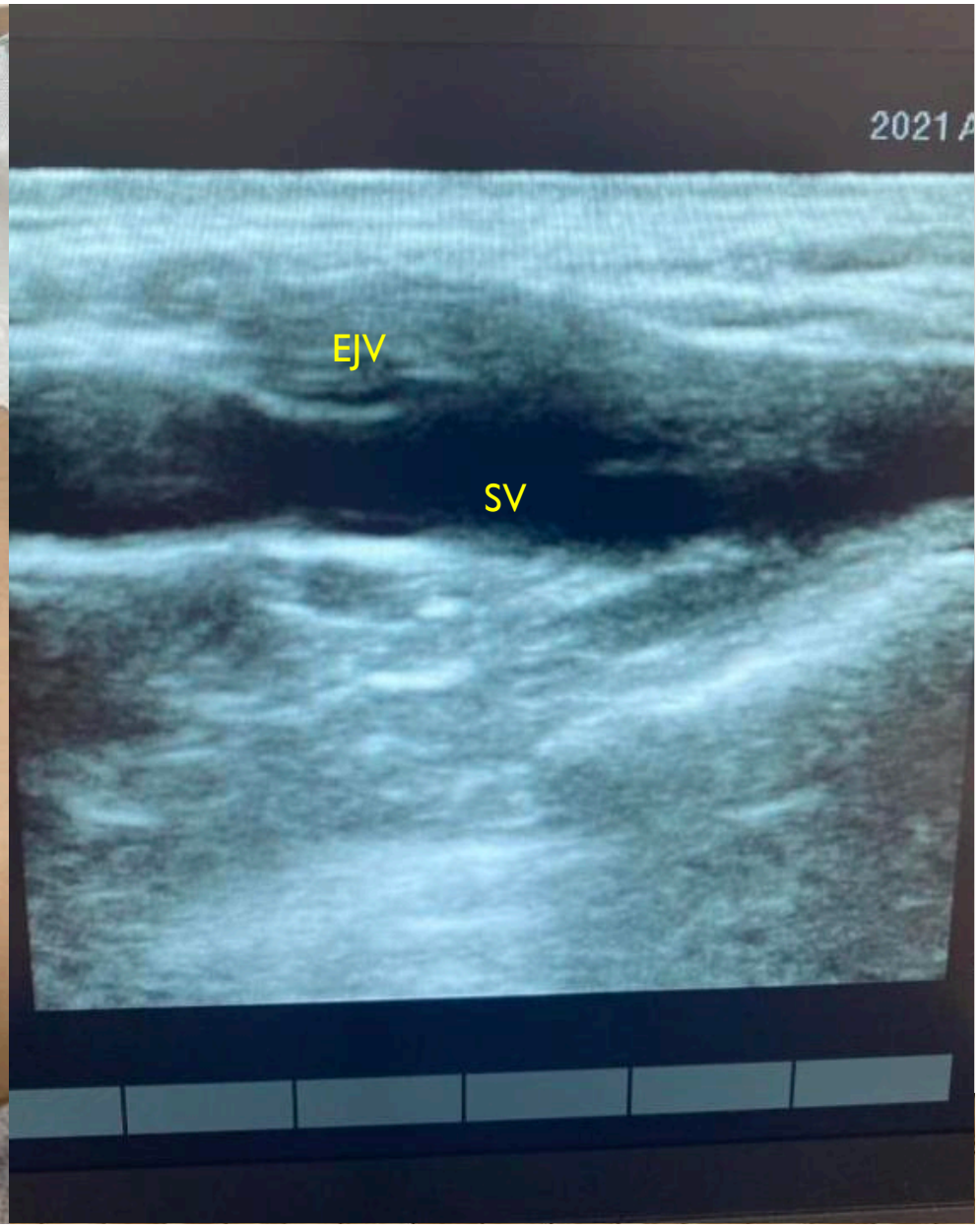
DOI: 10.1177/1129729818804718
journals.sagepub.com/home/jva
SAGE

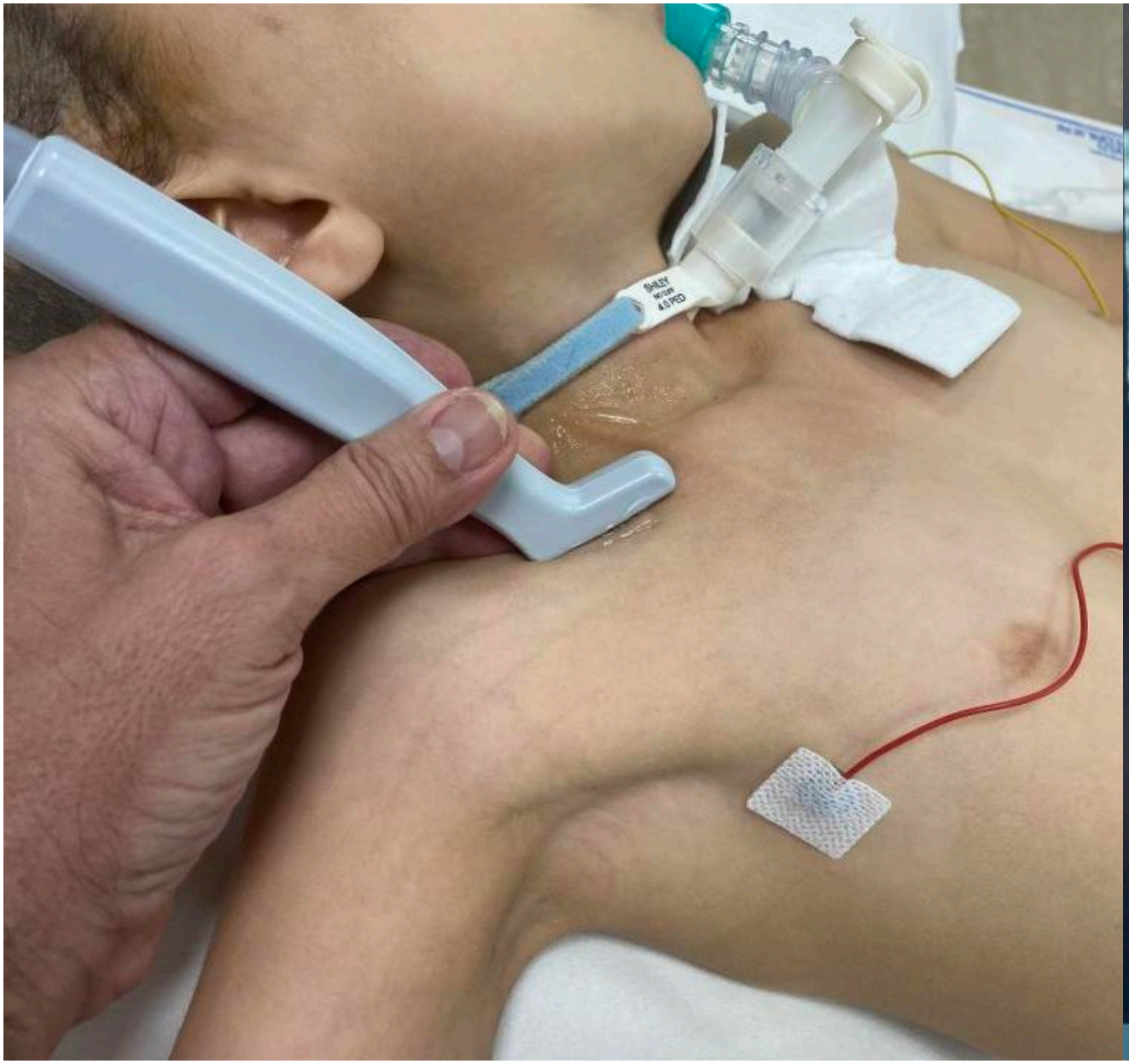
Timothy R Spencer[1] and Mauro Pittiruti[2]

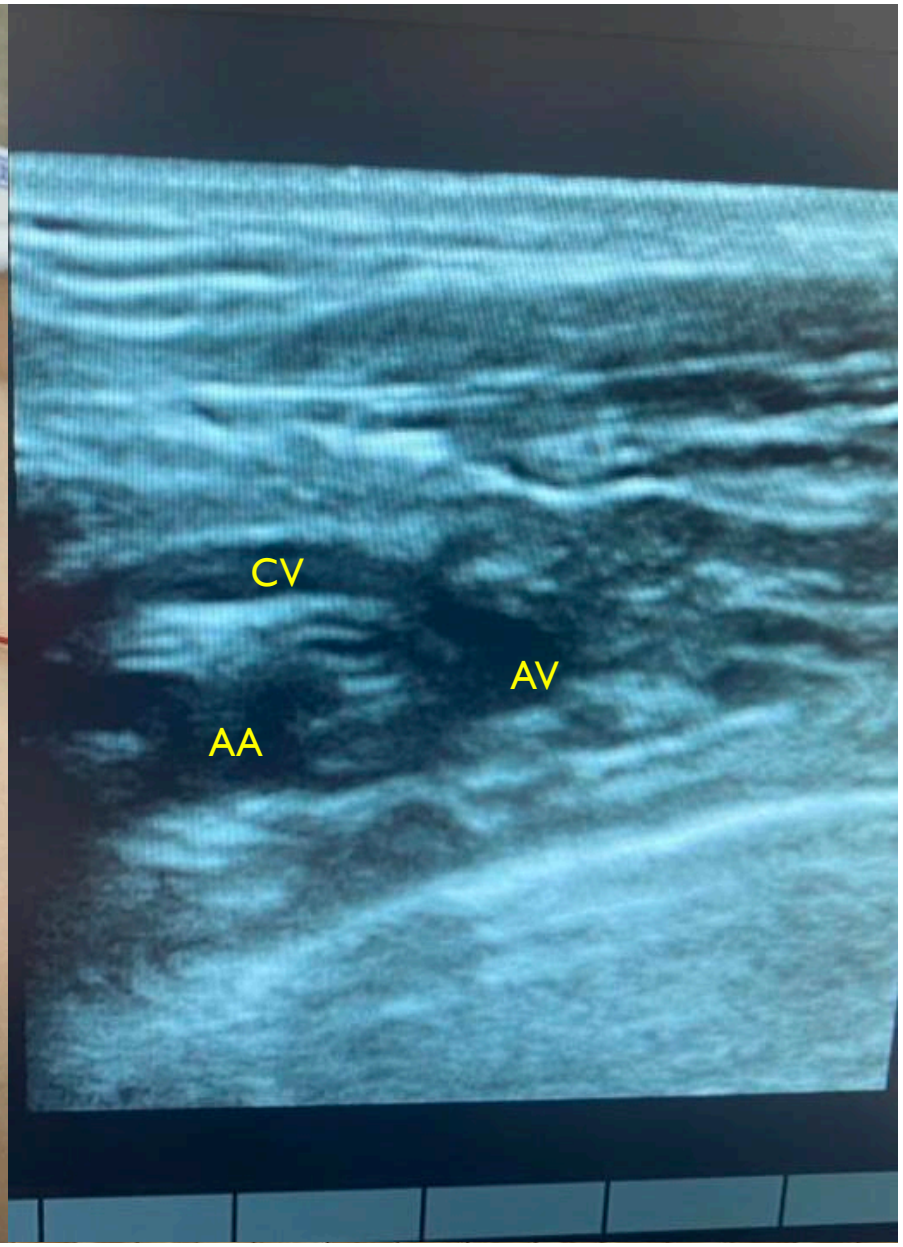

IJV
CA




SV
BCV


2021
EJV
SV




CV
AV
AA

2022

JVA The Journal of Vascular Access

Editorial

The SIP protocol update: Eight strategies, incorporating Rapid Peripheral Vein Assessment (RaPeVA), to minimize complications associated with peripherally inserted central catheter insertion

Fabrizio Brescia[1], Mauro Pittiruti[2], Timothy R Spencer[3] and Robert B Dawson[4]

The Journal of Vascular Access
1–9

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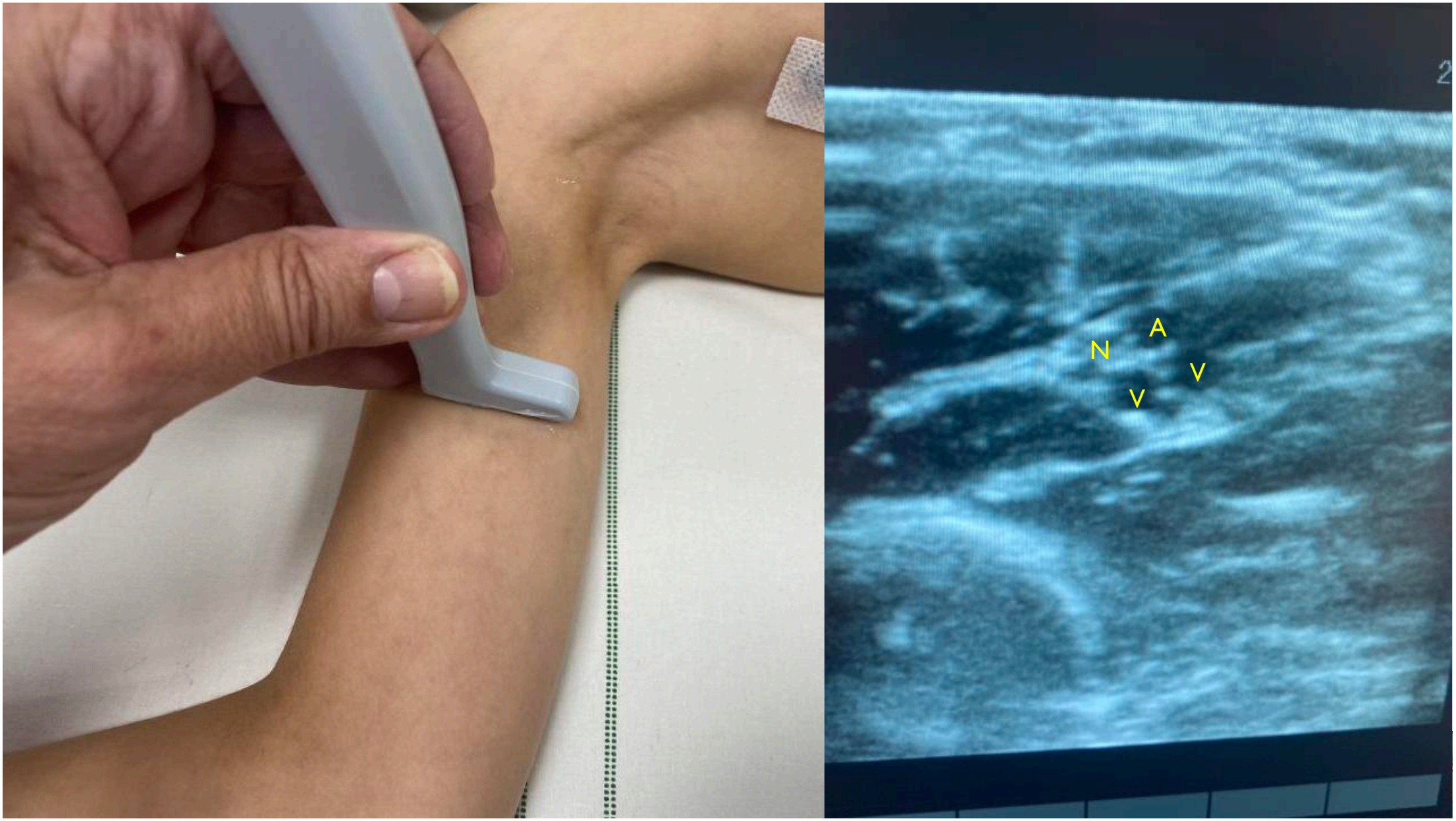
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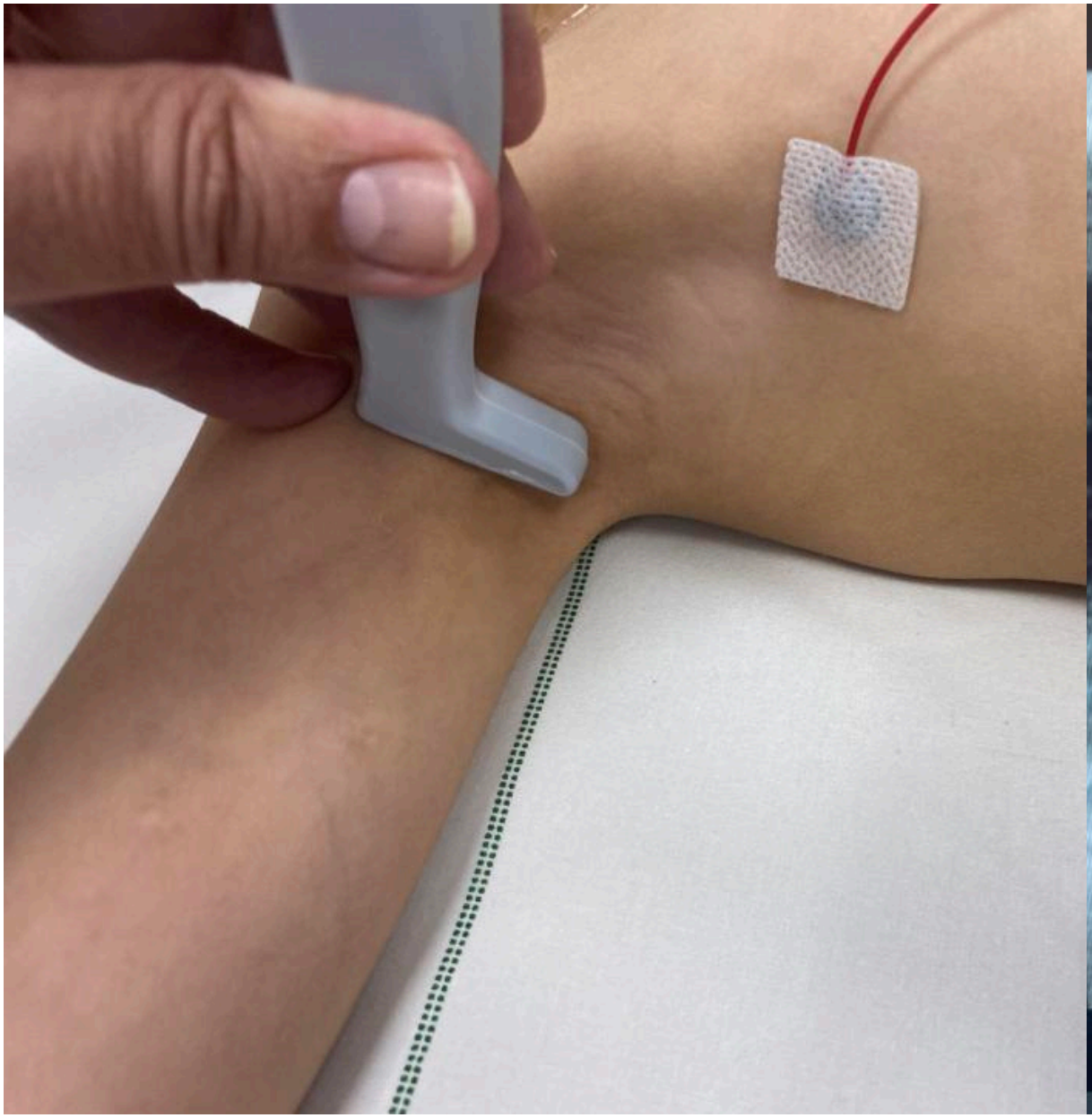

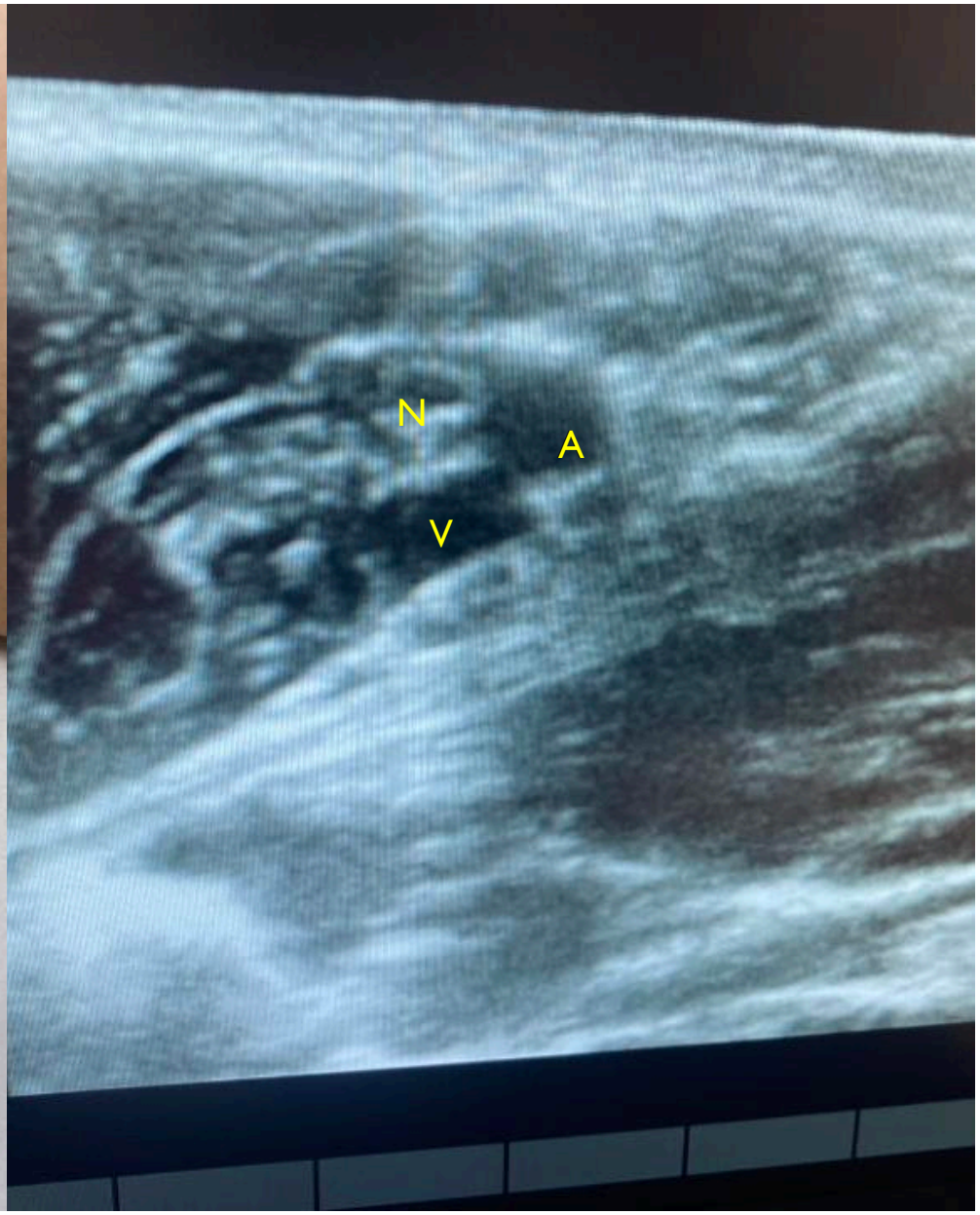
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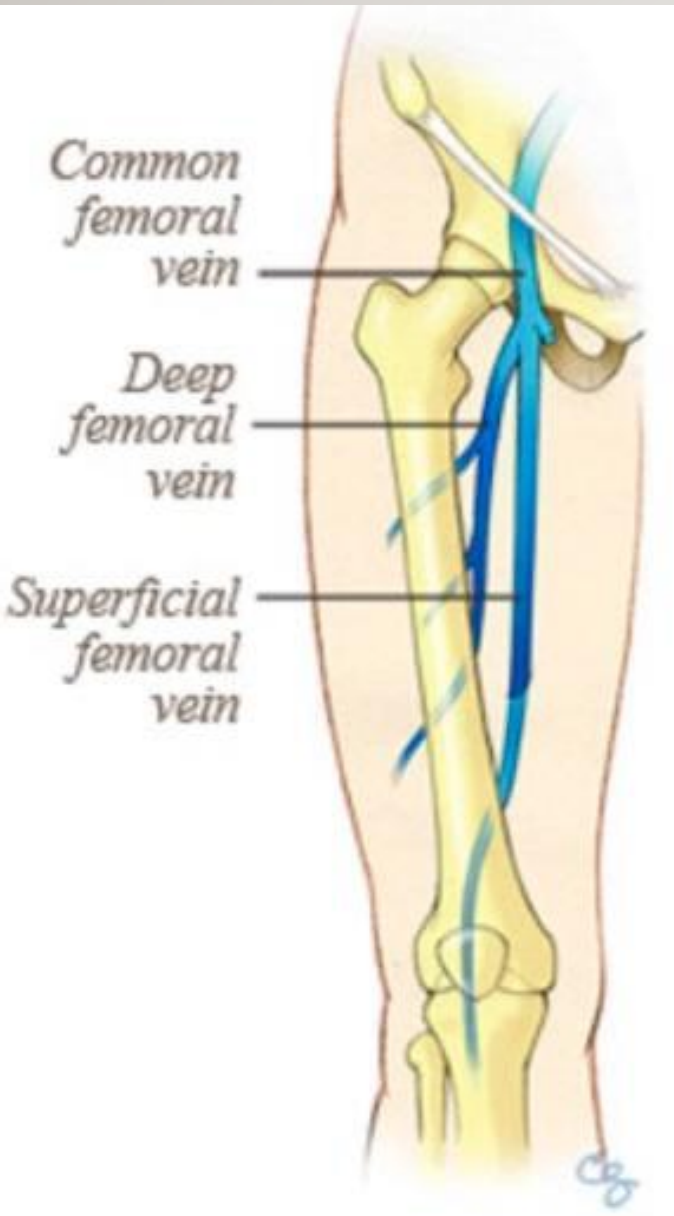

Editorial

JVA The Journal of Vascular Access

Rapid Femoral Vein Assessment (RaFeVA): A systematic protocol for ultrasound evaluation of the veins of the lower limb, so to optimize the insertion of femorally inserted central catheters

The Journal of Vascular Access
1–10

DOI: 10.1177/1129729820965063
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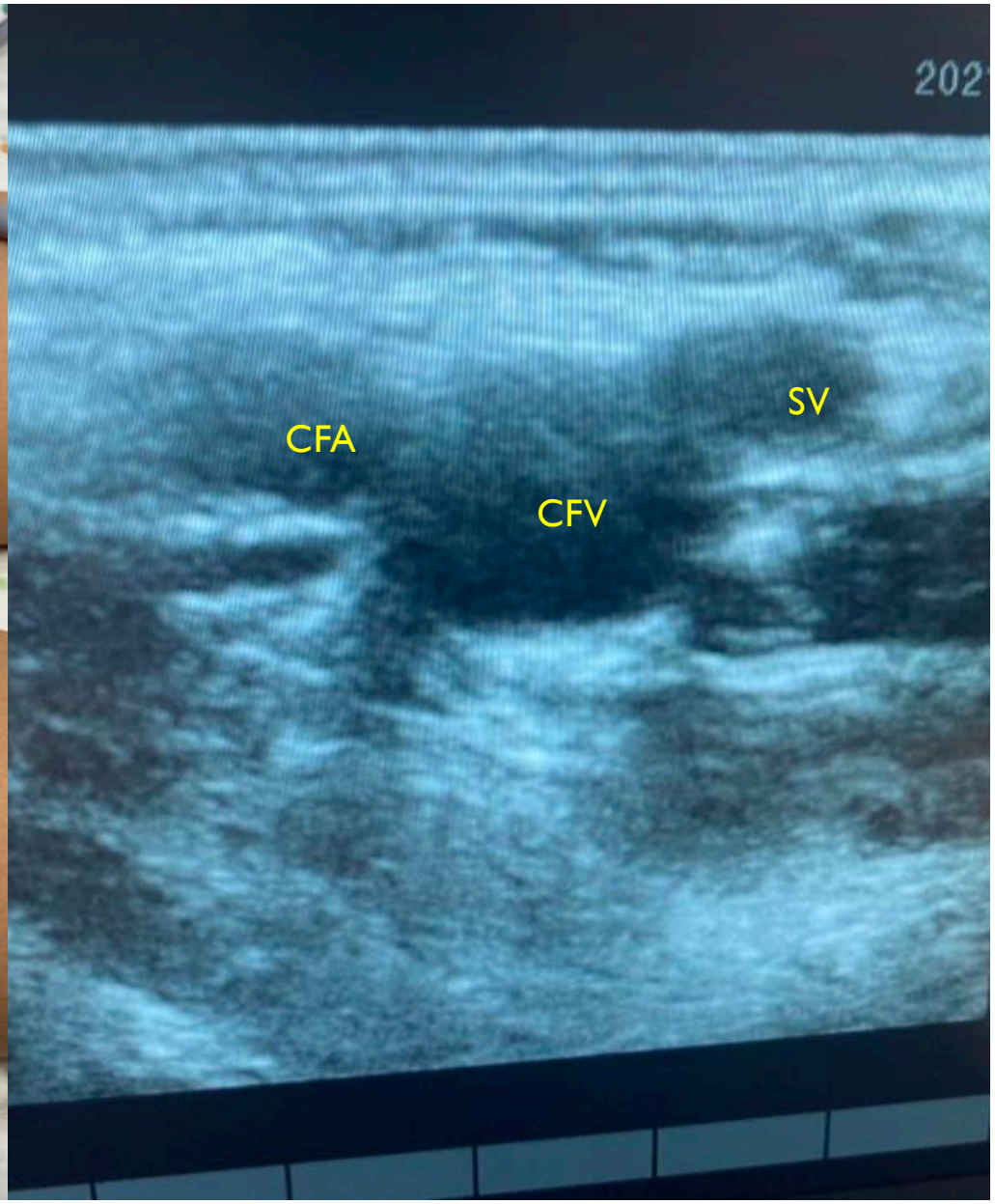
2020

Fabrizio Brescia[1], Mauro Pittiruti[2], Matthew Ostroff[3] and Daniele G Biasucci[4]

vena femorale comune (inguine)
vena femorale superficiale (metà coscia)


Pampers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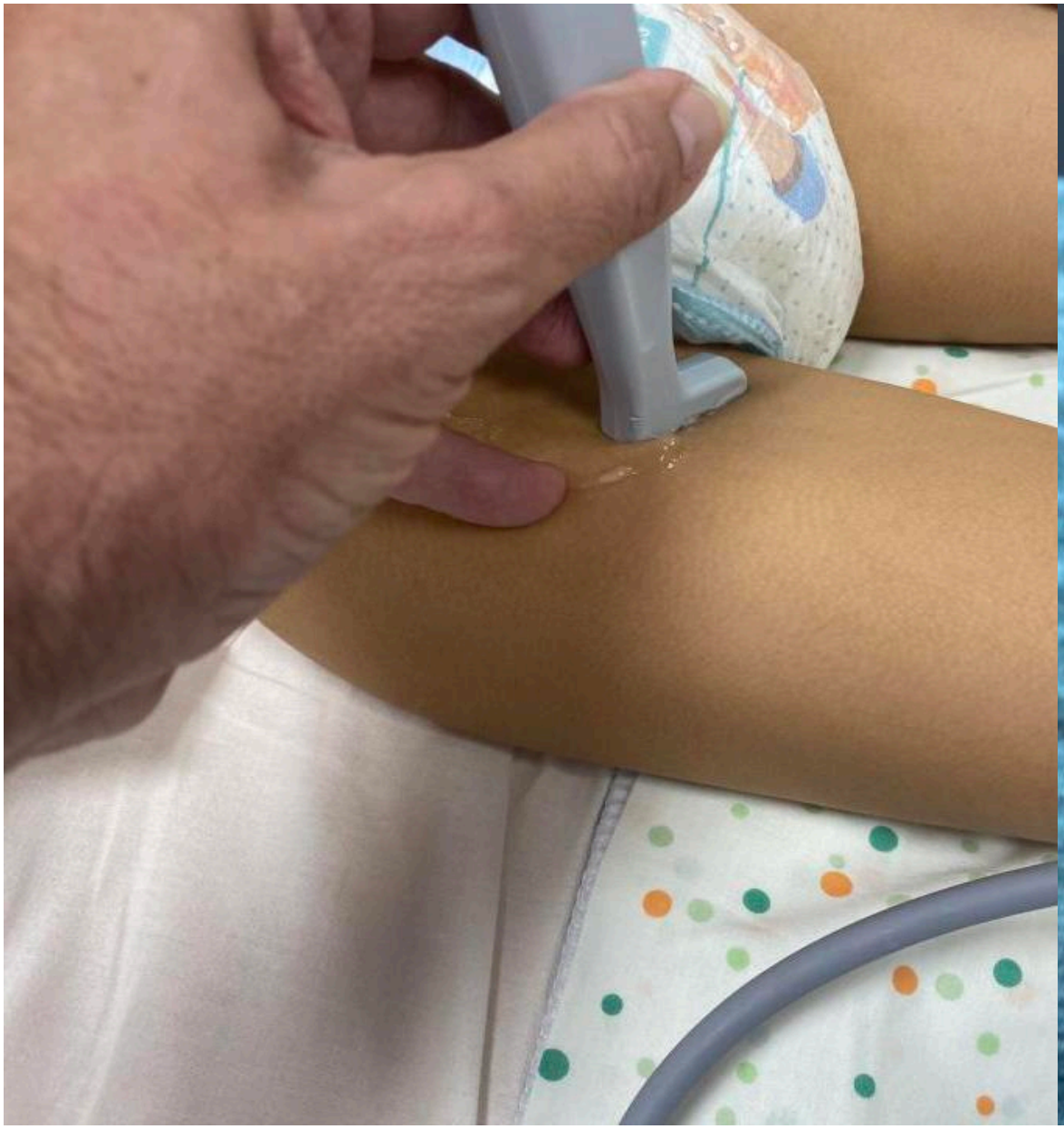

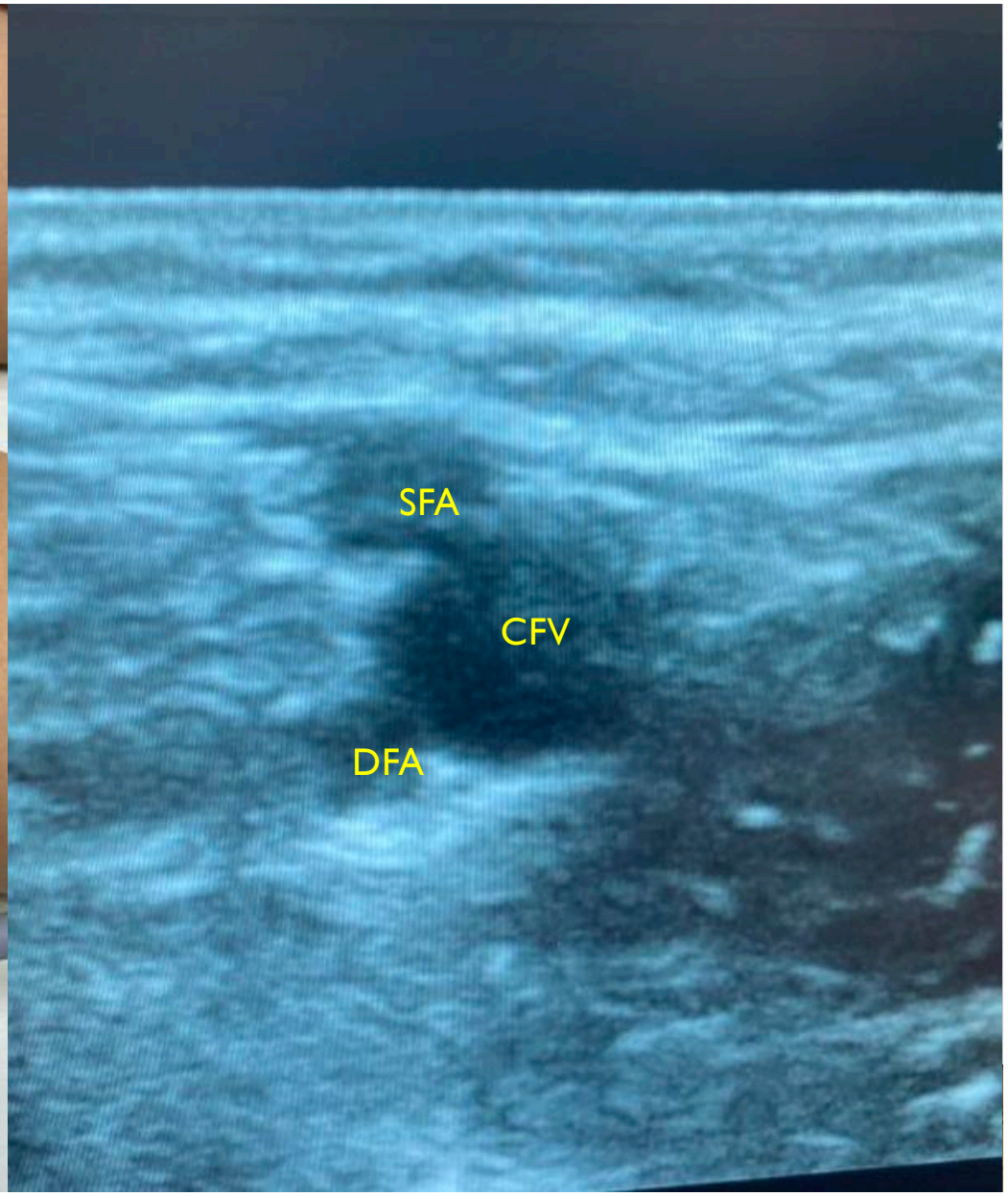
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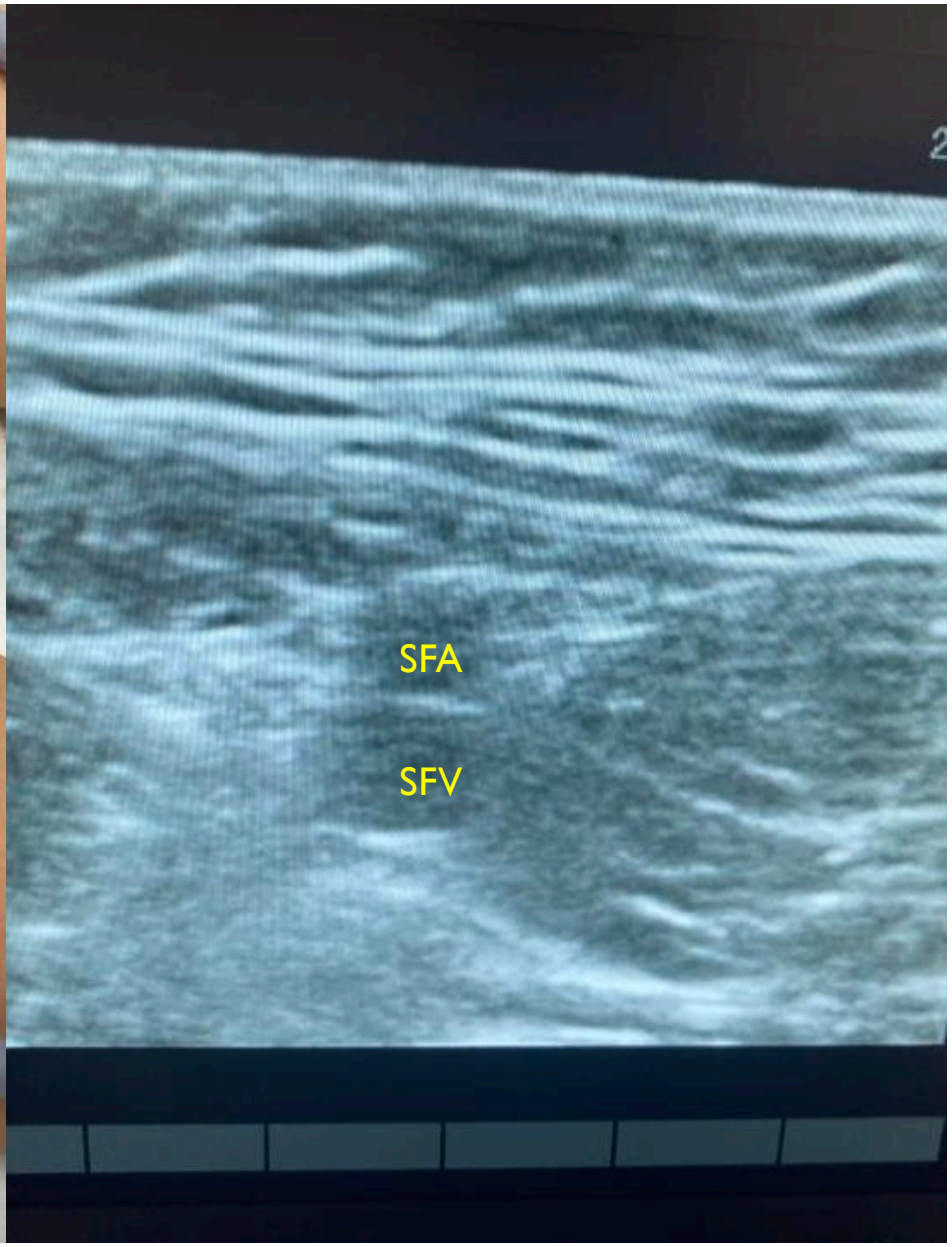
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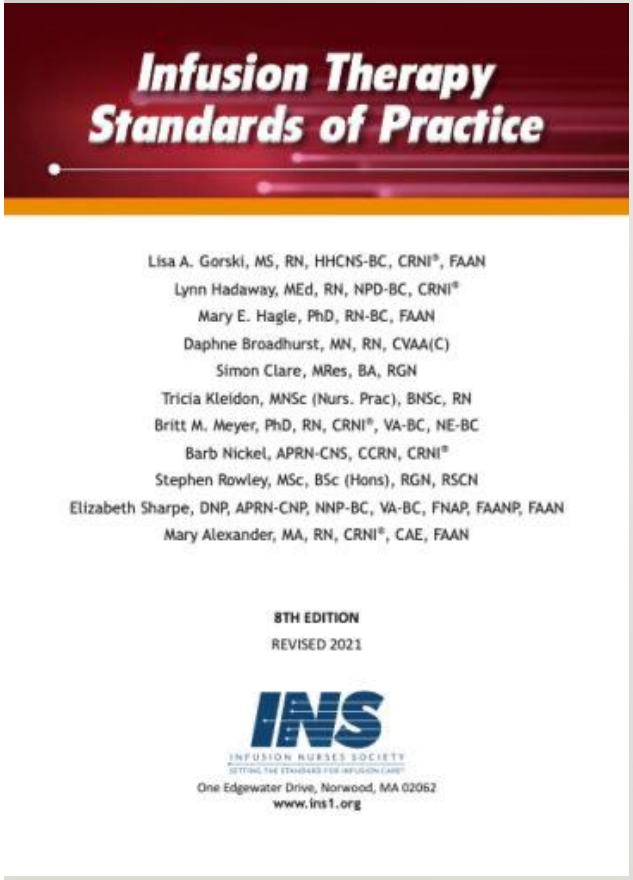


G. Use real-time ultrasound guidance and a systematic approach to insertion of CVADs in adults and children to improve insertion success rates, reduce number of needle punctures, and decrease insertion complication rates.[9,10,37-39] (I)

2021


SoGeSi

Techniques in vascular access

JVA | The Journal of Vascular Access

Ultrasound-guided cannulation of the superficial femoral vein for central venous access

The Journal of Vascular Access
1–8

DOI: 10.1177/11297298211003745
journals.sagepub.com/home/jva
SAGE

Maria Giuseppina Annetta, Bruno Marche, Laura Dolcetti, Cristina Taraschi, Antonio La Greca, Andrea Musarò, Alessandro Emoli, Giancarlo Scoppettuolo and Mauro Pittiruti

2021

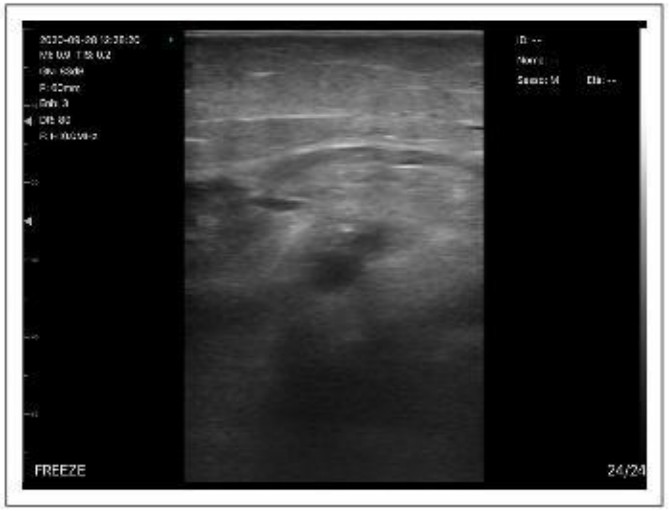


Figure 1. Ultrasound visualization of right superficial femoral artery and right superficial femoral vein at mid-thigh, in short axis: the vein is placed below the artery, slightly lateral.

Figure 3. Visualization of the vein in short axis, using wireless probe.

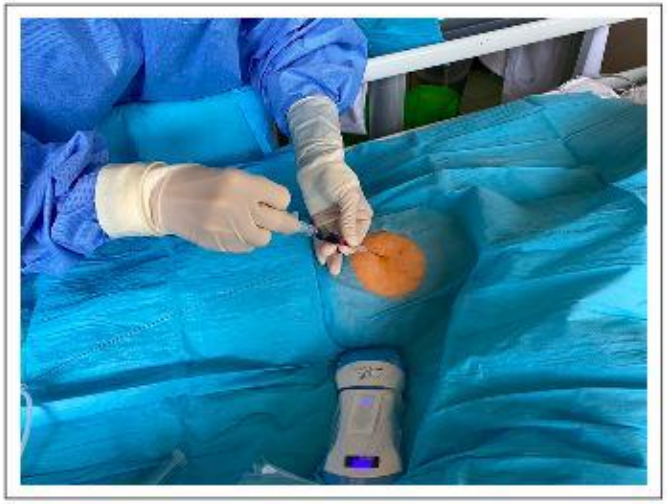


Figure 4. Venipuncture with 21G needle.

CONTROLLO ECOGRAFICO DELLA ASSENZA DI DANNI PLEURO-POLMONARI

JVA
ISSN 1129-7298

J Vasc Access 2014; 00 (00): 000-000
DOI: 10.5301/jva.5000314

ORIGINAL ARTICLE

2014

Central venous access devices in pediatric malignancies: a position paper of Italian Association of Pediatric Hematology and Oncology

Alessandro Crocoli[1], Assunta Tornesello[2], Mauro Pittiruti[3], Angelica Barone[4], Paola Muggeo[5], Alessandro Inserra[1], Angelo Claudio Molinari[6], Valeria Grillenzoni[7], Viviana Durante[8], Maria Pia Cicalese[9], Giulio Andrea Zanazzo[10], Simone Cesaro[7]

Soon after procedures potentially associated with pleural damage, pneumothorax should be excluded by ultrasound scan of the inter-costal space.

Singh *et al. Critical Care* (2020) 24:65
https://doi.org/10.1186/s13054-020-2787-9

2020

Critical Care

RESEARCH Open Access

International evidence-based guidelines on Point of Care Ultrasound (POCUS) for critically ill neonates and children issued by the POCUS Working Group of the European Society of Paediatric and Neonatal Intensive Care (ESPNIC)

Yogen Singh[1,2*†], Cecile Tissot[3†], María V. Fraga[4], Nadya Yousef[5], Rafael Gonzalez Cortes[6], Jorge Lopez[6], Joan Sanchez-de-Toledo[7], Joe Brierley[8], Juan Mayordomo Colunga[9], Dusan Raffaj[10], Eduardo Da Cruz[11], Philippe Durand[12], Peter Kenderessy[13], Hans-Joerg Lang[14], Akira Nishisaki[15], Martin C. Kneyber[16], Pierre Tissieres[12], Thomas W. Conlon[15] and Daniele De Luca[5,17]

POCUS is helpful to accurately detect pneumothorax in neonates and children—*strong agreement (quality of evidence B).* In adults, LUS has a high diagnostic accuracy for the diagnosis of pneumothorax [88, 89] and has been reported to be more sensitive than conventional radiology [90]. Neonatal data confirm this high diagnostic performance for tension pneumothorax [91].

EJA

Eur J Anaesthesiol 2020; **37**:344–376

GUIDELINES

European Society of Anaesthesiology guidelines on peri-operative use of ultrasound-guided for vascular access (PERSEUS vascular access)

Massimo Lamperti, Daniele Guerino Biasucci, Nicola Disma, Mauro Pittiruti, Christian Breschan, Davide Vailati, Matteo Subert, Vilma Traškaitė, Andrius Macas, Jean-Pierre Estebe, Regis Fuzier, Emmanuel Boselli and Philip Hopkins

2020

Should ultrasound be used for verification of immediate postprocedural life-threatening complications after central venous catheterisation?

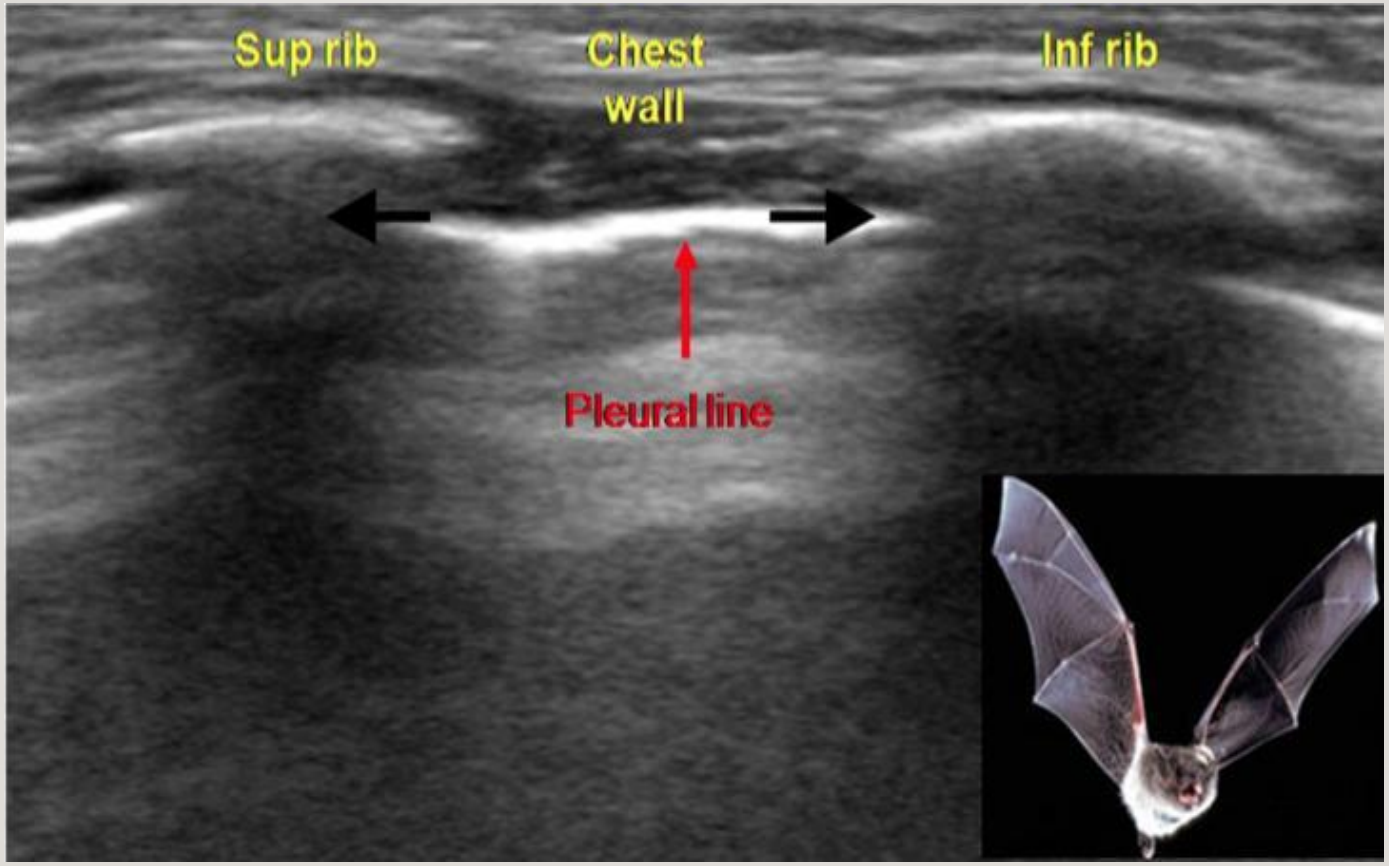
Recommendations

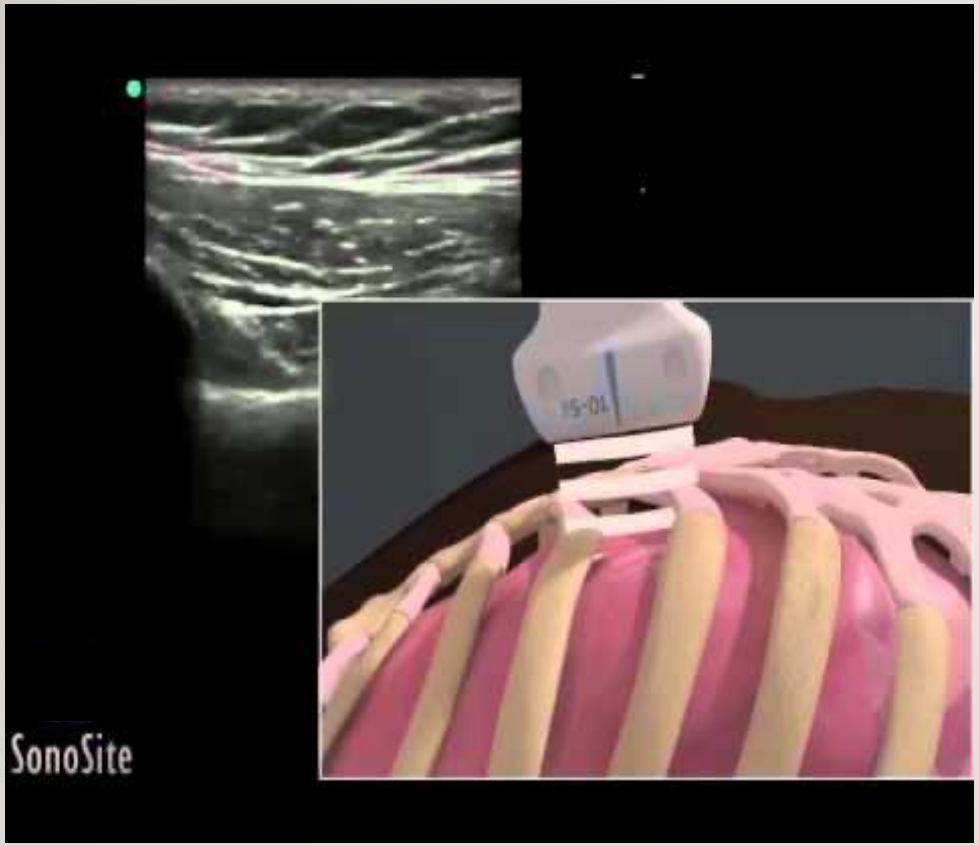
(1) The quality of evidence on which to base recommendations is generally weak, with prospective cohort studies with a high degree of heterogeneity.

(2) We recommend performing PLUS to rule out potential pleural-pulmonary complications (mainly pneumothorax) soon after the procedure in any difficult puncture of the subclavian or axillary vein and, particularly, if the patient complains of shortness of breath or discomfort that worsens after catheter placement **(1B).**

(3) We recommend using PLUS to monitor the development of a confirmed pleural-pulmonary complication or for follow-up of treatment **(1B).**

(4) We recommend ultrasound for diagnosis and follow-up of catheter-related thrombosis **(1C).**


Sup rib
Chest wall
Inf rib
Pleural line


SonoSite

2017

2. **The world of <u>pediatric central venous access needs an update</u>, by implementing materials and methods which have become (or are becoming) the standard of care in adults:**

- Consistent adoption of US-guidance for all central venous access devices (PICC, CICC, FICC, ports)
- Adoption of tip location by intracavitary EKG and/or echocardio
- Shift to power injectable polyurethane for all external catheters (the reason for still using fragile silicon catheters like Broviac and Hickman is mysterious)
- Increased use of PICCs as first option central line in all children
- Increased adoption of tunneling for all external catheters (even if non-cuffed)

TIP LOCATION MEDIANTE ECG INTRACAVITARIO NEL BAMBINO - OGGI

JVA
ISSN 1129-7298

J Vasc Access 2014; 00 (00): 000-000
DOI: 10.5301/jva.5000281

ORIGINAL ARTICLE

2014

The intracavitary ECG method for positioning the tip of central venous access devices in pediatric patients: results of an Italian multicenter study

Francesca Rossetti[1], Mauro Pittiruti[2], Massimo Lamperti[3], Ugo Graziano[4], Davide Celentano[5], Giuseppe Capozzoli[6]

[1] Department of Anesthesia, Children's Hospital 'Meyer', Firenze - Italy
[2] Department of Surgery, Catholic University Hospital, Roma - Italy
[3] Department of Neuroanesthesia, Neurological Institute 'Besta', Milano - Italy
[4] Department of Surgery, Children's Hospital 'Santobono', Napoli - Italy
[5] Pediatric Intensive Care Unit, Catholic University Hospital, Roma - Italy
[6] Department of Anesthesia and Intensive Care, Ospedale Civile di Bolzano, Bolzano - Italy

UN PUNTO MOLTO CHIARO

Abbandonare la fluoroscopia !

- Più costosa
- Più scomoda
- Meno costo-efficace
- Più pericolosa
- Meno accurata della tecnica ECG e dell'ecocardio

AHRQ recommendations

2013

Annals of Internal Medicine | SUPPLEMENT

The Top Patient Safety Strategies That Can Be Encouraged for Adoption Now

Paul G. Shekelle, MD, PhD; Peter J. Pronovost, MD, PhD; Robert M. Wachter, MD; Kathryn M. McDonald, MM; Karen Schoelles, MD, SM; Sydney M. Dy, MD, MSc; Kaveh Shojania, MD; James T. Reston, PhD, MPH; Alyce S. Adams, PhD; Peter B. Angood, MD; David W. Bates, MD, MSc; Leonard Bickman, PhD; Pascale Carayon, PhD; Sir Liam Donaldson, MBChB, MSc, MD; Naihua Duan, PhD; Donna O. Farley, PhD, MPH; Trisha Greenhalgh, BM BCH; John L. Haughom, MD; Eileen Lake, PhD, RN; Richard Lilford, PhD; Kathleen N. Lohr, PhD, MA, MPhil; Gregg S. Meyer, MD, MSc; Marlene R. Miller, MD, MSc; Duncan V. Neuhauser, PhD, MBA, MHA; Gery Ryan, PhD; Sanjay Saint, MD, MPH; Stephen M. Shortell, PhD, MPH, MBA; David P. Stevens, MD; and Kieran Walshe, PhD

Table 2. Patient Safety Strategies Ready for Adoption Now

Strongly encouraged

- Preoperative checklists and anesthesia checklists to prevent operative and postoperative events
- Bundles that include checklists to prevent central line–associated bloodstream infections
- Interventions to reduce urinary catheter use, including catheter reminders, stop orders, or nurse-initiated removal protocols
- Bundles that include head-of-bed elevation, sedation vacations, oral care with chlorhexidine, and subglottic suctioning endotracheal tubes to prevent ventilator-associated pneumonia
- Hand hygiene
- The do-not-use list for hazardous abbreviations
- Multicomponent interventions to reduce pressure ulcers
- Barrier precautions to prevent health care–associated infections
- Use of real-time ultrasonography for central line placement
- Interventions to improve prophylaxis for venous thromboembolisms

Encouraged

- Multicomponent interventions to reduce falls
- Use of clinical pharmacists to reduce adverse drug events
- Documentation of patient preferences for life-sustaining treatment
- Obtaining informed consent to improve patients' understanding of the potential risks of procedures
- Team training
- Medication reconciliation
- Practices to reduce radiation exposure from fluoroscopy and CT
- The use of surgical outcome measurements and report cards, such as those from ACS NSQIP
- Rapid-response systems
- Use of complementary methods for detecting adverse events or medical errors to monitor for patient safety problems
- Computerized provider order entry
- Use of simulation exercises in patient safety efforts

INS 2016

Use methods for identifying CVAD tip location during the insertion procedure (ie, "real time") due to greater accuracy, more rapid initiation of infusion therapy, and reduced costs.

1. Use electrocardiogram (ECG) methods with either a metal guidewire or a column of normal saline inside the catheter lumen and observe the ECG tracing to place the CVAD tip at the CAJ. Follow manufacturers' directions for use with other ECG-based technology using a changing light pattern to detect tip location.

INS 2016

Avoid fluoroscopy except in the case of difficult CVAD insertions, as it requires exposure to ionizing radiation.

Postprocedure radiograph imaging is not necessary if alternative tip location technology confirms proper tip placement.[3,12-18] (II)

TIP NAVIGATION E TIP LOCATION MEDIANTE ECOGRAFIA NEL BAMBINO - OGGI

2020

EJA

Eur J Anaesthesiol 2020; **37**:344–376

GUIDELINES

European Society of Anaesthesiology guidelines on peri-operative use of ultrasound-guided for vascular access (PERSEUS vascular access)

Massimo Lamperti, Daniele Guerino Biasucci, Nicola Disma, Mauro Pittiruti, Christian Breschan, Davide Vailati, Matteo Subert, Vilma Traškaitė, Andrius Macas, Jean-Pierre Estebe, Regis Fuzier, Emmanuel Boselli and Philip Hopkins

Recommendations

(1) The quality of evidence on which to base recommendations is generally weak, with relatively small RCTs and prospective cohort studies that have a high degree of heterogeneity.

(2) When an intracardiac electrocardiogram is not applicable, we recommend using real-time ultrasound to detect and prevent central venous catheter malposition, as it has been shown to be well tolerated, feasible, quickly performed and interpreted at bedside, and more accurate and faster than a chest radiograph **(1C).**

(3) We recommend combining vascular ultrasound for guidewire and central venous line tip navigation with transthoracic echocardiography for tip location **(1C).**

2021

JVA | The Journal of Vascular Access

Editorial

The Journal of Vascular Access
1–9

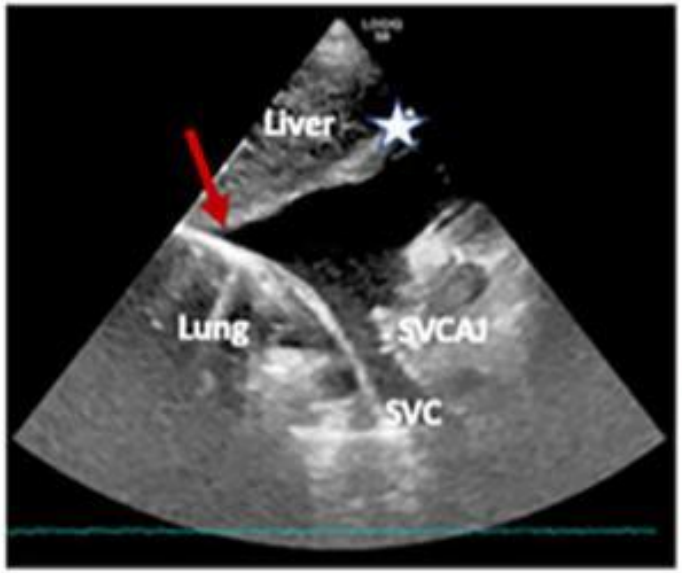
DOI: 10.1177/11297298211031391
journals.sagepub.com/home/jva
SAGE

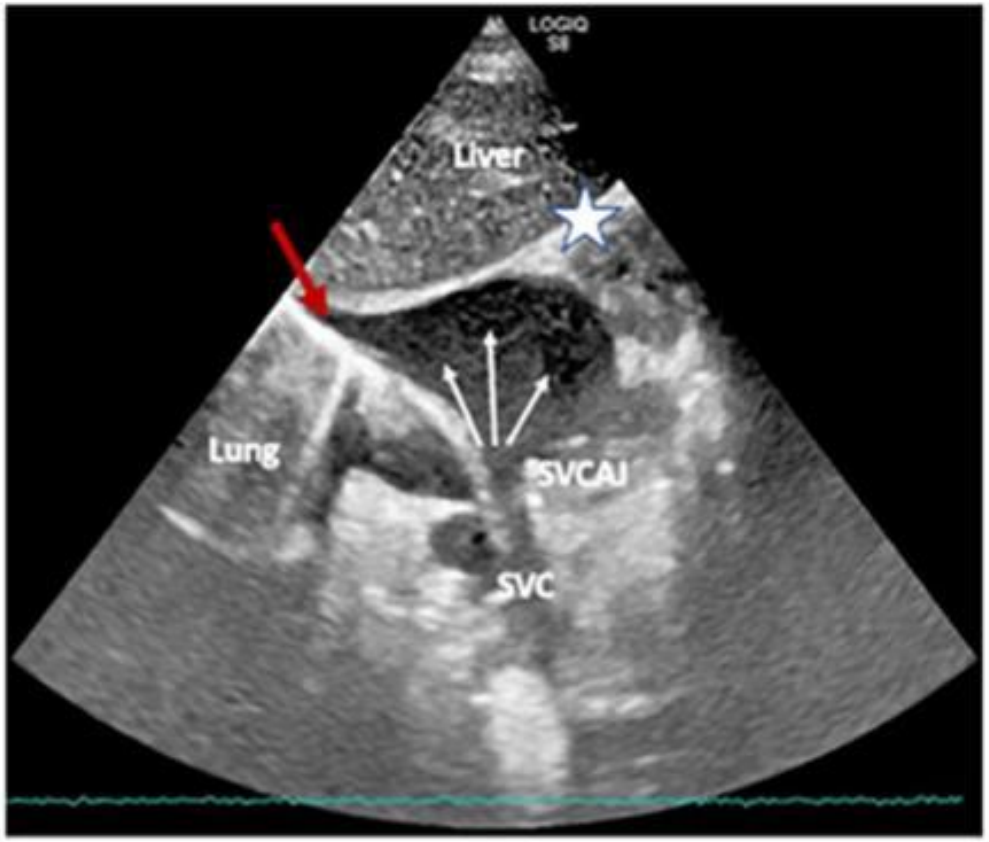
ECHOTIP-Ped: A structured protocol for ultrasound-based tip navigation and tip location during placement of central venous access devices in pediatric patients

Geremia Zito Marinosci[1*], Daniele Guerino Biasucci[2*], Giovanni Barone[3], Vito D'Andrea[4], Daniele Elisei[5], Emanuele Iacobone[5], Antonio La Greca[6] and Mauro Pittiruti[6]

CVC	Protocol	Probe	Windows
CICC	Tip navigation	Linear "hockey stick" probe, 10–14 MHz	Same acoustic windows as RaCeVA
	Tip location	Micro-convex probe, 4–8 MHz, or small sectorial probe, 3–7 MHz	Subcostal bi-caval view (recommended) or four-chambers apical view (as alternative option)
PICC	Tip navigation	Linear "hockey stick" probe, 10–14 MHz	Same acoustic windows as RaPeVA and RaCeVA
	Tip location	Micro-convex probe, 4–8 MHz, or small sectorial probe, 3–7 MHz	Subcostal bi-caval view (recommended) or four-chambers apical view (as alternative option)
FICC	Tip navigation	Linear "hockey stick" probe, 10–14 MHz, or micro-convex probe, 4–8 MHz	Short + long axis views of the femoral vein and external iliac vein; and short + long axis views of IVC
	Tip location	Micro-convex probe, 4–8 MHz	Subcostal longitudinal view of the IVC

PICC: peripherally inserted central catheter; RaCeVA: rapid central vein assessment; RaPeVA: rapid peripheral vein assessment; CICC: centrally inserted central catheter; FICC: femoral inserted central catheter; IVC: inferior vena cava.


Liver
Lung
SVCAJ
SVC


Liver
Lung
SVCAJ
SVC

JVA The Journal of Vascular Access

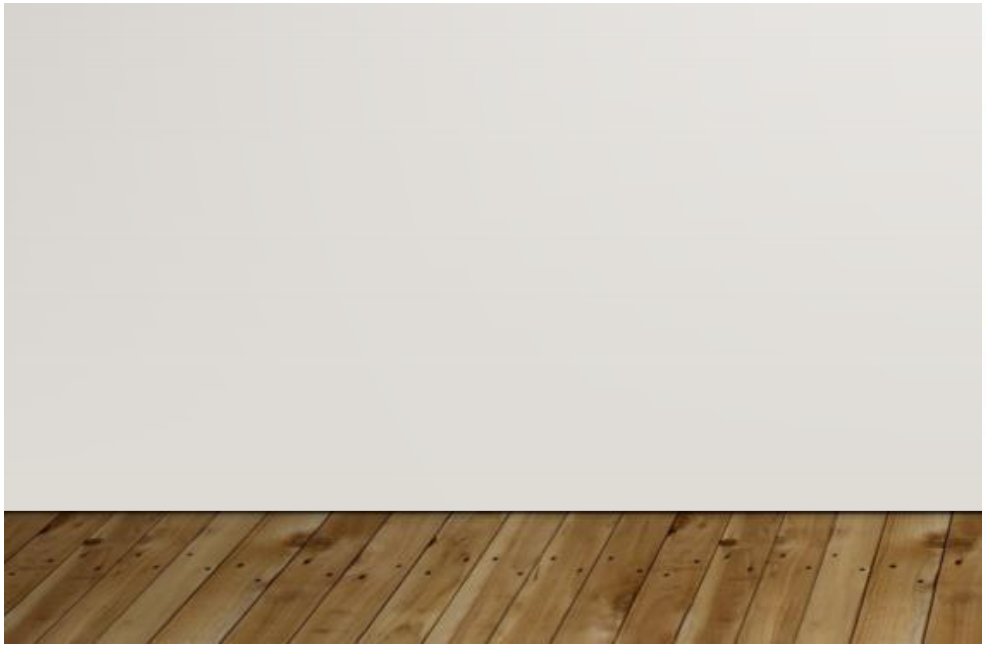
Techniques in vascular access

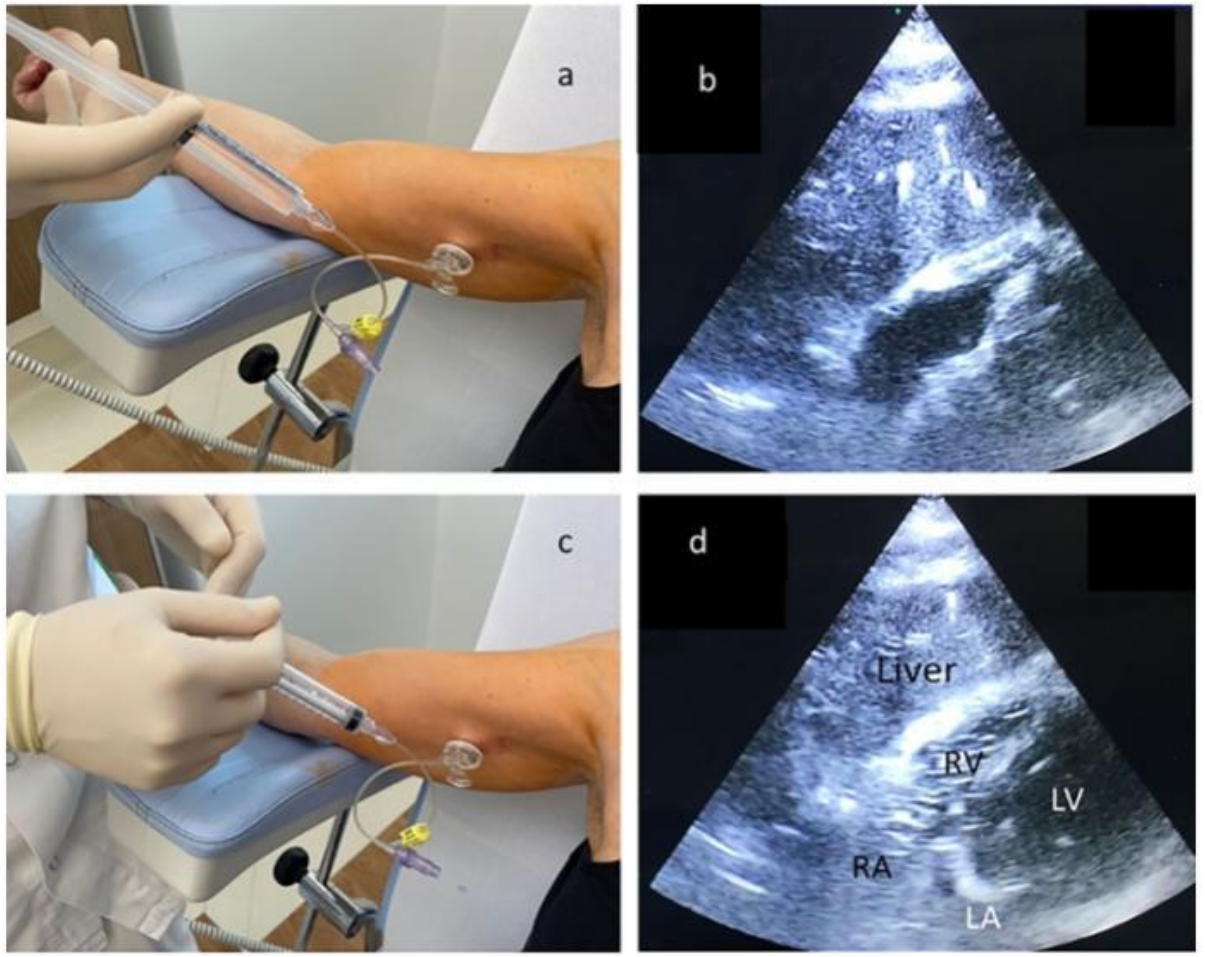
An ultrasound-based technique in the management of totally implantable venous access devices with persistent withdrawal occlusion

Sonia D'Arrigo[1], Maria Giuseppina Annetta[1] and Mauro Pittiruti[2]

The Journal of Vascular Access
1–5

2021





JVA 2021 in press

Ultrasound vs. intracavitary electrocardiography for intraprocedural tip location during central venous catheterization in infants and children: a prospective clinical study

Journal:	*The Journal of Vascular Access*
Manuscript ID	JVA-22-0335.R1
Manuscript Type:	Original Research Article
Date Submitted by the Author:	n/a
Complete List of Authors:	Pittiruti, Mauro; Catholic University Hospital, Rome, Italy, Dept of Surgery Salerno, Gilda; Catholic University Hospital, Rome, Italy Mancino, Aldo; Fondazione Policlinico Universitario Agostino Gemelli, IRCCS , Pediatric Intensive Care Unit Carlini, Debora; Catholic University Hospital, Rome Celentano, Davide; Fondazione Policlinico Universitario Agostino Gemelli IRCCS Annetta , Maria Giuseppina; Policlinico Universitario Agostino Gemelli Conti, Giorgio; Fondazione Policlinico Universitario Agostino Gemelli, IRCCS , Pediatric Intensive Care Unit

JVA 2021 in press

Results: We studied 100 consecutive central venous catheterizations in children of age ranging from one month to 18 years. The applicability of IC-ECG based tip location was 98% and its feasibility 100%; the time required for IC-ECG was 1.9+2 minutes. The applicability of US-based tip location was 96% and its feasibility was 100%; the maneuver required 2.2+3 minutes.

Conclusions: US is an appropriate alternative method for intraprocedural tip location in children. The combined use of US and IC-ECG (both maneuvers being accurate, inexpensive, cost-effective, non-invasive, and equally fast to perform) should be recommended for tip location in pediatric patients, and it will avoid completely the use of fluoroscopy or of post-procedural x-ray.

2017

2. **The world of <u>pediatric central venous access needs an update</u>, by implementing materials and methods which have become (or are becoming) the standard of care in adults:**

- Consistent adoption of US-guidance for all central venous access devices (PICC, CICC, FICC, ports)
- Adoption of tip location by intracavitary EKG and/or echocardio
- Shift to power injectable polyurethane for all external catheters (the reason for still using fragile silicon catheters like Broviac and Hickman is mysterious)
- Increased use of PICCs as first option central line in all children
- Increased adoption of tunneling for all external catheters (even if non-cuffed)

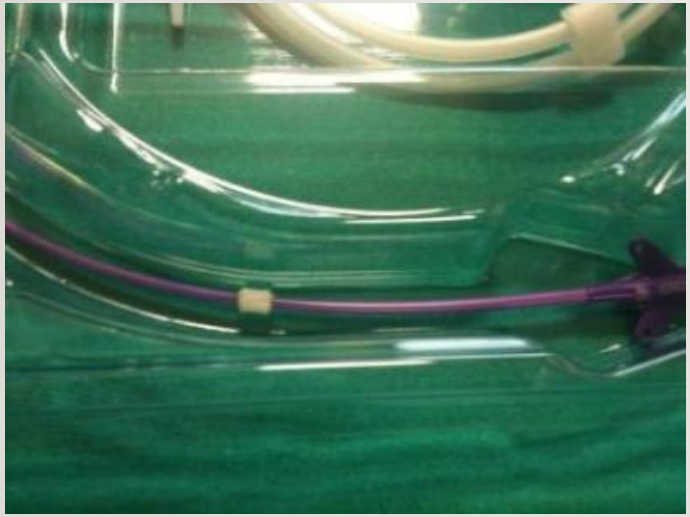
SILICONE E POLIURETANO - OGGI

Ha qualche vantaggio usare silicone invece che il poliuretano? **No**

Svantaggi dei cateteri esterni in silicone rispetto a quelli in poliuretano:

- Più fragili
- Maggior rischio di rotture del tratto esterno
- Maggior rischio di kinking
- Maggior rischio di dislocazione
- Maggior rischio complicanze occlusive
- Più costosi

ABBANDONARE I TUNNELLIZZATI CUFFIATI IN SILICONE: USARE POLIURETANO POWER INJECTABLE



Ann Hematol (2016) 95:817–825
DOI 10.1007/s00277-016-2634-x

ORIGINAL ARTICLE

A comprehensive approach to the prevention of central venous catheter complications: results of 10-year prospective surveillance in pediatric hematology-oncology patients

Simone Cesaro[1,2] · Mara Cavaliere[2] · Anna Pegoraro[1,2] · Piergiorgio Gamba[3] · Nicola Zadra[4] · Gloria Tridello[1,2]

2016

Over a 10-year period, 919 patients (57.3 % males and 42.7 % females) were included in the study: 538 patients (58.5 %) were affected by leukemia or lymphoma, while 381 patients (41.5 %) were affected by solid tumor or non-malignant disease. A total of 1161 newly placed long-term CVCs were inserted for a total of 413,901 CVC-days of observation. The vast majority of CVCs were partially implanted, open-ended, Broviac-Hickman type CVC (95 %). Table 2 lists main patient and CVC characteristics.

complications were managed successfully in most cases and, therefore, were associated with a very low rate of CVC removal (2.3 %). Conversely, mechanical complications, affecting 18.3 % of CVCs, were associated with the highest premature removal rate (77.4 %) and represented 74 % of all CVCs removed due to complications (164 of 223). Mechanical complications, classified as dislocation (80 %), fracture (16 %), kinking (4 %), occurred at a median time of 61 days, range 0–818 from insertion. In six cases (3 %), these episodes happened early, by 48 h from insertion.

Bacteremia affected 14.8 % of CVCs and caused a CVC removal rate of 18.6 %. Among the 172 episodes, 107 (62 %)

SILICONE VS. POLIURETANO

- Nessuna differenza in termini di **rischio infettivo**
- Nessuna differenza in termini di **rischio trombotico**
- Differenza in termini di rischio di **complicanze meccaniche** (rotture, dislocazioni), più frequenti con i cateteri in silicone
- Differenza in termini di rischio di **occlusione** (poliuretano ha minor rischio di occlusione e si associa a più facile disostruzione)

VALVOLATI VS. NON VALVOLATI

- Nessuna differenza in termini di **occlusione**
- Nessuna differenza in termini di **rischio infettivo**
- Nessuna differenza in termini di **rischio trombotico**
- Notevole differenza in termini di rischio di **malfunzione** (più frequente nei cateteri valvolati)
- Notevole differenza in termini di **costo** (più alto per i cateteri valvolati)

LA SCELTA DEL MATERIALE DEI CATETERI OGGI

EVITARE TUTTI I CATETERI VALVOLATI, SIA A PUNTA CHIUSA CHE A PUNTA APERTA

- Nessun vantaggio, alti costi, più alta % di complicanze

EVITARE I CATETERI IN SILICONE

- Nessun vantaggio, alti costi, più alta % di complicanze

PREFERIRE SEMPRE E COMUNQUE CATETERI POWER INJECTABLE IN POLIURETANO

children

2022

MDPI

Review

Vascular Access in Pediatric Oncology and Hematology: State of the Art

Alessandro Crocoli [1], Cristina Martucci [1,*], Giorgio Persano [1], Maria Debora De Pasquale [2], Annalisa Serra [2], Antonella Accinni [1], Ivan Pietro Aloi [1], Arianna Bertocchini [1], Simone Frediani [1], Silvia Madafferi [1], Valerio Pardi [1] and Alessandro Inserra [1]

[1] General Surgery Department, Bambino Gesu Children's Hospital, IRCCS, 00165 Rome, Italy; alessandro.crocoli@opbg.net (A.C.); giorgio.persano@opbg.net (G.P.); antonella.accinni@opbg.net (A.A.); ivanpietro.aloi@opbg.net (I.P.A.); arianna.bertocchini@opbg.net (A.B.); simone.frediani@opbg.net (S.F.); silvia.madafferi@opbg.net (S.M.); valerio.pardi@opbg.net (V.P.); alessandro.inserra@opbg.net (A.I.)

[2] Paediatric Haematology/Oncology Cell and Gene Therapy Department, Bambino Gesu Children's Hospital, IRCCS, 00165 Rome, Italy; mdebora.depasquale@opbg.net (M.D.D.P.); annalisa.serra@opbg.net (A.S.)

* Correspondence: cristina.martucci@opbg.net; Tel.: +39-0668592155

Table 1. AIEOP Recommendations for VADs Positioning *.

(1)	A tunneled catheter is recommended for continuous use (A I)
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(6)	Insertion by surgical venous cutdown is not recommended (A I)
(7)	The ultrasound-guided technique represents the current standard for venipuncture and venous cannulation for insertion of VAD (A It)
(8)	The use of cyanoacrylate tissue glue is recommended (A II)

IL PASSATO

IL PRESENTE

2017

2. **The world of <u>pediatric central venous access needs an update</u>, by implementing materials and methods which have become (or are becoming) the standard of care in adults:**

- Consistent adoption of US-guidance for all central venous access devices (PICC, CICC, FICC, ports)
- Adoption of tip location by intracavitary EKG and/or echocardio
- Shift to power injectable polyurethane for all external catheters (the reason for still using fragile silicon catheters like Broviac and Hickman is mysterious)
- Increased use of PICCs as first option central line in all children
- Increased adoption of tunneling for all external catheters (even if non-cuffed)

PICC = PRIMA SCELTA COME CVC NEL BAMBINO

Editorial

2020

JVA The Journal of Vascular Access

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

The Journal of Vascular Access
1–4

DOI: 10.1177/1129729820936411
journals.sagepub.com/home/jva
SAGE

Alessandro Crocoli[1], Simone Cesaro[2], Monica Cellini[3], Francesca Rossetti[4], Luca Sidro[5], Fulvio Pinelli[6] and Mauro Pittiruti[7]

Children - Elective

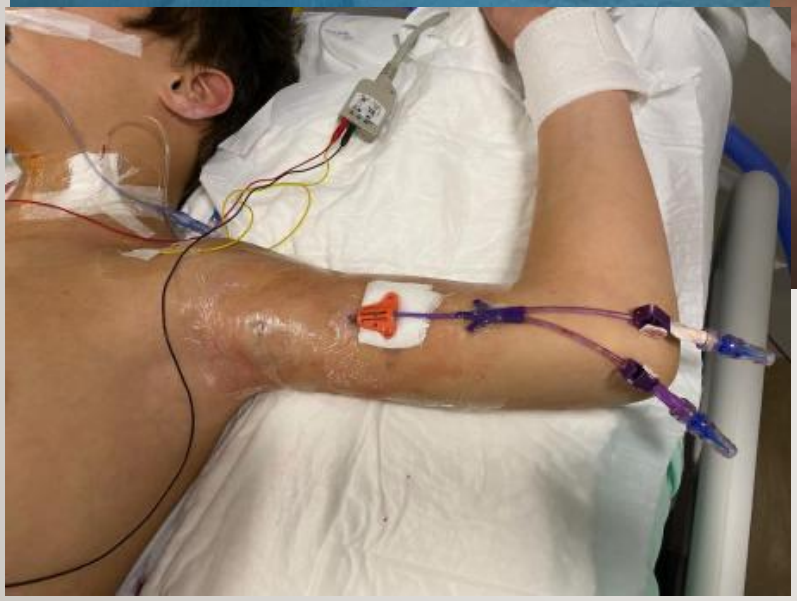
Intra-hospital use

Peripheral access is appropriate

- < 48 hrs
  - No-DIVA → short peripheral cannula ('standard')
  - DIVA → US-guided long peripheral cannula (mini-midline)
- 2-7 days
  - No-DIVA → short peripheral cannula ('advanced')
  - DIVA → US-guided long peripheral cannula (mini-midline)
- >7 days
  - US-guided long peripheral cannula (mini-midline)

Central access is required

- Arm veins available (green zone) → non-tunneled PICC
- Arm veins available (only in yellow zone) → tunneled PICC
- Arm veins not available → CICC (tunneled or not)



JVA
ISSN 1129-7298

J Vasc Access 2017; 18 (6): 535-539
DOI: 10.5301/jva.5000773

ORIGINAL RESEARCH ARTICLE

2017

Atypical use of PICC in infants and small children: a unicentric experience

Filippo Bernasconi[1], Clelia Zanaboni[2], Andrea Dato[2], Andrea Dolcino[3], Michela Bevilacqua[4], Luigi Montagnini[2], Nicola Disma[5]

[1] School of Anesthesia and Intensive Care, University of Milan, Milan - Italy
[2] Department of Anesthesia, Giannina Gaslini Institute, Genoa - Italy
[3] School of Anesthesia and Intensive Care, University of Genoa, Genoa - Italy
[4] Giannina Gaslini Institute, Genoa - Italy
[5] Department of Anaesthesia, Great Ormond Street Hospital, London - UK

2017

2. **The world of <u>pediatric central venous access needs an update</u>, by implementing materials and methods which have become (or are becoming) the standard of care in adults:**

- Consistent adoption of US-guidance for all central venous access devices (PICC, CICC, FICC, ports)
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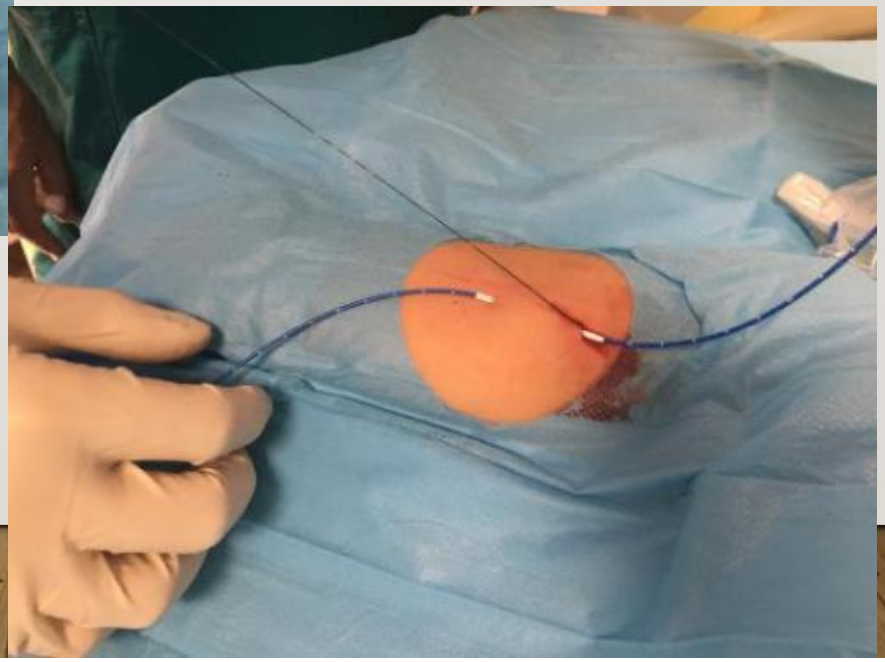
- Increased use of PICCs as first option central line in all children
- Increased adoption of tunneling for all external catheters (even if non-cuffed)

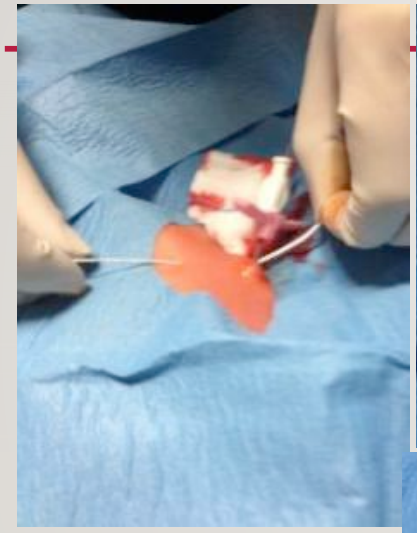
TUNNELLIZZARE !

USARE LA TUNNELLIZZAZIONE



TUNNELED CICC IN A CHILD

TUNNELED CICC IN NEONATE



2021

Techniques in vascular access

JVA | The Journal of Vascular Access

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

The Journal of Vascular Access
1–7

DOI: 10.1177/11297298211034306
journals.sagepub.com/home/jva
SAGE

Matthew D Ostroff[1], Nancy Moureau[2] and Mauro Pittiruti[3]

Table 1. RAVESTO—Rapid Assessment of Vascular Exit Site and Tunneling Options.

Central venous access device	Type and path of tunnel	Indications for tunneling
PICC	Tunnel to Dawson's green area	Puncture site in Dawson's yellow area; non-hospitalized patients with expected long intravenous treatment
CICC (supraclavicular puncture)	Tunnel to infraclavicular area	Long term intravenous treatment in non-hospitalized patients (antibiotics, parenteral nutrition, chemotherapy); expected difficulties in management of the exit site in hospitalized patients (beard, humidity, tracheostomy, instability, etc.)
	Tunnel to arm	Compromised skin integrity of the chest area; oral or endotracheal secretions over chest; implanted device on ipsilateral chest; chest surgery; contracted shoulder; etc.
	Tunnel to back	Cognitive disorder resulting in device removal; contraindication to chest or arm exit site
CICC (infraclavicular puncture)	Tunnel to lower chest	Long term intravenous treatment in non-hospitalized patients (antibiotics, parenteral nutrition, chemotherapy); expected problems in management of the exit site in hospitalized patients (tracheostomy, etc.)
	Tunnel to arm	Compromised skin integrity of the chest area; oral or endotracheal secretions over chest; implanted device on ipsilateral chest; chest surgery; contracted shoulder; etc.
	Tunnel to back	Cognitive disorder resulting in device removal; contraindication to chest or arm exit site
FICC (puncture at the groin)	Tunnel to the abdomen	Non-emergency line in walking patients with contraindication to PICC/CICC
	Tunnel to mid-thigh	Non-emergency line in bedridden patients with contraindication to PICC/CICC
FICC (puncture at mid-thigh)	Tunnel to the abdomen	Non-emergency line in walking patients with contraindication to PICC/CICC
	Tunnel to distal thigh	Long term intravenous treatment in bedridden patients with contraindication to PICC/CICC

2017

3. **Eliminate the problem of dislodgment** (the main cause of loss of the central line in pediatrics) by an extensive use of subcutaneously anchored securement devices.

ANCORAGGIO SOTTOCUTANEO

JVA
ISSN 1129-7298

J Vasc Access 2017; 18 (6): 540-545
DOI: 10.5301/jva.5000780

ORIGINAL RESEARCH ARTICLE

2017

Potential role of a subcutaneously anchored securement device in preventing dislodgment of tunneled-cuffed central venous devices in pediatric patients

Andrea Dolcino[1,2], Antonio Salsano[1], Andrea Dato[2], Nicola Disma[3], Alessio Pini Prato[4], Filippo Bernasconi[5], Luigi Montagnini[2], Stefano Avanzini[2], Michela Bevilacqua[2], Giovanni Montobbio[2], Girolamo Mattioli[2], Clelia Zanaboni[2]

[1] University of Genoa, Genoa - Italy
[2] Giannina Gaslini Institute, Genoa - Italy
[3] Department of Anaesthesia, Great Ormond Street Hospital, London - UK
[4] Antonio e Biagio e Cesare Arrigo Hospital, Alessandria - Italy
[5] University of Milan, Milan - Italy

Original research article

2020

JVA The Journal of Vascular Access

GAVeCeLT-WoCoVA Consensus on subcutaneously anchored securement devices for the securement of venous catheters: Current evidence and recommendations for future research

The Journal of Vascular Access
1–10

DOI: 10.1177/1129729820924568
journals.sagepub.com/home/jva
SAGE

Fulvio Pinelli[1], Mauro Pittiruti[2], Ton Van Boxtel[3], Giovanni Barone[4], Roberto Biffi[5], Giuseppe Capozzoli[6], Alessandro Crocoli[7], Stefano Elli[8], Daniele Elisei[9], Adam Fabiani[10], Cristina Garrino[11], Ugo Graziano[12], Luca Montagnani[13], Alessio Pini Prato[14], Giancarlo Scoppettuolo[15], Nicola Zadra[16], Clelia Zanaboni[17], Pietro Zerla[18], Evangelos Konstatinou[19], Matt Jones[20], Hervé Rosay[21], Liz Simcock[22], Marguerite Stas[23] and Gilda Pepe[15]

BJN 2019

Clinical experience of a subcutaneously anchored sutureless system for securing central venous catheters

Mauro Pittiruti, Giancarlo Scoppettuolo, Laura Dolcetti, Davide Celentano, Alessandro Emoli, Bruno Marche and Andrea Musarò

THE JOURNAL OF MATERNAL-FETAL & NEONATAL MEDICINE
https://doi.org/10.1080/14767058.2021.1922377

2021

Taylor & Francis
Taylor & Francis Group

Check for updates

SHORT REPORT

Securement of central venous catheters by subcutaneously anchored suturless devices in neonates

Vito D'Andrea[a], Giovanni Barone[b], Lucilla Pezza[a], Giorgia Prontera[a], Giovanni Vento[a] and Mauro Pittiruti[c]

[a]Department of Woman and Child Health and Public Health, Fondazione Policlinico Universitario Agostino Gemelli IRCCS, Roma, Italy; [b]Neonatal Intensive Care Unit, Azienda Sanitaria Romagna, Infermi Hospital Rimini, Rimini, Italy; [c]Department of Surgery, Fondazione Policlinico Universitario "Agostino Gemelli" IRCCS - Università Cattolica del Sacro Cuore, Rome, Italy


LIFT
securacath
4F
HOLD

Original research article

2021

JVA The Journal of Vascular Access

Safety and effectiveness of subcutaneously anchored securement for tunneled central catheters in oncological pediatric patients: A retrospective study

The Journal of Vascular Access
1–6

DOI: 10.1177/11297298211009364
journals.sagepub.com/home/jva
SAGE

Alessandro Crocoli[1], Cristina Martucci[1], Luca Sidro[2], Daniela Delle Donne[2], Giuseppe Menna[3], Mauro Pittiruti[4], Maria Debora De Pasquale[5], Luisa Strocchio[5], Gian Luigi Natali[6] and Alessandro Inserra[1]

SECURE & PROTECT
STABILIZZARE IL CATETERE E PROTEGGERE IL SITO DI EMERGENZA

1) Ancoraggio sottocutaneo
2) Colla in cianoacrilato
3) Membrane semipermeabili ad alto MVTR

LA COLLA IN CIANOACRILATO

Ten years of clinical experience with cyanoacrylate glue for venous access in a 1300-bed university hospital

Mauro Pittiruti, Maria Giuseppina Annetta, Bruno Marche, Vito D'Andrea and Giancarlo Scoppettuolo

BJN 2022

JVA | The Journal of Vascular Access

Original research article

The Journal of Vascular Access
1–12

DOI: 10.1177/11297298211024037
journals.sagepub.com/home/jva
SAGE

Short peripheral intravenous catheter securement with cyanoacrylate glue compared to conventional dressing: A randomized controlled trial

2022

Amit Bahl, S. Matthew Gibson, David Jankowski and Nai-Wei Chen

2021

JVA The Journal of Vascular Access

Techniques in vascular access

Use of cyanoacrylate glue for the sutureless securement of epicutaneo-caval catheters in neonates

The Journal of Vascular Access
1–4

DOI: 10.1177/11297298211008103
journals.sagepub.com/home/jva
SAGE

Vito D'Andrea[1], Lucilla Pezza[1], Giovanni Barone[2], Giorgia Prontera[1], Mauro Pittiruti[3] and Giovanni Vento[1]

JVA
ISSN 1129-7298

ORIGINAL RESEARCH ARTICLE

2022

JVA The Journal of Vascular Access

The Journal of Vascular Access
2018, Vol. 19(1) 58–62

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DOI: 10.5301/jva.5000816
journals.sagepub.com/home/jva
SAGE

Experimental study on the chemico-physical interaction between a two-component cyanoacrylate glue and the material of PICCs

Francesca Di Puccio[1], Daniela Giacomarro[1], Lorenza Mattei[1], Mauro Pittiruti[2], Giancarlo Scoppettuolo[2]

[1] Dipartimento di Ingegneria Civile e Industriale, Università di Pisa, Pisa - Italy
[2] Fondazione Policlinico Universitario "A. Gemelli", Roma - Italy

children

2022

MDPI

Review

Vascular Access in Pediatric Oncology and Hematology: State of the Art

Alessandro Crocoli [1], Cristina Martucci [1,*], Giorgio Persano [1], Maria Debora De Pasquale [2], Annalisa Serra [2], Antonella Accinni [1], Ivan Pietro Aloi [1], Arianna Bertocchini [1], Simone Frediani [1], Silvia Madafferi [1], Valerio Pardi [1] and Alessandro Inserra [1]

[1] General Surgery Department, Bambino Gesu Children's Hospital, IRCCS, 00165 Rome, Italy; alessandro.crocoli@opbg.net (A.C.); giorgio.persano@opbg.net (G.P.); antonella.accinni@opbg.net (A.A.); ivanpietro.aloi@opbg.net (I.P.A.); arianna.bertocchini@opbg.net (A.B.); simone.frediani@opbg.net (S.F.); silvia.madafferi@opbg.net (S.M.); valerio.pardi@opbg.net (V.P.); alessandro.inserra@opbg.net (A.I.)

[2] Paediatric Haematology/Oncology Cell and Gene Therapy Department, Bambino Gesu Children's Hospital, IRCCS, 00165 Rome, Italy; mdebora.depasquale@opbg.net (M.D.D.P.); annalisa.serra@opbg.net (A.S.)

* Correspondence: cristina.martucci@opbg.net; Tel.: +39-0668592155

Table 1. AIEOP Recommendations for VADs Positioning *.

(1)	A tunneled catheter is recommended for continuous use (A I)
(2)	For discontinuous use, a totally implanted VAD is recommended (A II)
(3)	It is recommended that the ratio of the catheter caliber to vein diameter should not exceed 1/3 (A II)
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(7)	The ultrasound-guided technique represents the current standard for venipuncture and venous cannulation for insertion of VAD (A It)
(8)	The use of cyanoacrylate tissue glue is recommended (A II)

MEDICAZIONI SEMIPERMEABILI AD ALTA TRASPIRABILITÀ

Original research article

2021

JVA | The Journal of Vascular Access

Comparing test methods for moisture-vapor transmission rate (MVTR) for vascular access transparent semipermeable dressings

The Journal of Vascular Access
1–8

DOI: 10.1177/11297298211050485
journals.sagepub.com/home/jva
SAGE

Paul Bainbridge[1], Paul Browning[2], Stéphanie F Bernatchez[3], Casey Blaser[3] and Guido Hitschmann[1]

Dressing	MVTR liquid (inverted method)	MVTR vapor (upright method)
A	4089	1682
B	845	773
C	1225	1079
D	1047	976
E	1031	936
F[b]	30,530	2838
G	5164	1644

Dressing		MVTR liquid (inverted method)	MVTR vapor (upright method)
A	Tegaderm Advanced	4089	1682
B		845	773
C		1225	1079
D		1047	976
E		1031	936
F[b]	IV 3000	30,530	2838
G	SorbaView	5164	1644

J Wound Ostomy Continence Nurs. 2013;40(4):1-15
Published by Lippincott Williams & Wilkins

WOUND CARE

Medical Adhesives and Patient Safety: State of the Science

Consensus Statements for the Assessment, Prevention, and Treatment of Adhesive-Related Skin Injuries

Laurie McNichol ■ Carolyn Lund ■ Ted Rosen ■ Mikel Gray

Wound Care

J Wound Ostomy Continence Nurs. 2017;44(3):211-220.
Published by Lippincott Williams & Wilkins

OPEN

Management of Central Venous Access Device–Associated Skin Impairment

An Evidence-Based Algorithm

Daphne Broadhurst ◆ Nancy Moureau ◆ Amanda J. Ullman ◆ The World Congress of Vascular Access (WoCoVA) Skin Impairment Management Advisory Panel

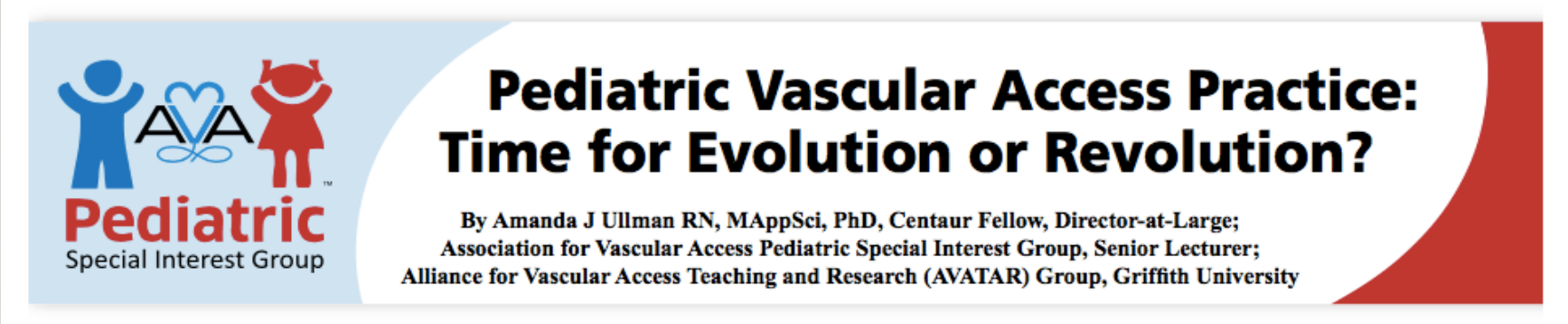
CE 1.5 ANCC Contact Hours

Medical adhesive-related skin injuries associated with vascular access

Jan Hitchcock and Louise Savine

British Journal of Nursing, 2017, (IV Therapy Supplement) Vol 26, No 8

CONCLUSIONI



- Era il 2017…
- A cinque anni di distanza, possiamo dire che è stata una rivoluzione (ancora in atto) più che una evoluzione
- **Molte strategie tradizionali oggi non hanno più senso e devono essere sostituite da strategie più SICURE per il paziente, più EFFICACI come risultato clinico, più RAPIDE nella esecuzione, e più COSTO-EFFICACI a livello aziendale.**

OCCORRE ABBANDONARE LE VECCHIE ABITUDINI PERICOLOSE E COSTOSE

- **Abbandonare la fluoroscopia**
- **Abbandonare la venolisi**
- **Abbandonare la puntura alla cieca**
- **Abbandonare il controllo radiologico**
- **Abbandonare i punti di sutura**
- **Abbandonare i cateteri in silicone**
- **Abbandonare i cateteri valvolati**

OCCORRE INVECE FARE SCELTE 'SAGGE'

1) Utilizzare in modo 'globale' l'ecografo

- Scelta della vena
- Puntura ecoguidata
- Esclusione complicanze immediate
- Tip navigation
- Tip location
- Esclusione complicanze tardive non infettive

OCCORRE INVECE FARE SCELTE 'SAGGE'

2) Utilizzare l'ECG intracavitario

3) Scegliere razionalmente il sito di emergenza (tunnellizzare!)

4) Stabilizzare il catetere e proteggere il sito di emergenza

SECURE & PROTECT:

ancoraggio sottocutaneo

colla in cianoacrilato

membrane semipermeabili ad alto MVTR

ESEMPIO DI 'SCELTE SAGGE': IL PROTOCOLLO ISAC-PED

Impianto Sicuro dell'Accesso Centrale Pediatrico

Si applica a tutti i CVC inseriti in vene profonde (CICC, PICC, FICC): in pratica, a tutti gli accessi centrali ecoguidati del bambino e del neonato, con la sola esclusione di ECC e CVO

ISAC-PED

1. Scelta ragionata della vena mediante esame ecografico sistematico (RaCeVA – RaPeVA - RaFeVA)
2. Tecnica asettica appropriata: igiene delle mani, massime protezioni di barriera e antisepsi cutanea con clorexidina 2% in IPA 70%
3. Utilizzo dell'ecografo per la venipuntura ecoguidata della vena prescelta e per il successivo controllo ecografico della assenza di pneumotorace o di altre complicanze legate alla inserzione
4. Verifica intra-procedurale della posizione centrale della punta mediante la tecnica dell'ECG intracavitario e/o mediante ecocardiografia
5. Tunnellizzazione del catetere per ottenere l'exit site in posizione ottimale
6. Protezione del sito di emergenza mediante colla in cianoacrilato
7. Stabilizzazione del catetere mediante 'sutureless device' e membrana trasparente semipermeabile ad alto MVTR.

Clinical trial protocol

2022

JVA The Journal of Vascular Access

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

The Journal of Vascular Access
1–12

DOI: 10.1177/11297298221074472
journals.sagepub.com/home/jva
SAGE

Mauro Pittiruti[1], Davide Celentano[2], Giovanni Barone[3], Vito D'Andrea[4], Maria Giuseppina Annetta[5] and Giorgio Conti[2]

Results: All neonates, infants and children requiring a non-emergency central line (except for umbilical venous catheters and epicutaneo-cava catheters) were included in the study. Out of 729 central line insertions, there were no immediate complications (no pneumothorax, no arterial puncture, no malposition); the incidence of early and late complications (local ecchymosis, dislodgment, local pain, exit site infection) was 3.7%; in the first 2 weeks after insertion, no catheter-related bacterial infection or catheter-related thrombosis was recorded.

Nessuna complicanza legata alla manovra di inserzione

Original research article

2022

JVA The Journal of Vascular Access

The Journal of Vascular Access
1–7

DOI: 10.1177/11297298221122128
journals.sagepub.com/home/jva
SAGE

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

Maria Giuseppina Annetta[1], Davide Celentano[2], Lucrezia Zumstein[3], Giorgio Attinà[3], Antonio Ruggiero[3], Giorgio Conti[1] and Mauro Pittiruti[4]

Results: A total of 227 CVADs were analyzed: 175 peripherally inserted central catheters (PICCs), 50 centrally inserted central catheters (CICCs), and 2 femorally inserted central catheters. All CVADs were non-valved, non-cuffed power injectable polyurethane catheters; 81% were tunneled. Median dwelling time of CVADs was 172 days, for a total number of 39,044 catheter days. A very low incidence of both symptomatic catheter-related thrombosis (0.9%) and catheter-related blood stream infection (0.56 episodes per 1000 catheter days) was found. Unscheduled removal or guidewire replacement because of mechanic complications occurred in 15.7% of CVADs. There was no difference in terms of complications between PICCs and CICCs or between tunneled and non-tunneled catheters.

Nessuna complicanza legata alla manovra di inserzione

UNA NUOVA CONSAPEVOLEZZA

Molte complicanze a distanza sono in realtà legate a '***scelte sbagliate***' al momento dell'impianto:

- **Scelta di cateteri fragili** (ovvero in silicone), a rischio di dislocazione e rottura, e con minore performance clinica
- **Tecniche di venolisi o di puntura alla cieca**, che si associano a maggior rischio di complicanze
- **Utilizzo routinario di metodi radiologici** per la tip location, con conseguente aumento di malposizioni e posizioni sub-ottimali, che si associano a malfunzione e trombosi
- **Scelta di siti di emergenza non ideali** (collo e inguine), che si associano a maggior rischio di infezione e dislocazione
- **Fissaggio inappropriato** (ovvero con punti di sutura) che si associa a maggior rischio di infezione e dislocazione

Università Cattolica del Sacro Cuore – Roma

in collaborazione con ASL Romagna
in collaborazione con GAVeCeLT
in collaborazione con GAVePed

MASTER UNIVERSITARI IN ACCESSI VENOSI PEDIATRICI E NEONATALI

Master di I livello per infermieri
NURSING DEGLI ACCESSI VENOSI PEDIATRICI E NEONATALI

Master di II livello per medici
ACCESSI VENOSI NEL BAMBINO E NEL NEONATO

A partire dall'Anno Accademico 2020-2021, avranno inizio presso la Università Cattolica di Roma i primi Master Universitari italiani specificamente dedicati agli accessi venosi pediatrici e neonatali. La domanda per richiedere la iscrizione ai Master va inoltrata tramite il sito della Università Cattolica entro il 14 dicembre 2020.
Le lezioni, i workshop e periodi di tirocinio clinico si svolgeranno nell'anno 2021.

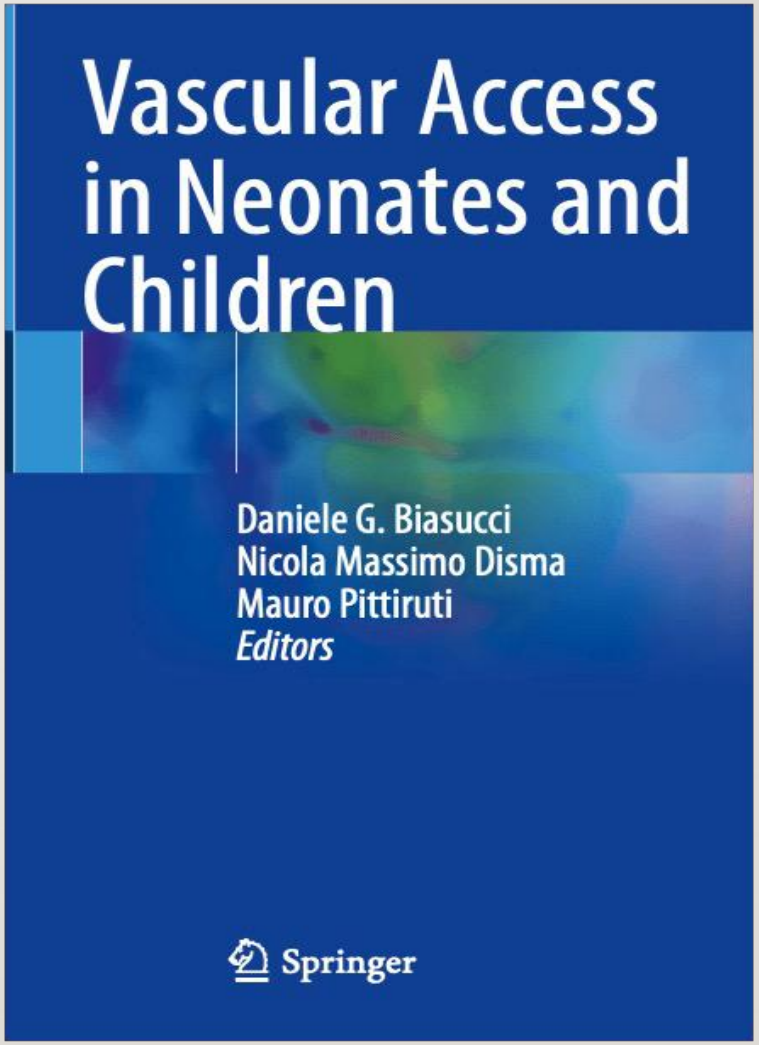
Docenti dei Master: *Gina Ancora, Giovanni Barone, Michela Bevilacqua, Daniele G. Biasucci, Antonella Capasso, Davide Celentano, Rita Celli, Antonio Chiaretti, Giorgio Conti, Alessandro Crocoli, Vito D'Andrea, Laura Dolcetti, Alessandro Emoli, Aldo Mancino, Bruno Marche, Rossella Mastroianni, Andrea Musarò, Lidia Muscheri, Alessio Pini Prato, Mauro Pittiruti, Nicola Pozzi, Carmen Rodriguez, Francesca Rossetti, Flavia Savelli, Grazia Scazzari, Giancarlo Scoppettuolo, Luca Sidro, Cristina Taraschi, Federica Tosi, Francesca Tota, Giovanni Vento, Clelia Zanaboni, Geremia Zito*
e altri esperti italiani del GAVePed – Gruppo Accessi Venosi Pediatrici

UNIVERSITÀ CATTOLICA del Sacro Cuore

Per maggiori informazioni, rivolgersi al coordinatore scientifico dei Master, Mauro Pittiruti mauropittiruti@me.com e/o al coordinatore didattico Bruno Marche masteravroma@yahoo.it

SERVIZIO SANITARIO REGIONALE EMILIA-ROMAGNA
Azienda Unità Sanitaria Locale della Romagna

GAVePed
Gruppo Accessi Venosi Pediatrici



GRAZIE DELL'ATTENZIONE

mauropittiruti@me.com

www.gavecelt.it