GAVeCeLT 2024

Novità nel mondo degli accessi venosi (1)

Moderano Daniele G.Biasucci e Tim Spencer

Le novità dell'accesso venoso neonatale secondo le più recenti raccomandazioni GAVePed e NEVAT

GAVePed
Gruppo Accessi Venosi Pediatrici

NEVAT

Giovanni Barone

Ospedale Infermi di Rimini

GAVeCeLT
Gli Accessi Venosi Centrali a Lungo Termine

GdS Accessi Vascolari Neonatali

Agenda

1. Novità sulle indicazioni
2. Novità dell’impianto
3. Novità della gestione

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Infection Control & Hospital Epidemiology (2022), 1–17
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SHEA

SHEA/IDSA/APIC Practice Recommendation

Strategies to prevent central line-associated bloodstream infections in acute-care hospitals: 2022 Update

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Il metodo più efficace per prevenire le infezioni catetere correlate è minimizzare l'utilizzo dei cateteri venosi centrali!

1. **Provide easy access to an evidence-based list of indications for CVC use to minimize unnecessary CVC placement** (Quality of Evidence: LOW)
2. **Require education and competency assessment of healthcare personnel (HCP) involved in insertion, care, and maintenance of CVCs about CLABSI prevention** (Quality of Evidence: MODERATE)[74–78]
   a. Include the indications for catheter use, appropriate insertion and maintenance, the risk of CLABSI, and general infection prevention strategies.
   b. Ensure that all HCP involved in catheter insertion and maintenance complete an educational program on essential practices to prevent CLABSI before performing these duties.[79,80] Periodic retraining with a competency assessment may be of benefit.[81]
   c. Periodically assess HCP knowledge of and adherence to preventive measures.
   d. Require all HCP who insert a CVC to undergo a credentialing process (as established by the individual healthcare institution) to ensure their competency before independently inserting a CVC and aseptic technique for accessing and maintaining the CVC thereafter.
   e. Re-educate when an institution changes components of the infusion system that requires a change in practice (eg, when an institution's change of the needleless connector requires a change in nursing practice).
   f. Use simulation training for proper catheter insertion and maintenance if available.[82–85]

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EDITORIAL

The neonatal DAV-expert algorithm: a GAVeCeLT/GAVePed consensus for the choice of the most appropriate venous access in newborns

Giovanni Barone[1] · Vito D'Andrea[2] · Gina Ancora[1] · Francesco Cresi[3] · Luca Maggio[4] · Antonella Capasso[5] · Rossella Mastroianni[6] · Nicola Pozzi[7] · Carmen Rodriguez-Perez[8] · Maria Grazia Romitti[9] · Francesca Tota[10] · Ferdinando Spagnuolo[11] · Francesco Raimondi[5] · Mauro Pittiruti[12]

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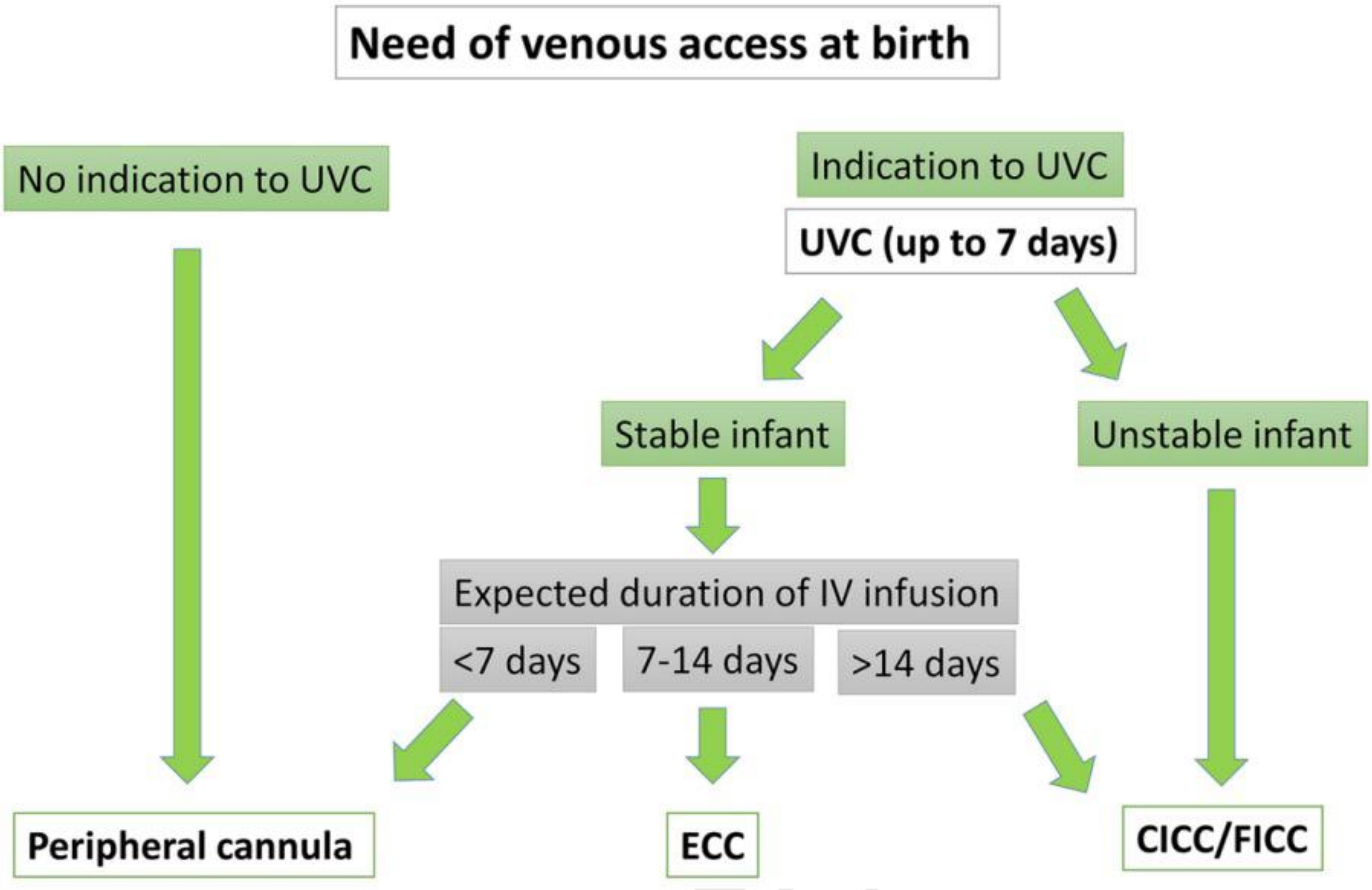
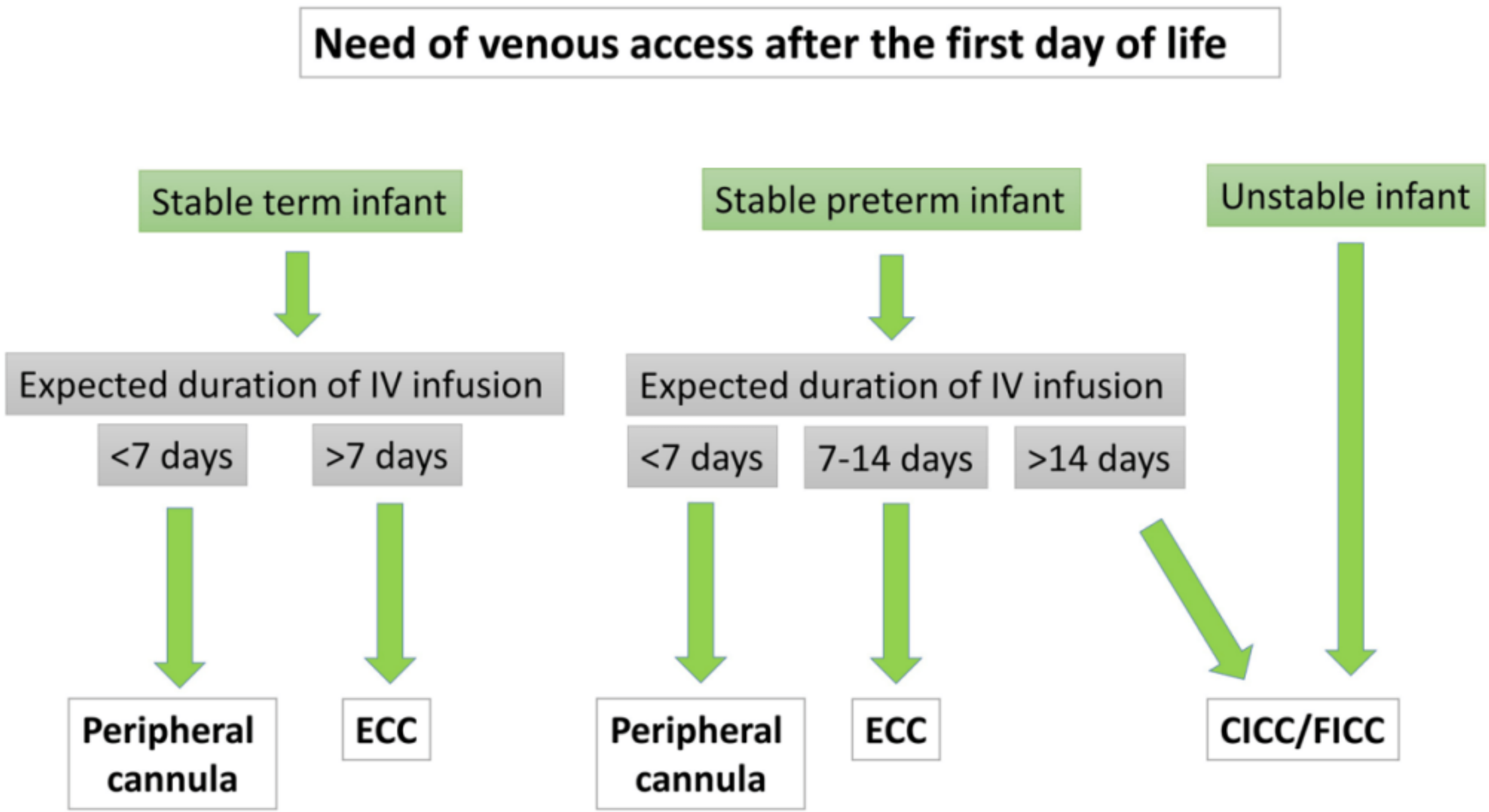
Applicazione **RAND/University of California at Los Angeles (UCLA) Appropriateness Methodology as a three-step consensus process – METODO DELPHI modificato**

Algoritmo di scelta



Algoritmo di scelta



Risultati della consensus

Use ECC only for intravenous therapy scheduled for 2 weeks or less

Although there is a certain uncertainty regarding the actual duration of an ECC, several reports show that – at least in preterm neonates – the risk of infective and mechanical complications of ECCs increases enormously after 14 days.[1–5] Therefore, in many neonatal intensive care units (NICUs), these lines are routinely replaced by new ones after 2 weeks. When the expected duration of intravenous infusion is beyond 2–3 weeks, a more appropriate option of central venous access is the placement of large-bore polyurethane catheters (3–4 Fr) by ultrasound-guided percutaneous puncture and cannulation of the internal jugular vein, of the brachiocephalic vein (CICC) or of femoral vein (FICC).[6] Many papers of the last few years have suggested that ultrasound-guided CICCs are feasible and safe even in very small neonates, with a high percentage of success and minimal risk, in experienced hands.[7–14] CICCs and FICCs offer several advantages not only in terms of performance (high flow, blood withdrawal, etc.), but also it is likely that they are associated with lower risk of complications (occlusion, secondary malposition, venous thrombosis, mechanical rupture, infection) if compared to ECC.[6,15,16]

Editorial

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

Risultati della consensus

Quali sono le appropriate indicazioni per l'uso di CICC e FICC?

Supraclavicular Approach to Ultrasound-Guided Brachiocephalic Vein Cannulation in Children and Neonates

Zied Merchaoui[1†], Ulrik Lausten-Thomsen[1,2†], Florence Pierre[1], Maher Ben Laiba[1], Nolwenn Le Saché[1] and Pierre Tissieres[1,2]*

Supraclavicular Ultrasound-Guided Catheterization of the Subclavian Vein in Pediatric and Neonatal ICUs: A Feasibility Study

Anne-Sophie Guilbert, MD[1]; Lorenço Xavier, MD[1]; Clément Ammouche, MD[1]; Philippe Desprez, MD[1]; Dominique Astruc, MD[2]; Pierre Diemunsch, PhD[3]; Jocelyne Bientz, MD[1]

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]

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ORIGINAL ARTICLE

Ultrasound-guided percutaneous insertion of 2.7 Fr tunnelled Broviac lines in neonates and small infants

G. S. Arul · H. Livingstone · P. Bromley · J. Bennett

Pediatric Anesthesia

Pediatric Anesthesia ISSN 1155-5645

ORIGINAL ARTICLE

Ultrasound-guided supraclavicular cannulation of the brachiocephalic vein in infants: a retrospective analysis of a case series

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3 Department of Statistics, University of Klagenfurt, Klagenfurt, Austria
4 Department of Anatomy, Medical University of Graz, Graz, Austria

Ultrasound-Guided Subclavian Vein Cannulation in Low Birth Weight Neonates

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Risultati della consensus

Panel recommendations.

1. Indications for ultrasound-guided CICCs or FICCs include the following: (a) newborns (at any gestational age) with hemodynamic instability developed after the first 24 h of life, or even within the first 24 h of life, if UVC insertion is not feasible or if the UVC cannot be placed in a proper position; (b) newborns who need or might need rapid fluid repletion (in emergency and/or before major surgery); (c) newborns with major malformation pathologies requiring surgery (e.g., major exomphalos; esophageal atresia); (d) stable newborns requiring a central line, if ECC cannot be placed in a proper position; (e) newborns requiring repeated blood samplings; (f) newborns requiring multiple transfusions; (g) CICCs or FICCs should also be considered in stable preterm newborns with an expected duration of PN longer than 2 weeks.
2. Ultrasound-guided CICCs and FICCs should be preferably power injectable and made of polyurethane. Calibers between 3 and 4Fr are usually appropriate, depending on the size of the vein being cannulated.
3. Consider the benefit of tunneling all ultrasound-guided CICC/FICC, especially in elective conditions.

Novità sulle indicazioni

Il DAV Expert è un documento italiano promosso dal GAVePed ed è il primo documento interamente focalizzato sul neonato e che si fonda su una solida base scientifica e le più recenti evidenze.

Definisce una nuova visione del CVO (sempre più da vedere come una via per l'emergenza/urgenza).

Limita il ruolo del catetere ECC ai neonati premature stabili con una previsione di terapia endovenosa di 2 settimane.

Estende il ruolo di CICC e FICC ecoguidati in considerazione dei dati della letteratura in termini di sicurezza e performance.

Agenda

1. Novità sulle indicazioni
2. Novità dell’impianto
3. Novità della gestione

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]

Ultrasound pre-puncture evaluation of central veins (RaCeVA)
Hand hygiene and maximal barrier precautions
Skin antisepsis with 2% chlorhexidine in alcohol
Ultrasound-guided venipuncture
Tip location by intracavitary echocardiography and/or echocardiography
Tunneling the catheter so as to obtain an exit site in the infraclavicular area
Securement with the sutureless device
Sealing of the exit site with glue
Coverage with transparent semipermeable dressing

SIC PED applicato al neonato

Table 1. Our insertion bundle.

Ultrasound pre-puncture evaluation of central veins (RaCeVA)
Hand hygiene and maximal barrier precautions
Skin antisepsis with 2% chlorhexidine in alcohol
Ultrasound-guided venipuncture
Tip location by intracavitary echocardiography and/or echocardiography
Tunneling the catheter so as to obtain an exit site in the infraclavicular area
Securement with the sutureless device
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Coverage with transparent semipermeable dressing

Original Paper

Neonatology

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2019

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

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Table 1. Measurements of the diameters of the most relevant deep veins in the 5 weight groups

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
L SBV	1.8±0.6 (0.8–3.2)	1.1±0.3 (0.8–1.6)	1.4±0.3 (0.8–1.7)	1.8±0.3 (1.3–2.2)	2.0±0.3 (1.5–2.3)	2.5±0.3 (1.9–3.2)	0.92
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
L AxVc	2.0±0.4 (1.3–3.2)	1.6±0.2 (1.3–1.9)	1.9±0.5 (1.3–2.8)	2.0±0.3 (1.4–2.2)	2.2±0.2 (1.9–2.5)	2.5±0.4 (2.0–3.2)	0.93
R AxVa	1.6±0.4 (0.8–2.4)	1.2±0.3 (0.8–1.5)	1.5±0.3 (1.0–1.9)	1.5±0.3 (1.1–2.1)	1.8±0.3 (1.3–2.2)	2.1±0.2 (1.5–2.4)	0.92
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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
L BrV	1.1±0.4 (0.6–1.9)	0.9±0.2 (0.7–1.3)	0.8±0.2 (0.6–1.0)	1.0±0.2 (0.7–1.3)	1.2±0.1 (1.0–1.4)	1.6±0.2 (1.3–1.9)	0.90
R BaV	1.0±0.3 (0.5–1.5)	0.7±0.2 (0.5–1.1)	1.0±0.2 (0.7–1.2)	0.9±0.2 (0.6–1.2)	1.2±0.2 (0.7–1.4)	1.3±0.1 (1.1–1.5)	0.91
L BaV	1.0±0.3 (0.5–1.5)	0.7±0.1 (0.5–1.0)	0.9±0.1 (0.7–1.1)	0.9±0.1 (0.6–1.1)	1.3±0.2 (0.8–1.5)	1.3±0.1 (1.1–1.5)	0.92
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
L FeV	2.3±0.7 (1.1–3.5)	1.4±0.3 (1.1–1.9)	2.1±0.5 (1.6–2.9)	2.0±0.4 (1.4–2.6)	2.9±0.2 (2.5–3.3)	3.1±0.2 (2.9–3.5)	0.91
R SaV	1.3±0.5 (0.5–2.3)	0.8±0.2 (0.5–1.2)	1.0±0.3 (0.7–1.8)	1.3±0.2 (0.9–1.5)	1.7±0.4 (1.2–2.3)	1.8±0.3 (1.3–2.3)	0.88
L SaV	1.3±0.5 (0.4–2.3)	0.8±0.2 (0.4–1.1)	1.1±0.2 (0.7–1.5)	1.2±0.2 (0.8–1.4)	1.8±0.3 (1.4–2.3)	1.8±0.3 (1.4–2.3)	0.89

Values are expressed in millimeters as mean ± standard deviation (range). ICC, intraclass correlation; R, right; L, left; IJV, internal jugular vein; BCV, brachiocephalic vein; SBV, subclavian vein; EJV, external jugular vein; AxVc, axillary vein at the chest; AxVa, axillary vein at the axilla; BrV, brachial vein; BaV, basilic vein; FeV, femoral vein; SaV, saphenous vein.

Table 1. Measurements of the diameters of the most relevant deep veins in the 5 weight groups

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
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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
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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
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R AxVa	1.6±0.4 (0.8–2.4)	1.2±0.3 (0.8–1.5)	1.5±0.3 (1.0–1.9)	1.5±0.3 (1.1–2.1)	1.8±0.3 (1.3–2.2)	2.1±0.2 (1.5–2.4)	0.92
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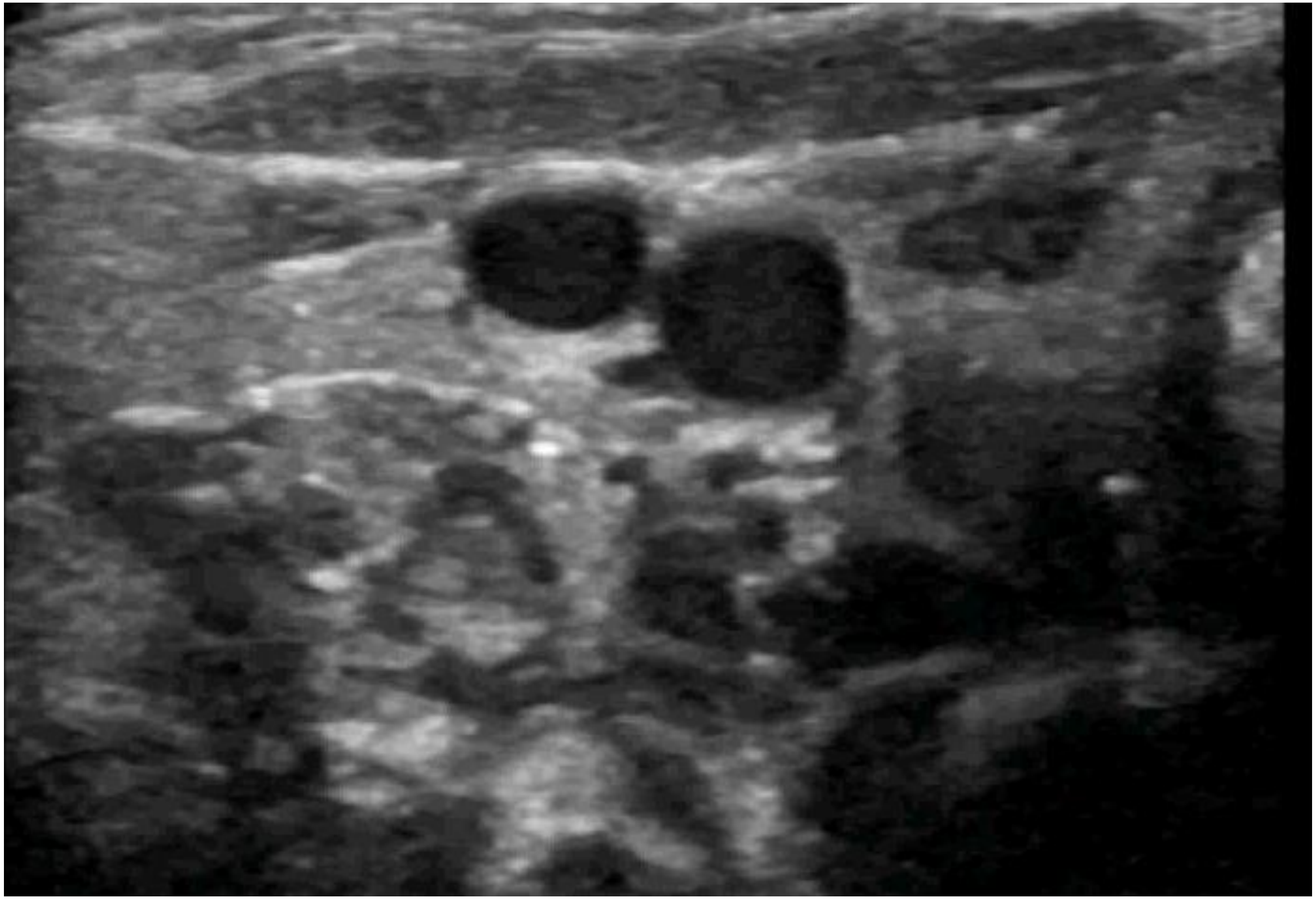
L BrV	1.1±0.4 (0.6–1.9)	0.9±0.2 (0.7–1.3)	0.8±0.2 (0.6–1.0)	1.0±0.2 (0.7–1.3)	1.2±0.1 (1.0–1.4)	1.6±0.2 (1.3–1.9)	0.90
R BaV	1.0±0.3 (0.5–1.5)	0.7±0.2 (0.5–1.1)	1.0±0.2 (0.7–1.2)	0.9±0.2 (0.6–1.2)	1.2±0.2 (0.7–1.4)	1.3±0.1 (1.1–1.5)	0.91
L BaV	1.0±0.3 (0.5–1.5)	0.7±0.1 (0.5–1.0)	0.9±0.1 (0.7–1.1)	0.9±0.1 (0.6–1.1)	1.3±0.2 (0.8–1.5)	1.3±0.1 (1.1–1.5)	0.92
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
L FeV	2.3±0.7 (1.1–3.5)	1.4±0.3 (1.1–1.9)	2.1±0.5 (1.6–2.9)	2.0±0.4 (1.4–2.6)	2.9±0.2 (2.5–3.3)	3.1±0.2 (2.9–3.5)	0.91
R SaV	1.3±0.5 (0.5–2.3)	0.8±0.2 (0.5–1.2)	1.0±0.3 (0.7–1.8)	1.3±0.2 (0.9–1.5)	1.7±0.4 (1.2–2.3)	1.8±0.3 (1.3–2.3)	0.88
L SaV	1.3±0.5 (0.4–2.3)	0.8±0.2 (0.4–1.1)	1.1±0.2 (0.7–1.5)	1.2±0.2 (0.8–1.4)	1.8±0.3 (1.4–2.3)	1.8±0.3 (1.4–2.3)	0.89

Values are expressed in millimeters as mean ± standard deviation (range). ICC, intraclass correlation; R, right; L, left; IJV, internal jugular vein; BCV, brachiocephalic vein; SBV, subclavian vein; EJV, external jugular vein; AxVc, axillary vein at the chest; AxVa, axillary vein at the axilla; BrV, brachial vein; BaV, basilic vein; FeV, femoral vein; SaV, saphenous vein.

SIC PED applicato al neonato

Table 1. Our insertion bundle.

Ultrasound pre-puncture evaluation of central veins (RaCeVA)
Hand hygiene and maximal barrier precautions
Skin antisepsis with 2% chlorhexidine in alcohol
Ultrasound-guided venipuncture
Tip location by intracavitary echocardiography and/or echocardiography
Tunneling the catheter so as to obtain an exit site in the infraclavicular area
Securement with the sutureless device
Sealing of the exit site with glue
Coverage with transparent semipermeable dressing



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Securement with the sutureless device
Sealing of the exit site with glue
Coverage with transparent semipermeable dressing

Original research article

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

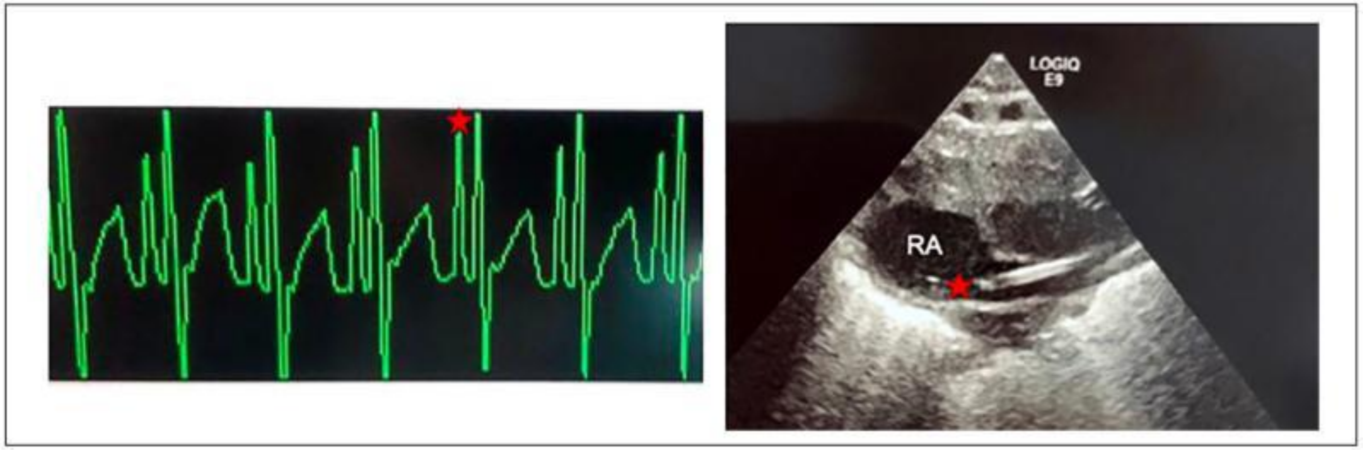
Vito D'Andrea[1], Lucilla Pezza[1], Giorgia Prontera[1], Gina Ancora[2], Mauro Pittiruti[3], Giovanni Vento[1] and Giovanni Barone[2]

JVA The Journal of

The applicability of IC-ECG was 100%, since a P wave was evident on the surface ECG of all neonates recruited for the study.

The feasibility of IC-ECG was also 100%, since a peak of the P wave was identified during all procedures.

The match between IC-ECG based tip location and ultrasound-based tip location was optimal, since all catheters were properly located at the CAJ as judged by ultrasound. All catheter tips were identified at ultrasound tip location, using one or more of the windows as described above.



Review

JVA The Journal of Vascular Access

The Journal of Vascular Access
1–8

DOI: 10.1177/11297298241259247
journals.sagepub.com/home/jva
Sage

A narrative review on tip navigation and tip location of central venous access devices in the neonate: Intracavitary ECG or real time ultrasound?

Miria Natile[1], Gina Ancora[1], Vito D'Andrea[2], Mauro Pittiruti[3] and Giovanni Bar

Table 1. Tip location by intracavitary ECG.

Vascular Access Device	Applicability	Feasibility	Accuracy
UVC	Applicable, but not recommended	Yes	Low
ECC – upper limbs	Applicable, but not recommended	Not always feasible	High
ECC – lower limbs	Not always applicable	Not always feasible	Low
CICC	Applicable and highly recommended	Yes	High
FICC	Not always applicable	Not always feasible	Low

IC-ECG = never applicable for tip navigation.

Table 2. Tip location by real time ultrasound.

Vascular Access Device	Applicability	Feasibility	Accuracy
UVC	Applicable, highly recommended	Yes	High
ECC – upper limbs	Applicable, recommended	Yes	High
ECC – lower limbs	Applicable, recommended	Yes	High
CICC	Applicable	Yes	High
FICC	Applicable, recommended	Yes	High

Real time ultrasound = always applicable for tip navigation.

SIC PED applicato al neonato

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Tip location by intracavitary echocardiography and/or echocardiography
Tunneling the catheter so as to obtain an exit site in the infraclavicular area
Securement with the sutureless device
Sealing of the exit site with glue
Coverage with transparent semipermeable dressing

RAVESTO applicato al neonato

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

Dove tunnellizzare nel neonato?

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.) Quasi sempre
	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. Presenza di stomie
	Tunnel to back	Cognitive disorder resulting in device removal; contraindication to chest or arm exit site Decubito prono obbligato

Tunnellizzazione del catetere

SIC PED applicato al neonato

Table 1. Our insertion bundle.

Ultrasound pre-puncture evaluation of central veins (RaCeVA)
Hand hygiene and maximal barrier precautions
Skin antisepsis with 2% chlorhexidine in alcohol
Ultrasound-guided venipuncture
Tip location by intracavitary echocardiography and/or echocardiography
Tunneling the catheter so as to obtain an exit site in the infraclavicular area
Securement with the sutureless device
Sealing of the exit site with glue
Coverage with transparent semipermeable dressing

2021

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

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SHORT REPORT

Check for updates

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

Table 1. Demographics' population.

PMA at insertion (weeks)	31 ± 5.5
Weight at insertion (grams)	1400 ± 293
Indwelling time (days)	39 ± 25
Indication at insertion (n)	Surgery disease 30% (22)
	Respiratory distress syndrome 22% (16)
	BPD 20% (14)
	Prolonged parenteral nutrition 15% (11)
	Septic shock 8% (6)
	DIVAs >4% (3)
72 Elective removal	96%


3FR


PORTEX

SIC-Ped
Safe Insertion of Central access in Pediatric patient

- 345 neonati.
- Nessuna complicanza al momento dell'impianto.
- Rimozione elettiva del dispositivo nel 98% dei casi.
- Incidenza di CRBSI 0.3/1000 giorni catetere.
- Nessun caso di trombosi o migrazione del catetere.
- 4 pubblicazioni scientifiche.

- **Centrally inserted central catheters in preterm neonates with weight below 1500 g by ultrasound-guided access to the brachio-cephalic vein. JVA 2021.** doi: 10.1177/1129729820940174
- **Securement of central venous catheters by subcutaneously anchored suturless devices in neonates. JMFNM 2021.** doi: 10.1080/14767058.2021.1922377
- **The intracavitary ECG method for tip location of ultrasound-guided centrally inserted central catheter in neonates. JVA 2022.** doi: 10.1177/11297298211068302
- **A GAVeCeLT bundle for central venous catheterization in neonates and children: A prospective clinical study on 729 cases. JVA 2022.** https://doi.org/10.1177/11297298221074472

In un setting ideale….

Combination of ketamine and fentanyl (KetaFent) for safe insertion of ultrasound-guided central venous catheters in infants

Vito D'Andrea[1]*, Giorgia Prontera[1], Giovanni Barone[2] and Giovanni Vento[1]

2023

Prospective case series study on the use of a novel analgosedation protocol for ultrasound-guided catheterization in Neonatal Intensive Care Unit

Giovanni Barone[1] · Miria Natile[1] · Carmen Simona Nigro[2] · Vito D'Andrea[3] · Gina Ancora[1]

2024

JVA The Journal of Vascular Access

The Journal of Vascular Access
1–6

DOI: 10.1177/11297298241236220
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Sage

A novel neonatal protocol for Safe Insertion of Umbilical Venous Catheters (SIUVeC): Minimizing complications in placement and management

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

Table 1. The eight steps of the SIUVeC protocol.

Pre-procedural evaluation (including US evaluation).
Adoption of pre-assembled insertion kits.
Appropriate aseptic technique (hand hygiene, maximal barrier precautions, skin antisepsis with 2% chlorhexidine in 70% isopropyl alcohol).
Vein cannulation using the smallest catheter that may meet the infusion requirements and choosing widely between single versus double lumen UVC.
Real-time tip navigation and tip location by US (according to the NeoECHOTIP protocol).
Securement of the catheter and protection of the exit site (combining sutureless devices, cyanoacrylate glue, semipermeable transparent membranes).
Post-procedural serial assessment of tip location by US.
Early removal of the device (within 4–5 days).

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Sage

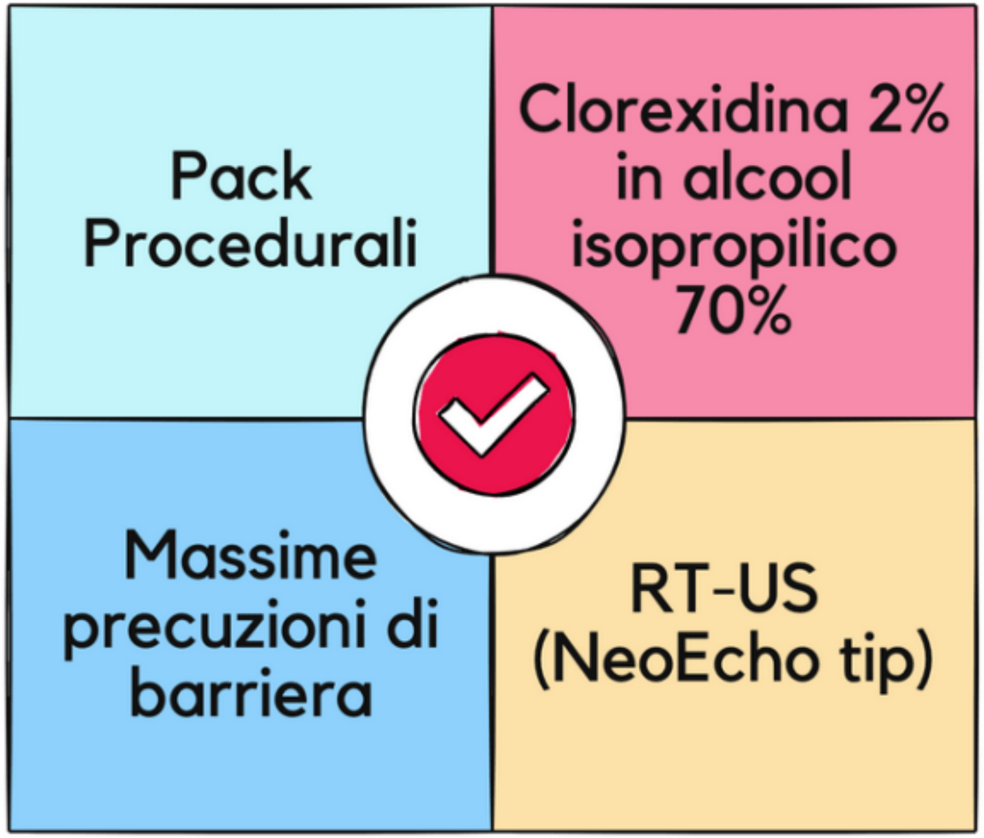
The SIECC protocol: A novel insertion bundle to minimize the complications related to epicutaneo-cava catheters in neonates

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

Table 1. The seven steps of the SIECC protocol.

1.	Pre-procedural evaluation of superficial veins (including the RaSuVA protocol)
2.	Adoption of pre-assembled insertion kits
3.	Appropriate aseptic technique (hand hygiene, maximal barrier precautions, skin antisepsis with 2% chlorhexidine in 70% isopropyl alcohol)
4.	Intra-procedural assessment of tip navigation and tip location by ultrasound (adopting the Neo-ECHOTIP protocol)
5.	Securement of the catheter and protection of the exit site
6.	Post-procedural serial assessments of tip location by ultrasound
7.	Removal of the device within 2 weeks

SIUVeC - SIECC - SIC



Tip location

E. Use tip locating methods to identify CVAD tip location during the insertion procedure (ie, "real-time") for neonate, pediatric, and adult patients. Studies have demonstrated greater accuracy, more efficient initiation of infusion therapy, and reduced costs.[1,12] (IV)

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.[1,12-30] (I)

3. Consider using ultrasound to confirm catheter tip position in neonates and in the emergency department or other critical care environments where immediate confirmation of tip location is time critical.[6,33,40] (IV)

22. CENTRAL VASCULAR ACCESS DEVICE TIP LOCATION

Infusion Therapy Standards of Practice

Review

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A narrative review on tip navigation and tip location of central venous access devices in the neonate: Intracavitary ECG or real time ultrasound?

Miria Natile[1], Gina Ancora[1], Vito D'Andrea[2], Mauro Pittiruti[3] and Giovanni Barone[1]

Table 1. Tip location by intracavitary ECG.

Vascular Access Device	Applicability	Feasibility	Accuracy
UVC	Applicable, but not recommended	Yes	Low
ECC – upper limbs	Applicable, but not recommended	Not always feasible	High
ECC – lower limbs	Not always applicable	Not always feasible	Low
CICC	Applicable and highly recommended	Yes	High
FICC	Not always applicable	Not always feasible	Low

IC-ECG = never applicable for tip navigation.

Table 2. Tip location by real time ultrasound.

Vascular Access Device	Applicability	Feasibility	Accuracy
UVC	Applicable, highly recommended	Yes	High
ECC – upper limbs	Applicable, recommended	Yes	High
ECC – lower limbs	Applicable, recommended	Yes	High
CICC	Applicable	Yes	High
FICC	Applicable, recommended	Yes	High

Real time ultrasound = always applicable for tip navigation.

Editorial

JVA The Journal of Vascular Access

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2022, Vol. 23(5) 679–688

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

UVC: umbilical venous catheter; ECC: epicutaneo-caval catheter; RaCeVA: rapid central vein assessment; RaPeVA: rapid peripheral vein assessment; CICC: centrally inserted central catheter; FICC: femoral inserted central catheter.

Neo-ECHOTIP e prevenzione della malposizione primaria nei CVO

Global Neonatal Research

Neonatology

Neonatology
DOI: 10.1159/000538905

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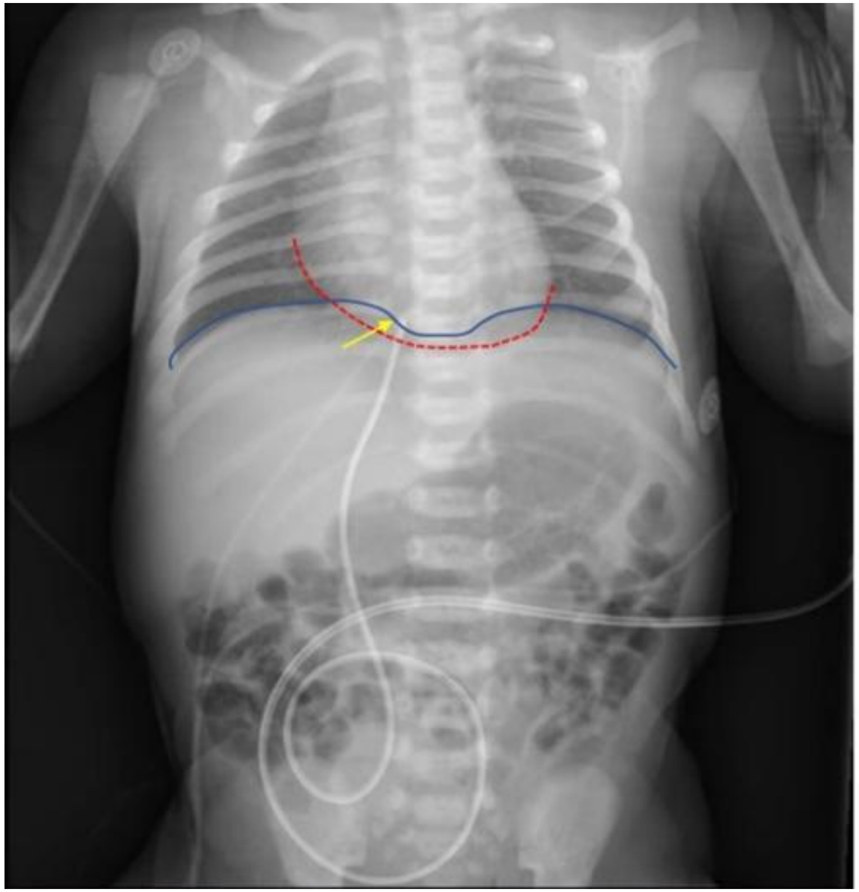
Published online: June ■■■, 2024

Real-Time Ultrasound Tip Location Reduces Malposition and Radiation Exposure during Umbilical Venous Catheter Placement in Neonates: A Retrospective, Observational Study

Vito D'Andrea[a] Giorgia Prontera[a] Francesco Cota[a] Alessandro Perri[a]
Rosellina Russo[b] Giovanni Barone[c] Giovanni Vento[a]

[a]Neonatology Unit, Department of Woman and Child Health and Public Health, Fondazione Policlinico Universitario "Agostino Gemelli" IRCCS, Rome, Italy; [b]Department of Diagnostic Imaging, Oncological Radiotherapy, and Hematology, Fondazione Policlinico Universitario "Agostino Gemelli" IRCCS, Rome, Italy; [c]Neonatal Intensive Care Unit, Infermi Hospital, AUSL Romagna, Rimini, Italy



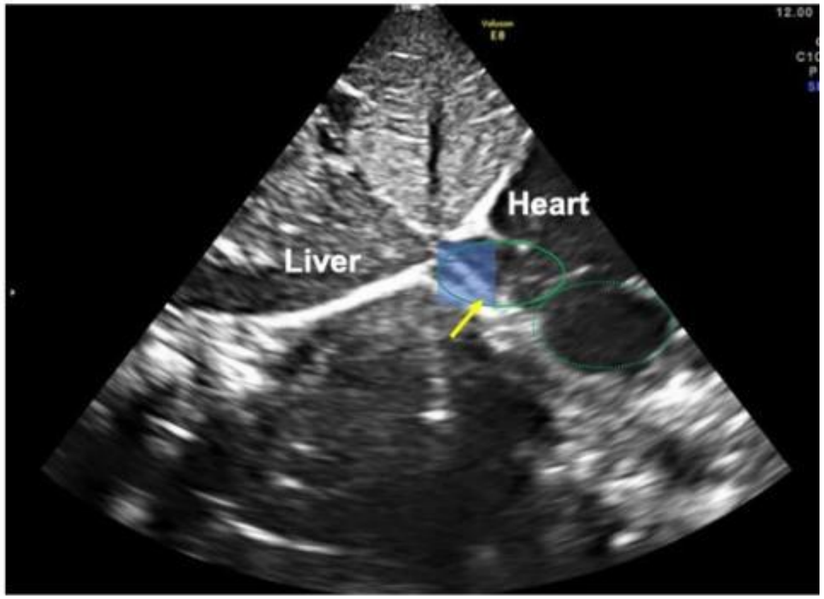

12.00
Heart
Liver

Table 2. UVC tip location at insertion

	X-ray group (212)	RT-US group (249)	*p* value
Safe position, *n* (%)	51 (24.1)	225 (90.4)	<0.001
Primary malposition, *n* (%)	161 (75.9)	24 (9.6)	<0.001
In the heart position	41 (25.4)	–	
Intrahepatic position	100 (62.1)	–	
Prehepatic position	20 (12.4)	24 (100)	

Neo-ECHOTIP e prevenzione della malposizione primaria negli ECC

Real-Time Ultrasound Tip Location Reduces Malposition and Radiation Exposure during Epicutaneo-Caval Catheter Placement in Neonates

Vito D'Andrea, MD[1,*] Giorgia Prontera, MD[1,*] Francesco Cota, MD[1] Rosellina Russo, MD[2]
Giovanni Barone, MD[3] Giovanni Vento, MD[1]

	X-ray	RT-US	*p*-Value
Primary malposition	107 (65.4%)	11 (13.25%)	<0.001
Single repositioning	79 (47.88%)	10 (12.5%)	<0.001
Multiple repositioning	28 (16.97%)	1 (1.2%)	<0.001

38. VASCULAR ACCESS DEVICE SECUREMENT

KEY DEFINITIONS

Adhesive securement device (ASD): an adhesive-backed device that adheres to the skin with a mechanism to hold the VAD in place; a separate dressing is placed over the ASD. Both the dressing and ASD must be removed and replaced at specific intervals during the VAD dwell time.

Integrated securement device (ISD): a device that combines a dressing with securement functions; includes transparent, semipermeable window and a bordered fabric collar with built-in securement technology.

Subcutaneous anchor securement system (SASS): a securement device that anchors the VAD in place via flexible feet/posts that are placed just beneath the skin; these act to stabilize the catheter right at the point of insertion. A separate dressing is placed over the SASS. The SASS does not need to be changed at regular intervals when the dressing is changed; it can remain in place if there are no associated complications.

Tissue adhesive (TA): a medical-grade cyanoacrylate glue that can seal the insertion site and temporarily bond the catheter to the skin at the point of insertion and under the catheter hub. TA should be reapplied at each dressing change.

Techniques in vascular access

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1–4

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

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

THE JOURNAL OF PEDIATRICS • www.jpeds.com

ORIGINAL ARTICLES

Securement of Umbilical Venous Catheter Using Cyanoacrylate Glue: A Randomized Controlled Trial

Vito D'Andrea, MD[1], Giorgia Prontera, MD[1], Giovanni Pinna, MD[2], Francesco Cota, PhD[1], Simona Fattore, MD[1], Simonetta Costa, PhD[1], Martina Migliorato, MD[1], Giovanni Barone, MD[3], Mauro Pittiruti, MD[4], and Giovanni Vento, MD[1]

Objective To evaluate the role of cyanoacrylate glue in reducing dislodgement of umbilical venous catheters (UVCs).

Study design This was a single-center, randomized, controlled, nonblinded trial. All infants requiring an UVC according to our local policy were included in the study. Infants with a UVC with a centrally located tip as verified by real-time ultrasound examination were eligible for the study. Primary outcome was the safety and efficacy of securement by cyanoacrylate glue plus cord-anchored suture (SG group) vs securement by suture alone (S group), as measured by reduction in dislodgment of the external tract of the catheter. Secondary outcomes were tip migration, catheter-related bloodstream infection, and catheter-related thrombosis.

Results In the first 48 hours after UVC insertion, dislodgement was significantly higher in the S group than in the SG group (23.1% vs 1.5%; $P < .001$). The overall dislodgement rate was 24.6% in the S group vs 7.7% in the SG group ($P = .016$). No differences were found in catheter-related bloodstream infection and catheter-related thrombosis. The incidence of tip migration was similar in both groups (S group 12.2% vs SG group 11.7%).

Conclusions In our single-center study, cyanoacrylate glue was safe and effective for securement of UVCs, and particularly effective in decreasing early catheter dislodgments. *(J Pediatr 2023;260:113517)*.

Trial registration UMIN-CTR Clinical Trial; Registration number: R000045844.

Novità dell’impianto

I 3 protocolli di impianto del GaVePed stabiliscono il nuovo standard of care per il posizionamento dei cateteri venosi centrali.

Stabiliscono le migliori pratiche cliniche per minimizzare il rischio di complicanza in un paziente estramamente fragile.

Rafforzano il ruolo cruciale della tip location intraprocedurale.

Definiscono in maniera precisa il “secure&protect” dei cateteri venosi neonatali.

Agenda

1. Novità sulle indicazioni
2. Novità dell'impianto
3. Novità della gestione

Why Proper CL Maintenance is Critical

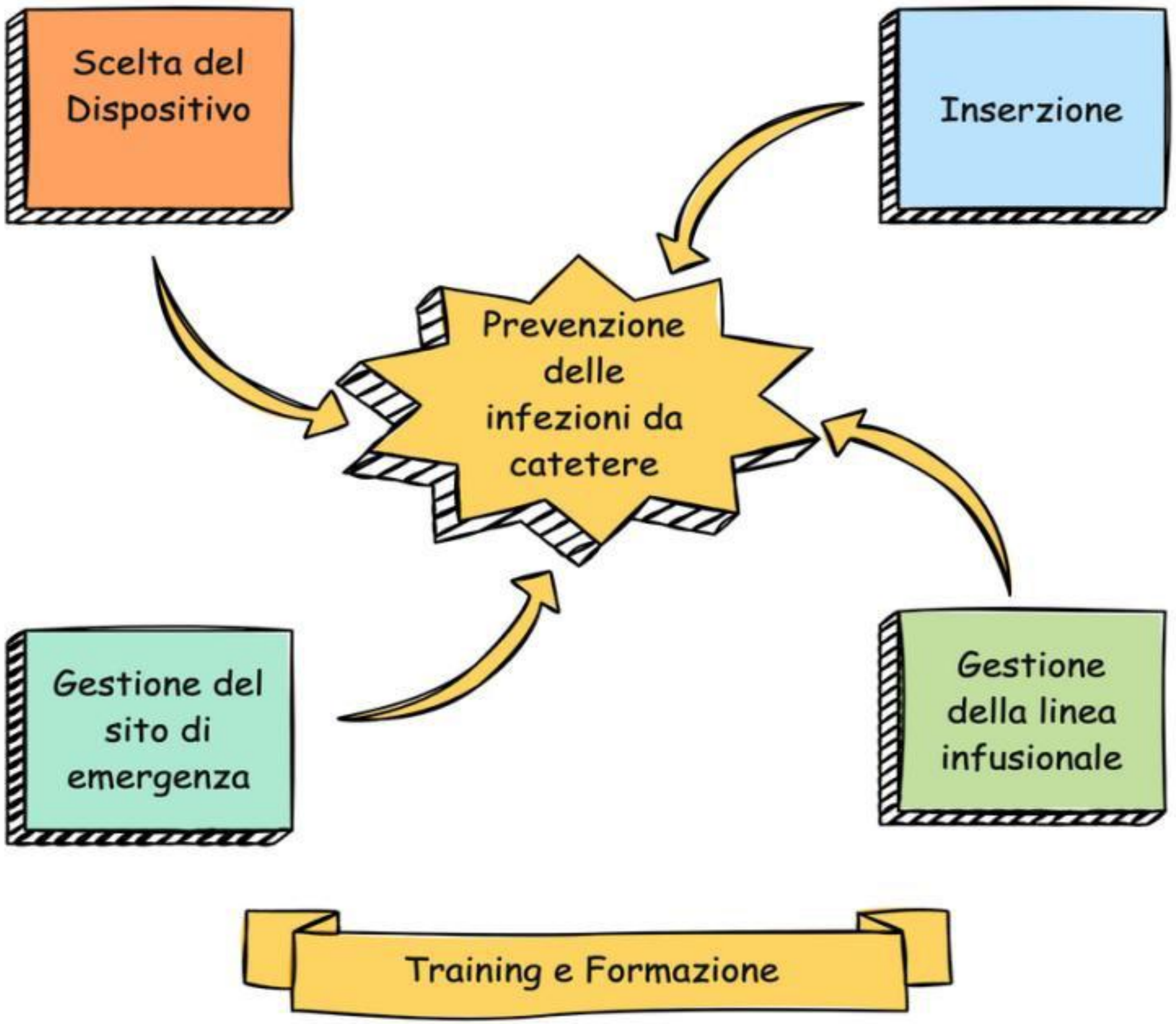
Insertion Period
= 30 min
= 0.3%

Maintenance Period = 167.5h = 99.7%

0 1 2 3 4 5 6 7

Average Central Line Days

Modified, courtesy of J. LeDonne, MD



Scelta del Dispositivo
Inserzione
Prevenzione delle infezioni da catetere
Gestione del sito di emergenza
Gestione della linea infusionale
Training e Formazione

Le Infezioni da Catetere Venoso Centrale
sono una delle maggiori problematiche infettive
nei neonati in Terapia Intensiva

AUMENTO DELLA MORTALITÀ:

Tasso di mortalità attribuito tra

4 / 20 %

(Taylor et al., 2014)

AUMENTO DURATA DELLA DEGENZA:

Aumento della durata media di degenza di

4 – 7 giorni

(Sathiyamurthy et al., 2016)

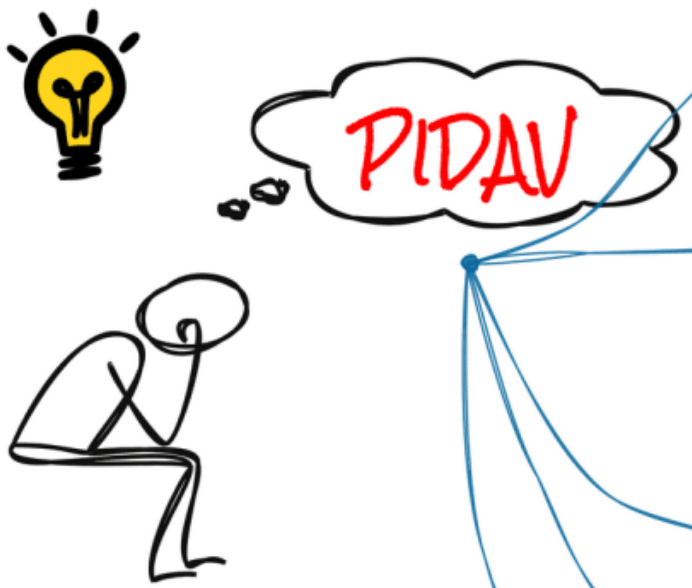
PEGGIORAMENTO OUTCOME NEURO:

CP
Peggiori score in tutte le scale

OR 1.4-1.7

(Stoll et al., 2004)

Prevenzione delle infezioni



1. Corretta indicazione
2. Corretta asepsi
3. Scelta corretta del sito di emergenza
4. Corretta tecnica di impianto
5. Fissaggio appropiato
6. Protezione del sito di emergenza
7. Protezione della linea infusionale
8. Facilitare l'adozione di BUNDLE

GAVeCeLT
Gli Accessi Venosi Centrali a Lungo Termine

GAVePed
Gruppo Accessi Venosi Pediatrici

Port Protector per la disinfezione degli hub

- Cappucci contenenti una **spugna** di alcool isopropilico al 70%
- Disinfettano passivamente in 1-4 minuti e se non rimossi fino a 7 gg
- Sono raccomandati dalle linee guida SHEA/IDSA 2014 e 2023 e dalle INS 2016, 2021, 2024; Epic 3.

Original research article

JVA The Journal of Vascular Access

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1–8

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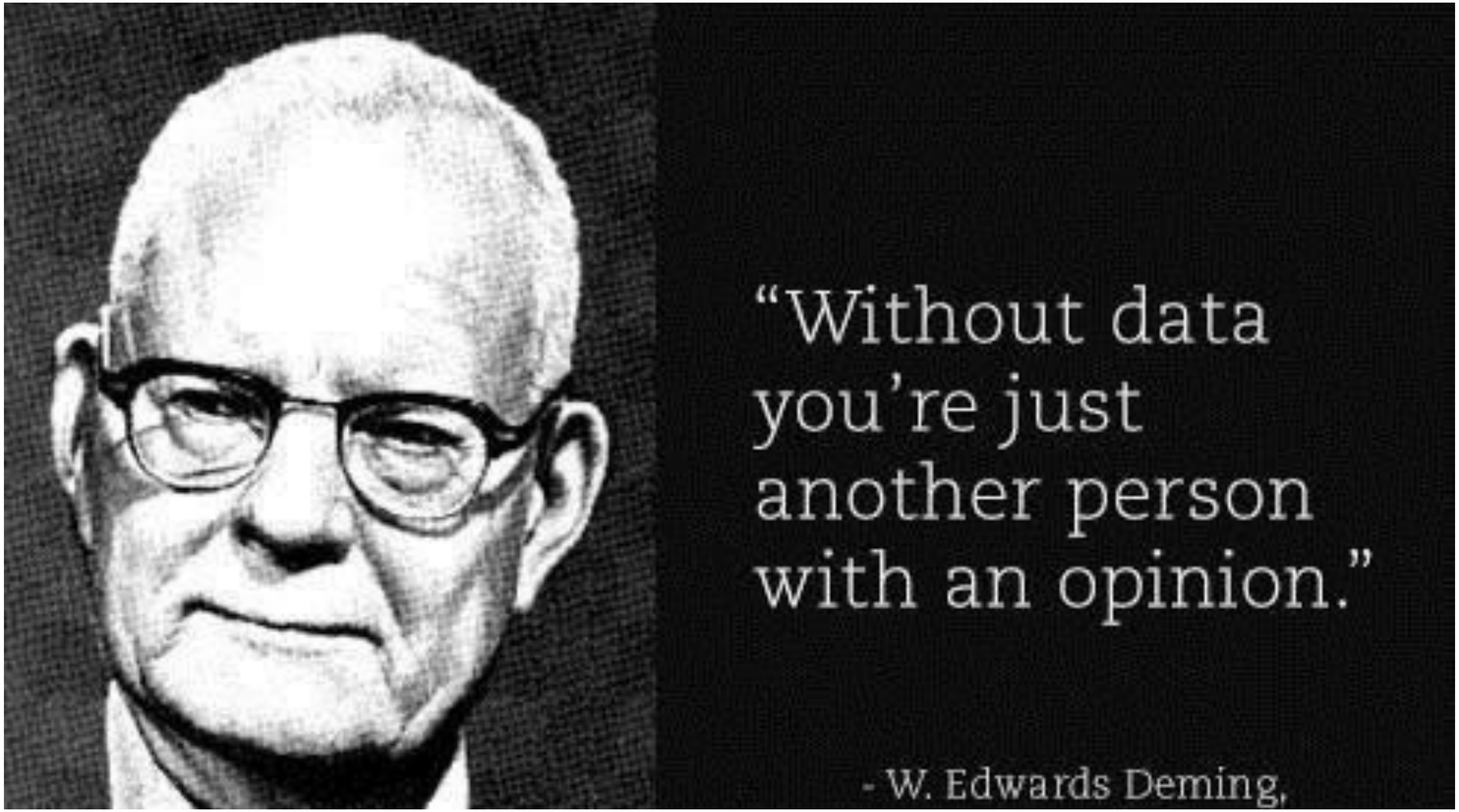
SAGE

Closed intravenous systems for central vascular access: A difference maker for CLABSI rates in neonates?

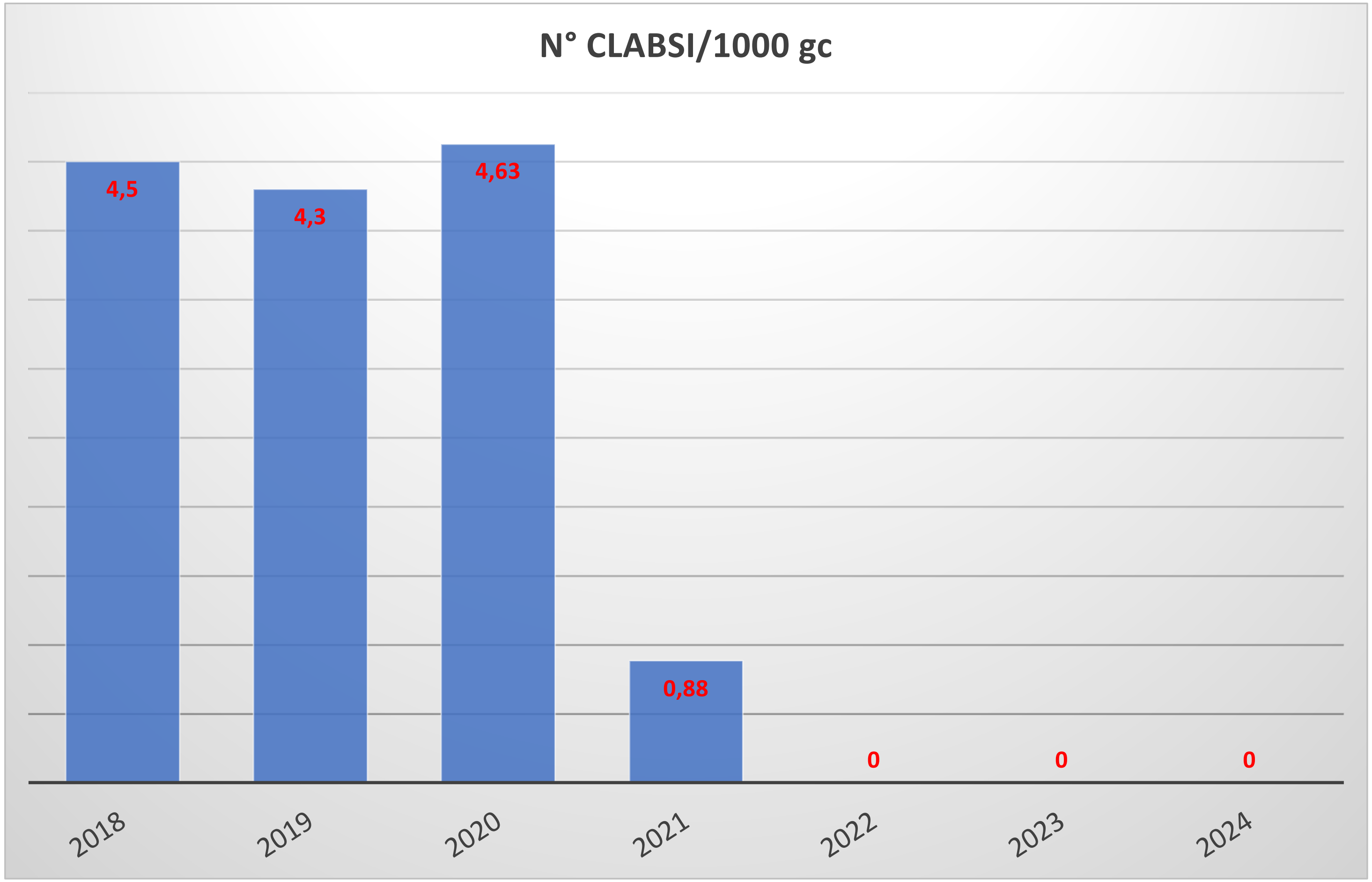
Matheus F.P.T. van Rens[1], Kevin Hugill[2], Airene L.V. Francia[3], Mohamad Adnan Mahmah[4], Afaf Boulous J Al Shadad[5], Imelda Caseres Chiuco[6] and Krisha L.P. Garcia[7]

Table 2. Comparison of CLABSI events, number of CL days, and CLABSI rate per 1000/days between pre- and post-introduction of the closed IV set, monthly rate.

Comparison	IV System	Minimum	Maximum	Mean	Standard Deviation	Mann-Whitney *U*-test *p*-value
CLABSI rate per 1000/days	Legacy	0.00	7.21	2.8744	2.72	0.031*
	Closed	0.00	1.99	0.2211	0.66	
Number of CL days	Legacy	366.00	636.00	457.00	93.62	0.040*
	Closed	422.00	817.00	583.89	133.15	
CLABSI Events	Legacy	0.00	3.00	1.22	1.09	0.031*
	Closed	0.00	1.00	0.11	0.33	


"Without data you're just another person with an opinion."
- W. Edwards Deming,

Dati CLABSI TIN Rimini



How did we reach target “zero”?

1. Acquisizione delle nuove tecnologie (port protector, rampe/octopus preassemblati, colla, ecografo, et c).
2. Applicazione sistematica del DAV– Expert.
3. Applicazione sistematica dei 3 bundle di impianto (SIUVeC; SIECC; SIC-PED) e del bundle PIDAV per la gestione.
4. Facilitazione dell’adozione dei bundle tramite check list ad hoc.
5. Identificazione di referenti medici e infermieristici.
6. Attivato un sistema di monitoraggio delle infezioni correlate a catetere
7. Formazione di tutto il personale medico e infermieristico.

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Novità della gestione

Una applicazione sistematica del protocollo PIDAV consente una prevenzione efficace delle infezioni anche in epoca neonatale.

La formazione del personale ha un ruolo fondamentale.

La pianificazione delle line infusionali svolge un ruolo cruciale.

Attività di monitoraggio e feedback periodici sono fondamentali per individuare al meglio la tempistica dei programma di retraining.

Progetti futuri

- Raccomandazioni NEVAT che promuovano a livello europeo la buona pratica clinica degli accessi venosi neonatali seguendo il lavoro del GaVePed.
- Creazione di una consensus ad hoc sulla gestione dell'accesso venoso neonatale NEVAT-GaVePed.
- Creazione di un bundle per l'impianto dei cateteri venosi periferici.

GAVeCeLT
Gli Accessi Venosi Centrali a Lungo Termine

WoCoVA
World Congress Vascular Access

SIN
Società Italiana di Neonatologia

GAVePed
Gruppo Accessi Venosi Pediatrici

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