Accesso venoso periferico nel paziente pediatrico DIVA

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Review > J Infus Nurs. 2005 May-Jun;28(3 Suppl):S22-32; quiz S33-6.
doi: 10.1097/00129804-200505001-00005.

Cost containment and infusion services

Kathy Kokotis [1]

Proactive Vascular planning

The value of an infusion team is not in the performance of routine tasks, but in the process change involved with proactive vascular access planning at patient admission. Few hospitals have implemented a proactive approach to vascular access planning on the front end of therapy.

- Selezione accurata del VAD
- Riduzione significativa del rischio di complicanze a carico del paziente
- Maggior costo-efficacia clinica
- Miglioramento della efficienza organizzativa
- Maggiore risparmio aziendale

Pediatr Emerg Care. 2008 Mar;24(3):143-7. doi: 10.1097/PEC.0b013e3181666f32.

Derivation of the DIVA score: a clinical prediction rule for the identification of children with difficult intravenous access

Kenneth Yen [1], Anne Riegert, Marc H Gorelick

TABLE 3. Point Values for Each Variable of the 4-Variable DIVA Score

Predictor Variable	Scores		
Vein visible after tourniquet	Visible, 0		Not visible, 2
Vein palpable after tourniquet	Palpable, 0		Not palpable, 2
Age category	≥3 years old (older), 0	1–2 years old (toddler), 1	<1 year old (infant), 3
History of prematurity	Not premature, 0		Premature, 3

The sum of point values of the variables is the DIVA score (range, 0–10).

Academic Emergency Medicine
Official Journal of the Society for Academic Emergency Medicine

ORIGINAL RESEARCH CONTRIBUTION

Validation and Refinement of the Difficult Intravenous Access Score: A Clinical Prediction Rule for Identifying Children With Difficult Intravenous Access

Michael W. Riker, MD, Chris Kennedy, MD, Brad S. Winfrey, RN, Kenneth Yen, MD, MS, and M. Denise Dowd, MD, MPH

Table 4
Multivariate Models Analysis for DIVA Validation study

Model	Variables	OR	95% CI	Goodness-of-fit Statistic*
DIVA 4 (Yen)	Vein not palpable	2.5	1.3–4.8	0.96
	Vein not visible	4.0	2.3–8.4	
	Age (months)			
	0–11	2.0	1.1–3.6	
	12–35	4.6	2.5–8.6	
	≥ 36	1.0	REF	
	Prematurity	1.3	0.6–2.5	
DIVA 5 (Yen)	Vein not palpable	2.5	1.3–4.8	0.79
	Vein not visible	4.3	2.3–8.4	
	Age (months)			
	0–11	2.0	1.1–3.6	
	12–35	4.6	2.5–8.5	
	≥ 36	1.0	REF	
	Prematurity	1.3	0.6–2.5	
	Skin shade			
	Light	1.0	REF	
	Dark	0.97	0.6–1.7	
DIVA 4 (Riker)	Vein not palpable	2.4	1.3–4.5	0.79
	Vein not visible	4.2	2.2–8.0	
	Age (months)			
	0–11	1.9	1.1–3.4	
	12–35	4.4	2.4–8.0	
	≥ 36	1.0	REF	
	NICU stay	1.4	0.7–2.9	
DIVA 3 (Riker)	Vein not palpable	2.5	1.4–4.7	0.97
	Vein not visible	4.2	2.2–8.0	
	Age (months)			
	0–11	1.9	1.1–3.4	
	12–35	4.5	2.5–8.2	
	≥ 36	1.0	REF	

DIVA = difficult intravenous access; NICU = newborn intensive care unit; REF = reference.
*Hosmer and Lemeshow test.

Patients with a **DIVA** score of **4** or greater had more than 50% likelihood of failed first IV attempt

Modified from Rikers et al; doi: 10.1111/j.1553-2712.2011.01205.x

26. VASCULAR ACCESS DEVICE (VAD) PLANNING

Standard

26.1 The appropriate type of vascular access device (VAD), peripheral or central, is selected to accommodate the patient's vascular access needs based on the prescribed therapy or treatment regimen; anticipated duration of therapy; vascular characteristics; and patient's age, comorbidities, history of infusion therapy, preference for VAD location, and ability and resources available to care for the device.
26.2 Selection of the most appropriate VAD occurs as a collaborative process among the interprofessional team, the patient, and the patient's caregiver(s).
26.3 The VAD selected is of the smallest outer diameter with the fewest number of lumens and is the least invasive device needed for the prescribed therapy.
26.4 Peripheral vein preservation is considered when planning for vascular access.
26.5 Safety-engineered devices are selected and consistently activated and/or used.

22. VASCULAR VISUALIZATION

Standard

22.1 To ensure patient safety, the clinician is competent in the use of vascular visualization technology for vascular access device (VAD) insertion. This knowledge includes, but is not limited to, appropriate vessels, size, depth, location, and potential complications.
22.2 Vascular visualization technology is used in patients with difficult venous access and/or after failed venipuncture attempts.
22.3 Vascular visualization technology is employed to increase the success with peripheral cannulation and decrease the need for central vascular access device (CVAD) insertion, when other factors do not require a CVAD.

Glossary

Difficult Intravenous Access (DIVA). Refers to multiple, unsuccessful attempts to cannulate a vein; the need for special interventions to establish venous cannulation based on a known history of difficulty due to diseases, injury, and/or frequent unsuccessful venipuncture attempts; may be acute due to sudden illness (eg, fluid volume deficit) or chronic due to lengthy history of difficult intravenous access.

26. VASCULAR ACCESS DEVICE PLANNING

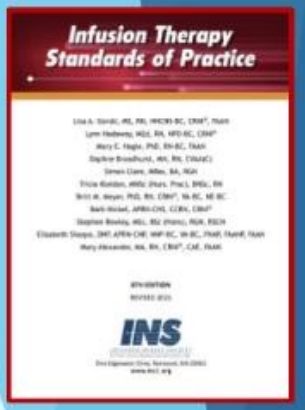
2. Use vascular visualization technology (eg, near infrared, ultrasound) to increase success for patients with difficult intravenous access (DIVA). See Standard 22, *Vascular Visualization*.[2,15-20] (I)

34. VASCULAR ACCESS DEVICE PLACEMENT

1. Consider use of a population-specific DIVA assessment tool to guide early referral to an infusion/vascular access specialist if indicated. In several published reviews, some tools are better at identifying children and adults with DIVA; each tool has limitations, and further study is needed.[4,5,12-19] (I)

C. Assess the need for measures to reduce pain of insertion (refer to Standard 32, *Pain Management for Venipuncture and Vascular Access Procedures*).

D. Use visualization technology to aid in peripheral vein identification and selection for patients with DIVA (refer to Standard 22, *Vascular Visualization*).
   1. Choose a long PIVC as follows:
      a. When all aspects of a short PIVC are met, but the vessel is difficult to palpate or visualize with the naked eye; ultrasound guidance/near infrared technology is recommended.
      b. Evaluate depth of vessel when choosing a long PIVC to ensure two-thirds of catheter lies within vein.[20-24] (III)



Review

JVA The Journal of Vascular Access

European recommendations on the proper indication and use of peripheral venous access devices (the ERPIUP consensus): A WoCoVA project

The Journal of Vascular Access
1–18

DOI: 10.1177/11297298211023274
journals.sagepub.com/home/jva
SAGE

Mauro Pittiruti[1], Ton Van Boxtel[2], Giancarlo Scoppettuolo[1], Peter Carr[3], Evangelos Konstantinou[4], Gloria Ortiz Miluy[5], Massimo Lamperti[6], Godelieve Alice Goossens[7], Liz Simcock[8], Christian Dupont[9], Sheila Inwood[10], Sergio Bertoglio[11], Jackie Nicholson[12], Fulvio Pinelli[13] and Gilda Pepe[1]

(6) Last but not least, new algorithms for the proper choice of the VAD have been released, which now take into consideration a wider range of peripheral VADs, and have also adopted new terminology, such as the term DIVA (Difficult Intra-Venous Access) that identifies the patient whose superficial veins of the upper arm are not visible and/or palpable.[16–18] Examples of this kind are the

The choice of the PVAD depends also on the availability of the superficial veins. When the superficial veins of the arm are difficult to visualize and palpate (so-called "DIVA"), SPC can be inserted only accessing deep veins of the arm by US guidance; though, US-guided short cannulas usually have a limited duration, due to the fact most of the cannula stays outside of the vein, with high risk of dislocation. In this condition, unless the line is required only for <24 h, the recommendation is to place a LPC in a deep vein of the arm, by US guidance.[42,45]

Nonetheless, it is most likely that soon NIR guidance will prove to be useful in specific categories of DIVA patients, particularly in those patients where the main obstacle to the visualization of the vein is the pigmentation of the skin.

The indications for specific PVADs are mainly based on the expected duration of treatment:

- *SPCs are appropriate for emergency and/or short duration access (24–48 h)*
- *"integrated" SPCs are appropriate for non-emergency access, when expected duration is 2–7 days*
- *LPCs are appropriate in DIVA patients, or when expected duration is 1–4 weeks*
- *MCs are appropriate when expected duration >4 weeks.*

Pericoli da evitare

- **Mancato riconoscimento del paziente difficile (DIVA)**
- **Sfruttamento sconsiderato delle vene periferiche del paziente** con una lunga serie di posizionamenti di agocannule
- **Posizionamento di un Catetere venoso centrale anche senza reale necessità di infusioni per via centrale** soltanto per esaurimento/inagibilità delle vene periferiche

Di cosa abbiamo bisogno ?

Formazione

Strumenti decisionali

Team dedicati

Tecnologie avanzate

Device adeguati

POSITION PAPER
The Use of Visualization Technology for the Insertion of Peripheral Intravenous Catheters

Formazione

Background / Problem

Education on vascular access and the insertion of PIVC is typically not provided in formal clinical training (e.g., nursing school). Recent surveys revealed that 57% of nurses reported not being taught in nursing school, 71% reported receiving on-the-job training, and 11% were taught using the "see one, do one" approach.[23] With PIVC insertion being the most common clinical procedure and the evidence demonstrating high failure rates, there is opportunity to improve training, skill level, and guidance associated with the use of visualization technology.[23, 24]

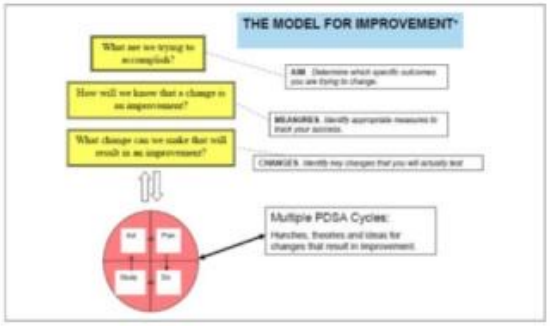
Difficult IV access patients are often those presenting with prematurity, obesity, chronic illness, hypovolemia, vasculopathy or intravenous (IV) drug use.[19] Repeated attempts to insert PIVCs can cause vessel depletion. This often leads to the escalation of more invasive devices, such as central venous catheters. Repeated failed attempts at PIVC catheterization can cause pain, distress, bruising or nerve injury to the patient.[6,24] IV insertion failure also impacts healthcare system efficiency and total cost of care.

Failed PIVC insertion can often lead to a second victim, the clinician attempting insertion. After PIVC insertion failure, the inserter may feel frustration, anxiety, loss of confidence and there may be a loss of trust between the clinician and the patient/family.[6,25]

J Vasc Access. 2021 Jan;22(1):81-89. doi: 10.1177/1129729820924554. Epub 2020 Jun 2.

Implementing an emergency department vascular access team: A quality review of training, competency, and outcomes

Jon A Bell [1], Timothy R Spencer [2]



Abstract

Peripheral intravenous catheters are frequently used devices in emergency departments. Many patients now present with difficult anatomy and are labeled as difficult intravenous access patients. A common technology to address this challenge is ultrasound. While studies have examined the ability to train emergency staff, few have addressed how this should be done and the outcomes associated with such training. No studies were found with dedicated vascular access specialist teams in emergency departments. An emergency department vascular access specialist team was formed at a hospital in Bangor, Maine, United States to train, validate, and proctor clinicians with ultrasound-guided peripheral intravenous devices. A quality review of this process was compiled and determined that appropriate clinicians with dedicated training and guidance can achieve higher levels of procedural success. Furthermore, evidence substantiates that frequent practice is linked to a higher quality of care and that a significant need for such teams is present. This review examines how a team was implemented and its impact both department- and facility-wide. It is possible that hospitals benefit from the services of vascular access specialists to provide higher quality care. Successful implementation of such specialist teams requires foundational knowledge and skills in vascular access with ongoing quality measures to ensure competency and compliance with evidence-based practices.

Formazione

Br J Nurs. 2018 Apr 26;27(8):S28-S35. doi: 10.12968/bjon.2018.27.8.S28.

Vessel Health and Preservation: a model and clinical pathway for using vascular access devices

Nancy L Moureau [1], Peter J Carr [2]

Figure 1. Original USA model of vascular access clinical pathway for patient start of care through discontinuation of device, including evaluation of outcomes
Source: PICC Excellence Inc, Nancy Moureau

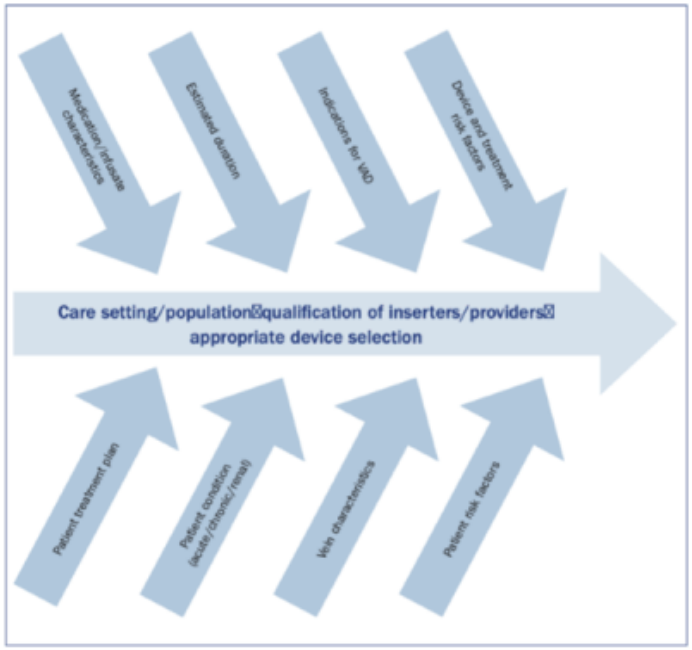


Figure 2. Device selection factors
Source: PICC Excellence Inc

al, 2017). Assessment and selection form the evidence-based processes of the first quadrant of the VHP model. The goal of the first quadrant is the timely intentional selection of the most appropriate location and device type for insertion establishing the 'right line, for the right patient, at the right time' (Moureau et al, 2012) (*Figure 2*). Within the first 48 hours of hospital

Strumenti Decisionali

http://davexpert.gavecelt.it

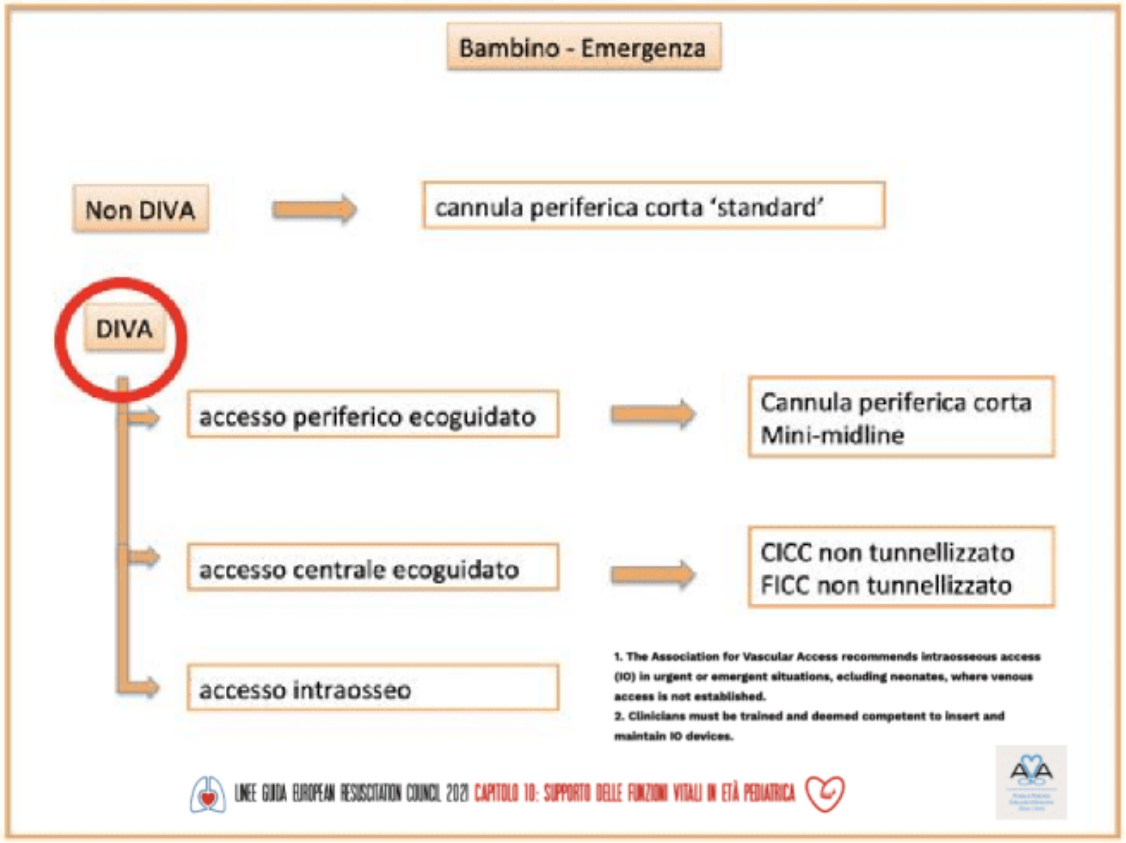
Algoritmo di scelta

- Strumento per la scelta del dispositivo per accesso venoso (DAV) più appropriato per la singola situazione clinica
- Propone soluzioni basate su:
  - Sicurezza per il paziente
  - Efficacia clinica del dispositivo
  - Costo-efficacia della scelta

Strumenti Decisionali

Bambino in emergenza uso intraospedaliero

Giusta linea → Giusto paziente → Giusto tempo

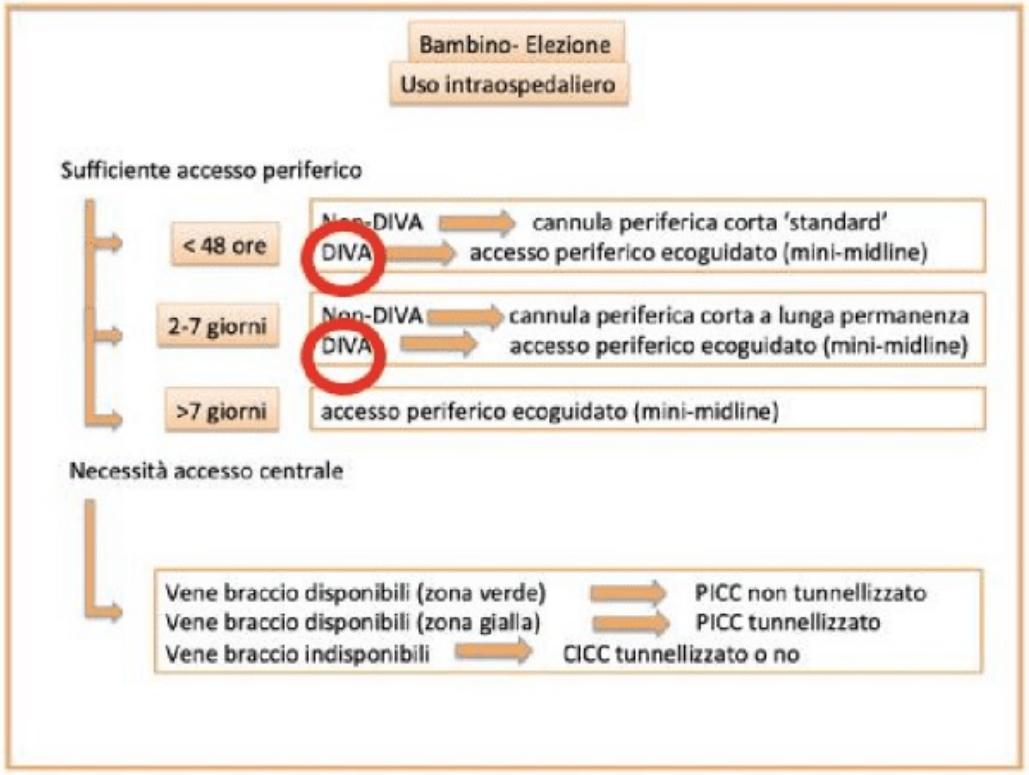


DAV EXPERT GAVeCeLT

Strumenti Decisionali

Bambino in elezione uso intraospedaliero

Giusta linea → Giusto paziente → Giusto tempo



DAV EXPERT GAVeCeLT

Strumenti Decisionali

> Br J Nurs. 2012;21(21):S28, S30-2. doi: 10.12968/bjon.2012.21.Sup21.S28.

The strategic role of the nurse in the selection of IV devices

Thais Queiroz Santolim [1], Luiz Augusto Ubirajara Santos, Arlete Mazzini Miranda Giovani, Vanessa Cristina Dias

Affiliations + expand

PMID: 23469519 DOI: 10.12968/bjon.2012.21.Sup21.S28

Abstract

Use of vascular devices represents one of the most common procedures used as a complementary measure in the treatment of patients. An indication algorithm was established to serve as a guideline for nurses in choosing the best intravenous device, considering the main variables of drug therapy. A protocol approved by the Institute of Orthopedics and Traumatology of Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo (IOT-HCFMUSP), where the authors work, was subsequently established and the nurse carried out the evaluation for the indication of both the peripheral device and the central device, whether a peripherally inserted central catheter (PICC) or other device inserted by the physician. As a result, there was a decrease in the incidence of phlebitis from 0.77% in 2010 to 0.17% in 2011, with an annual curve of negative tendency. The nursing team also appeared more satisfied, diminishing stress related to puncture failure.

J Infus Nurs. 2010 May-Jun;33(3):156-60. doi: 10.1097/NAN.0b013e3181d9c942.

Benefits of establishing an intravenous team and the standardization of peripheral intravenous catheters

Gislene Aparecida da Silva [1], Sheila Priebe, Fábio Nunes Dias

Abstract

The purpose of this study was to show the importance of a team dedicated to intravenous (IV) insertion and the standardization of peripheral IV catheters in reducing venipuncture attempts, reducing cases of phlebitis, and optimizing costs. The benefits achieved by the team were a decrease in venipuncture attempts, a decrease of phlebitis (from 0.47% to 0.35%), the optimization of the team's time, and a 29.47% reduction in the use of catheters. The study corroborates the IV team's importance in the process of managing nurses' workflow, since it provides important indicators for quality management.

ASSOCIATION FOR VASCULAR ACCESS

POSITION PAPER

The Use of Visualization Technology for the Insertion of Peripheral Intravenous Catheters

The Association for Vascular Access (AVA) recommendations:

Practice Recommendations

Given the variability of facilities, personnel and training, organizational capabilities, and practices, AVA recommends the following steps regarding vessel visualization for the insertion of peripheral intravenous catheters:

1. Healthcare providers using vein visualization technologies for the insertion of peripheral intravenous catheters will be adequately **trained** on the use of the technology, its benefits and limitations.
2. Peripheral intravenous catheter **outcomes** will be measured and understood including first stick success and catheter dwell time. Improvement measures may include (but are not limited to) team member training, patient education, and implementation of vein visualization technology.
3. **Transillumination** technology should be considered as a visualization tool if more advanced visualization technology is not available.
4. In an effort to prevent vessel depletion and improve patient comfort, the use of **infrared/near infrared** visualization technology or **ultrasound guidance** should be considered for peripheral intravenous catheter insertion as a first intervention when used by trained healthcare providers.
5. For technology that comes in contact with the patient, follow the manufacturer's recommendations for appropriate covers to ensure proper protection of the patient. Training should also include proper care of the technology including cleaning and charging. For ultrasound, refer to the Association for Vascular Access guidance document on transducer disinfection.

Tecnologie avanzate

Review > J Vasc Access. 2022 Oct 26;11297298221132866.
doi: 10.1177/11297298221132866. Online ahead of print.

The effect of transilluminator device on successful peripheral venous catheter placement in children: A systematic review and meta-analysis

Mahbobeh Firooz [1], Samad Karkhah [2 3], Seyed Javad Hosseini [1]

Conclusion

RCTs and Non-RCTs studies showed different results in terms of some outcomes. Based on the results of four RCT studies, the use of TD significantly increased the FASR of PVCP. Also, TD decreased the MNA (one study, significantly) and the MDSPP (two studies, insignificantly). In addition, the results of two non-RCTs showed TD insignificantly decreased the FASR of PVCP and MNA. Although, TD significantly decreased the MDSPP (one study). More evidence for decision-making about the effectiveness of TD on successful PVCP is required. Future research should design rigor and robust RCT studies.

Vene superficiali (< 7mm)

Tecnologie avanzate

Br J Anaesth. 2013 Jun;110(6):966-71. doi: 10.1093/bja/aet003. Epub 2013 Feb 5.

Vein visualization: patient characteristic factors and efficacy of a new infrared vein finder technology

F B Chiao [1], F Resta-Flarer, J Lesser, J Ng, A Ganz, D Pino-Luey, H Bennett, C Perkins Jr, B Witek

Conclusion

Our study investigated patient characteristics that influence the identification of veins available for i.v. access. Our findings contribute pertinent and new data on i.v. access. African-American or Asian ethnicity, and obese weight were all patient characteristic groups associated with decreased vein visibility. On average, our practitioners identified approximately six veins on each upper extremity using unassisted vision (CM). The visibility of superficial veins eligible for attempted i.v. cannulation consistently increased when using the new infrared VueTek Veinsite® device. These findings can serve as a basis for future studies. Early identification of patients with difficult i.v. access will lead to better clinical care, preventing complications and reducing delays in starting treatment.

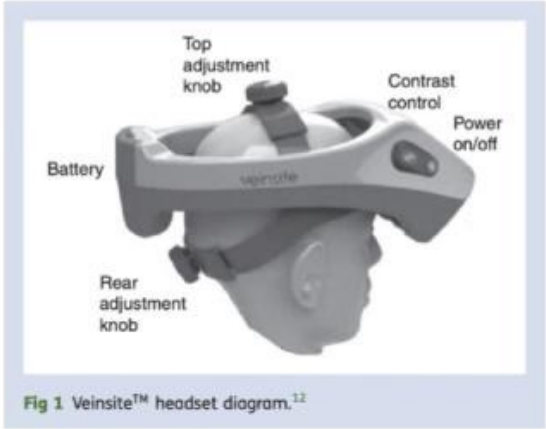


Fig 1 Veinsite™ headset diagram.[12]

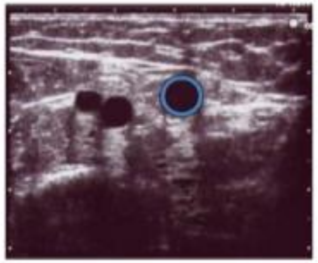
Vene superficiali (< 7mm)

Tecnologie avanzate

Review > Intensive Care Med. 2012 Jul;38(7):1105-17. doi: 10.1007/s00134-012-2597-x. Epub 2012 May 22.

International evidence-based recommendations on ultrasound-guided vascular access

Massimo Lamperti [1], 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



Practice Guideline > Crit Care. 2020 Feb 24;24(1):65. doi: 10.1186/s13054-020-2787-9.

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], Daniele De Luca [5 17]

> Eur J Anaesthesiol. 2020 May;37(5):344-376. doi: 10.1097/EJA.0000000000001180.

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

Massimo Lamperti [1], Daniele Guerino Biasucci, Nicola Disma, Mauro Pittiruti, Christian Breschan, Davide Vailati, Matteo Subert, Vilma Traškaitė, Andrius Macas, Jean-Pierre Estebe, Regis Fuzier,

Vene profonde (> 7 mm)

Tecnologie avanzate

Editorial > J Vasc Access. 2021 Jul 19;11297298211034023. doi: 10.1177/11297298211034023.
Online ahead of print.

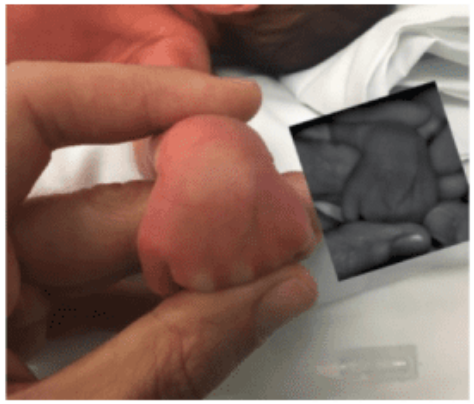
The integrated short peripheral cannula: A new peripheral venous access device?

Fulvio Pinelli [1], Mauro Pittiruti [2]

Table 1. Principal differences between standard SPC and integrated SPC.

	Standard SPC	Integrated SPC
Features	Safety or non-safety, open or closed system, winged or non-winged, ported or non-ported	Safety, closed system, winged, non-ported, preassembled extension, preassembled needle-free connector
Material	Polyurethane or polytetrafluoroethylene (Teflon)	Polyurethane
Expected duration	2–3 days	4–6 days
Clinical indication	Peripheral venous access required for limited period of time (<48 h): operating room, radiology suite, short infusions	Peripheral venous access required for several days, in hospitalized patients

SPC: short peripheral cannula.



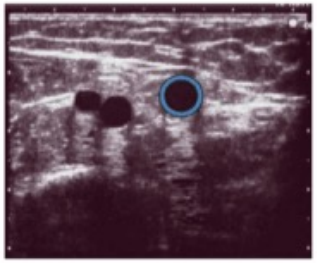
Device adeguati

› BMJ Paediatr Open. 2018 Mar 28;2(1):e000244. doi: 10.1136/bmjpo-2017-000244. eCollection 2018.

Ultrasound-guided placement of long peripheral cannulas in children over the age of 10 years admitted to the emergency department: a pilot study

Angela Paladini [1], Antonio Chiaretti [1], Kidane Wolde Sellasie [2], Mauro Pittiruti [3], Giovanni Vento [1]

Conclusions: Ultrasound-guided placement of LC was associated with a low risk of catheter failure and complications compared with the 'blind' placement of SC. LC placement may be considered a valid option in patients with DIVA requiring PVA in paediatric ED or in children who are candidates for infusion therapy expected to last longer than 5 days.



Device adeguati

TAKE HOME MESSAGES

- Identificare precocemente il paziente DIVA
- Creare Team di Specialisti dell'Accesso Vascolare
- Promuovere
  - Formazione
  - PDTA
  - Tecnologie avanzate
  - Device adeguati