



V Convegno
Nazionale
GAVePed



Accessi venosi
nel neonato e
nel bambino

Palacongressi, Rimini
15-16 maggio 2023

L'accesso venoso periferico nel neonato



M.Grazia Romitti
Fondazione Poliambulanza



Accesso venoso periferico (AVP)

Definizione

ACCESSO VENOSO PERIFERICO

Qualunque dispositivo vascolare la cui **punta** è nel sistema venoso ma **NON** in vena cava superiore o in vena cava inferiore o atrio destro (indipendentemente dalla vena incannulata e del dispositivo impiantato).

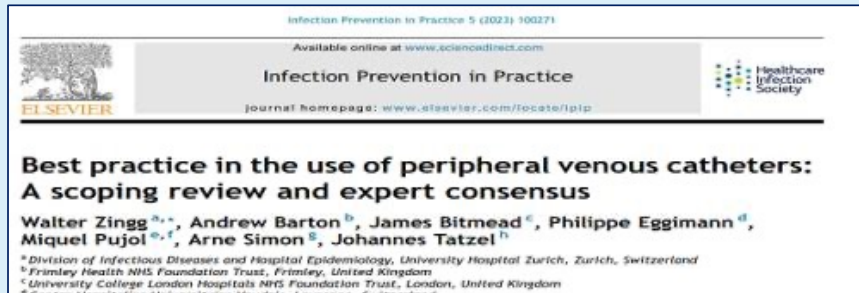
Procedura che prevede la rottura della naturale barriera protettiva cutanea con un dispositivo che mette in comunicazione diretta il mondo esterno con il flusso ematico del paziente



AVP accesso venoso più utilizzato in TIN

Sottostima dei potenziali rischi/complicanze

Presidio “dato per scontato”, ridotta consapevolezza e sottostima dei potenziali rischi



ence. Peripheral intravenous catheters have been in use for a very long time and have become such common place that potential risks are underestimated or even ignored. In addition, outcome surveillance of PIVC-associated complications is cumbersome and time-consuming. The absence of surveillance data contributes to a lack of awareness about the potential risks associated with their use.



Harm associated with inappropriate PIVC insertion and management is an under-recognised patient safety issue. Local and national studies have demonstrated, after successful insertion, pediatric PIVCs are associated with high rates of local and systemic complications, including infiltration/extravasation, occlusion and dislodgment (Ben



AVP accesso venoso più utilizzato in TIN

Elevata percentuale di «failure»

Percentuale di “failure” elevata rimasta costante

TABLE III - Reasons for catheter removal (n = 518)

| | n (%) |
|--------------------------------------|------------|
| Successful completion/end of therapy | 69 (13.3) |
| Complication | 288 (55.6) |
| Infiltration | 193 (67.0) |
| Leaking catheter | 53 (18.4) |
| Catheter occlusion | 15 (5.2) |
| Other | 27 (9.3) |
| Reason unknown | 150 (29.0) |
| Died or transferred | 14 (2.7) |

Failure: ogni outcome negativo associato ad un accesso venoso periferico (40-60%); si instaura un circolo vizioso «rimozione re inserzione» spesso causa di ulteriori fallimenti, interruzione terapeutica, dolore, stress.

JVA
ISSN 1129-7298 ORIGINAL ARTICLE

JVAC Access 2016; 17 (4): 309-315
DOI: 10.5391/jva.5000558

Peripheral intravenous cannulation: complication rates in the neonatal population: a multicenter observational study

Manique Legemaat¹, Peter J. Carr², Roland M. van Iken³, Manique van Dijk⁴, Irina E. Postolowsky⁵, Agnes van den Hoogen^{1*}

FEATURES

Accepted but Unacceptable: Peripheral IV Catheter Failure

Hein, Robert E. MD; Klausner, Jeffrey D. MD, MPH; Klemperer, John D. MD; Fint, Lori M. BSN, RN, CCRN; Huang, Emily BA **Author Information** ⓘ

Journal of Infusion Nursing: May/June 2019 - Volume 42 - Issue 3 - p 151-164



AVP accesso venoso più utilizzato in TIN «failure» eziologia



Fattori NON modificabili

(peculiarità del neonato) :

Ridotto spessore cutaneo, esiguo diametro e fragilità dei vasi, giunzione dermo/epidermica labile, distensibilità del tessuto sottocutaneo, movimenti incontrollati

Fattori potenzialmente modificabili

BMJ Open Evaluation of unmodifiable and potentially modifiable factors affecting peripheral intravenous device-related complications in neonates: a retrospective observational study

Matheus F P T van Rens,¹ Kevin Hugill,¹ Mohamad A Mahmah,¹ Mohammad Bayoumi ¹, Airene L V Francia,¹ Krisha L P Garcia,¹ F H J van Loon ^{2,3}

Extrinsic modifiable factors influence PIVC dwell time, such as clinician training, exposure, experience, choice of the optimal PIVC for the right patient for the right therapy, site selection and preparation, insertion technology, maintenance care bundles, stabilisation materials and dressings.

AVP accesso venoso più utilizzato in TIN

Quale traguardo?

“1 accesso per 1 paziente posizionato con 1 tentativo”

Valutazione/scelta proattiva accurata

The ABBA project (Assess Better Before Access): A retrospective cohort study of neonatal intravascular device outcomes

Matheus F. P. T. van Rens^{1*}, Mohammad A. A. Bayoumi¹,
Agnes van de Hoogen², Airene L. V. Francia¹,
Irian J. Cabanillas³, Fredericus H. J. van Loon² and
Timothy R. Spencer⁴

recommended to Assess the patient Better Before inserting the venous Access device (ABBA) for proper venous access device selection using the VAD algorithm together. Using the “5 Rights for Venous Access” that is, the Right device, for the Right vein, with the Right therapy, for the Right duration, for the Right patient will provide better outcomes and prevent unnecessary catheter-related complications in NICU.



AVP scelta del dispositivo per il neonato

Fattore che impatta risultato/durata/complicanze

Cannule periferiche corte semplici



Cannule periferiche lunghe



Cannule periferiche corte integrate



Accesso Intraosseo



AVP Scelta del dispositivo per il neonato

Fattore che impatta risultato/durata/complicanze

Cannula periferica standard o semplice (CPC)

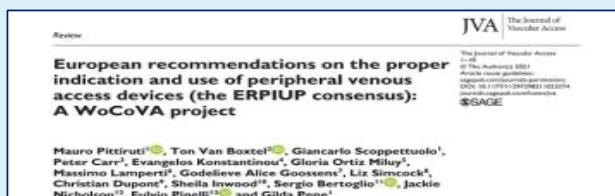
Materiale: Poliuretano.

Calibro: 24 e 26 G (giallo, viola)

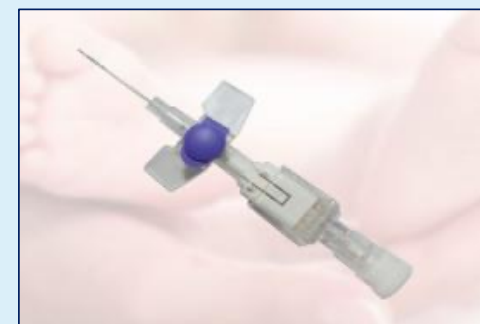
Tecnica: Inserzione diretta

Indicazioni:

- *SPCs are appropriate for emergency and/or short duration access (24–48 h)*



| | |
|------|----------|
| 24 G | Giallo |
| 26 G | Violetto |



Accesso vascolare più usato in Neonatologia

AVP Scelta del dispositivo per il neonato

Fattore che impatta risultato/durata/complicanze

Cannula periferica corta integrate

Materiale: Poliuretano.

Calibro: 24 e 26 G (giallo, viola)

Tecnica: inserzione diretta

Indicazioni:

- *"integrated" SPCs are appropriate for non-emergency access, when expected duration is 2-7 days*



Editorial

JVA The Journal of Vascular Access

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

The Journal of Vascular Access
1-5
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Fulvio Pinelli¹ and Mauro Pittiruti²

We propose to adopt the term "integrated SPC," which defines more closely this new type of SPC characterized by safety mechanisms, closed system, wing, preassembled extension and preassembled needle-free connector.

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
1-6
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Mauro Pittiruti¹, Ton Van Baxtel², Giancarlo Scoppettuolo¹, Peter Carr³, Evangelos Konstantinou⁴, Gloria Ortiz Miluy⁵, Massimo Lamperti⁶, Godelieve Alice Goossens⁷, Liz Simcock⁸, Christian Dupont⁹, Sheila Inwood¹⁰, Sergio Bertoglio¹¹, Jackie Nicholson¹², Fulvio Pinelli¹³ and Gilda Pepe¹

AVP scelta del dispositivo per il neonato

Fattore che impatta risultato/durata/complicanze

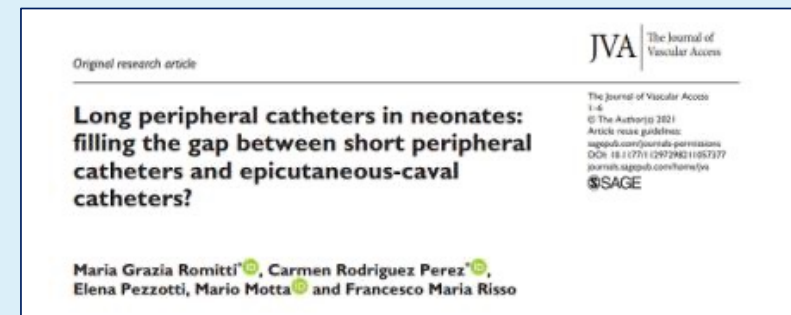
Cannula periferica lunga (CPL)

Materiale: Poliuretano

Calibro: 2 Fr (4,6,8 cm)

Tecnica: Seldinger

Indicazioni: terapie 3/12 gg



Long peripheral cannulas (2 Fr, 4–6 cm) may be potentially useful in some neonates who require peripheral venous access for more than 3 days since, in this clinical situation, short peripheral cannulas are unsuitable due to their limited dwelling time and, on the other hand, EECs may be inappropriate because too invasive. In our experience, 4–6 cm 2 Fr long cannulas could be a promising device to be positioned particularly for neonates with bodyweight >2000 g. As for the question in the title of our work, we cannot say that the gap is bridged yet, however, we have started to build the bridge.

AVP Scelta del dispositivo per il neonato Fattore che impatta risultato/durata/complicanze

Confronto CPC CPL (6,8 cm)

Donna Dowling, PhD, RN; Desi M. Newberry, DNP, NNP-BC; and Leslie Parker, PhD, APRN, FAAN > Section Editors

Original Research

Effective Use of Extended Dwell Peripheral Intravenous Catheters in Neonatal Intensive Care Patients

Jessica M. Marchetti, MSN, RNC, VA-BC; Tricia Blaine, BS, RNC, VA-BC; Colleen E. Shelly, MPH; Sara Cherkerzian, ScD; Nina Hanley, BSN, RNC, VA-BC; Lindsey Murphy, BSN, RNC, VA-BC; Katherine E. Gregory, PhD, RN, FAAN

the NICU. Our comparisons show that EPIV catheters may be an appropriate alternative to PIV catheters in the NICU based on fewer placement attempts, longer dwell times, and overall fewer complications. Future research is needed to better understand the advantages and disadvantages of PIV catheters and EPIV catheters in the NICU. This research

TABLE 3. Dwell Time and Complications by Type of Catheter (N = 376) Among 61 Infants Admitted to the NICU Between November 2016 and May 2019

| | PIV (n = 306) | EPIV (n = 70) | P |
|--|--------------------------|--------------------------|-----------------|
| Dwell time, median [IQR], d | 1.0 [1-2] | 3.5 [2-6] | <.001 |
| Successful placement on first attempt, n (%) | 15 (5) | 0 (0) | <.001 |
| Additional attempts, n (%) | | | |
| 1 | 171 (56) | 46 (66) | .09 |
| 2 | 62 (20) | 22 (32) | .04 |
| ≥3 | 47 (15) | 1 (1) | .002 |
| Complications during use, n (%) | 245 (80) | 29 (41) | <.001 |
| Infiltration | 136 (44) | 8 (11) | <.001 |
| Dislodgement | 9 (3) | 5 (7) | .09 |
| Leak | 53 (17) | 17 (24) | .17 |
| Occlusion | 56 (18) | 4 (6) | .009 |
| Thrombus | 2 (1) | 1 (1) | .51 |
| CLABSI | 1 (<1) | 0 (0) | .03 |

Abbreviations: CLABSI, central line-associated bloodstream infection; EPIV, extended dwell peripheral intravenous; IQR, interquartile range; NICU, neonatal intensive care unit; PIV, peripheral intravenous.
Bold font indicates p<0.05.



Advance in Neonatal Care 2022

AVP Scelta del dispositivo per il neonato

Fattore che impatta risultato/durata/complicanze

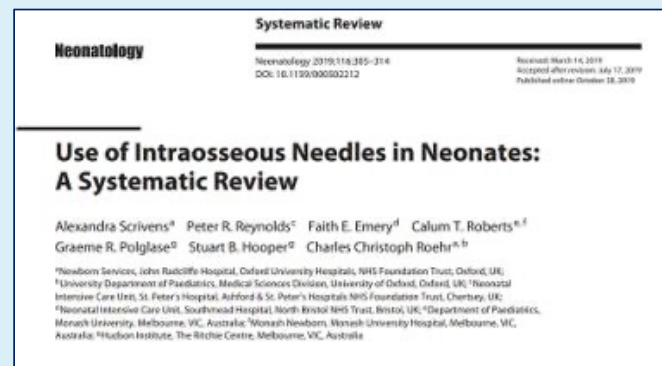
Accesso intraosseo; utilizzato in emergenza (difficoltà ad ottenere un accesso in tempi brevi >90"e 2 tentativi falliti)



Arrow® EZ-IO®



The NIO Infant™



there is no evidence to suggest that IO access is preferable to UVC, it represents an effective alternative when all methods of UVC and IV access have failed or are not possible in a resuscitation scenario, either in the delivery suite or on the neonatal unit. IO is likely to be more helpful in the latter where the umbilical cord has dried.

Accesso di TRANSIZIONE rimuovere entro 24 ore

AVP scelta del dispositivo

Fattori che impattano risultato/durata/complicanze

La tecnologia del dispositivo design, funzionalità e materiale

Original research article

JVA | The Journal of Vascular Access

Effect of peripheral intravenous catheter type and material on therapy failure in a neonatal population

Matheus FPT van Rens¹, Kevin Hugill²,
Mohamad Adnan Mahmah¹, Airene LV Francia¹
and Fredericus HJ van Loon^{2,4}

The Journal of Vascular Access
1-9
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These materials have been chemically engineered to improve patient experience, reduce complications, and increase dwell time. For example, PURs combine rigidity and high resistance to kinking during insertion whilst afterwards softening when exposed to intra lumen body temperatures.

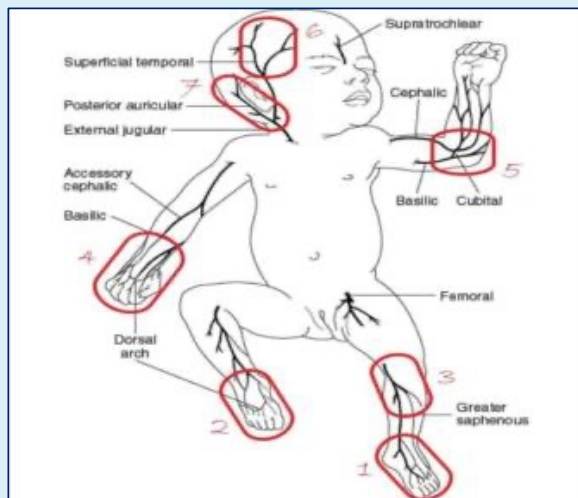
Phlebitis was higher in participants with the PTFE Neoflon catheter and lower in the PUR groups. This finding concerning the superiority of PUR versus PTFE catheters for phlebitis risk is in accord with the literature.

Furthermore, this study's findings tentatively support a view that catheter design/type and the material they are constructed from, rather than the catheter material alone is more predictive of some IV related complications.

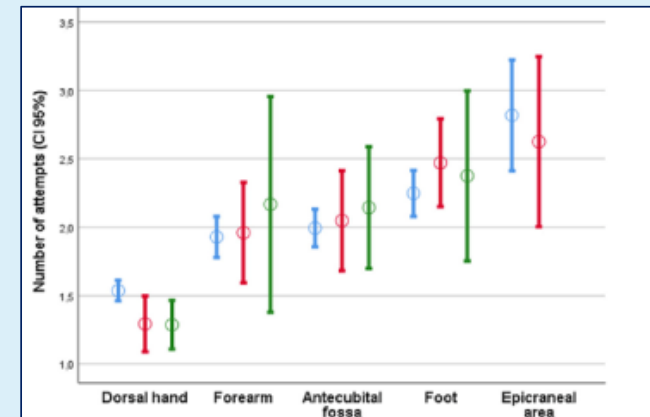
AVP Scelta della vena e della posizione

Fattori che impattano risultato/durata/complicanze

Valutazione sistematica di tutti i vasi scelta della vena



Scelta della posizione



AVP Scelta della vena

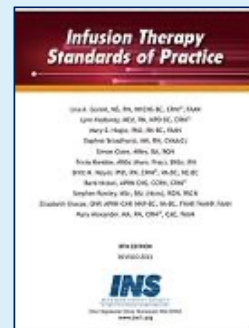
Fattore che impatta risultato/durata/complicanze

Le tecniche di visualizzazione aumentano la probabilità di successo di posizionamento al primo tentativo ne riducono i tempi

22. VASCULAR VISUALIZATION

Standard

22.1 Vascular visualization technology is employed to increase insertion success of the most appropriate, least invasive vascular access device (VAD), minimizing the need to escalate to an unnecessary, more invasive device and to reduce insertion-related complications.



Efficacy of Vein Visualization Devices for Peripheral Intravenous Catheter Placement in Preterm Infants

A Randomized Clinical Trial

Seda Çağlar, PhD, RN; Funda Büyükyılmaz, PhD, RN; İlkay Bakoğlu, RN; Sevil İnal, PhD, RN; Özgül Salihoglu, MD



AVP Fattori che impattano durata/complicanze

Corretta antisepsi, ANTT, adeguata stabilizzazione, protezione dell'exit site.



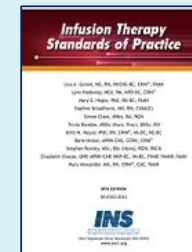
| | CPC STANDARD | CPC INTEGRATA | CPL NEONATALE |
|------------------------------|---|--|--|
| Massime precauzioni barriera | No <i>Standard-ANTT</i> | No <i>Standard-ANTT</i> | Si <i>Surgical-ANTT</i> |
| Antisepsi cutanea | CHG 2% in IPA 70% | CHG 2% in IPA 70% | CHG 2% in IPA 70% |
| Stabilizzazione | Membrana Trasparente Bordata +/- COLLA | COLLA +Membrana Trasparente Bordata | COLLA +Stabilizz adesivo cutaneo +Membrana Trasparente |
| Protezione exit site | Membrana Trasparente +/- COLLA | COLLA +Membrana Trasparente | COLLA +Membrana Trasparente |

AVP Fattori che impattano durata/complicanze

Soluzioni infusionali

Indicazioni all'accesso venoso PERIFERICO

- Farmaci e soluzioni **NON** lesive dell'endotelio, quindi compatibili con la via periferica:
 - pH >5 e <9
 - Farmaci e soluzioni ev con osmolarità <600 mOsm/L
 - Farmaci non vescicanti
 - Farmaci non irritanti, non flebitogeni



II. Short Peripheral Intravenous Catheters

4. Use a restricted dextrose and protein concentration ($\leq 10\%$ and/or 5% , respectively) if it is medically

AVP Fattori che impattano durata/complicanze

Alto rischio

- NPT (pH 5,3-6,3; > 600 mOsmol/L)
- Ampicillina (pH 9, osm 328-372)
- Ampicillina Sulbactam (pH 9, osm 400)
- Dobutamina cloridrato (pH 3,5 osm 280)
- Dopamina (pH 3,3 osm 277)
- Ganciclovir (pH 11, osm 320)
- Morfina solfato (pH 4, osm 295)
- Adrenalina
- Gentamicina (pH 3-5,5 osm 280-290)
- Vancomicina (pH 2,4-4,5 osm 291)
- Amikacina (pH 3,5-5,5; 349 mOsmol/L)

Medio rischio

- Cefazolina (pH 4,5-7 osm 293)
- Cefotaxime (pH 5-7,5 osm 357)
- Ceftazidima (pH 5,5-8 osm 240)
- Ceftriaxone (pH 6-8 osm 320)
- Eparina sodica (pH 5-8 osm 283-384)
- Fluconazolo (pH 4-8 osm 315)
- Piperacillina/tazobactam pH 5,1- 5,4 osm 445

Basso rischio

- SG 5% (pH 4; 252 mOsmol/L)
- SG 10% (pH 4; 505 mOsmol/L)
- SF 0,9% (pH 5; 308 mOsmol/L)
- Fentanyl (pH 4-6; mOsmol/L 288)
- Midazolam (pH 3-3,6; mOsmol/L 230-310)
- Bromuro di rocuronio (pH 3,8-4,2; mOsmol/L 270-310)
- Dexmedetomidina (pH 4,5-7; mOsmol/L 275-305)

AVP Fattori che impattano durata/complicanze Sorveglianza “EXIT SITE SEMPRE VISIBILE”

La sorveglianza:

SG5%, SG10% e SF 0,9% ogni 3 ore

Terapie ad orario al termine del farmaco

Soluzioni gluco-proteiche ogni 2 ore

Emoderivati ogni 15-30 minuti

IO osservazione continua

TOCCA

- Morbido
- Caldo
- Asciutto
- Dolore al tatto



GUARDA

- Scoperto e visibile
- Asciutto
- Non arrossato



CONFRONTA

- L'arto con l'accesso periferico
- 'Arto gonfio



2. In inpatient and nursing facilities, assess PIVCs at least every 4 hours; every 1 to 2 hours for patients who are critically ill/sedated or have cognitive deficits; hourly for neonatal/pediatric patients; and more often for patients receiving infusions of vesicant medications.

AVP Fattori che impattano risultati/durata/complicanze

La competenza

L'esperienza NON basta Training vari livelli, simulatori, rivalutazione delle competenze

5. COMPETENCY AND COMPETENCY ASSESSMENT

Acknowledge that the length of clinical experience and passive recurrent performance are not surrogates for clinical knowledge and procedural competence for experienced clinicians. The absence of appropriate evidence-based education and skill development among clinicians with all levels of experience are 2 factors among many that lead to premature failure and high complication rates of short PIVCs. Variations in performance of CVAD insertion in a simulation laboratory emphasize the need for ongoing competency assessment. Experienced clinicians may not recognize their need for reconstruction of knowledge and skills to correct inaccuracies and improve techniques.¹²⁻¹⁶ (IV)

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ORIGINAL ARTICLE

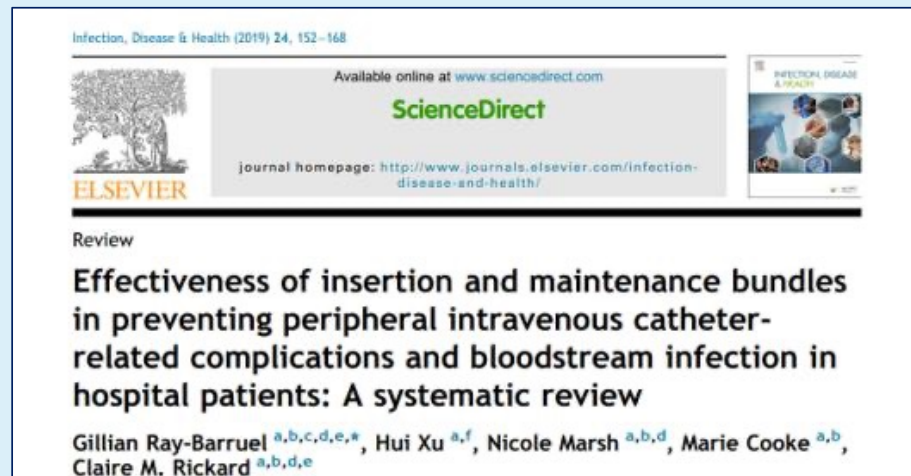
Peripheral intravenous cannulation: complication rates in the neonatal population: a multicenter observational study

Monique Legemaat^{1,2}, Peter J. Carr^{3,4}, Roland M. van Rens⁵, Monique van Dijk⁶, Irina E. Poslowsky^{7,8}, Agnes van den Hoogen^{2,8}

However, to have 'experience' is not enough. Appropriate training is also required for peripheral vein cannulation in neonates. This training should include knowledge of appropriate materials and the most appropriate methodology.

AVP Fattori che impatta risultato/durata/complicanze

BUNDLES un supporto pratico/reminder per incentivare adesione alle LG



Bundles attempt to simplify lengthy guidelines into a short point-of-care reminder to improve staff compliance with best practice; therefore, bundle components should be based on high quality evidence [4]. Bundle items such as hand hygiene, chlorhexidine skin prep, disinfection of needleless connectors, PIVC site checks, PIVC dressing checks, daily review of PIVC need, and documentation of insertion and removal are all recommended in guidelines and clinical standards

Bundle **Impianto** AVP in neonato

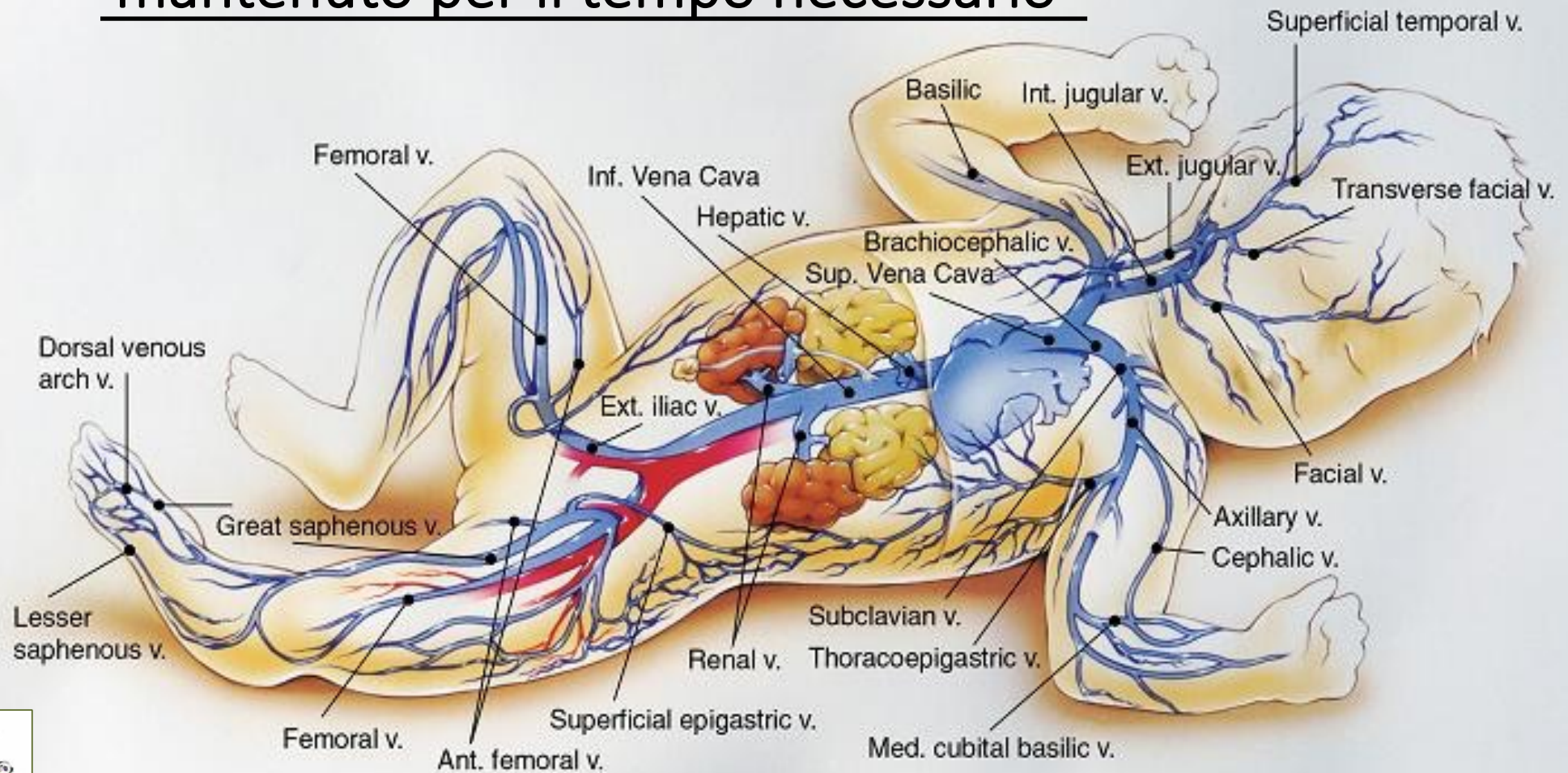
1. Indicazione clinica appropriata al dispositivo
2. Scelta del **dispositivo** più appropriato (calibro/materiale)
3. Scelta della vena più appropriata (protocollo **RaSuVA**)
4. **Antisepsi** appropriata della cute (clorexidina 2% in alcol isopropilico al 70%)
5. Impianto con tecnologie di visualizzazione (NIR)
6. **Stabilizzazione e protezione** del sito di emergenza mediante colla in cianoacrilato e membrana trasparente ad elevata traspirabilità



Bundle di **Gestione** AVP in neonato

1. **Utilizzo** appropriato del dispositivo (evitare farmaci irritanti-vescicanti)
2. **Flush** con soluzione fisiologica (2 volte lo spazio morto) prima e dopo ogni infusione
3. **Lock** con soluzione fisiologica, **NFC** neutro e **Port Protector** se uso intermittente.
4. **Sorveglianza ripetuta** nella giornata del sito di emergenza
5. Sostituzione della medicazione se sporca o bagnata o staccata
6. Rimozione del dispositivo in caso di complicanza locale o se non più necessario.

“1 accesso scelto per 1 paziente posizionato con 1 tentativo mantenuto per il tempo necessario”





Grazie per l'attenzione

TP FONDAZIONE
POLIAMBULANZA
L'ospedale, come vorresti che fosse.

