GAVePed 2025 MILANO 12-13 maggio

Utilizzo della Vena Femorale nel neonato

Indicazioni Tecniche Materiali

Vito D’Andrea

Editorial

JVA The Journal of Vascular Access

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The SIF protocol: A seven-step strategy to minimize complications potentially related to the insertion of femorally inserted central catheters

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Abstract

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Table 1. Non-dialysis femoral venous access today.

Patients	Device	Indication	Access	Exit site	Tip location method	Preferred securement
Neonates	ECC	Short term	Superficial veins of the lower limb	Peripheral sites	Neo-ECHOTIP	Sutureless
	Non-tunneled FICC	Emergency	CFV	Groin	Not required	Sutureless
	Tunneled FICC	Short/long term	CFV	Mid-thigh	Neo-ECHOTIP	Subcutaneous anchorage
Children	Non-tunneled FICC	Emergency	CFV	Groin	ECHOTIP-Ped	Sutureless
	Tunneled FICC	Short/long term	CFV	Mid-thigh	ECHOTIP-Ped	Subcutaneous anchorage
Adults	Peripheral catheter	Short term	Deep veins of the lower limb	Various sites	Not required	Sutureless
	Non-tunneled FICC	Emergency	CFV	Groin	Not required	Sutureless
	Non-tunneled FICC	Short/long term	SFV	Mid-thigh	ECHOTIP/IC-ECG	Subcutaneous anchorage
	Tunneled FICC	Short/long term	CFV or SFV	Mid-thigh	ECHOTIP/IC-ECG	Subcutaneous anchorage
	FICC-port	Long term	CFV or SFV	—	ECHOTIP	—

ECC: epicutaneo-cava catheter; FICC: femorally inserted central catheter; CFV: common femoral vein; SFV: superficial femoral vein.
Neo-ECHOTIP, ECHOTIP-Ped, ECHOTIP, IC-ECG: see explanation in the text.
Short term: <3–4 weeks; long term: >3–4 weeks.

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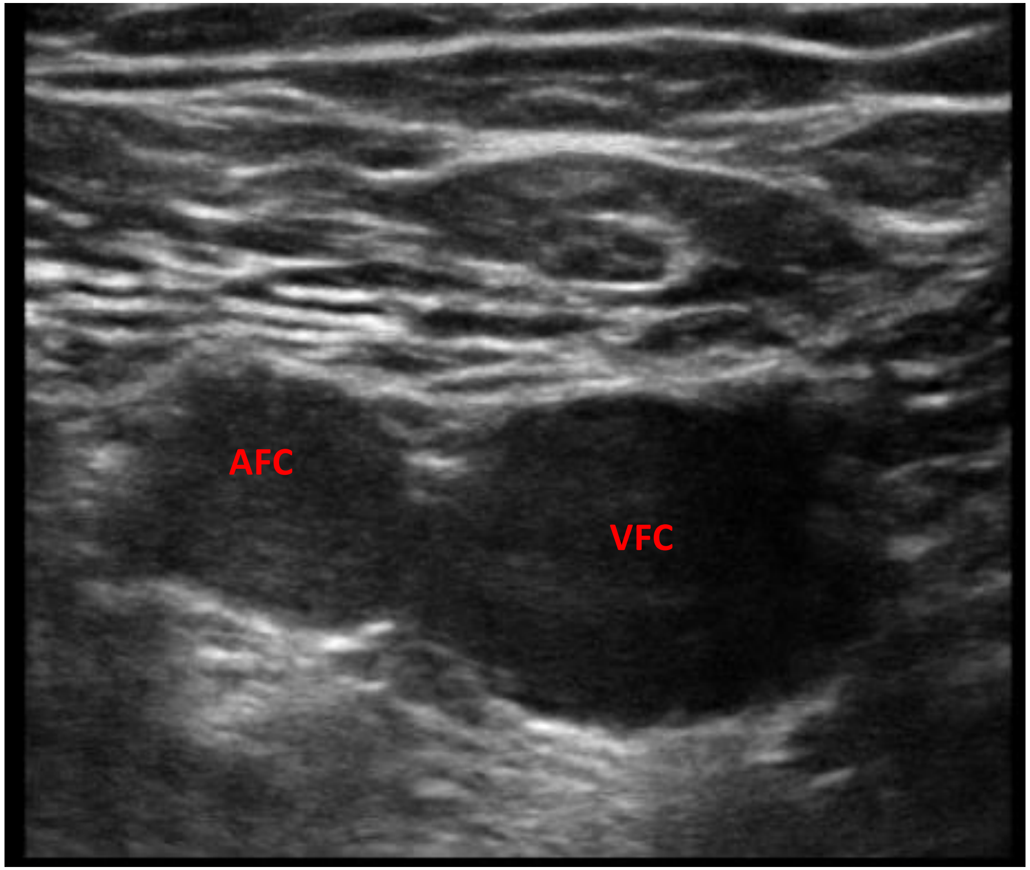
Esplorazione sistematica delle vene della zona inguinale e della coscia, al fine di valutarne pervietà/calibro e di scegliere il sito migliore di venipuntura.

Spostamento della sonda ecografica verso il basso, dall’inguine fino a metà coscia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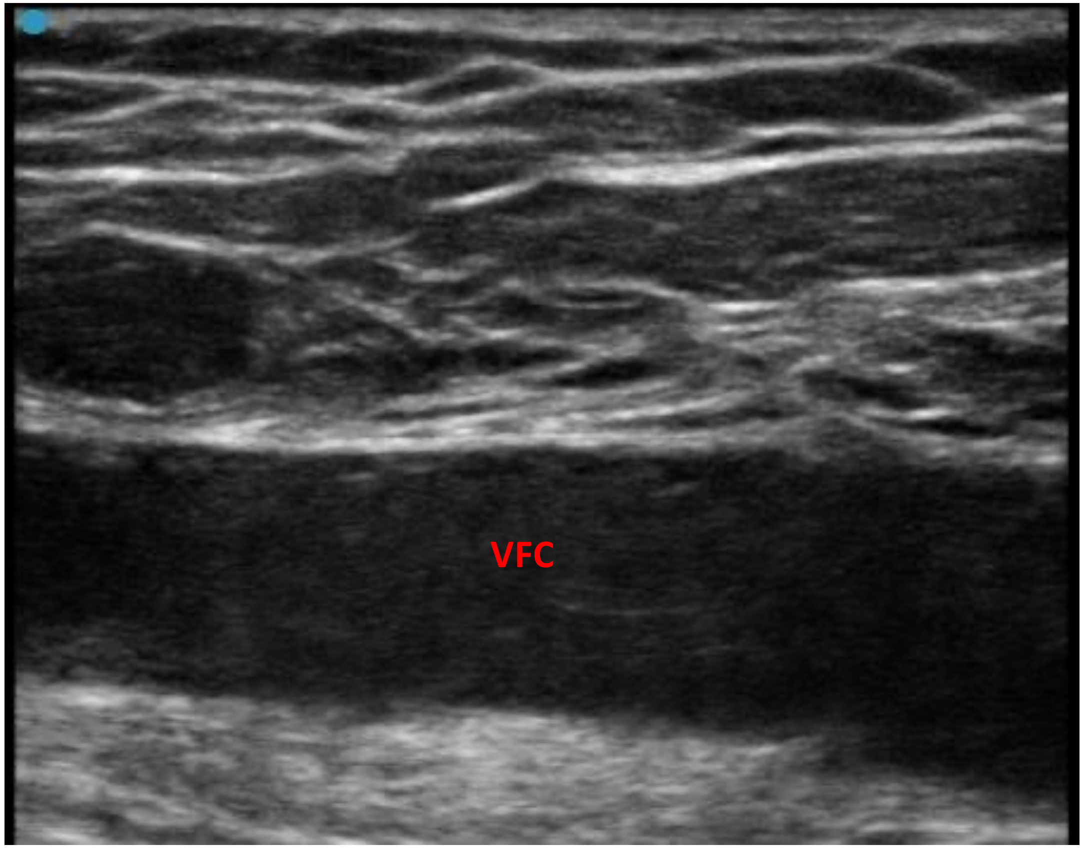
VFC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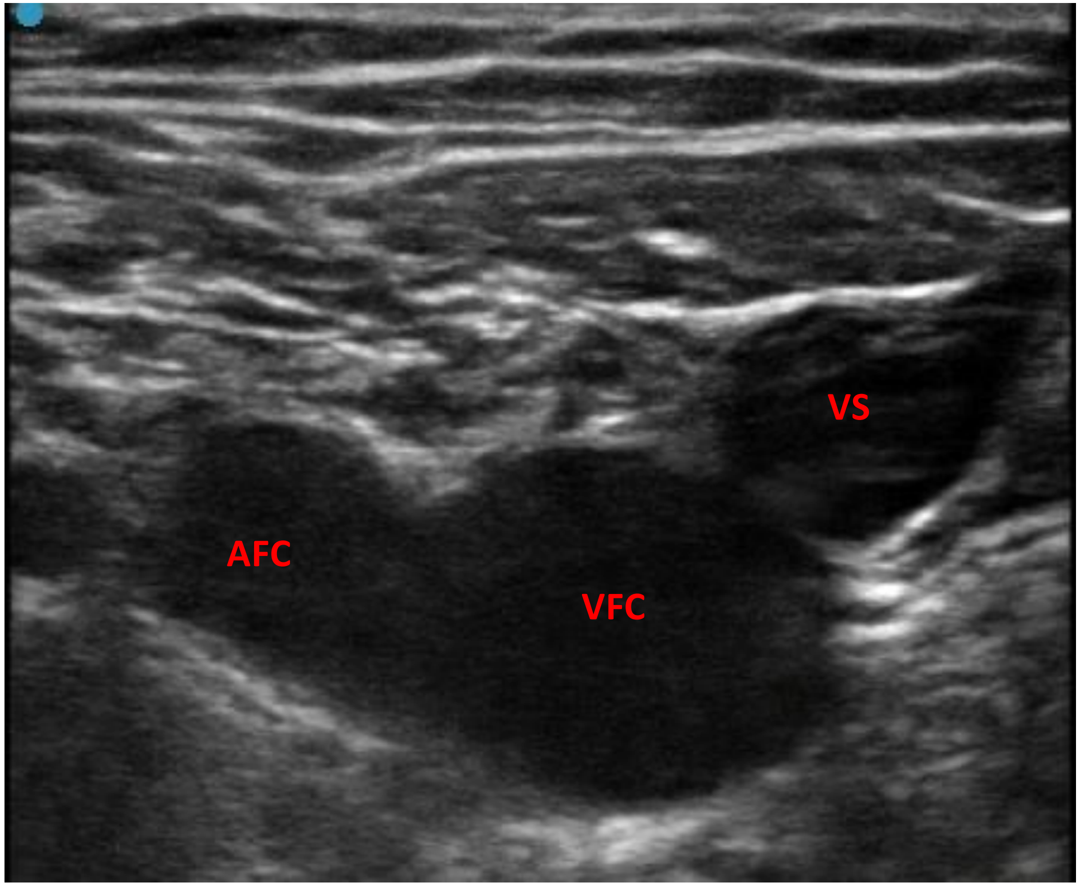
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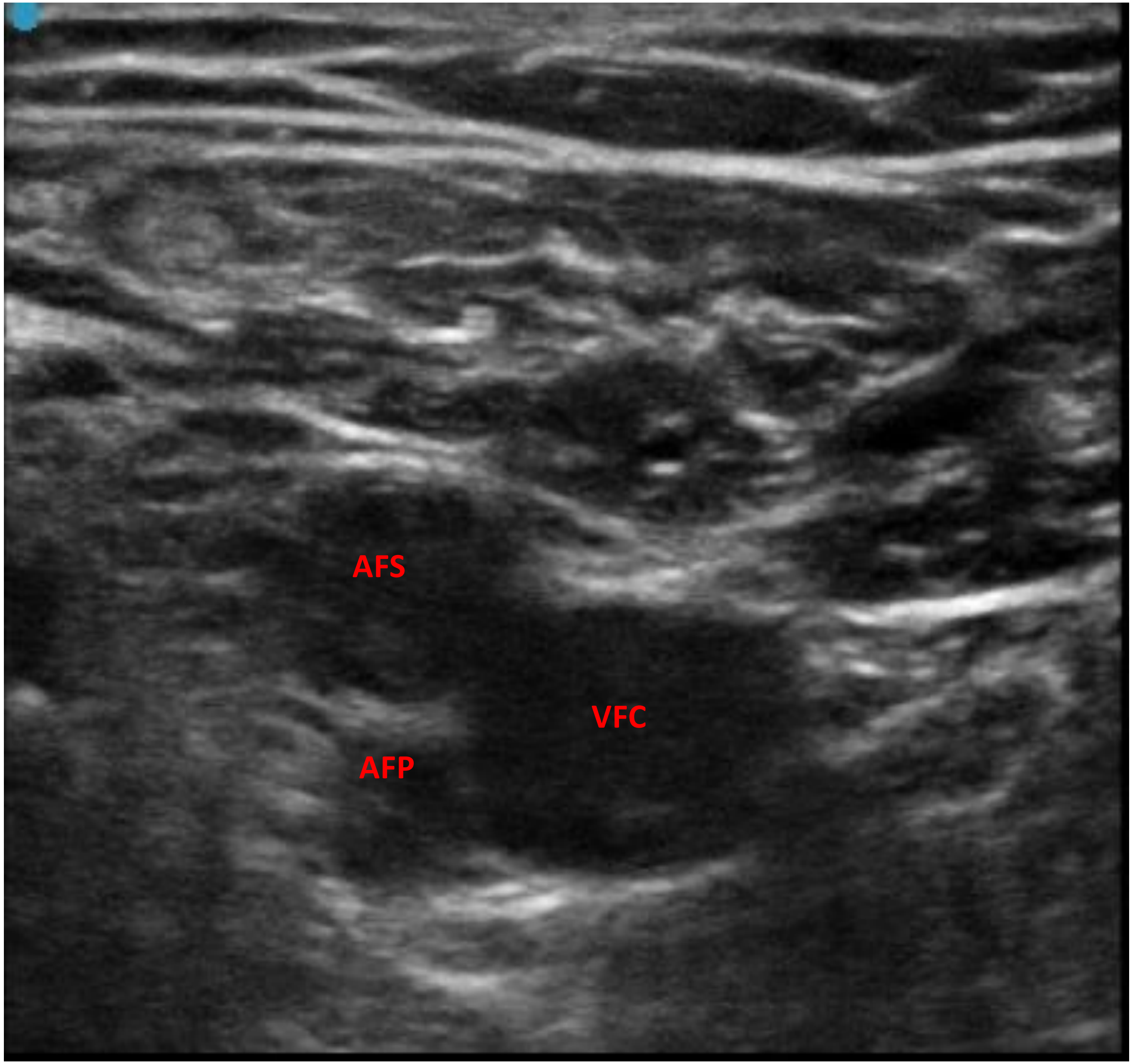
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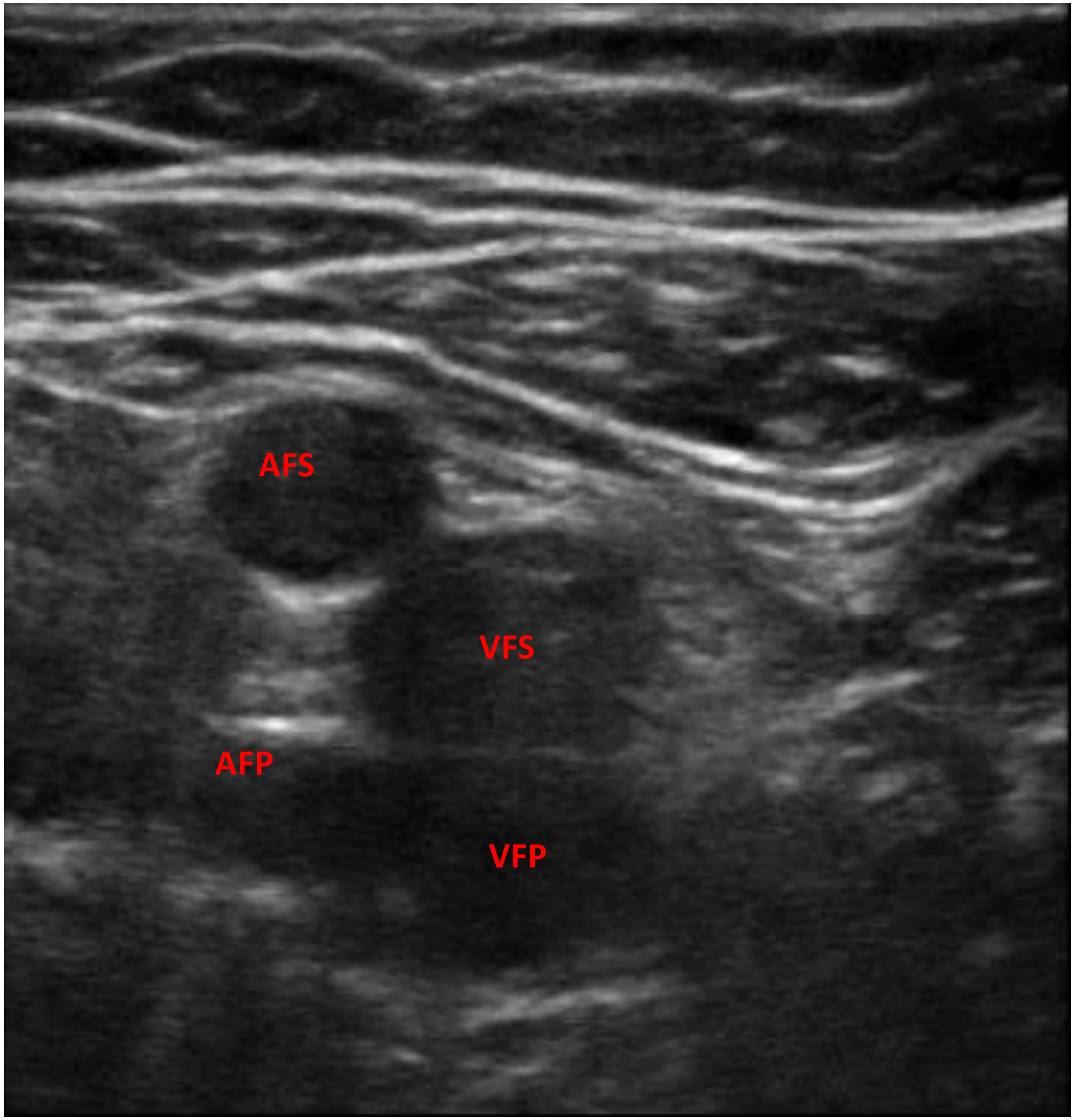
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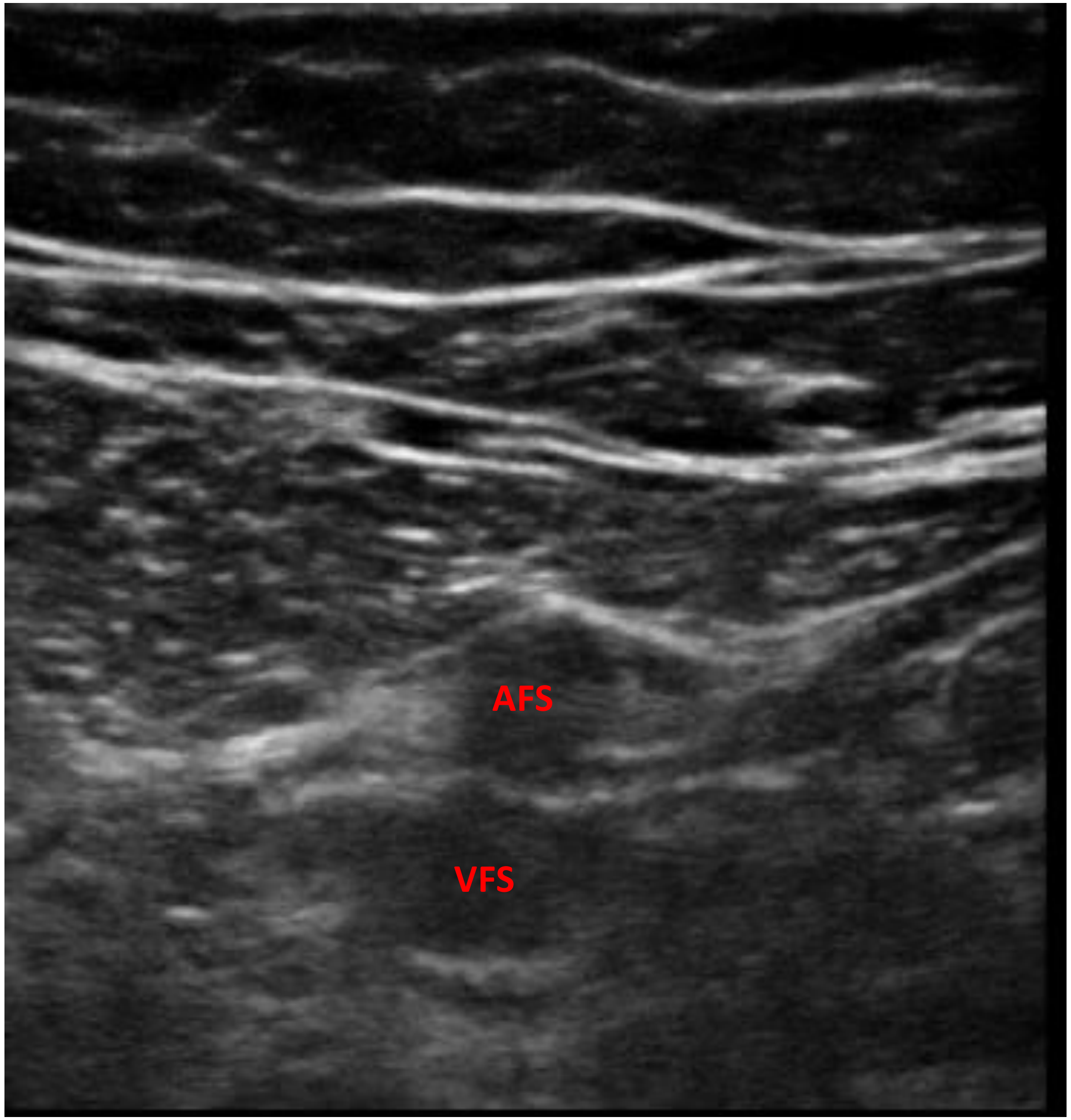
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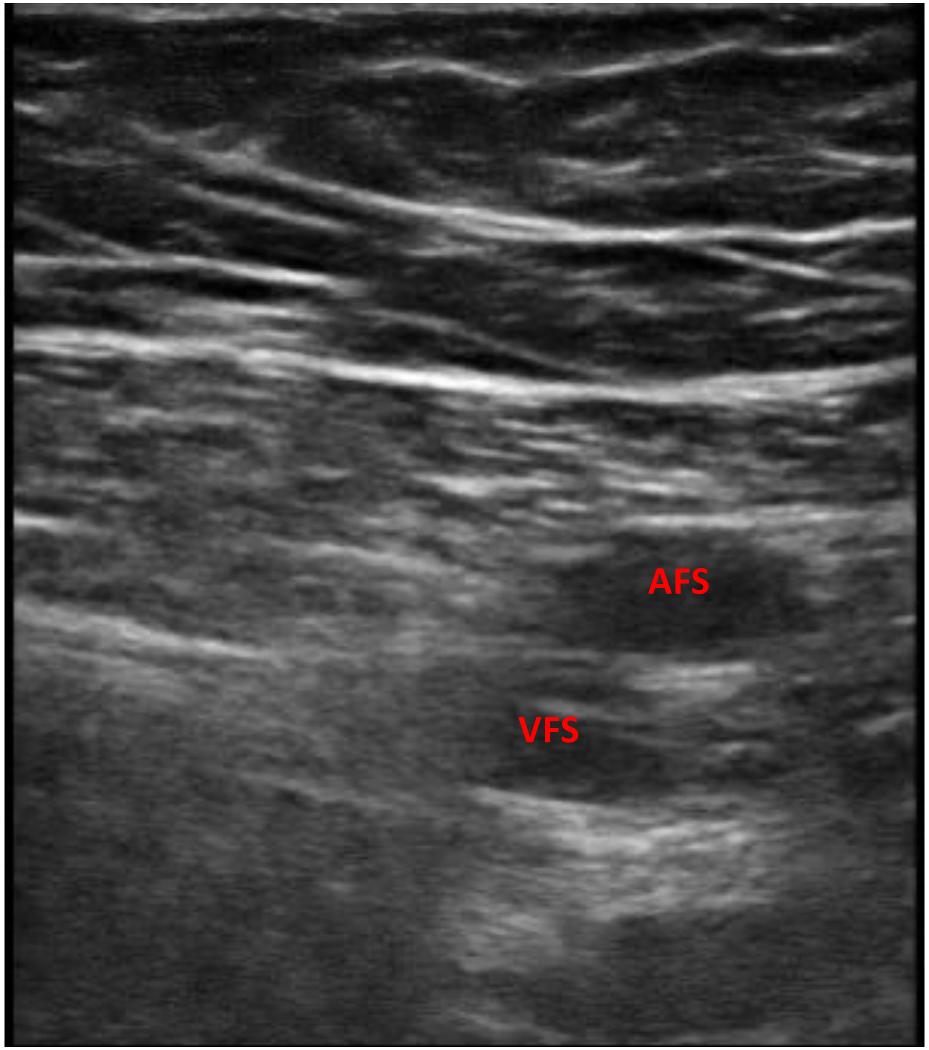
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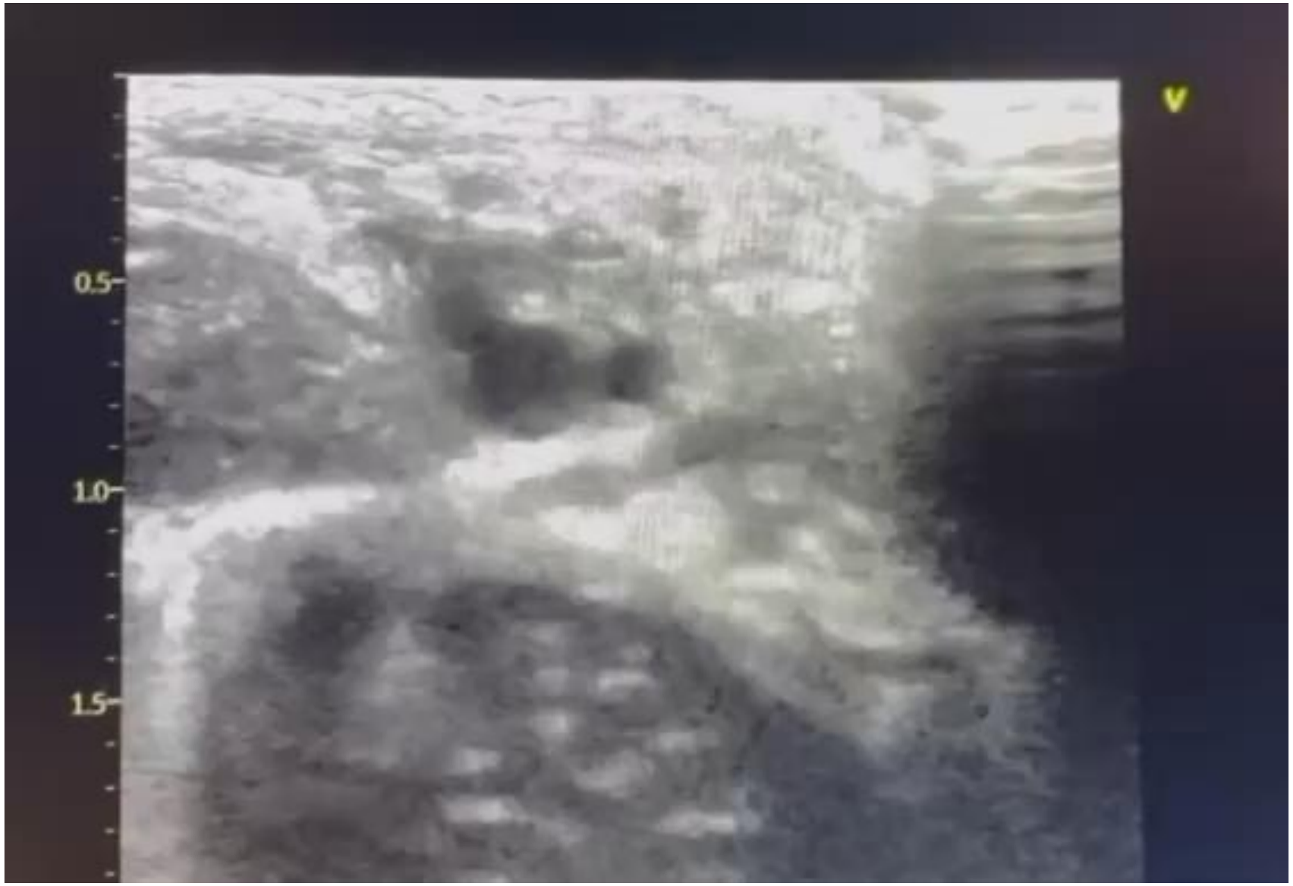
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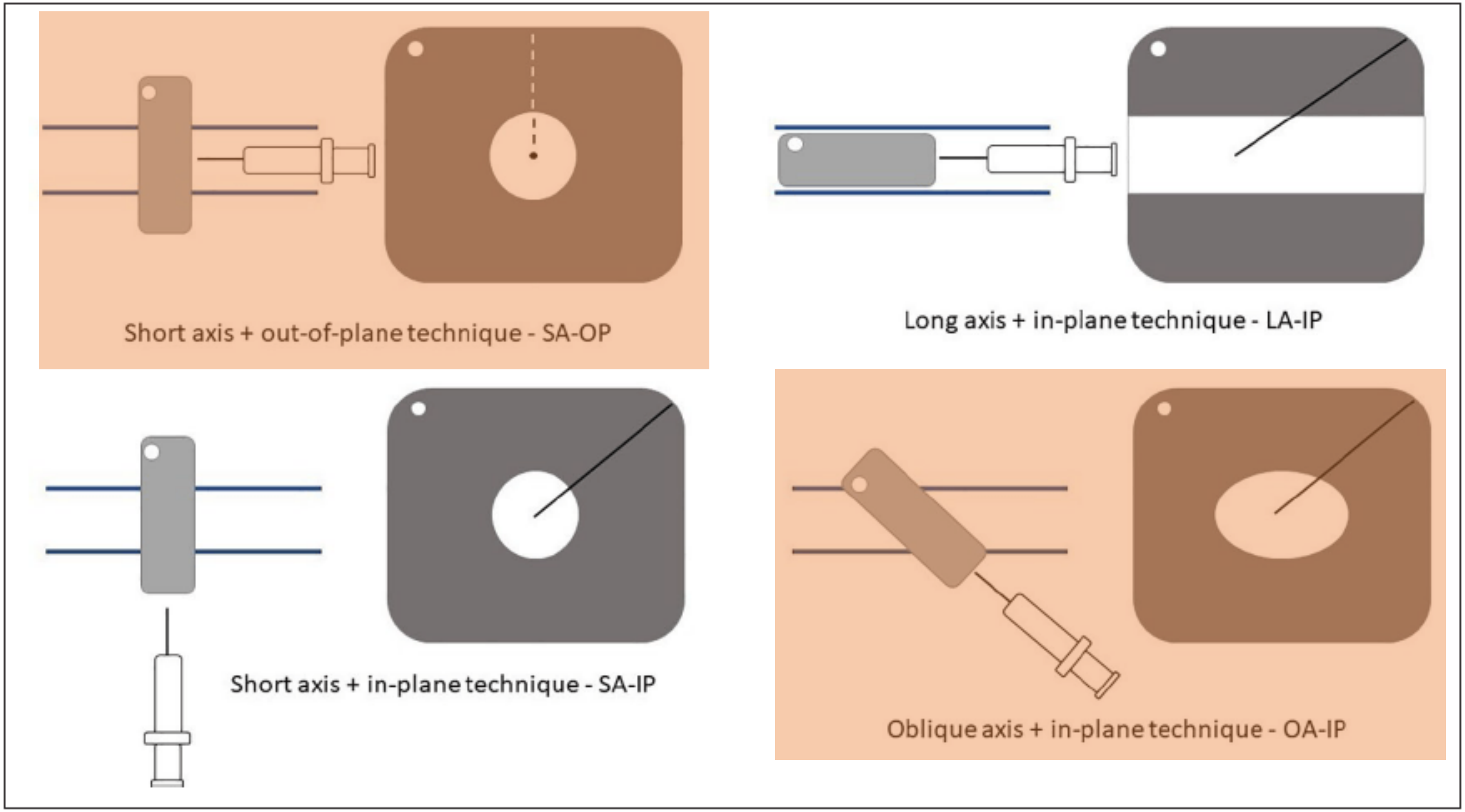

Techniques for US guided cannulation.

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
L AxVa	1.6±0.4 (0.8–2.6)	1.2±0.2 (0.8–1.7)	1.5±0.4 (1.0–2.1)	1.7±0.3 (1.0–2.1)	1.8±0.2 (1.4–2.1)	2.0±0.3 (1.6–2.6)	0.91
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

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Step 1	*Preprocedural evaluation*—choice of the vein by systematic ultrasound examination of the veins of the groin and the thigh (RaFeVA protocol) and choice of the ideal exit site (Femoral ZIM)
Step 2	*Appropriate aseptic technique*—hand hygiene, skin antisepsis with 2% chlorhexidine in 70% alcohol, maximal barrier precautions
Step 3	*Ultrasound-guided insertion*—ultrasound-guided venipuncture, ultrasound verification of the correct direction of the guidewire (tip navigation)
Step 4	*Intra-procedural assessment of tip location*—if the tip must be in IVC, use length estimation by anthropometric measurement and consider post-procedural x-ray; if the tip must be in RA or at IVC/RAJ, use intracavitary ECG and/or by transthoracic echocardiography (in subcostal view, using the "bubble test")
Step 5	*Adequate protection of the exit site*—reduction of the risk of bleeding and risk of contamination by sealing with cyanoacrylate glue
Step 6	*Proper securement of the catheter*—stabilization of the catheter using skin-adhesive sutureless devices, transparent dressing with integrated securement, or subcutaneous anchorage
Step 7	*Appropriate coverage of the exit site*—semi-permeable transparent dressing, preferably with high breathability

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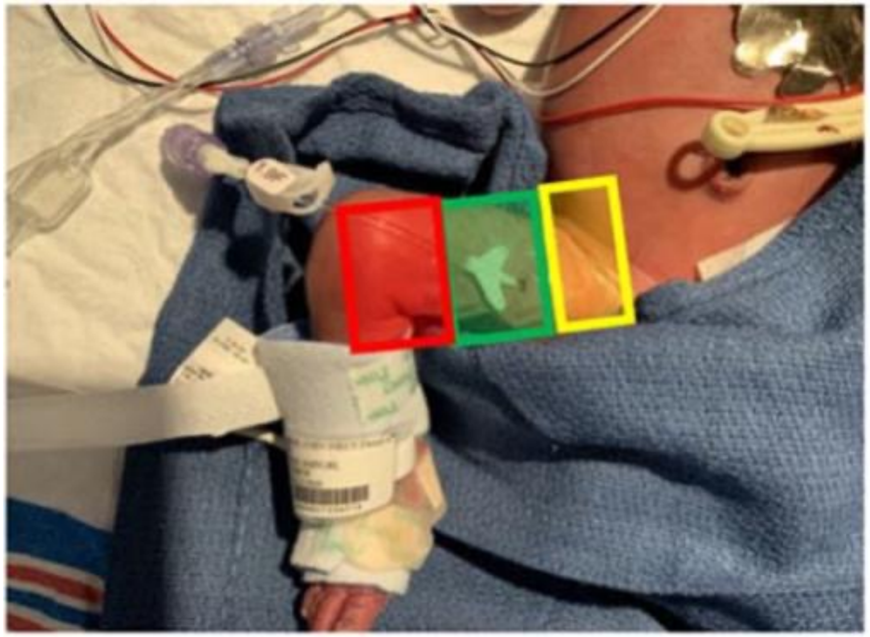
groin
upper third of the thigh
mid-thigh
TUNNELING A
tunneling of the catheter upward to the abdomen
TUNNELING B
tunneling of the catheter downward to the mid-thigh

(a) (b) (c)



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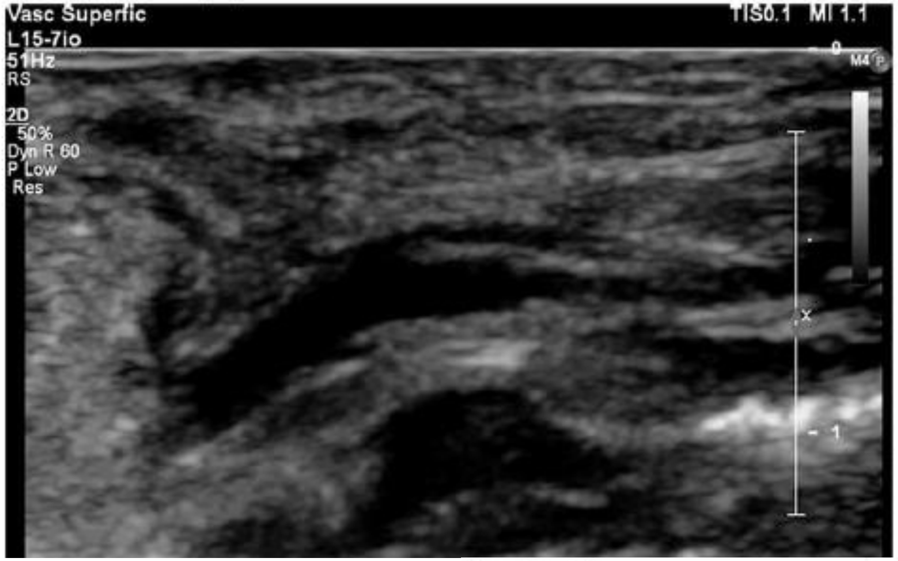
Vasc Superfic
TIS0.1 MI 1.1
L15-7io
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RS
2D
50%
Dyn R 60
P Low
Res
0
M4
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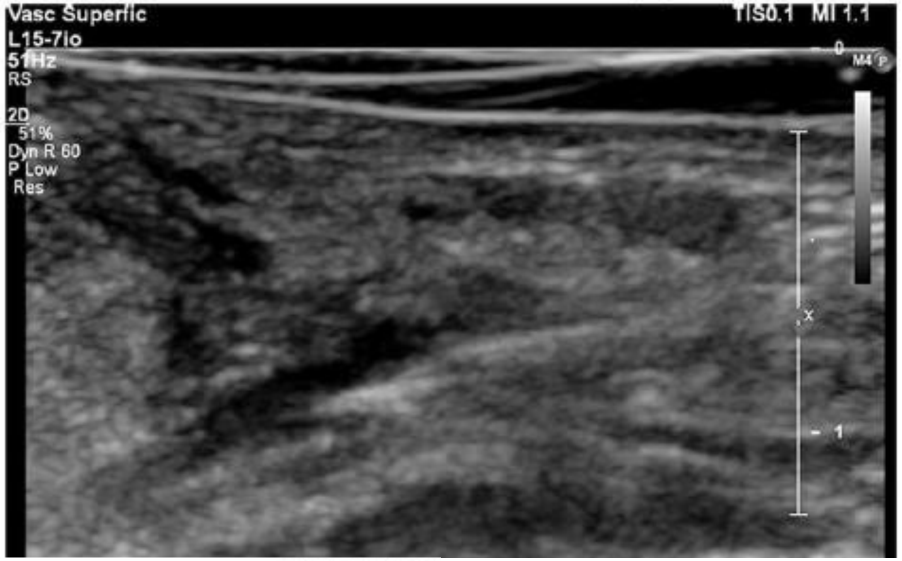
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Dyn R 60
P Low
Res
0
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Vasc Superfic
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2D
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Dyn R 60
P Low
Res
0
M4
1

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An Italian expert consensus on the choice of the method of tip location for central venous access devices

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1–14

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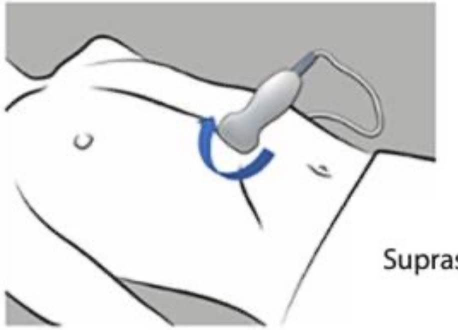
Vincenzo Faraone[1], Mauro Pittiruti[2], Maria Giuseppina Annetta[3], Giovanni Barone[4], Fabrizio Brescia[5], Maria Calabrese[6], Antonella Capasso[7], Giuseppe Capozzoli[8], Vito D'Andrea[9], Sonia D'Arrigo[3], Daniele Elisei[10], Stefano Elli[11], Igor Giarretta[12], Antonio Gidaro[13], Davide Giustivi[14], Emanuele Iacobone[10], Rossella Mastroianni[15], Fulvio Pinelli[16], Giancarlo Scoppettuolo[17], Ferdinando Spagnuolo[18], Geremia Zito Marinosci[19], Gilda Pepe[2] and Daniele G Biasucci[20]

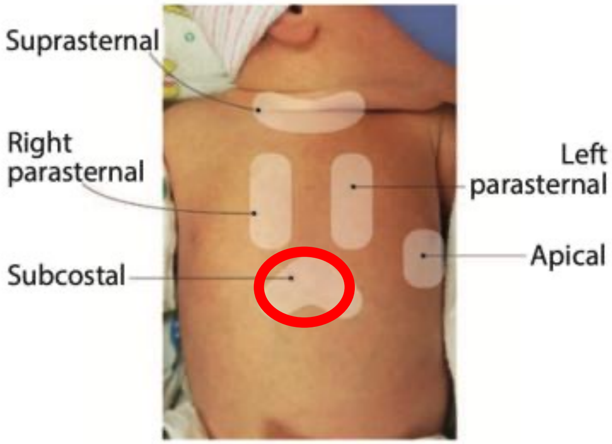
Statement 3.1: The IC-ECG method is recommended as the intraprocedural method of first choice for the tip location of any CVAD whose tip is to be placed near the junction between superior vena cava and right atrium, or inside the right atrium (with the exception of ECC in the newborn).

Statement 6.1: Intraprocedural tip location by TTE is indicated as the first option in the following situations:

- **In the newborn, for the tip location of UVC, ECC, FICC;**

Finestra **SottoCostale**
visualizzazione **Longitudinale** della **VCI**





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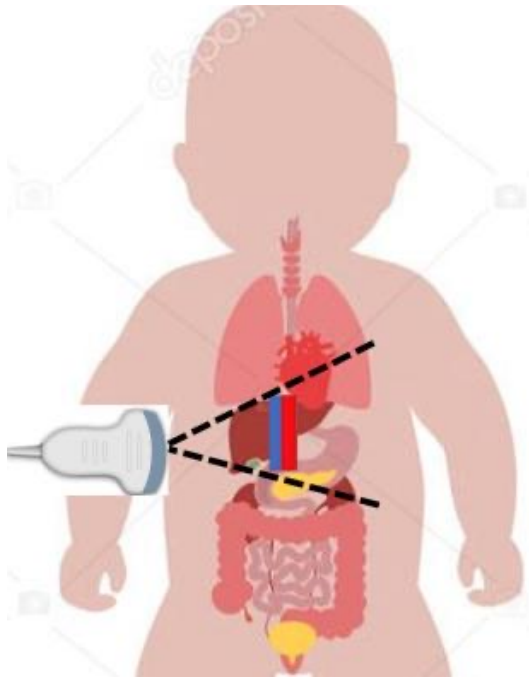
visualizzazione **Longitudinale** della **VCI**



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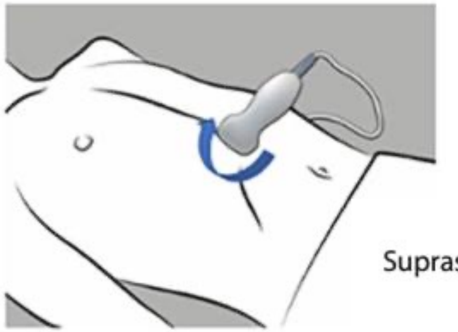
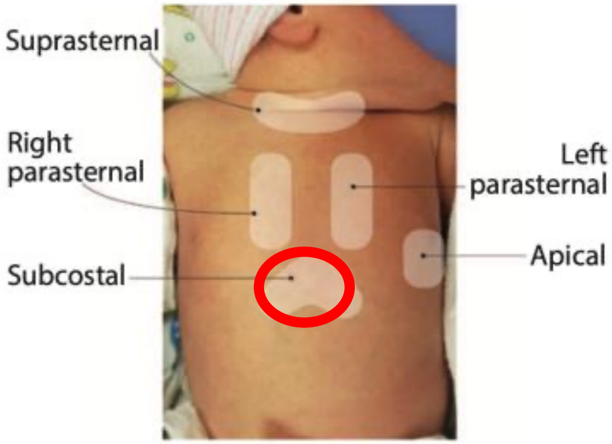
visualizzazione **Longitudinale** della **VCI**





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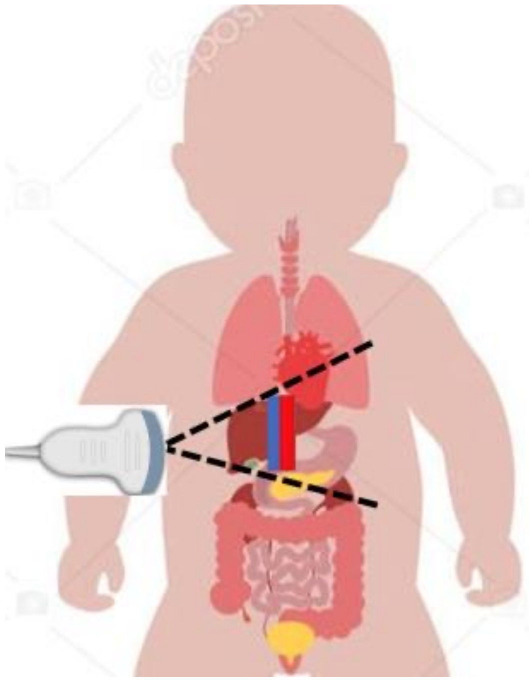
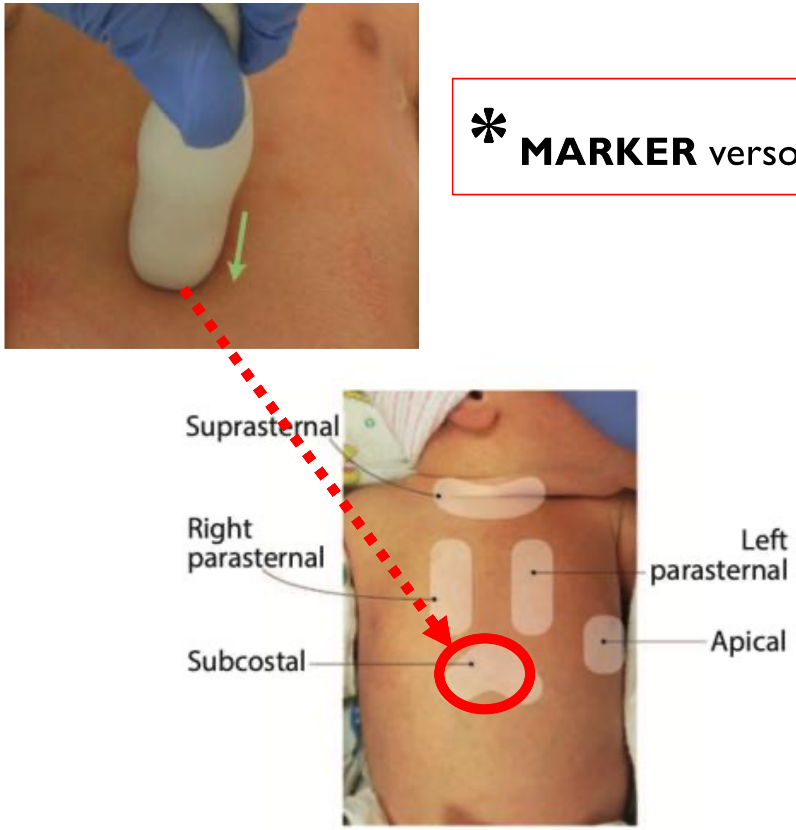


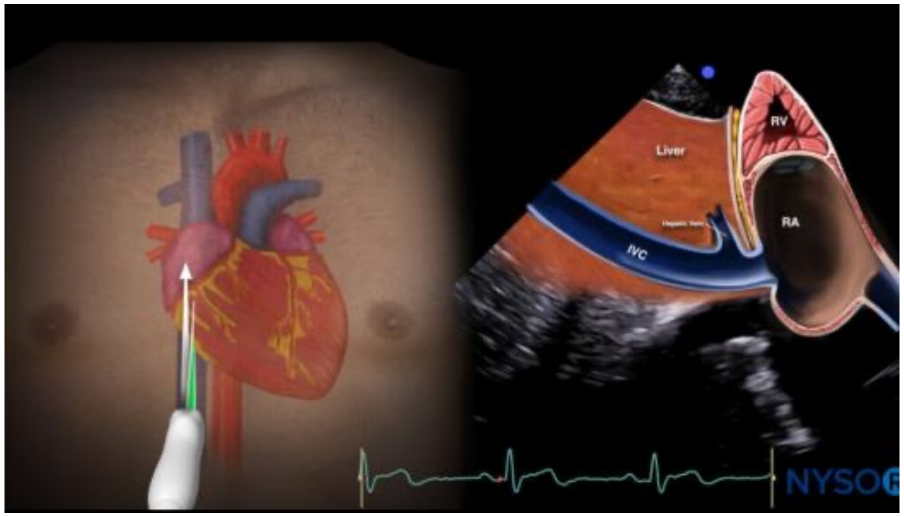
Finestra SottoCostale

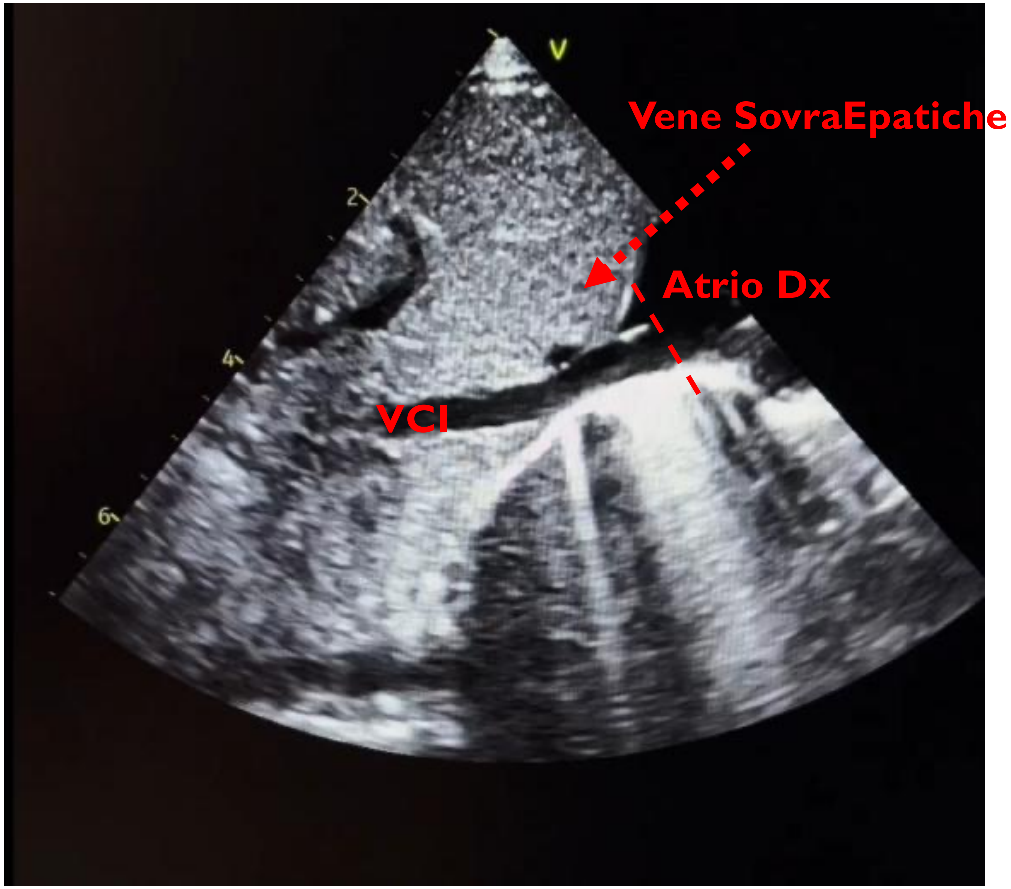
visualizzazione

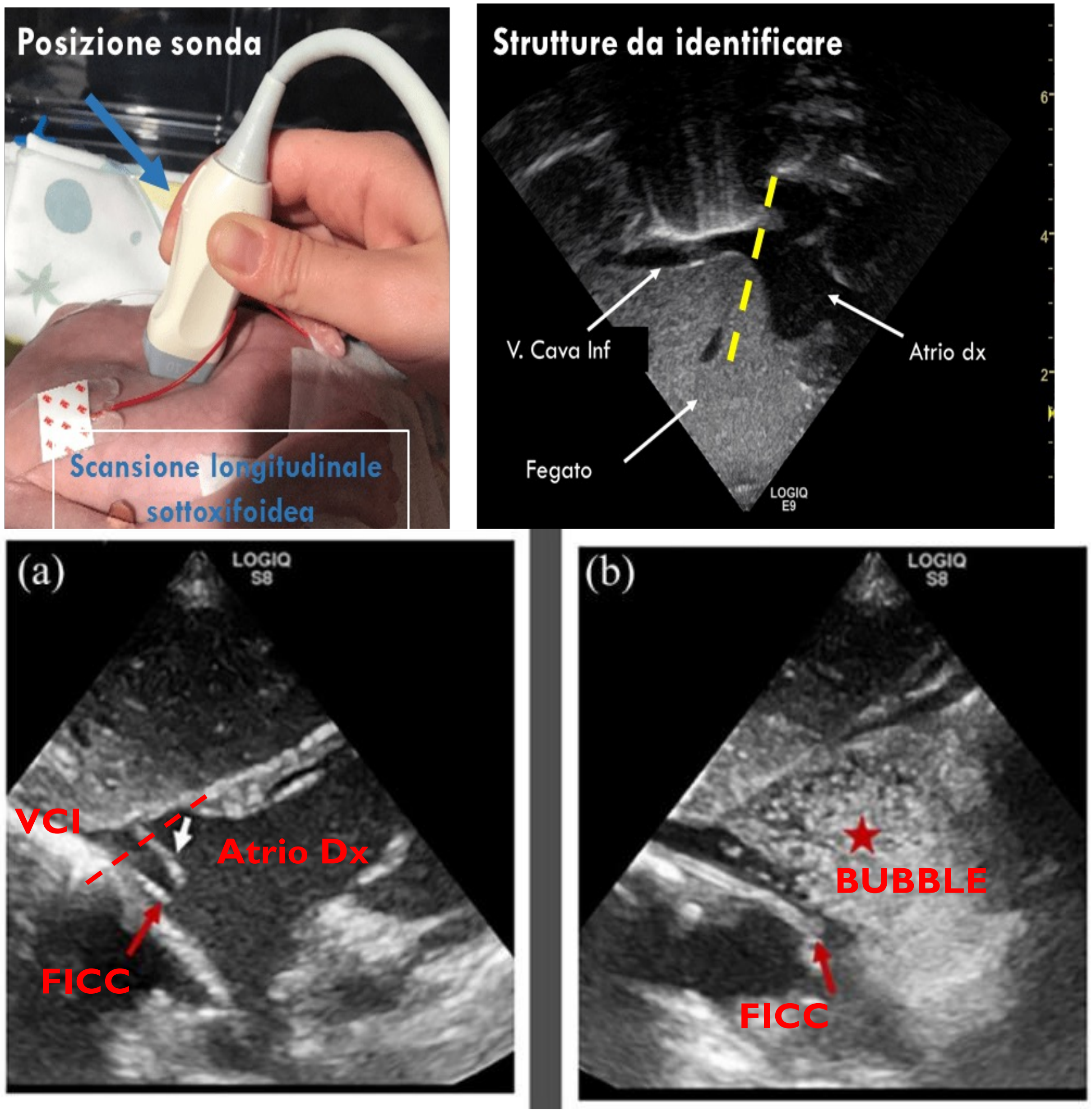
Longitudinale della **VCI**



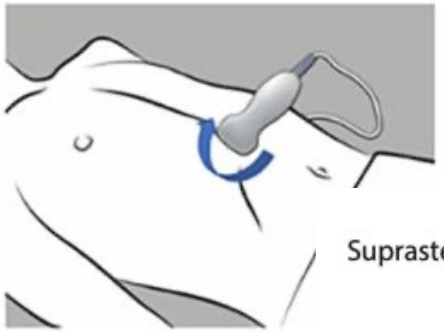
* **MARKER** verso l'alto indirizzato verso la testa

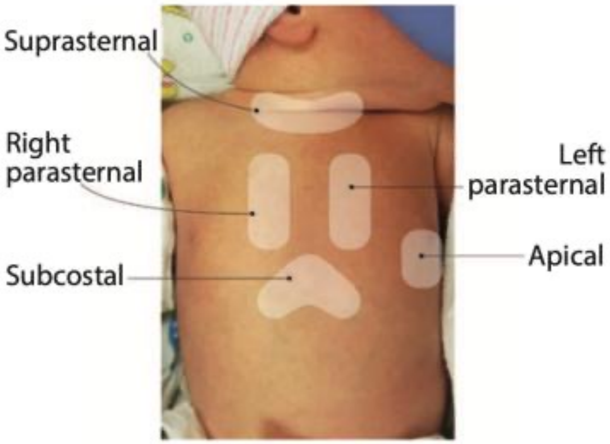



Vene SovraEpatiche
Atrio Dx
VCI

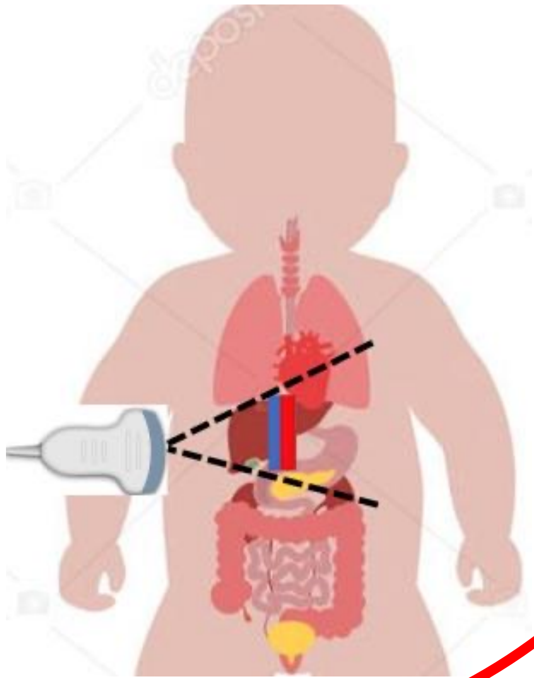

Posizione sonda
Scansione longitudinale
sottoxifoidea
Strutture da identificare
V. Cava Inf
Atrio dx
Fegato
LOGIQ
E9
(a)
LOGIQ
S8
VCI
Atrio Dx
FICC
(b)
LOGIQ
S8
BUBBLE
FICC

Finestra **SottoCostale**
visualizzazione **Longitudinale** della **VCI**

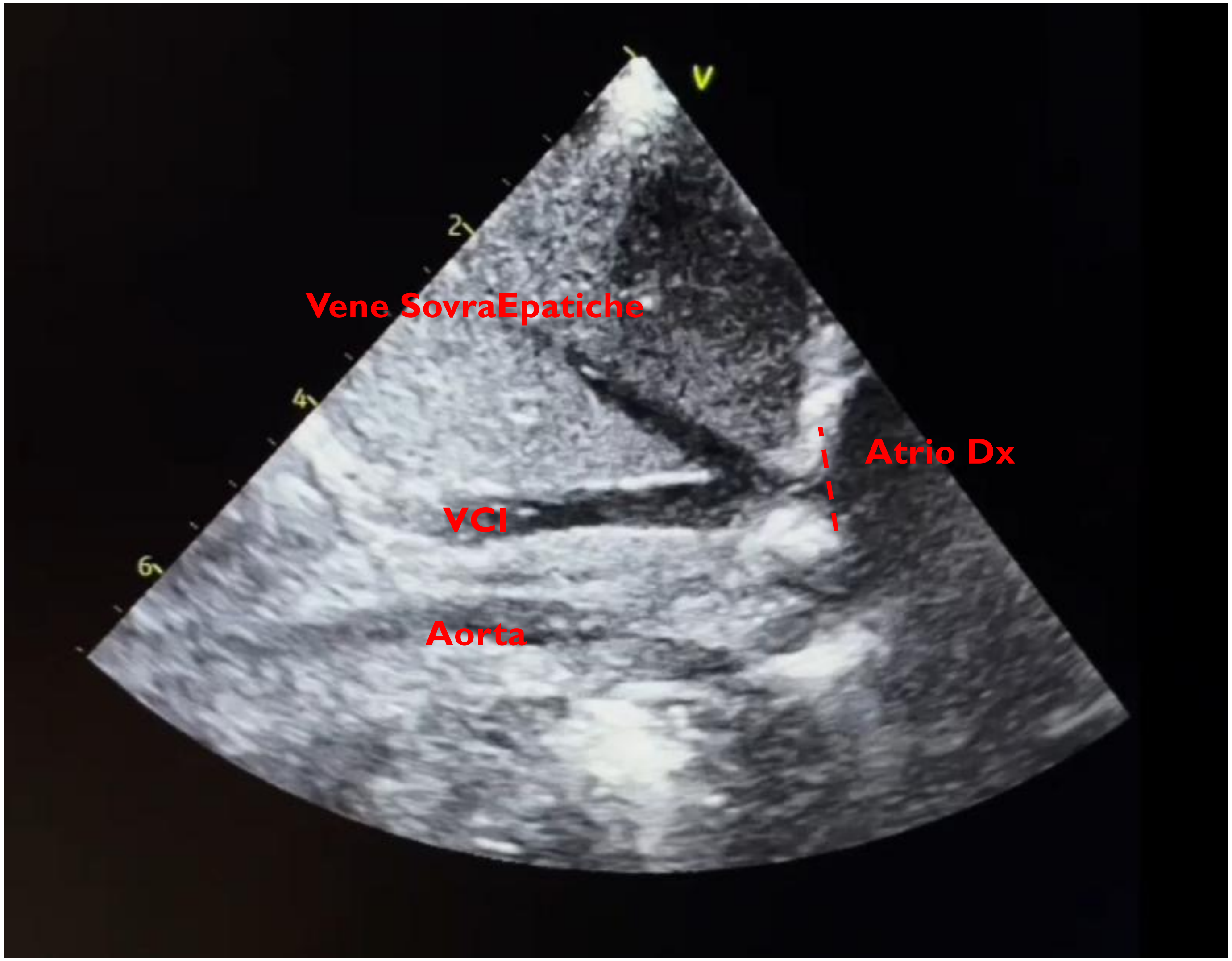


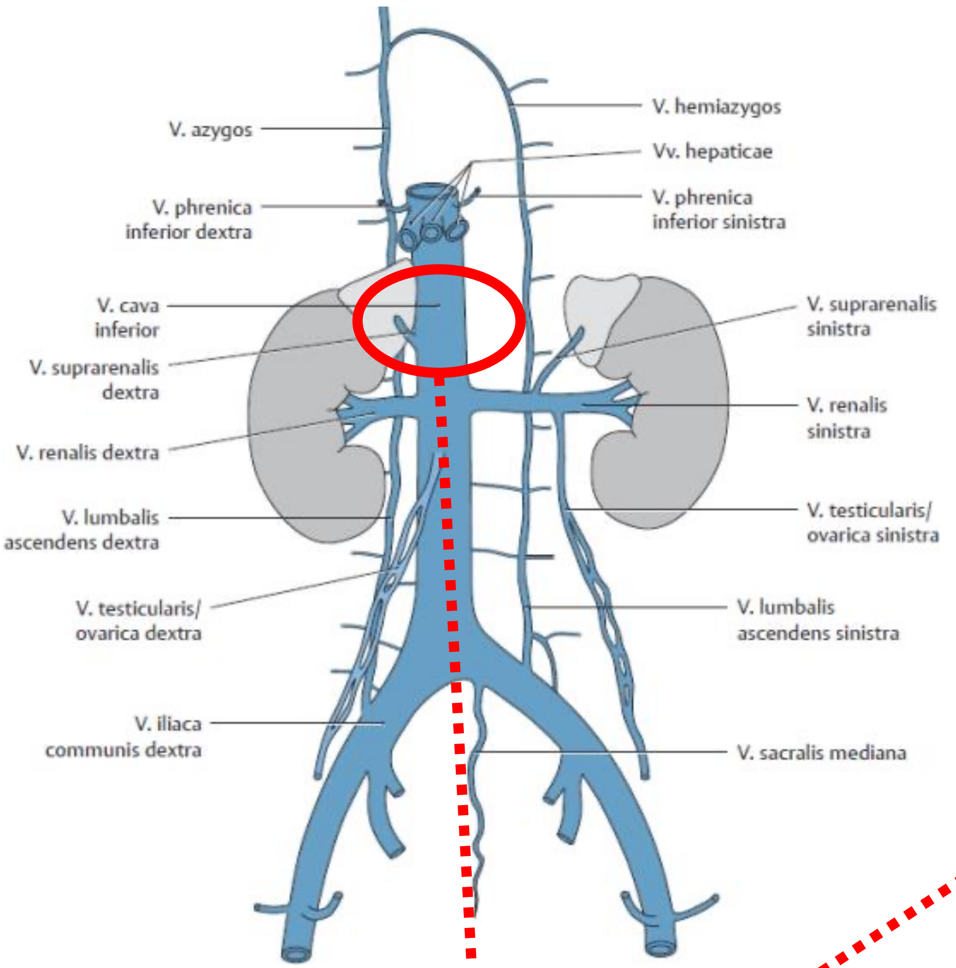


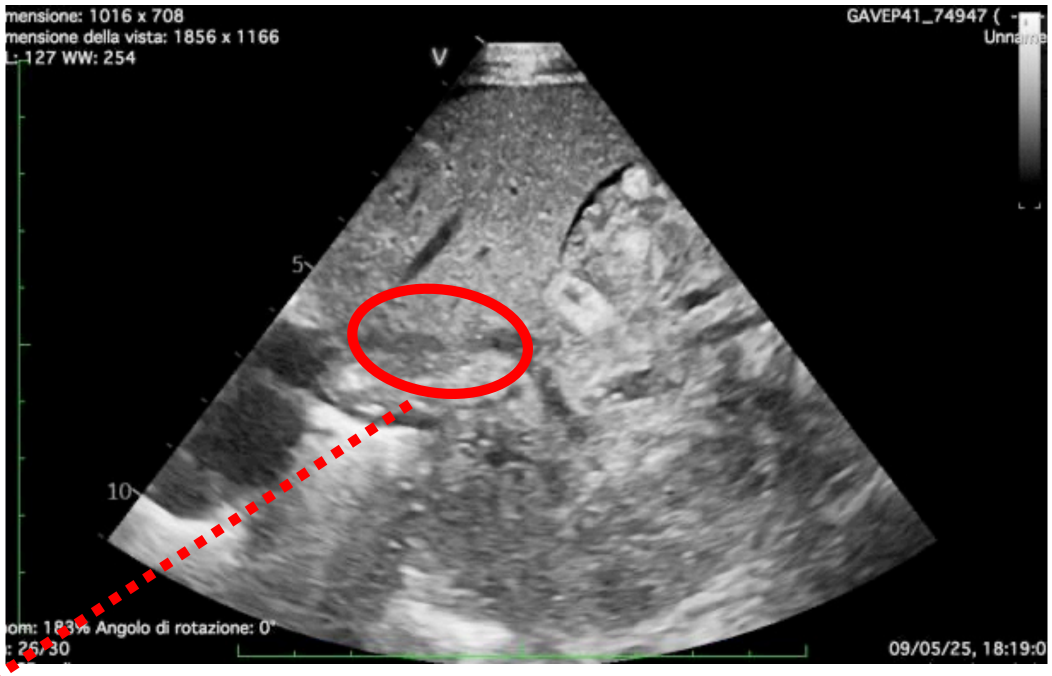
Finestra **TransEpatica**
visualizzazione **Longitudinale** della **VCI**




HUAWEI P30 lite
TRIPLE CAMERA


V
2
4
6
Vene SovraEpatiche
Atrio Dx
VCI
Aorta


V. hemiazygos
V. azygos
Vv. hepaticae
V. phrenica inferior dextra
V. phrenica inferior sinistra
V. cava inferior
V. suprarenalis sinistra
V. suprarenalis dextra
V. renalis sinistra
V. renalis dextra
V. lumbalis ascendens dextra
V. testicularis/ ovarica sinistra
V. testicularis/ ovarica dextra
V. lumbalis ascendens sinistra
V. iliaca communis dextra
V. sacralis mediana


mensione: 1016 x 708
mensione della vista: 1856 x 1166
L: 127 WW: 254
GAVEP41_74947 (
V
5
10
om: 183% Angolo di rotazione: 0°
: 26/30
09/05/25, 18:19:0

ZONA TARGET

RaFeVA

- **FICC non tunnellizzati con *exit site* inguinale** (puntura v. femorale comune)
- **FICC tunnellizzati con *exit site* a metà coscia** (puntura v. femorale comune + tunnel)
- **FICC non tunnellizzati con *exit site* a metà coscia** (puntura v. femorale superficiale)

EEC

- Vene superficiali
- Venipuntura diretta o con tecnologia NIR
- 1-2.7 fr
- Richiedono analgesia
- Cateteri in silicone o PUR, non-power
- Bassi flussi
- Non idonei per i prelievi
- Non idonei per la misurazione della PVC
- Non idonei per il monitoraggio SvO2
- Non idonei per infusione di emoderivati
- Tip location incerta (ECO, Rx, ECG?)
- Mai tunnellizzati
- Durata 2-3 settimane
- Diagnosi di CLABSI
- Maggiori complicanze durante il mantenimento (es migrazione)

CICC e FICC

- Vene profonde
- Venipuntura ecoguidata
- 2-3-4fr
- Richiedono sedoanalgesia profonda
- Cateteri in poliuretano, power
- Alti flussi
- Idonei per i prelievi
- Idonei per la misurazione della PVC
- Idonei per il monitoraggio SvO2
- Idonei per infusione di emoderivati
- Tip location certa, mediante ECG o ECO
- Possono essere tunnellizzati
- Durata a lungo termine
- Possibilità di diagnosi di CRBSI
- Minori complicanze durante il mantenimento (es migrazione)

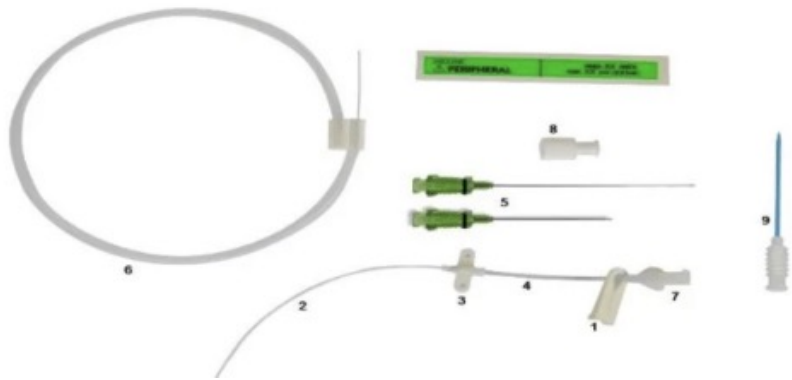

Pampers
Baby-dry

Materiale

Micro Kit

- Ago o cannula performanti
- Micro guide rette con punta morbida
- Cateteri di poliuretano di piccolo calibro (2F)

Micro medicazioni



CATETERE (PUR) O.R.X. CT-RATED					
Ø	**Infusioni ad alte pressioni** Flusso massimo con fluidi di viscosità 11,8 - 1 mPas	Lunghezza cm	Ago cm	Dilatatore	Guida (materiale e lunghezza in cm)
2 Fr	1,5 - 3 ml/s	4 cm	4,2	NO	Acciaio – 23
2 Fr	1,5 - 3 ml/s	6 cm	4,2	NO	Acciaio – 23
2 Fr	1,5 - 3 ml/s	6 cm	4,2	NO	Nitinol – 40 a J
2 Fr	1 - 2 ml/s	8 cm	4,2	NO	Acciaio – 26
2 Fr	1 - 2 ml/s	8 cm	4,2	NO	Nitinol – 40 a J
2 Fr	1 - 2 ml/s	10 cm	4,2	NO	Acciaio – 26
2 Fr	0,5 - 1 ml/s	15 cm	4,2	NO	Acciaio – 40

European Journal of Pediatrics (2023) 182:3385–3395
https://doi.org/10.1007/s00431-023-04984-4

REVIEW

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]

<u>Nel neonato acuto/grave</u>:

Neonati con instabilità emodinamica e necessità di monitoraggio della PVC e della SvO2 a qualunque età di vita (nell'impossibilità a posizionare un CVO o in caso di CVO malposizionato).

Neonato con patologia malformativa maggiore prima dell'intervento chirurgico (es atresia esofagea, onfalocele, gastroschisi etc).

Necessità di accesso centrale per rapida replezione volemica (in emergenza e/o in vista di interventi di chirurgia maggiore).

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<u>Nei neonati pretermine stabile</u>:

- Neonati pretermine con previsione di NP e terapia endovenosa prolungata (> 14 giorni).
- Neonato pretermine con patologia gastrointestinale chirurgica (NEC o perforazione intestinale).

European Journal of Pediatrics (2023) 182:3385–3395
https://doi.org/10.1007/s00431-023-04984-4

REVIEW

Check for updates

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]

- Esaurimento del patrimonio venoso superficiale
- Neonati nei quali - pur essendovi vene periferiche superficiali disponibili - la inserzione di un catetere epicutaneo cavale incontra difficoltà ripetute di posizionamento della punta

European Journal of Pediatrics (2023) 182:3385–3395
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REVIEW

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

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Consider the benefit of tunneling all ultrasound-guided CICC/FICC, especially in elective conditions.

Special considerations.

Even though is always advisable to tunnel the catheter, in some situations, this maneuver can be impractical, for example, because of the limited duration of sedation in extremely low birth weight infants, or because of the difficulty of using the modified Seldinger technique in babies weighing less than 750 g, or because of insufficient training of the operator.

Secure & Protect

La scelta dei materiali della medicazione

La sinergia degli elementi della medicazione

Stabilizzazione

- Del tratto esterno del catetere
- Prevenzione micromovimenti che causano irritazione venosa e danno endoteliale

Protezione

- Dalla colonizzazione microbica della cute circostante
- Dalla contaminazione diretta (mani o altri materiali)

FICC nel neonato

Non è mai la prima scelta per gli accessi a medio e lungo termine

(solo se controindicati i CICC)

FICC

Vantaggi

- Zona meno “pericolosa”
- Puntura out of plane
- Tip navigation

Svantaggi

- Dimensioni ridotte
- Puntura out of plane
- Angolo acuto tra femorale e iliaca
- Regione inguinale più sporca
- No emodinamica, no ScVO2

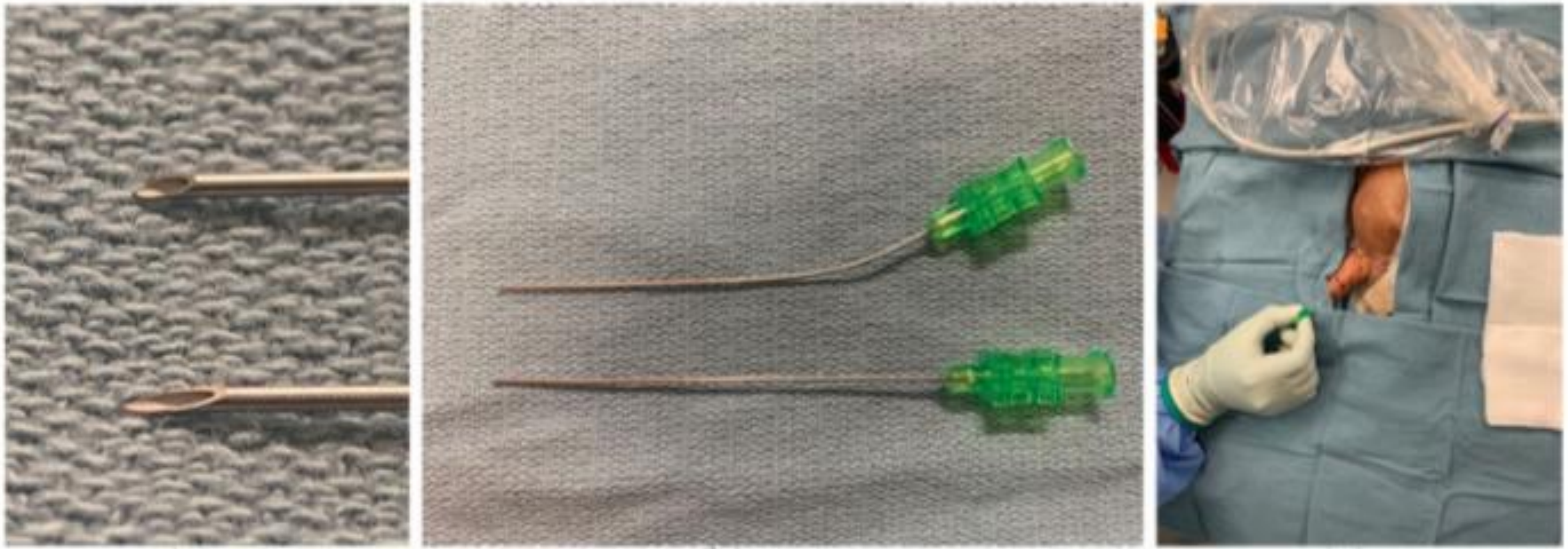
JVA | Vascular Access

The Journal of Vascular Access
1–8

DOI: 10.1177/1129729820933527
journals.sagepub.com/home/jva
SAGE

Single-access ultrasound-guided tunneled femoral lines in critically ill pediatric patients

Andrew Woerner[1], Jesse L Wenger[2] and Eric J Monroe[1]



A retrospective analysis of the clinical effectiveness of subcutaneously tunneled femoral vein cannulations at the bedside: A low risk central venous access approach in the neonatal intensive care unit

Matthew Ostroff[1], Adel Zauk[2], Sara Chowdhury[2], Nancy Moureau[3] and Carly Mobley[2]

Birth weight in grams	Patients birth weight	Patient weight upon insertion
400–500	1	0
500–600	4	2
600–700	2	2
700–800	5	5
800–900	4	4
900–1000	10	5
1000–1100	3	6
1100–1200	7	6
1200–1300	8	8
1300–1400	7	8
1400–1500	5	4
1500–1600	3	4
1600–1700	3	5
1700–1800	2	5
1800–1900	3	4
1900–2000	6	4
>2000	7	10
	Range: 450–3345 g	Range: 570–3345 g
	Average: 1380 g	Average: 1527 g

Zone Insertion Method applied to the subcutaneous tunneled mid-

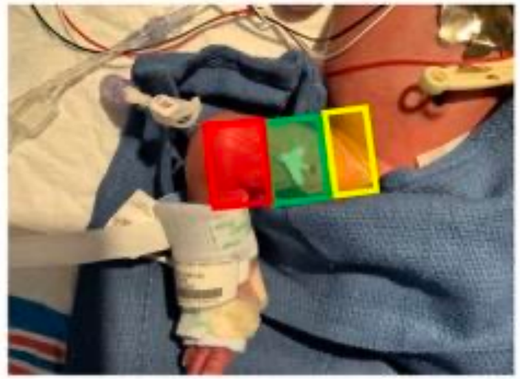


Table 6. Complications of ST-FICC's.

Complications	82
Infections	0
Symptomatic Thrombosis	0

Original research article

Distal superficial femoral vein versus axillary vein central catheter placement under ultrasound guidance for neonates with difficult access: A randomized clinical trial

Yanzhe Tan[1], Lifei Liu[1], Zhenzhen Tu[1], Ying Xu[1], Jia Xie[2] and Ping Ye[1]

Abstract

Background: Epicutaneo-caval catheters (ECCs) are extensively used in premature and ill neonates. This prospective, randomized, observational study aimed to compare the outcomes of ECC placement in the distal superficial femoral and axillary veins in neonates with difficult ECC access.

Methods: In a neonatal intensive care unit at a tertiary referral center, 60 neonates with difficult ECC access were randomized into two groups with catheters placed using the ultrasound-guided modified dynamic needle tip positioning (MDNTP) technique: distal superficial femoral vein (DSFV) and axillary vein (AV) groups.

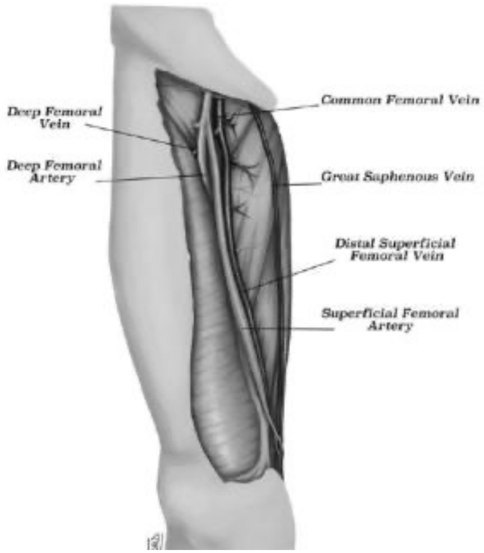
Results: The first attempt success rate was significantly higher in the DSFV group than in the AV group [23/30 (76.7%) vs 11/30 (36.7%), $p=0.001$; odds ratio (OR), 0.176; 95% confidence interval (CI) 0.057–0.543]. The mean procedural duration was significantly shorter in the DSFV group than in the AV group [mean: 308.5 (standard deviation: 81.1) s vs 522.74 (134.8) s, $t=-7.17$, $p<0.001$]. The incidence of complications was significantly lower in the DSFV group than in the AV group [4/30 (13.3%) vs 12/30 (40.0%), $p=0.019$; OR, 4.333; 95% CI 1.203–15.604]. The number of attempts was significantly fewer in the DSFV group than in the AV group ($p=0.012$).

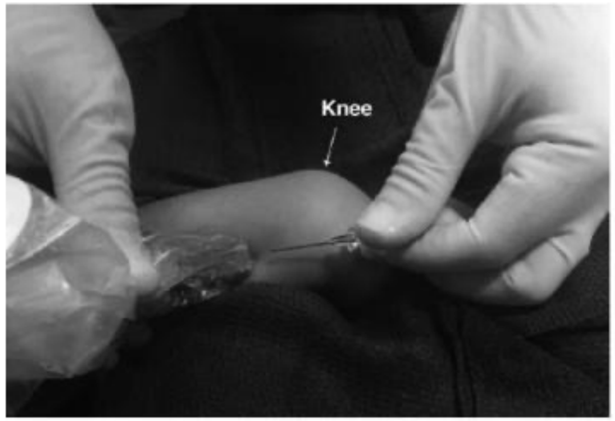
Conclusions: The distal superficial femoral and axillary veins are two alternative and safe access points for ECC placement in premature neonates (weight < 2.5 kg) with difficult access. However, access through the distal superficial femoral vein was quicker, easier, and had fewer complications than through the axillary vein.

	DSFV group ($n = 30$)	AV group ($n = 30$)	Statistic	Statistic	p Value
Sex					
Male, n (%)	15 (50%)	17 (56.7%)	χ^2	0.2679*	0.6048
Female, n (%)	15 (50%)	13 (43.3%)			
Gestational age (weeks)					
Mean (SD)	32.3 (1.9)	32.7 (2.3)	T	−0.88†	0.3813
Minimum–maximum	28.7–36.3	28.6–36.6			
Age at insertion time (days)					
Mean (SD)	15.6 (6.9)	16 (6.1)	T	−0.22†	0.8291
Minimum–maximum	2–27	4–28			
Weight (kg)					
Mean (SD)	1.6 (0.5)	1.6 (0.5)	T	−0.05†	0.9571
Minimum–maximum	0.8–2.4	0.9–2.4			
Vein diameter (mm)					
Median (Q1–Q3)	1.05 (0.9–1.2)	1.1 (1–1.2)	Z	−0.6165#	0.5376
Minimum–Maximum	0.8–1.3	0.8–1.3			
Venous depth (mm)					
Median (Q1–Q3)	6.5 (6–7)	2.1 (1.9–2.2)	Z	6.6594#	<0.0001
Minimum–maximum	5.1–7.9	1.7–2.3			

ORIGINAL ARTICLE

Distal Superficial Femoral Vein Cannulation for Peripherally Inserted Central Catheter Placement in Infants with Cardiac Disease





Objective. To describe a novel real-time ultrasound (US)-guided distal superficial femoral vein (DSFV) cannulation technique for insertion of peripherally inserted central catheters (PICC) in critically ill infants with congenital heart disease.

Design. Descriptive retrospective cohort study

Setting. Pediatric cardiac intensive care unit in a pediatric tertiary hospital

Patients. First 28 critically ill infants that received DSFV PICCs via this new technique.

Results. Thirty-seven US-guided DSFV PICCs were attempted on 31 infants from September 2012 to November 2014; 34 PICCs were placed in 28 patients (success rate 92%). Twenty-six of 28 patients underwent cardiac surgery. Median (IQR) age at time of PICC placement 39 days (13, 151); weight 3.4 kg (3.2, 5.3). 25/34 PICCs were placed in patients with STAT 4 or 5 category. Median PICC duration 16 days (11, 29); maximum duration 123 days. Ten infants (36%) had DSFV PICCs placed as the primary central venous access in perioperative period. Ten of 28 patients underwent cardiac catheterization while DSFV PICC was in place, four of which were performed through ipsilateral common femoral vein. Two patients had femoral arterial lines placed in the ipsilateral femoral artery while DSFV PICC was in place. There were no reported inadvertent arterial punctures. The PICC-associated infection rate was 4.6 per 1000 line days. Four of 34 DSFV PICCs (11.8%) were associated with deep venous thrombosis.

Conclusions. DSFV is a novel venous access site for PICC placement with high success rate and sufficient longevity and flexibility for critically ill infants with cardiac disease. More experience and larger studies are needed to confirm its potential advantages.

Table 1. Patient Characteristics

Variable	US-guided DSFV PICCs $n = 34$
Age at time of PICC placement (days)	39.5 (13.5, 150.8)
Weight (kg)	3.4 (3.2, 5.3)
STAT category, *n* (%)	
1	1 (2.9)
2	3 (8.8)
3	3 (8.8)
4	19 (55.9)
5	6 (17.6)
NA	2 (5.9)
Hospital length of stay (days)	34.5 (23.3, 51.5)

Data represented as median (interquartile range).
DSFV, distal superficial femoral vein; PICC, peripherally inserted central catheter; STAT, Society of Thoracic Surgeons and European Association for Cardiothoracic Surgery; US, ultrasound.

Table 2. DSFV Peripherally Inserted Central Catheter Data ($n = 34$)

Variable	Data
Line duration (days)	16 (11.3, 29.0)
Percent of HLOS with PICC in place	52 (24.2, 71.3)
Line length (cm)	19.5 (16.0, 20.5)
Line Sidedness, *n* (%)	
Left	14 (41.2)
Right	20 (58.8)
Line Size, *n* (%)	
2.6F	26 (76.5)
3F	2 (5.9)
3.9F	1 (2.9)
4F	5 (14.7)
PICC Number of Lumens, *n* (%)	
1	2 (5.9)
2	32 (94.1)
Femoral vein PICC as primary line, *n* (% of patient encounters)	10 (35.7)

Data represented as median (interquartile range).
HLOS, hospital length of stay; PICC, peripherally inserted central catheter.

Ultrasound to guided epicutaneo-caval catheter insertion in newborn infants

Xiao-Ling Ren[1], Man Wang[1,2], Yu-Ru Wei[1,2] and Jing Liu[1*]

[1]Department of Neonatology and NICU, Beijing Chao-Yang Hospital, Capital Medical University, Beijing, China, [2]Department of Neonatology and NICU, Beijing Chao-Yang District Maternal and Child Healthcare Hospital, Beijing, China

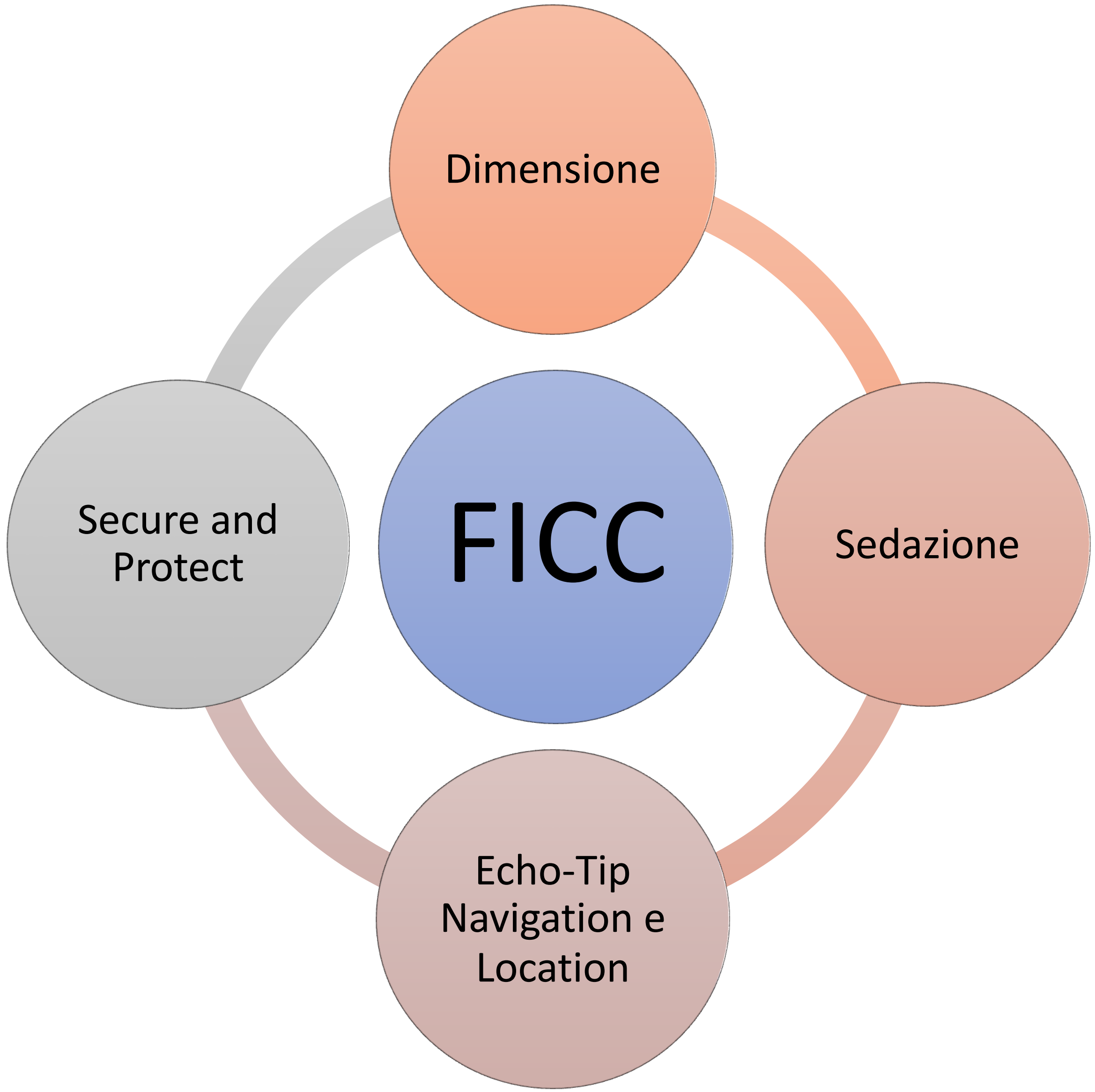
FIGURE 1
Color Doppler ultrasound measuring the angle between GSV and FV. Color Doppler ultrasound was used to assess the course conditions of bilateral GSV. The probe is placed in the groin (A). Measuring the angle between GSV and FV (B: angle = 100°; C: angle = 33.9°). The GSV on one side with a smaller angle between the two veins was selected for catheterization (C).

Objective: Recently, ultrasound (US) has been increasingly used for epicutaneo-caval catheter (ECC) tip positioning; however, the selection of blood vessels for ECC still depends on the operator's subjective judgment. This study aimed to explore the value of US in decision-making regarding the great saphenous vein (GSV), tip navigation, and tip location of ECC.
Methods: Catheterization through the GSV of the lower extremity was selected. The running condition of the GSV was assessed by using US, and the angle between the GSV and the femoral vein was observed and measured. We selected the GSV with a smaller angle to the femoral vein for ECC catheterization.
Results: ECC catheterization under ultrasound guidance increased the success rate at the time of catheterization from 82.5% to 100% (increased by 17.5%) and shortened the catheterization time from 56.1 ± 5.30 min to 31.5 ± 2.58 min on average (shortened by 44%). The incidence rate of catheter-related complications decreased by 58.2% catheter days from 6.80/1,000 to 2.84/1,000.
Conclusion: ECC insertion under the guidance of US has numerous advantages, including significantly improving the success rate of one-time catheterization, shortening the time of catheterization, and reducing catheter-related complications.

TABLE 3 Success rate of one-time catheterization between two groups.

Groups	Patients	Success	Success rate (%)	Increased by (%)
US-guided group	126	126	100	17.5
Non-US-guided guided	40	33	82.5	

US, ultrasound.


Dimensione
Secure and Protect
FICC
Sedazione
Echo-Tip Navigation e Location


danke
thank you
gracias
bedankt
dziekuje
obrigado
merci