

Tunnellizzazione:
Indicazione e Tecniche

DOTT.SSA
CRISTINA
MARTUCCI

Protocollo ISAC-Ped

Protocollo ISAC-Ped per l'Impianto Sicuro dell'Accesso Venoso Centrale nel paziente pediatrico

1. Scelta ragionata della vena mediante esame ecografico sistematico (secondo i protocolli RaCeVA, RaPeVA e RaFeVA)
2. Tecnica asettica appropriata: igiene delle mani, massime protezioni di barriera e antisepsi cutanea con clorexidina 2% in IPA 70%
3. Utilizzo dell'ecografo per la venipuntura ecoguidata della vena prescelta e per il successivo controllo ecografico della assenza di pneumotorace o di altre complicanze legate alla inserzione
4. Verifica intra-procedurale della posizione centrale della punta mediante la tecnica dell'ECG intracavitario e/o mediante ecocardioscopia (secondo il protocollo ECHOTIP-Ped)
5. Tunnellizzazione del catetere per ottenere il sito di emergenza in posizione ottimale
6. Protezione del sito di emergenza mediante colla in cianoacrilato
7. Stabilizzazione del catetere mediante *'sutureless device'* (utilizzare preferibilmente l'ancoraggio sottocutaneo in tutti i CVC messi in elezione) e membrana trasparente semipermeabile ad alto MVTR (*moisture vapor transfer rate*).

Perché tunnelizzare?

Puncture site $\neq$ exit site

Vantaggi:

- ↓ rischio infettivo
- ↓ dislocazioni (accidentali o volontarie)
- ↓ rischio trombotico
- ↑ comfort del paziente



Quando tunnellizzare?

- CVC cuffiati e non cuffiati
- PICCs, CICCes e FICCes

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Techniques in vascular access

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

Matthew D Ostroff ¹, Nancy Moureau², and Mauro Pittiruti ³

Quando tunnellizzare?

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Case reports

Preprocedural ultrasound vascular assessment is essential to decision-making

Fabrizio Brescia ¹, Fabio Fabiani¹, Eugenio Borsatti², Laura Parisella¹, Laura Roveredo¹, and Mauro Pittiruti ³

«Reliable venous access should be part of the clinical-therapeutic path of all **cancer patients**»



Quando tunnellizzare?

The Journal of Vascular Access
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Original research articles

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 Zauk², Sara Chowdhury², Nancy Moureau³, and Carly Mobley²

The Journal of Vascular Access
Volume 22, Issue 3, May 2021, Pages 344-352
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Original research articles

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

Giovanni Barone ¹, Mauro Pittiruti ², Gina Ancora¹, Giovanni Vento³, Francesca Tota⁴, and Vito D'Andrea ³

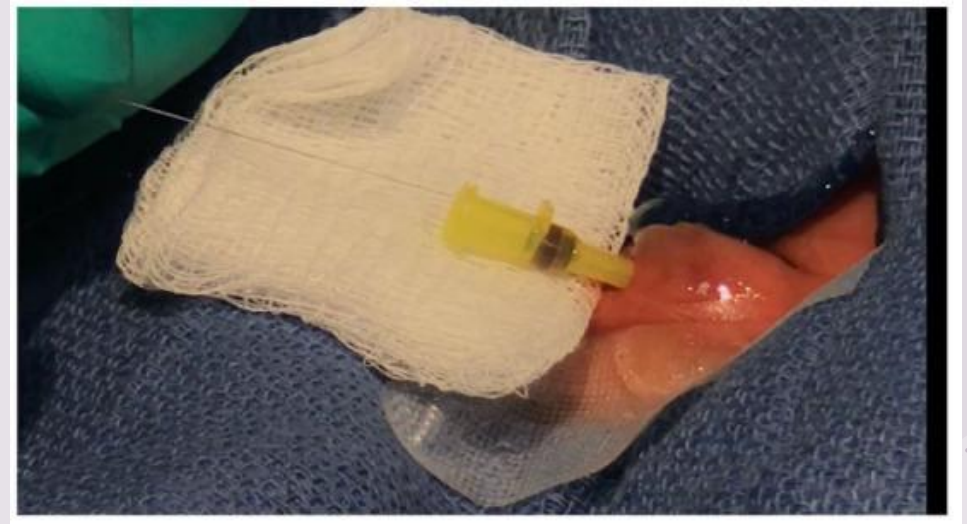
Come tunnelizzare?

“Pseudo-tunneling” :

- Singola puntura (→ non una reale tunnelizzazione)
- Lungo tragitto sottocutaneo tramite il device (“extended subcutaneous route”)

Indicazioni:

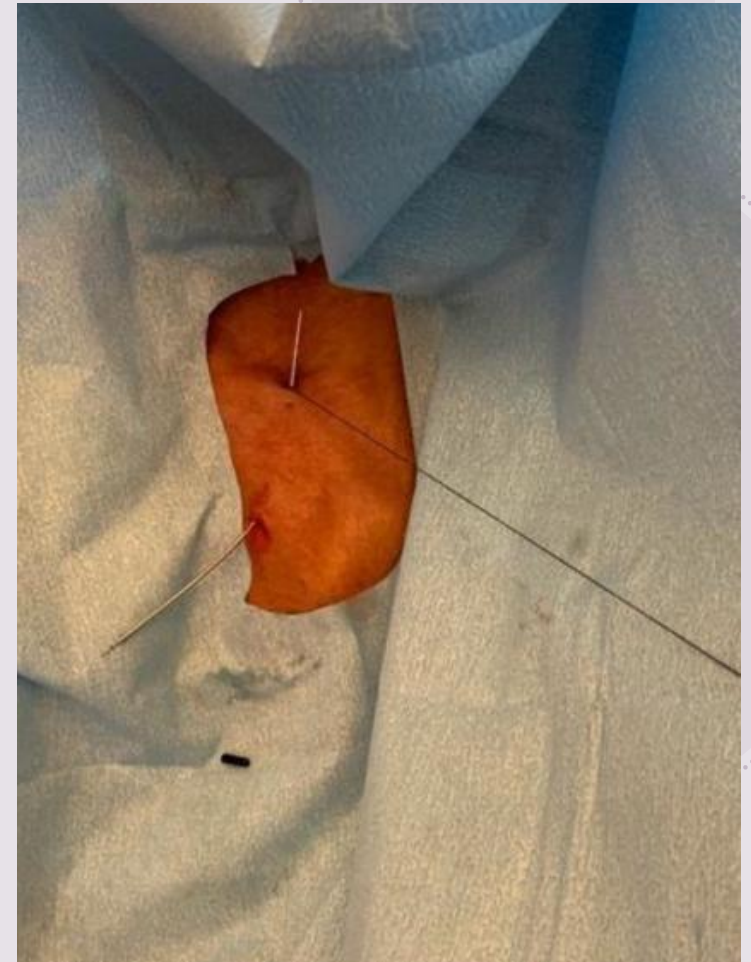
- Neonati o pz pediatrici
- PICCs che richiedano una tunnelizzazione corta



Come tunnellizzare?

Tramite apposito device (metallico o plastico)

- Puntura ecoguidata e successiva introduzione di CVC tramite filo guida
- Per via anterograda (exit site → insertion site) o retrograda (insertion site → exit site)



Come tunnellizzare?

Tramite cannula venosa periferica

- Dopo la creazione del tunnel tramite la cannula, si rimuove l'ago e si inserisce il catetere
 - 14G per 4-5Fr
 - 16G per 3Fr
- Tunnel max 4-5 cm (lunghezza max delle cannule 6 cm)



Dove tunnellizzare?



Dove tunnellizzare?

Caratteristiche di un **exit-site ideale**:

- Area pulita e piana, priva di umidità o peli
- Lontana da sedi contaminate
- Lontana da altri devices (PMK, defibrillatore, Catetere per dialisi)
- In caso di pz con deficit cognitivo, non raggiungibile con le mani

EVITARE EXIT-SITE SUL COLLO!



EVITARE EXIT-SITE SUL COLLO!



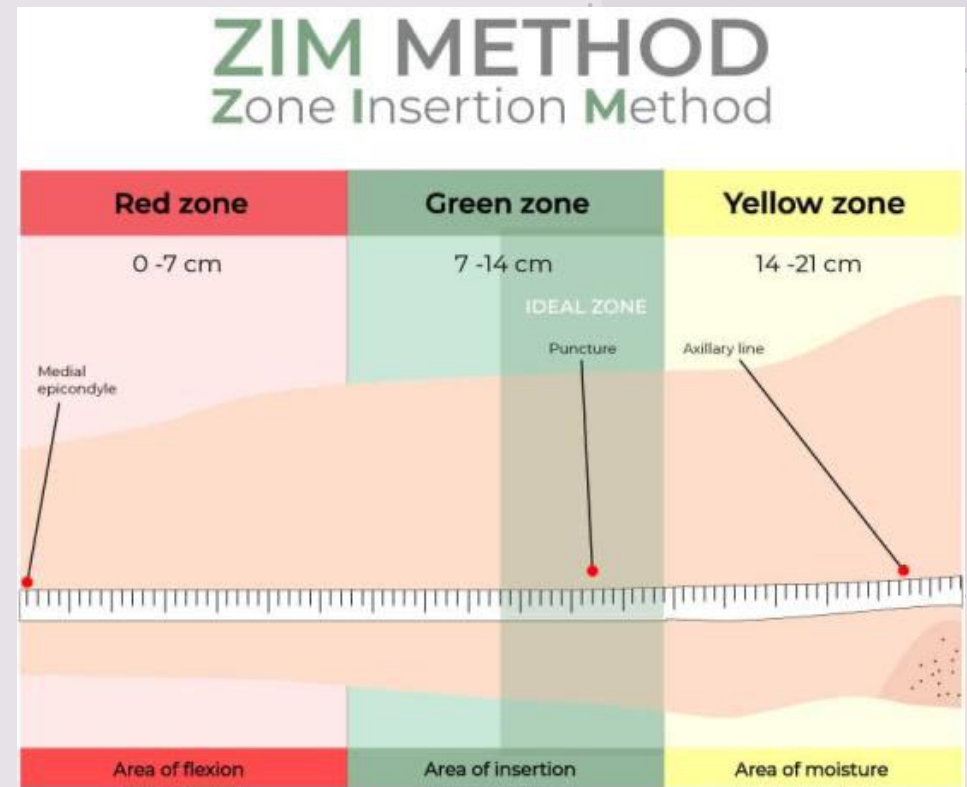
Dove tunnellizzare?

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

«Rapid Assessment of Vascular Exit Site and Tunneling Options (RAVESTO): A new decision tool in the management of the complex vascular access patients» – Ostroff MD, Moureau N, Pittiruti M; J Vasc Access 2023, Vol. 24(2) 311 –317

Dove tunnellizzare?

Per i PICCs: Dawson's Zone Insertion Method



Dove tunnellizzare?

CICCs con puntura sovraclavicolare (v. giugulare interna o esterna, tronco brachiocefalico, v. succlavia)



Tunnel to infraclavicular area



Tunnel to arm



Tunnel to back

Dove tunnellizzare?

CICCs con puntura infraclavicolare (v. ascellare o cefalica) → exit site sotto la clavicola (buona stabilità basso rischio di contaminazione batterica)



Tunnel to chest



Tunnel to arm

Dove tunnellizzare?

FICCs (v. femorale comune o superficiale) → exit site sulla coscia (per pazienti allettati) o sull'addome



Dove tunnellizzare?

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Original research articles

Chest-to-arm tunneling: A novel technique for medium/long term venous access devices

Maria Giuseppina Annetta¹, Matt Ostroff ², Bruno Marche¹, Alessandro Emoli¹, Andrea Musarò¹, Davide Celentano¹, Cristina Taraschi¹, Laura Dolcetti¹, Antonio La Greca¹, Giancarlo Scoppettuolo¹, and Mauro Pittiruti ¹



Dove tunnellizzare?

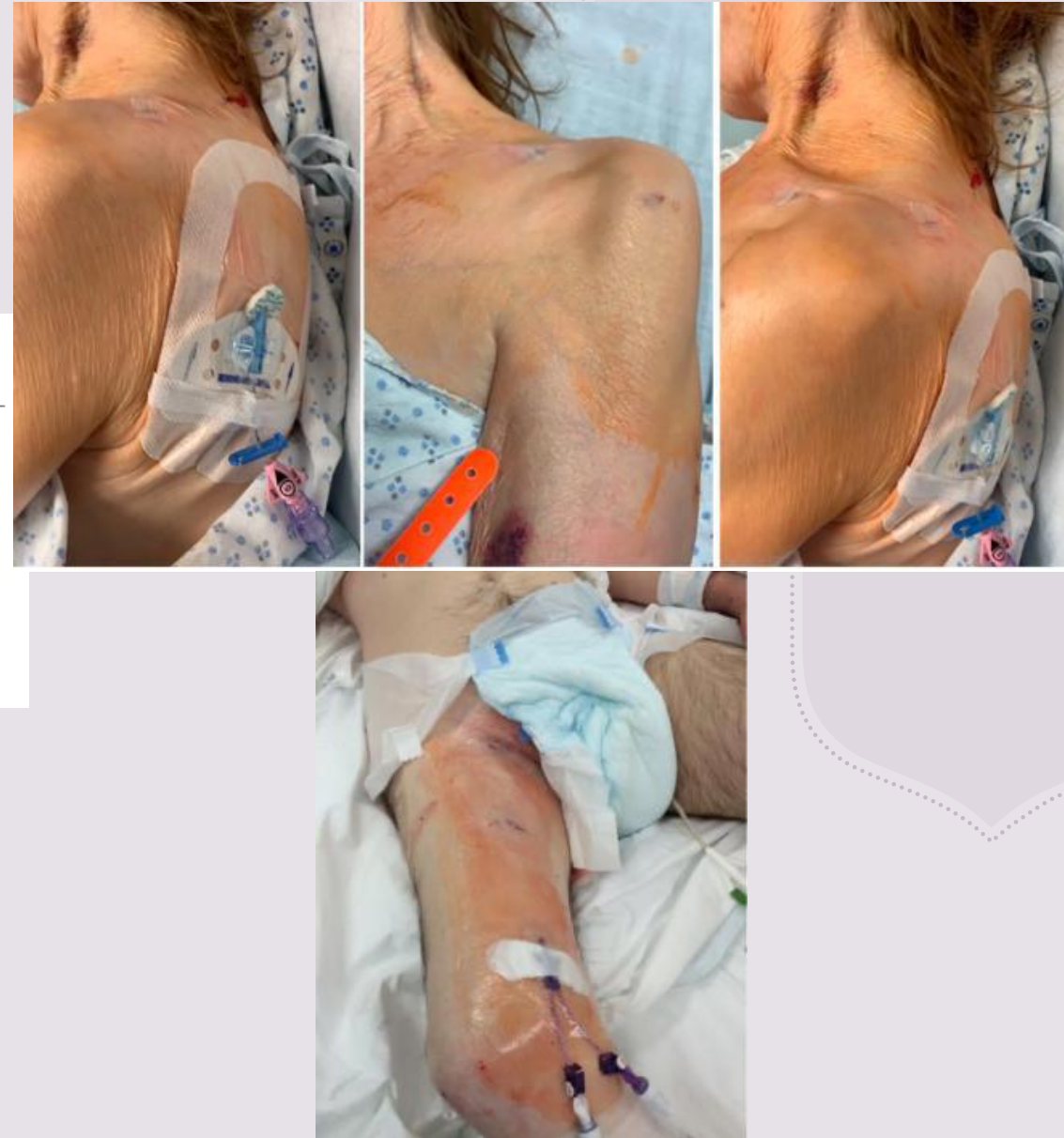
Case report

Alternative exit sites for central venous access: Back tunneling to the scapular region and distal tunneling to the patellar region

Matthew D Ostroff¹  and Mauro Pittiruti² 

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Dove tunnelling?

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Case reports

Venous catheter at alternate exit site in a 2-year-old requiring long-term antibiotics for osteomyelitis: A case report

Matthew D Ostroff , David Goldberg, Greg Bauhman, and and Cheri Korb



Dove tunnellizzare?

Pediatr Surg Int (2017) 33:1001–1005
DOI 10.1007/s00383-017-4099-y

ORIGINAL ARTICLE

Indications and outcomes for tunneled central venous line placement via the axillary vein in children

Allison F. Linden^{1,2} · Chase Corvin³ · Keva Garg³ · Richard R. Ricketts⁴ ·
A. Alfred Chahine^{2,5}

«Tunneled central venous line placement via a cutdown approach into the axillary vein can provide an **effective alternative approach to obtain long-term vascular access** in children with similar outcomes to the more traditional internal jugular and subclavian approaches.

It may be best indicated for **patients with anterior chest or neck challenges, such as wounds, ventriculoperitoneal shunts, tracheostomies and sternotomy incisions**. This approach should be within the pediatric surgeon's breadth of experience when dealing with challenging central venous line issues.»

Conclusioni



- La tunnellizzazione riduce il rischio di infezione, dislocazione e trombosi
- Può essere applicata con tutti i presidi (PICCs, CICCs e FICCs)
- L'exit-site va scelto sulla base delle caratteristiche del catetere e del paziente



GRAZIE per l'attenzione

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