



**VI Convegno
Nazionale
GAVePed**




**Accessi venosi
nel neonato e
nel bambino**

**Palazzo dei Congressi
Bologna
13-14 maggio 2024**



TIP MIGRATION e MALPOSIZIONI SECONDARIE

Come trattare le malposizioni secondarie nel neonato

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Vascular Access in Neonates and Children

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Nicola Massimo Disma
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Editors

Springer

MALPOSIZIONE SECONDARIA: definizione

«Spostamento della punta e del tratto intravascolare del catetere, rispetto alla corretta localizzazione della punta verificata durante la procedura o al termine di essa».

E' una **complicanza meccanica**.

Può accadere senza dislocare VAD in exit site.



MALPOSIZIONE SECONDARIA = TIP MIGRATION

MALPOSIZIONE SECONDARIA: cause



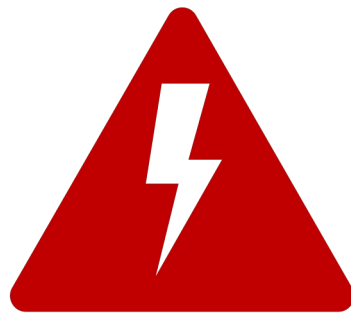
- ☐ **INCREMENTO PRESSIONE INTRATORACICA** (tosse, vomito, ventilazione meccanica,...)
- ☐ **STABILIZZAZIONE INADEGUATA** (dispositivi stabilizzazione e/o dressing non corretto)
- ☐ **OZZING PERSISTENTE** (non applicata colla)
- ☐ **SCELTA ERRATA DELL'EXIT SITE** (non adeguata stabilizzazione: es. collo)
- ☐ **MOVIMENTI degli ARTI**



Vascular Access in Neonates and Children, <https://doi.org/10.1007/978-3-030-94709-5>
Infusion Therapy Standards of Practice 9th edition, 2024
Peripherally inserted central catheter: guideline for practice. 4th edition, NANN 2022

CATETERI CHE MIGRANO PIÙ FREQUENTEMENTE

- Cateteri più sottili
- Silicone > poliuretano
- Cateteri non correttamente posizionati
(es. punta VAD in 1/3 medio VCS)



CVO
ECC



MALPOSIZIONE SECONDARIA: segni e sintomi



La migrazione di un catetere può essere asintomatica.

Segni e sintomi:

- **Dolore e irritabilità** (localizzazione VAD e infusati)
- **Eritema o edema locali**
- **Malfunzione VAD**
- **Difficoltà a rimuovere VAD**
- Sintomatologia specifica in funzione di posizione punta (**aritmia, versamento pleurico, versamento pericardico, tamponamento cardiaco, ...**).



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NANN 2022

MALPOSIZIONE SECONDARIA: complicanze

TIP PERIFERICA	TIP INTRACARDIACA	Altro
MALFUNZIONE NON CENTRALE STRAVASO/PERFORAZIONE VASCOLARE VERSAMENTO PLEURICO TROMBOSI C-R	MALFUNZIONE ARITMIA TROMBOSI C-R VERSAMENTO CARDIACO (ECC) TAMPONAMENTO (ECC)	RITARDO/FALLIMENTO TERAPIA NUOVO IMPIANTO



Point-of-care ultrasound for vascular access in neonates and children

Mauro Pittiruti¹ · Maria Giuseppina Annetta² · Vito D'andrea³



Ultrasound for diagnosis of late complications

Last but not least, ultrasound plays an important role in the diagnosis and management of most non-infective late complications: catheter-related thrombosis, fibroblastic sleeve, secondary malposition of the tip (so-called “tip migration”), late tissue damage related to tip migration, rupture of the catheter in its subcutaneous or intravascular tract.



Point-of-care ultrasound for vascular access in neonates and children

Mauro Pittiruti¹ · Maria Giuseppina Annetta² · Vito D'andrea³



The above-described ultrasound techniques of tip navigation and tip location can be safely used for ruling out secondary malposition (tip migration): for this purpose, in neonates and infants, ultrasound is usually more accurate than x-ray, especially if coupled with the technique of “bubble test” (rapid flushing of saline through the catheter, with the appearance of the micro-bubbles in the vasculature), which increases the accuracy in locating the tip. In some cases, ultrasound can also be used to reposition the tip, for example, when the tip of a CICC or a PICC has migrated into the ipsilateral internal jugular vein, a “jet injection” of saline through the catheter can be successful in pushing the tip back to the original position. When a secondary (or primary) malposition of the tip is suspected, the techniques described in the Neo-ECHOTIP protocol [22] and in the ECHOTIP-Ped protocol [23] are used for assessing the proper tip location; in some central lines (UVC and ECC), a periodic assessment of the position of the tip is recommended [24].



RIPOSIZIONAMENTO CICC



FLUSH con SOLUZIONE FISIOLÓGICA

RIPOSIZIONAMENTO CVO



Se intracardiaco: ritirare in ecoscopia
Se periferico: rimuovere



Changes in Upper Extremity Position Cause Migration of Peripherally Inserted Central Catheters in Neonates

Ali M. Nadroo, MD*; Ronald B. Glass, MD†; Jing Lin, MD*; Robert S. Green, MD*; and Ian R. Holzman, MD*

2002

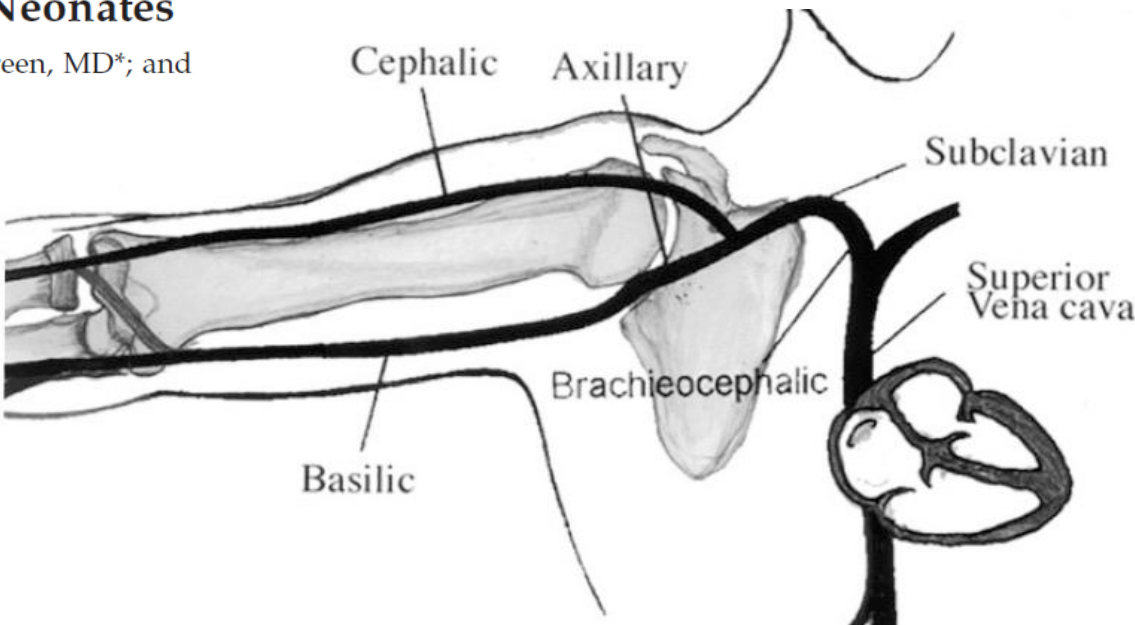


TABLE 1. Direction of the Displacement of the PICCs Related to Various Movements of the Upper Extremity

Shoulder and Elbow Movement	Vein of Catheter Placement		
	Basilic	Cephalic	Axillary
Shoulder adduction	Toward the heart	Away from the heart	Toward the heart
Shoulder abduction	Away from the heart	Toward the heart	Away from the heart
Elbow flexion	Toward the heart	Toward the heart	No effect
Elbow extension	Away from the heart	Away from the heart	No effect



Spostamenti della punta del catetere con movimenti del corpo

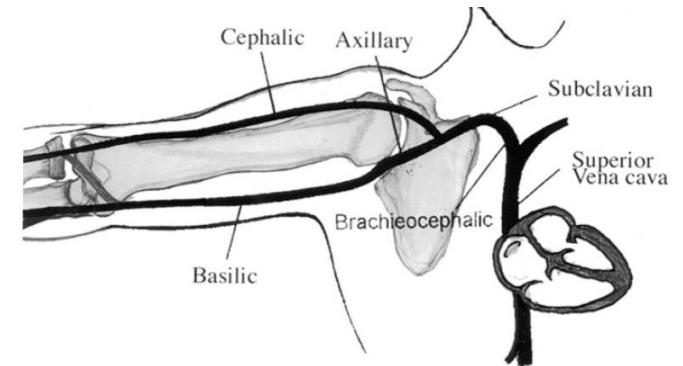


Table 3. Relationship Between Patient Position and Catheter Tip Location

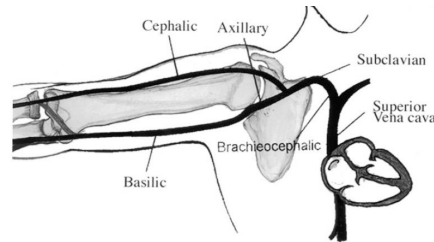
Catheter Insertion Site	Infant Position	Resultant Tip Movement
Cephalic vein ^{22,23}	Abduction of arm	Inward migration
	Adduction of arm	Outward migration
Basilic and axillary veins ²²	Abduction of arm	Outward migration
	Adduction of arm	Inward migration
Preantecubital insertion ²²	Flexion of arm	Inward migration
	Extension of arm	Outward migration
External jugular and catheters traversing neck ^{20,111,212}	Neck flexion	Inward migration
Leg vein insertion ²⁴	Leg flexion	Inward migration
	Leg extension	Outward migration



MANOVRE NON INVASIVE RIPOSIZIONAMENTO PUNTA CATETERE



OUT



CEFALICA

**BASILICA
ASCELLARE**

PRE-ANTECUBITALE

CEFALICA

**BASILICA
ASCELLARE**

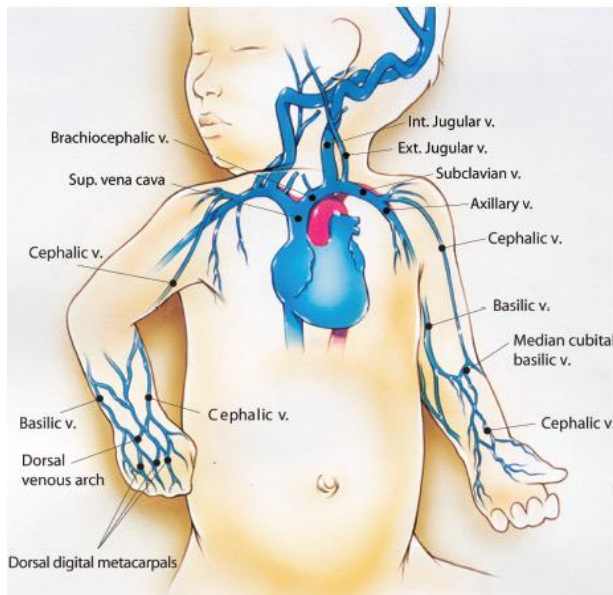
PRE-ANTECUBITALE



Repositioning Techniques for Malpositioned Neonatal Peripherally Inserted Central Catheters

2010

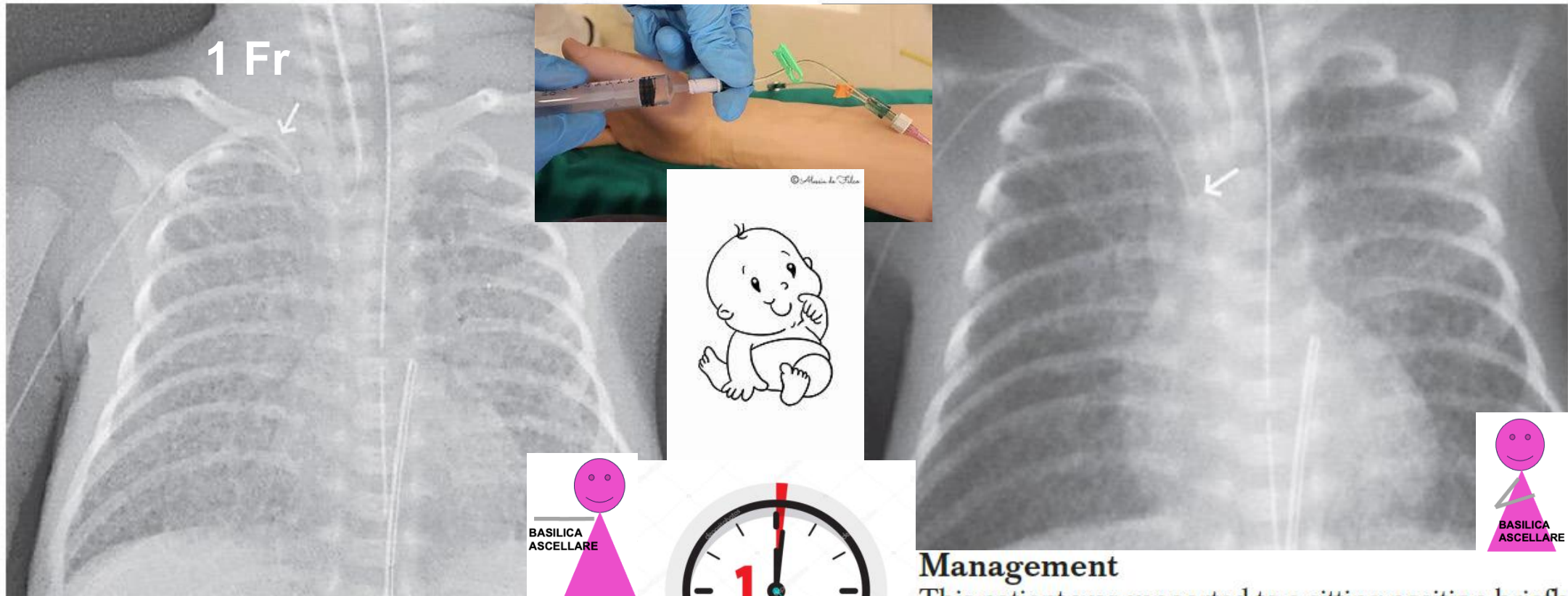
Elizabeth L. Sharpe, MSN, ARNP, NNP-BC



Catheter malposition occurs when the catheter tip fails to reach optimal tip location in the SVC with reported incidence rates ranging from 10% to 85.8%.^{9,13} When initial placement does not achieve or the catheter does not maintain optimal tip location in the SVC, varying catheter tip be placed in the lower half to one-third of the SVC, sometimes delineated as T3–T5.⁴⁻⁷ Catheter malposition has been reported to occur as frequently as 85.8% on initial insertion, accounting for 1.5%–3% of PICC complications.^{8,9} Catheters in situ can displace because of hemodynamics and physical forces such as patient position, and especially if subjected to external forces such as high-frequency ventilation.

Advances in Neonatal Care 10(3):p 129-132, June 2010. |
DOI: 10.1097/ANC.0b013e3181dda089



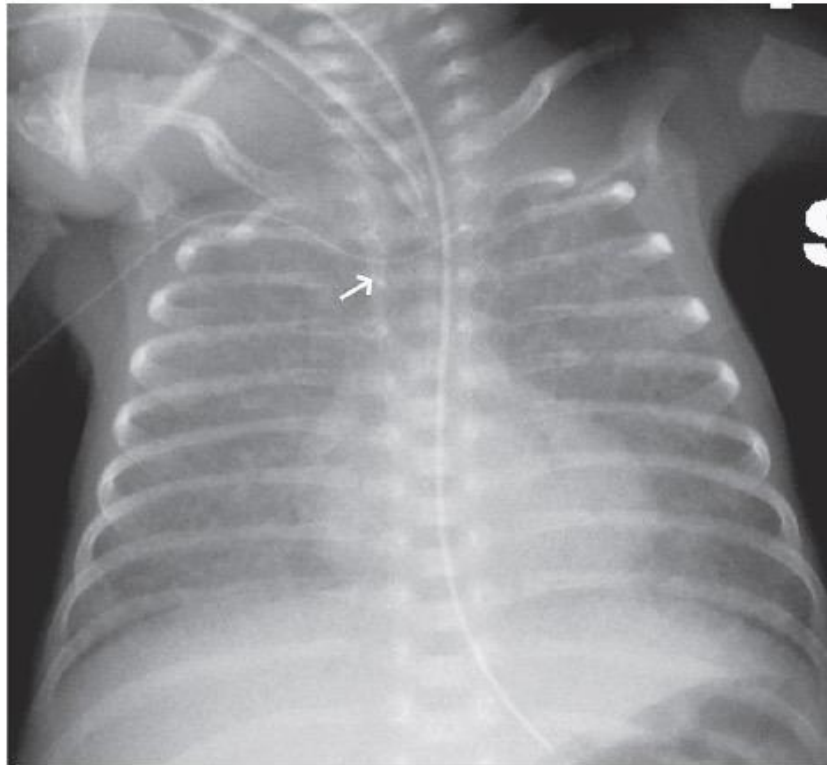


Baby H is a 25-week, 680-g infant who received umbilical arterial and umbilical venous catheters upon admission. By day 3 of life, the umbilical venous catheter became displaced and was removed. To provide vascular access, a 28-gauge polyurethane catheter was inserted via the right basilic vein without complication. The initial chest x-ray film indicated that the tip

Management

This patient was supported to a sitting position briefly (approximately 1 minute), while catheter was flushed with 1 mL of normal saline, right upper extremity was abducted and elbow extended, and then right upper extremity was adducted and elbow flexed. Follow-up x-ray film was taken with right upper extremity adducted and showed correction of the catheter tip to an appropriate location in the SVC, in central placement (Figure 2).

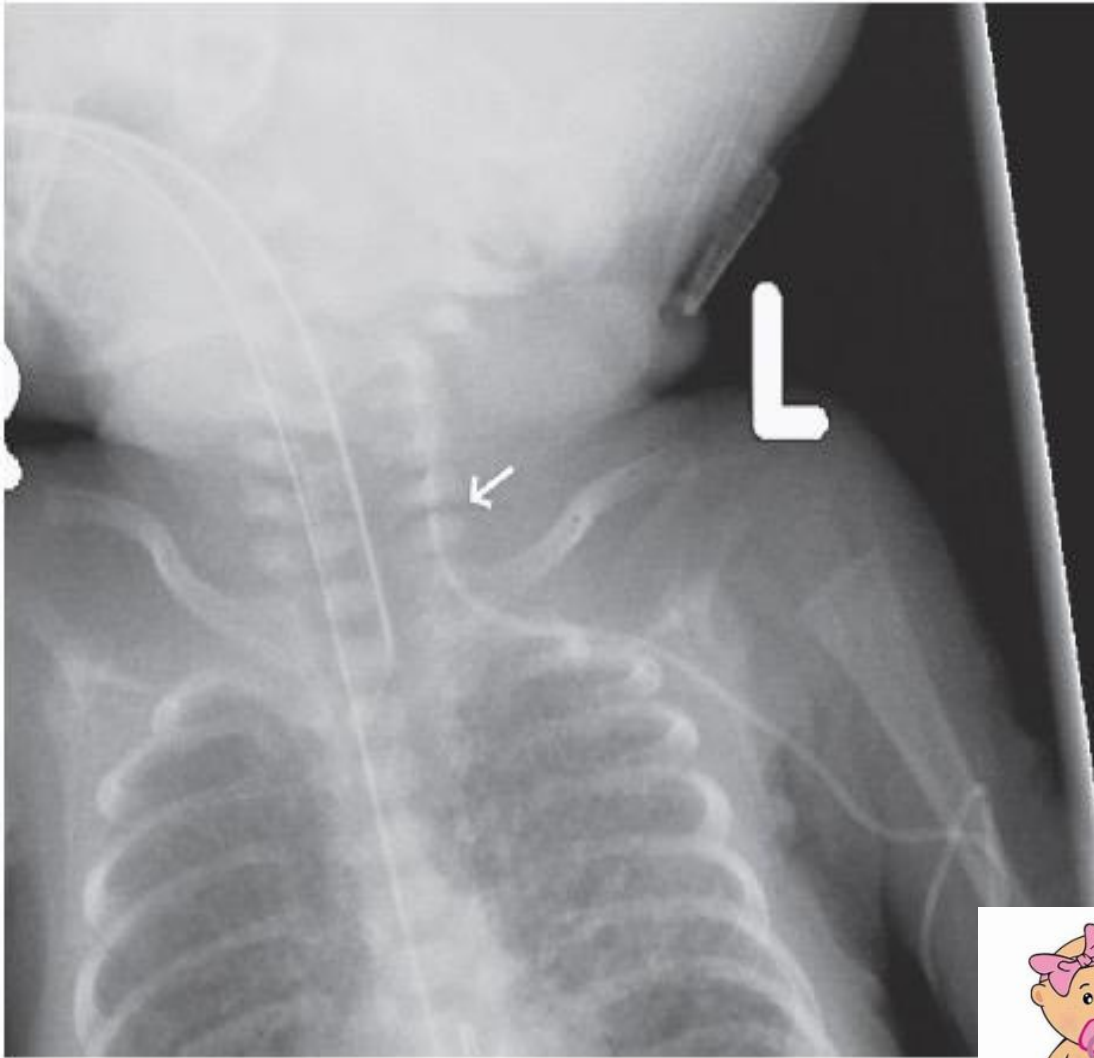
Baby R is a 28-week, 750-g infant who required reliable long-term vascular access for lingering hyperalimentation needs and medications. On day 19 of life, a 28-gauge polyurethane catheter was inserted via the right basilic vein without complication. Initial chest x-ray film showed catheter tip beyond the cavoatrial junction within the right atrium, and per digital annotator estimation, catheter was withdrawn 1.5 cm. Follow-up chest x-ray film showed tip of catheter across midline in the contralateral subclavian vein, rather than in the SVC, as might be expected (Figure 3).



Management

This patient was placed on the ipsilateral side as the catheter with the head of the bed elevated for approximately 20–30 minutes and catheter was flushed with 1 mL of normal saline, and then continuous infusion resumed. Follow-up anterior-posterior x-ray film, taken with patient in the supine position, showed that the catheter redirected into appropriate position in the SVC, not in the right atrium. Incidentally, this same malposition occurred to the patient described in case 1 on day 8 of dwell, and the catheter was successfully repositioned in the SVC using the same techniques.



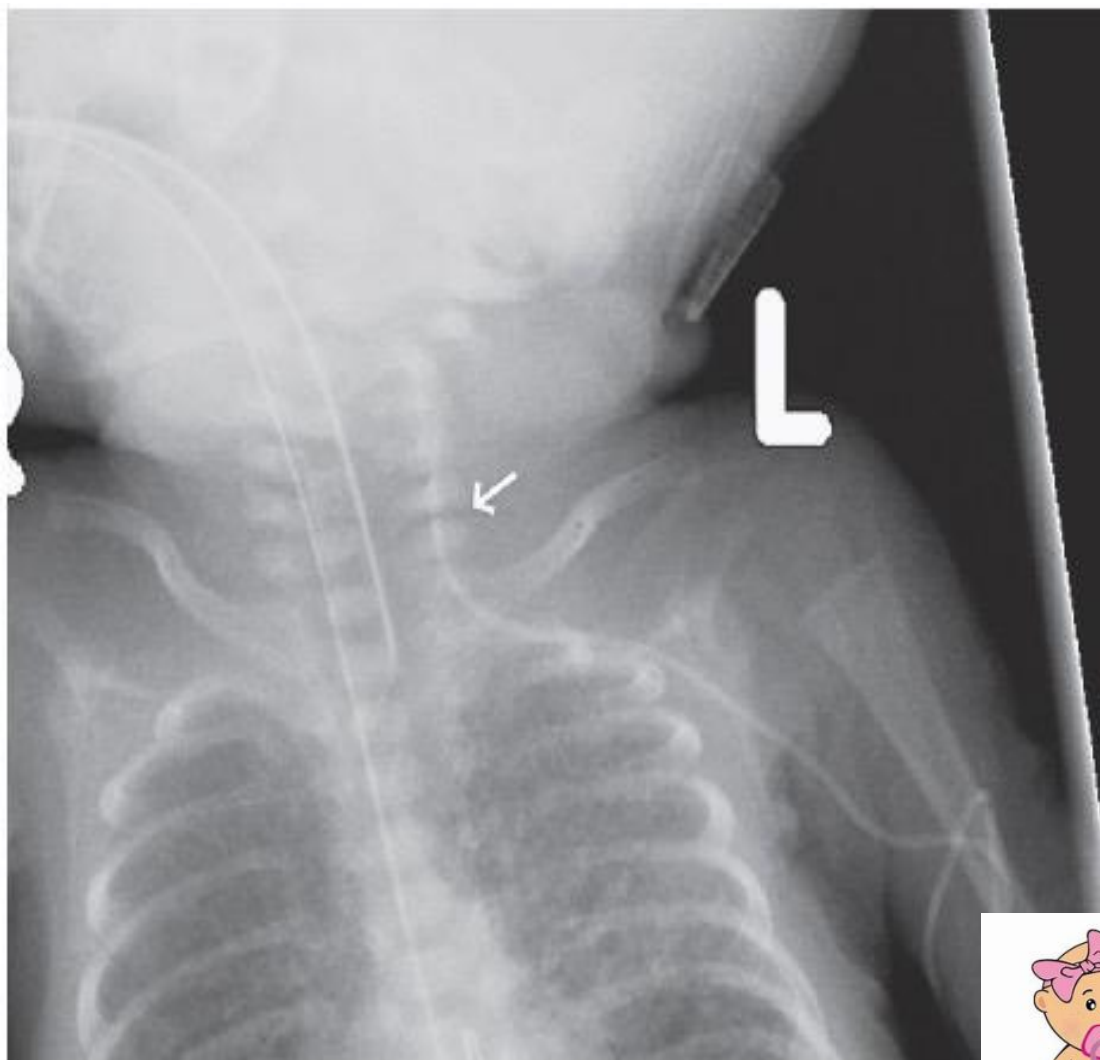


Baby N is a 26-week, 600-g infant, who on day 3 of life underwent placement of a 28-gauge polyurethane catheter via the left axillary vein with the catheter tip advanced to central placement. A chest x-ray film taken 2 days later showed the catheter tip positioned in the internal jugular vein, directed superiorly

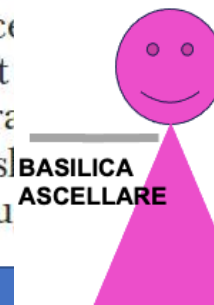
Management

This patient was supported to a sitting position, with head midline in a neutral position, for approximately 1 minute, while catheter was flushed with 1-mL normal saline. Follow-up x-ray film revealed that the catheter tip had resumed its initial central position.





Baby N is a 26-week, 600-g infant, who on day 3 of life underwent placement of a 24-gauge polyurethane catheter via the left axilla. The catheter tip was advanced to central venous position. A chest x-ray film taken 2 days later showed the catheter tip positioned in the internal jugular vein, directed superiorly.



Abduzione braccio alla spalla e gomito esteso (ritiro punta)



adduzione braccio e flessione del gomito (punta avanza)



Point-of-care ultrasound (POCUS) for tip localization of neonatal peripherally inserted central catheter (PICC): A prospective study

Shu-Yu Lin^a, Ming-Chou Chiang^{a,b,c}, Wei-Hung Wu^a, I-Hsyuan Wu^{a,b}, Mei-Yin Lai^{a,b,c}, Shih-Ming Chu^{a,b}, Reyin Lien^{a,b}, Kai-Hsiang Hsu^{a,b,c,*}

2023



MALPOSIZIONE SECONDARIA nel NEONATO

Quindi.....???



DIAGNOSI: TIP LOCATION ECOGRAFICA (Neo-ECHOTIP)

TRATTAMENTO: **ECO-ASSISTO**

- FLUSH CON SOLUZIONE FISIOLOGICA
- MANOVRE NON INVASIVE DI REPOSIZIONAMENTO
- RIMOZIONE

PREVENZIONE:

- STABILIZZAZIONE ADEGUATA,
- SORVEGLIANZA EXIT SITE (LUNGHEZZA CATETERE),
- ECHOTIP PERIODICA (CVO ed ECC)



Sistema Socio Sanitario



Presidio Ospedale
dei Bambini



Regione
Lombardia

ASST Spedali Civili



Grazie per l'attenzione