



GAVePed
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Come convincere gli operatori sanitari ad abbandonare il controllo radiologico post-impianto

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Come convincere gli operatori sanitari ad abbandonare il controllo radiologico post-impianto

I have no actual or potential conflict of interest in relation to this presentation

Il controllo radiologico post-procedurale...

Esclusione della presenza di pneumotorace (dopo impianto CICC)

Metodo di tip location

- controllo di anomalie del tragitto del catetere
- controllo della posizione finale della punta

Il controllo radiologico post-procedurale...

Come metodo per la esclusione dello pneumotorace, la radiografia post-procedurale è un metodo **meno accurato, meno flessibile, più nocivo, e più costoso** rispetto alla ecoscopia.

Infatti, il controllo ecoscopico dello spazio pleurico (presenza/assenza di *sliding*):

- è più sensibile e più specifico nella individuazione del PNX;
- può essere eseguito immediatamente dopo la venipuntura;
- può essere ripetuto in qualunque momento durante o dopo la procedura;
- non comporta costi aggiuntivi perché utilizza la stessa sonda lineare utilizzata per la venipuntura.

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

Massimo Lamperti, Daniele Guerino Biasucci, Nicola Disma, Mauro Pittiruti, Christian Breschan, Davide Vailati, Matteo Subert, Vilma Traškaitė, Andrius Macas, Jean-Pierre Estebe, Regis Fuzier, Emmanuel Boselli and Philip Hopkins

- (7) We recommend ultrasound for timely diagnosis of all potentially life-threatening complications (pneumothorax, haemothorax, cardiac tamponade and so on) after central venipuncture, as it has been shown to be more accurate and faster than a chest radiograph (1B).

REVIEW

Lung ultrasound for the sick child: less harm and more information than a radiograph

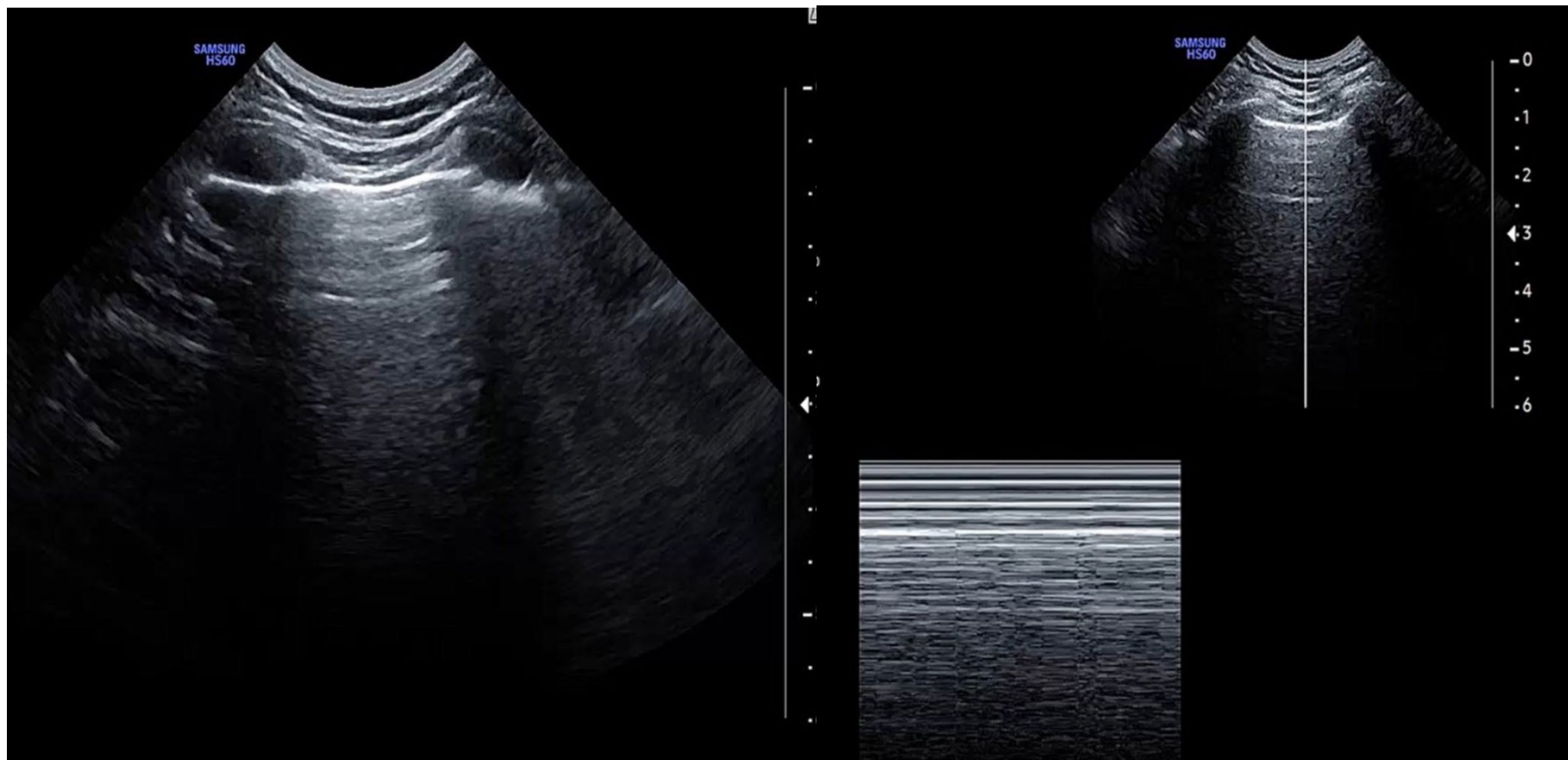
Giovanna Chidini¹  · Francesco Raimondi²

online: 21 December 2023
2023

1. Pneumothorax

An LU scan in B mode showing no pleural sliding and only A lines with no B lines in a distressed patient suggests significant pneumothorax. In the neonate, the ultrasound diagnosis of tension pneumothorax has been proven more reliable than clinical signs and much faster than the conventional radiograph [19, 20]. The so called Lung point sign can be visualized as a sharp demarcation between a sliding pleura with B lines underneath (where both pleural leaflets are moving together) and a still pleura with only A lines below (where air has

M-mode, the area affected by pneumothorax will appear as a uniform collection of horizontal, hyperechoic lines (the so called stratosphere sign). The superiority of



Point-of-care ultrasound (POCUS) protocol for systematic assessment of the crashing neonate—expert consensus statement of the international crashing neonate working group

Manage as appropriate

Thoracocentesis

Adjust MAP

European Journal of Pediatrics (2023) 182:53–66

57

Table 1 Summary of recommendations for the Crashing Neonate Protocol with levels of agreements and quality of published evidence

POCUS section	Recommendation	Level of agreement		Quality of evidence (GRADE)
		Experts in POCUS N=14	Neonatologists N=251	
Lung-1	Lung POCUS is helpful to diagnose pneumothorax accurately in the crashing neonate	Strongly agree	Agree	B
	<pre> graph TD A[Lung POCUS findings] --> B[Gut ischemia] A --> C[Free fluid] A --> D[Pulmonary hypertension] A --> E[Empty heart] B --> B1[Manage as appropriate] C --> C1[Manage as appropriate] D --> D1[Pulmonary vasodilator and consult expert] E --> E1[Reduce MAP or volume expanders] </pre>			

RESEARCH

Open Access



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. Fraga⁴, Nadya Yousef⁵, Rafael Gonzalez Cortes⁶, Jorge Lopez⁶, Joan Sanchez-de-Toledo⁷, Joe Brierley⁸, Juan Mayordomo Colunga⁹, Dusan Raffaj¹⁰, Eduardo Da Cruz¹¹, Philippe Durand¹², Peter Kenderessy¹³, Hans-Joerg Lang¹⁴, Akira Nishisaki¹⁵, Martin C. Kneyber¹⁶, Pierre Tissieres¹², Thomas W. Conlon¹⁵ and Daniele De Luca^{5,17}

Table 1 Summary of recommendations on the use of POCUS in the neonatal and paediatric critical care

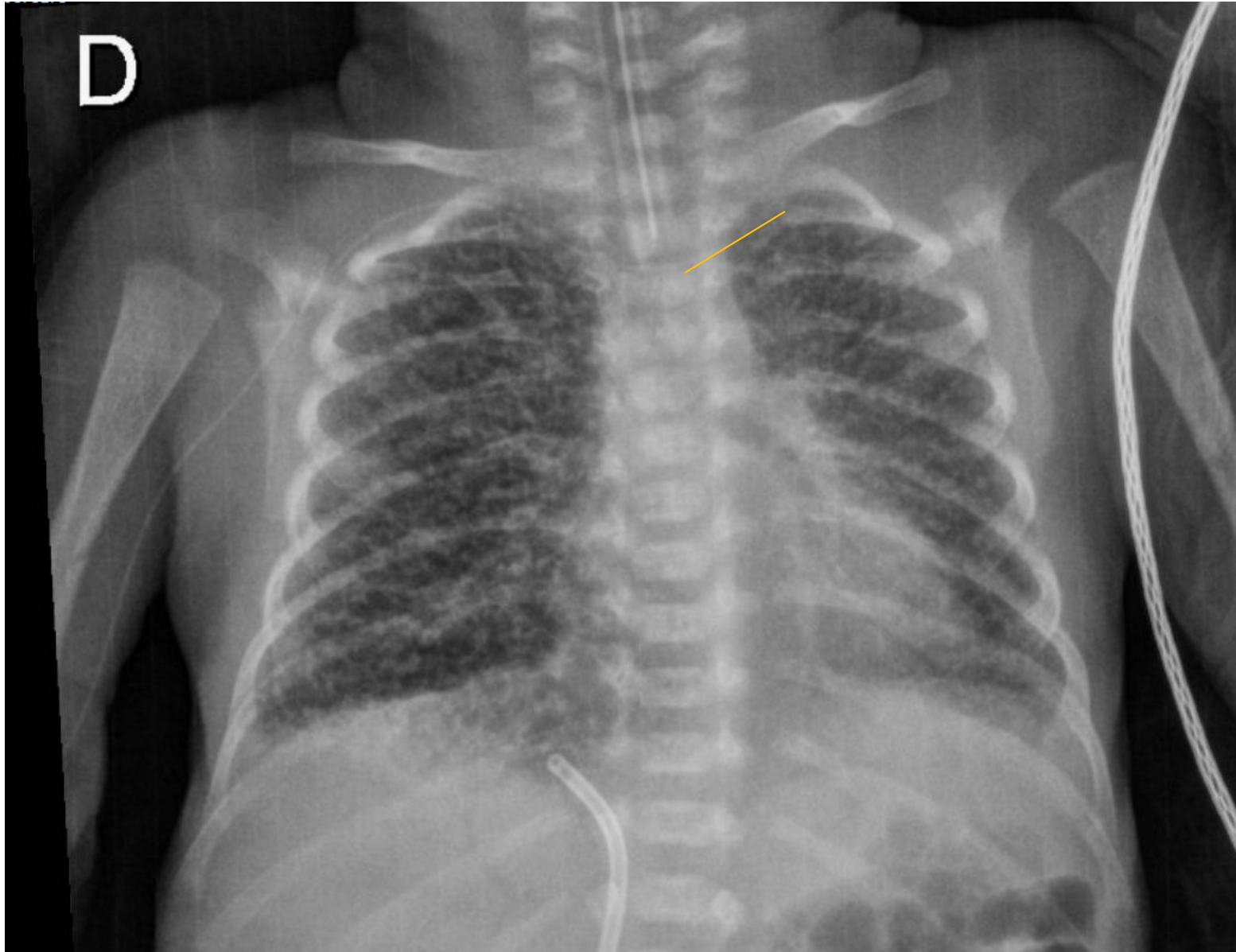
No.	Recommendation	Level of agreement	Quality of evidence
17.	POCUS is helpful to accurately detect pneumothorax in neonates and children	Strong agreement	B
18.	POCUS is helpful to insert chest tube or perform needle aspiration in neonatal tension pneumothorax	Strong agreement	B

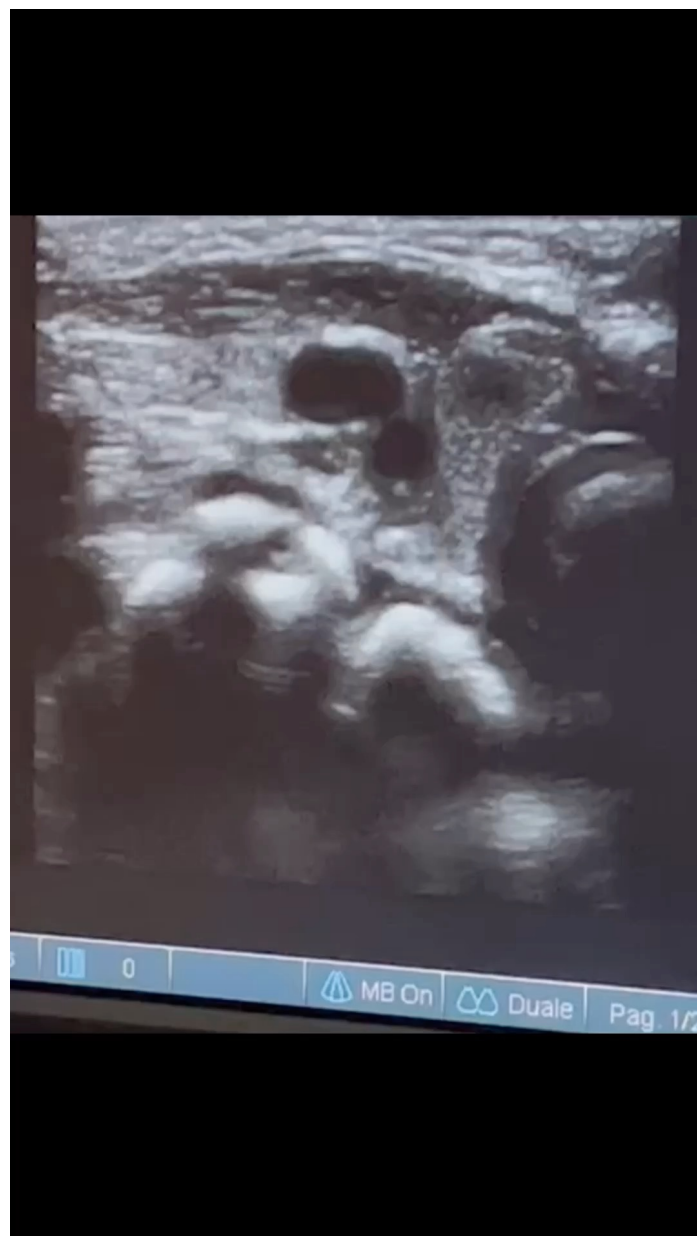
Il controllo radiologico post-procedurale...

Come metodo per la tip location, la radiografia post-procedurale è un metodo poco accurato, tardivo, nocivo, costoso.

Infatti :

- i sistemi radiologici sono meno accurati, più nocivi e più costosi dell'ECG intracavitario e della ecoscopia;
- la tip location deve essere eseguita durante la procedura e non dopo (vedi linee guida);
- le anomalie di tragitto del catetere (loop, inginocchiamenti, etc.) possono e devono essere esclusi durante la procedura.





Pertanto

Utilizzare oggi la radiografia post-procedurale dopo l'impianto di qualsiasi dispositivo per accesso venoso comporta:

Potenziali danni e complicanze a carico del paziente:

- Inutile esposizione ai raggi
- Conseguenze legate a **malposizioni primarie** o **posizioni sub-ottimali** della punta

Potenziale danno all'azienda ospedaliera:

- Ingiustificabile spreco di risorse
- Danno di immagine
- Contenziosi medico-legali

Inoltre

Utilizzare la radiografia post-procedurale per 'documentare' la posizione della punta che sia stata verificata durante la procedura mediante ECG intracavitario o ecoscopia:

- È una strategia carente di buon senso (verifica con metodo meno accurato di qualcosa che è stato già verificato con metodo più accurato!).
- E' uno spreco di risorse e di tempo.
- E' una inutile esposizione del paziente alle radiazioni ionizzanti.

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- (2) When an intracavity electrocardiogram is not applicable, we recommend using real-time ultrasound to detect and prevent central venous catheter malposition, as it has been shown to be well tolerated, feasible, quickly performed and interpreted at the bedside, and it is more accurate and faster than chest radiograph (1C).

Infusion Therapy Standards of Practice

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9TH EDITION

REVISED 2024

- E. Use tip locating methods to identify CVAD tip location during the insertion procedure (ie, “real-time”) for neonate, pediatric, and adult patients. Studies have demonstrated greater accuracy, more efficient initiation of infusion therapy, and reduced costs.^{1,12} (IV)
- 5. Postprocedure radiograph imaging is not necessary if alternative catheter tip location technology confirms appropriate tip placement.^{1,12-30,42,43} (I)



RACCOMANDAZIONI GAVeCeLT 2024
PER LA INDICAZIONE, L'IMPIANTO E LA GESTIONE
DEI DISPOSITIVI PER ACCESSO VENOSO

a cura di Mauro Pittiruti e Giancarlo Scoppettuolo

2024

La radiografia del torace post-procedurale sarà indicata soltanto nei casi in cui i risultati dell'ECG intracavitario e della ecocardioscopia siano dubbi.

Come mai il controllo radiologico post-procedurale è ancora così diffuso

Problema culturale:

- Ridotta conoscenza delle nuove tecnologie e dei nuovi protocolli.
- Mancato aggiornamento per pigrizia o ignoranza (vecchi operatori).
- Errata credenza che la documentazione radiologica della punta sia richiesta «per legge» (!)

Problema morale:

- Disinteresse per la vera cultura della **sicurezza** del paziente
- Disinteresse per la propria azienda ospedaliera





OLD WAY



NEW WAY

NEONATALE

S12-4

57Hz

5.0cm

2D

78%

C 52

P Off

Gen.

TIS1.7

MI 0.5

M4



F#748

***bpm

Are routine chest radiographs still indicated after central line insertion? A scoping review

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P. G. Brindley¹ , J. Deschamps², L. Milovanovic¹
and B. M. Buchanan¹

Barriers identified
Policy or protocol requiring radiography after line placement
Political forces in hospital would oppose this as I would be in minority performing the US protocol
I do not feel adequately comfortable with my US skills to make this call
Medicolegal concerns
Inertia: I don't think of it or it is just hard to change behavior and break habits
I lack sufficient ultrasound confidence to make this call
It is more convenient to get a chest radiography
I was not aware, or I did not appreciate that this was an option
Ultrasound is not as sensitive as chest radiography in evaluation of position or pneumothorax
No barriers, I currently use ultrasound and not chest radiography for confirmation
Lack of infrastructure to save images and report.
Adequate communication/documentation of good placement and exclusion of PTX

Are routine chest radiographs still indicated after central line insertion? A scoping review

P. G. Brindley¹ , J. Deschamps², L. Milovanovic¹
and B. M. Buchanan¹

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benefits. In short, the routine post-CVC CXR increasingly looks like an anachronism left over from pre-POCUS days.

When comparing POCUS and CXR, POCUS was also superior in terms of cost, accuracy and ability to detect the CVC tip.^{4,58,59} Moreover, three systematic

operators and interpreters, though, again, this applies to CXRs too. Fortunately, for POCUS operators, less than 10 h of training usually delivers basic proficiency,^{12,13,21} and the need to practise on patients can be avoided by using mannequins and simulation.⁶⁸ In return for the upfront time investment the “payoff” is a significantly shorter time to confirmation with US: 5–11 min for cardiac/vascular studies.^{12,13,21} Integrated approaches demonstrated a wider time interval of 1–20 min.^{14,17,19}

The remaining barriers center on medicolegal concerns, and change inertia. These should not be ignored, but can be challenged by our cumulative literature review. Firstly, in terms of safety, CVC insertion repre-

Come possiamo incentivare il cambiamento?

Strategie vincenti:

- Affidamento dell'impianto soltanto a personale medico-infermieristico specificamente ed appropriatamente addestrato.
- Adozione di protocolli di impianto aggiornati (Vedi i 'bundle' di inserzione del GAVeCeLT).
- Aggiornamento delle procedure aziendali, sulla base delle raccomandazioni nazionali e internazionali attualmente esistenti.

A novel neonatal protocol for Safe Insertion of Umbilical Venous Catheters (SIUVeC): Minimizing complications in placement and management

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Journal of Vascular Access 00(0)

Table 1. The eight steps of the SIUVeC protocol.

Pre-procedural evaluation (including US evaluation).
Adoption of pre-assembled insertion kits.
Appropriate aseptic technique (hand hygiene, maximal barrier precautions, skin antisepsis with 2% chlorhexidine in 70% isopropyl alcohol).
Vein cannulation using the smallest catheter that may meet the infusion requirements and choosing widely between single versus double lumen UVC.
Real-time tip navigation and tip location by US (according to the NeoECHOTIP protocol).
Securement of the catheter and protection of the exit site (combining sutureless devices, cyanoacrylate glue, semipermeable transparent membranes).
Post-procedural serial assessment of tip location by US.
Early removal of the device (within 4–5 days).

The SIECC protocol: A novel insertion bundle to minimize the complications related to epicutaneo-cava catheters in neonates

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Table 1. The seven steps of the SIECC protocol.

1. Pre-procedural evaluation of superficial veins (including the RaSuVA protocol)
2. Adoption of pre-assembled insertion kits
3. Appropriate aseptic technique (hand hygiene, maximal barrier precautions, skin antisepsis with 2% chlorhexidine in 70% isopropyl alcohol)
4. Intra-procedural assessment of tip navigation and tip location by ultrasound (adopting the Neo-ECHOTIP protocol)
5. Securement of the catheter and protection of the exit site
6. Post-procedural serial assessments of tip location by ultrasound
7. Removal of the device within 2 weeks

A GAVeCeLT bundle for central venous catheterization in neonates and children: A prospective clinical study on 729 cases

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Ultrasound pre-puncture evaluation of central veins (RaCeVA)

Hand hygiene and maximal barrier precautions

Skin antisepsis with 2% chlorhexidine in alcohol

Ultrasound-guided venipuncture

Tip location by intracavitary echocardiography and/or echocardiography

Tunneling the catheter so as to obtain an exit site in the infraclavicular area

Securement with the sutureless device

Sealing of the exit site with glue

Coverage with transparent semipermeable dressing

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

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and Daniele G Biasucci²⁰

Special considerations

- Post-procedural control may be conducted by different methods, with preference given to control by TTE with bubble test (accurate, rapid, safe, bedside, inexpensive) over radiological control (less accurate, logistically more challenging, more expensive, and unsafe). Radiologic control may be indicated in cases where TTE with bubble test is negative or not applicable or not feasible, or in cases where the integrity of the catheter and its entire trajectory must also be investigated.
- In the newborn, post-procedural tip location of CVADs is exclusively performed by TTE (with or without bubble test).

Conclusioni

- Il controllo radiologico post-procedurale non è mai indicato se non nei rarissimi casi in cui il controllo intraprocedurale sia fallito.
- È una metodica poco accurata e sub-ottimale.
- Espone operatori e pazienti a rischi significativi legati alla sua inaccuratezza.
- Occorre mettere in atto tutte le strategie per favorire la formazione degli operatori sanitari sui metodi di tip location intra-procedurale (ECG ed Eco).



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