

X
PICCC
DAY

Roma 2016
Auditorium del Massimo
Mercoledì 30 Novembre



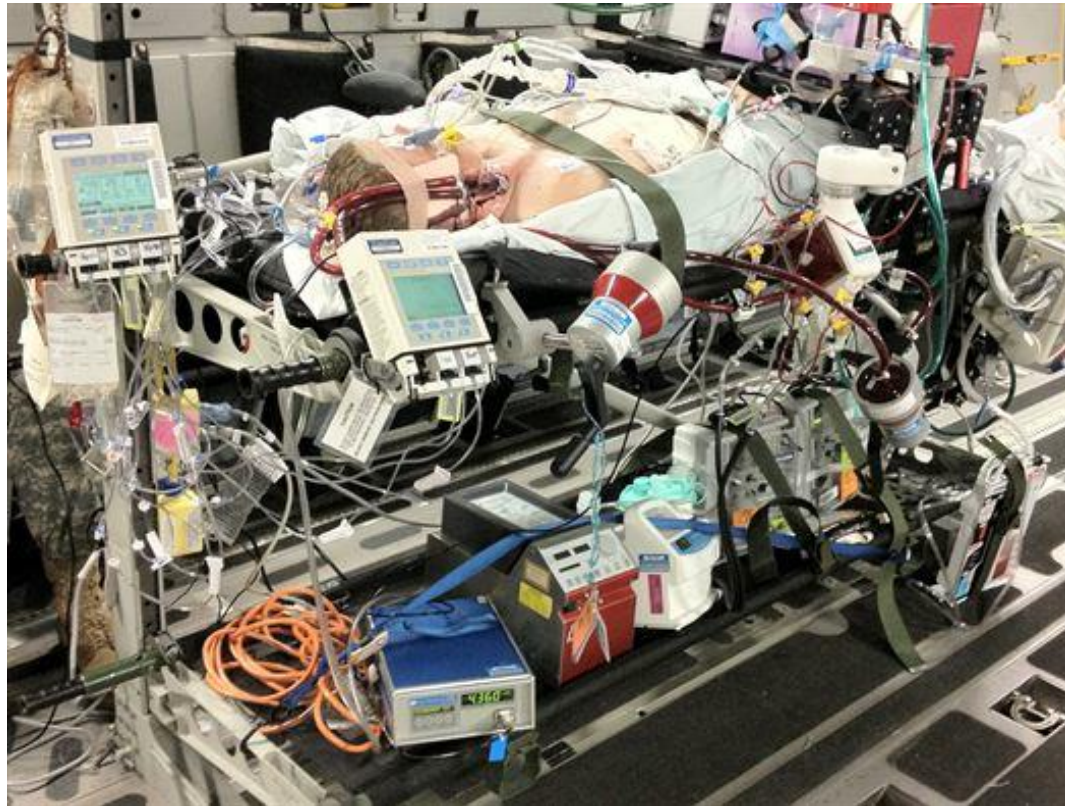
Riunione monotematica annuale
dedicata ai PICC e ai Midline

PICC in Terapia Intensiva: Quando e perchè

Dr.ssa Alessandra Panchetti

Dipartimento di Anestesia e Rianimazione
Azienda Ospedaliera Toscana Centro- Pistoia

PICC in Terapia Intensiva: Quando e perché



Caratteristiche del Paziente Critico

✓ *Fluido terapia*

- Infusione di farmaci, anche con pH<5 o pH>9
- Nutrizione Parenterale o farmaci ad alta osmolarità
- Emocomponenti
- Mdc
- Chemioterapici

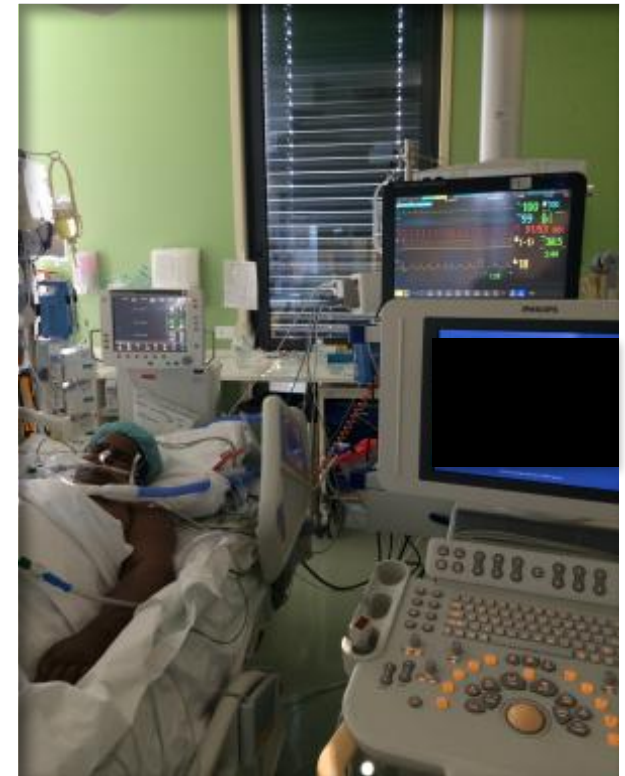
✓ *Monitoraggio emodinamico*

- Infusione di inotropi e/o vasocostrittori
- Introduuttore SG

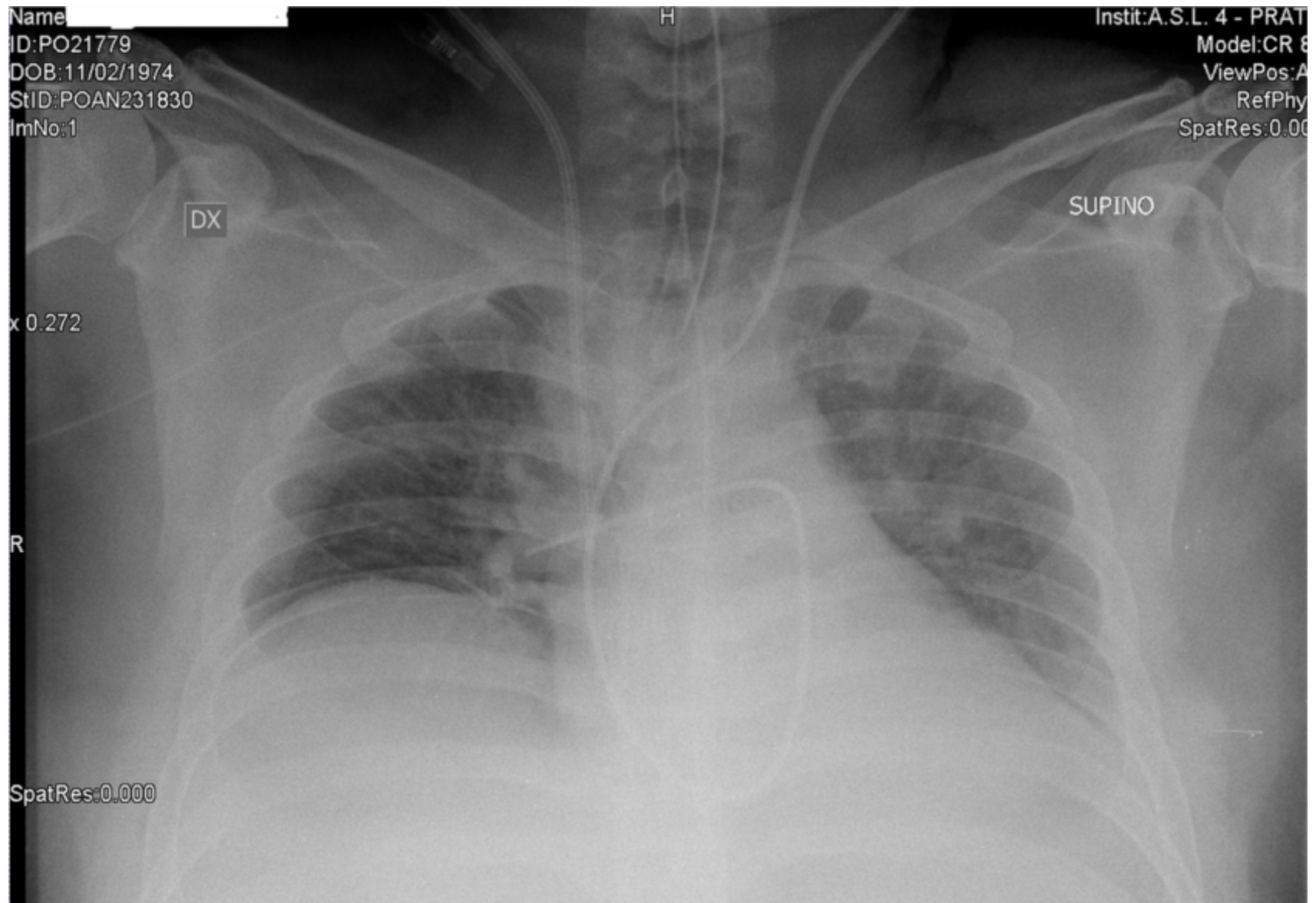
✓ *Prelievi ematici*

✓ *Supporto extracorporeo*

- CRRT
- Supporto epatico
- Supporto respiratorio (ECCO₂R; NovaLung; ECMO)



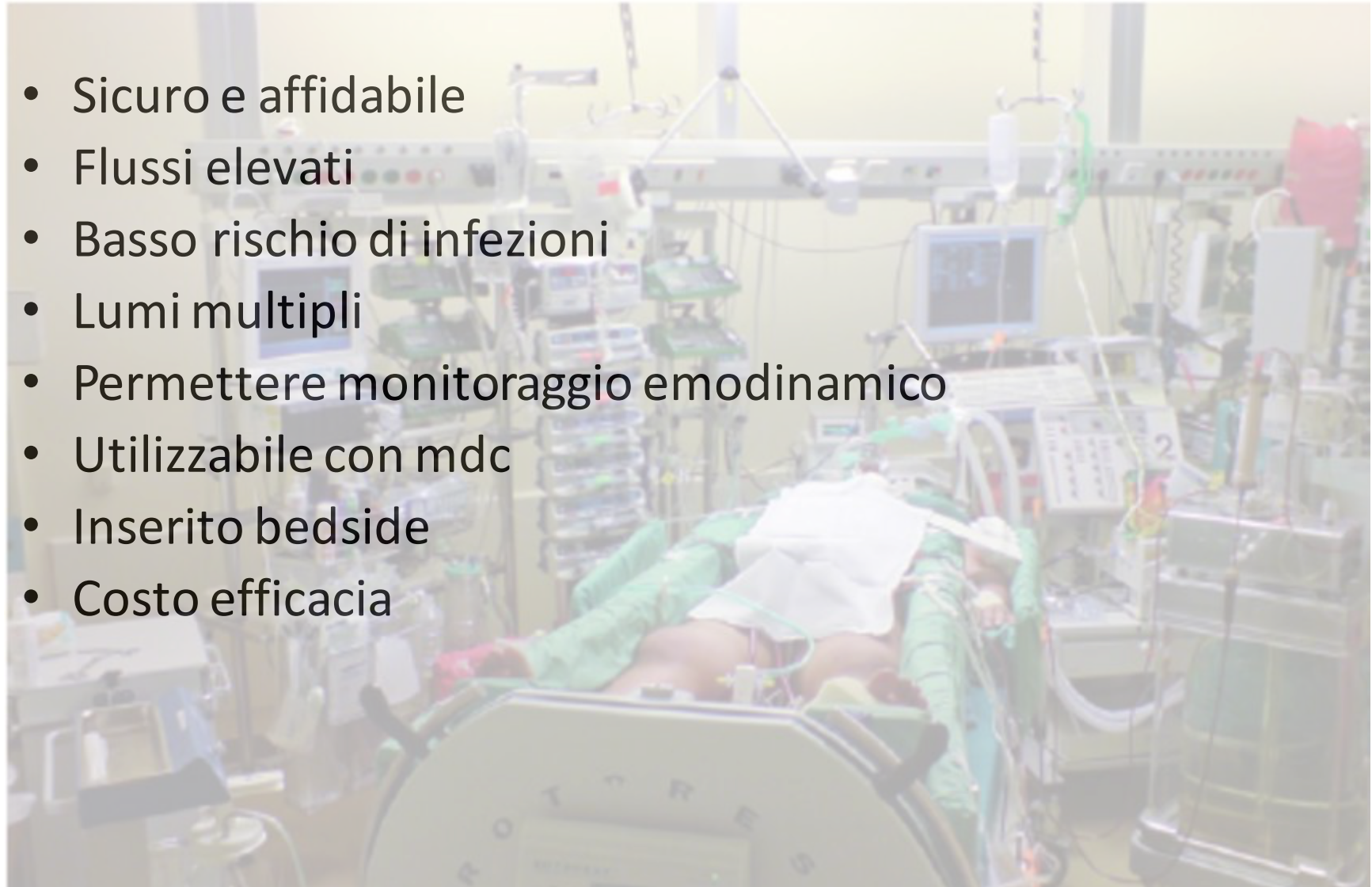
Caratteristiche del Paziente Critico



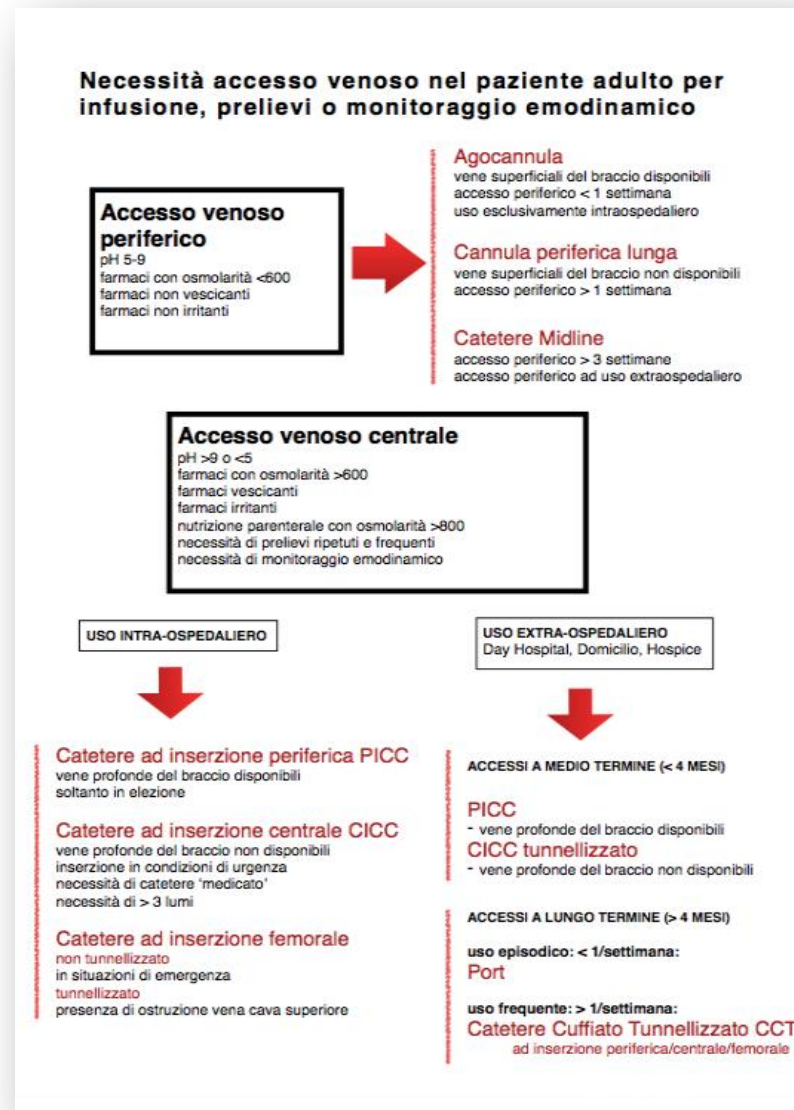
Dr. Vito Silvestri

Accesso venoso ideale in ICU

- Sicuro e affidabile
- Flussi elevati
- Basso rischio di infezioni
- Lumi multipli
- Permettere monitoraggio emodinamico
- Utilizzabile con mdc
- Inserito bedside
- Costo efficacia



Accesso venoso ideale in ICU



Accesso venoso ideale in ICU

Accesso venoso centrale

pH >9 o <5
farmaci con osmolarità >600
farmaci vescicanti
farmaci irritanti
nutrizione parenterale con osmolarità >800
necessità di prelievi ripetuti e frequenti
necessità di monitoraggio emodinamico

USO INTRA-OSPEDALIERO



Catetere ad inserzione periferica PICC

vene profonde del braccio disponibili
soltanto in elezione

Catetere ad inserzione centrale CICC

vene profonde del braccio non disponibili
inserzione in condizioni di urgenza
necessità di catetere 'medicato'
necessità di > 3 lumi

Catetere ad inserzione femorale

non tunnelizzato
in situazioni di emergenza
tunnelizzato
presenza di ostruzione vena cava superiore



REVIEW OF A LARGE CLINICAL SERIES

Peripherally Inserted Central Catheters in the Intensive Care Unit

Philip K. Ng, MD,
Mark J. Ault, MD, FACEP,
and Lawrence S. Maldonado, MD

Ng PK, Ault MJ, Maldonado LS. Peripherally inserted central catheters in the intensive care unit. *J Intensive Care Med* 1996;11:49-54.

Technique. The PICC insertion techniques have been described in detail by others [5–7]. In this study, all PICC placements involved 2 primary operators, one of whom was a physician. In 26 instances, the second operator was a nurse from the PICC service. Venous access was initially attempted percutaneously in all patients by entering a peripheral (preferably) antecubital vein via the Seldinger or the angiocath technique. When successful cannulation could not be obtained, a cutdown procedure was performed. The catheter was inserted into the vein and advanced so that the tip of the catheter rested in the superior vena cava. Catheter tip location was then confirmed by chest radiography. Catheters were evaluated daily, and all maintenance was performed by the PICC service.

Table 4. Summary of PICC Outcomes

	N (%)
Indication for PICC insertion (total)	91
Antibiotics	23 (25%)
TPN	40 (44%)
General access*	28 (31%)
Lumen number (total)	89
Single	58 (65%)
Multiple	31 (35%)
PICC completion rate	65/87 (74.7%)
End of course (EOC)	29 (33%)
Died	36 (41%)
Premature termination	22/87 (25.2%)
Dislodged	8 (9%)
Leaked	3 (3%)
Clotted	2 (2%)
Infection (total)	9 (10%)
Potential	8 (9%)
Confirmed	1 (1%)
Total PICC days	
All PICCs	1,666
EOC	635
Died	509
Premature termination (total)	522
Dislodged	120
Leaked	138
Clotted	117
Infection (total)	147
Potential	129
Confirmed	18
Average days per PICC	
All PICCs	19.1 ± 19
EOC	21.9 ± 18
Died	14.1 ± 15
Premature termination	22.7 ± 26
Dislodged	15 ± 14
Leaked	46 ± 26
Clotted	58.5 ± 76
Infection (total)	9 ± 9
Potential	16.1 ± 10
Confirmed	18

*General access includes antifungals, antivirals, chemotherapy, blood products, vasoactive medications, and phlebotomy access.

CICC o PICC ?



Controversie sui PICC

Flussi elevati non possibili

Impianto difficile

Alto tasso di TVP

Alto tasso di occlusione e/o malfunzionamento

Alto tasso di malposizionamento primario

No monitoraggio emodinamico

Controversie sui PICC

~~Flussi elevati non possibili~~

Pittiruti et al. *Critical Care* 2012, **16**:R21
<http://ccforum.com/content/16/1/R21>



RESEARCH

Open Access

Clinical experience with power-injectable PICCs in intensive care patients

Mauro Pittiruti^{1*}, Alberto Brutti², Davide Celentano², Massimiliano Pomponi², Daniele G Biasucci²,
Maria Giuseppina Annetta² and Giancarlo Scoppettuolo³

J Vasc Access 2014; 15 (6): 519-523
DOI: 10.5301/jva.5000280

ORIGINAL ARTICLE

A prospective, randomized comparison of three different types of valved and non-valved peripherally inserted central catheters

Mauro Pittiruti¹, Alessandro Emoli², Patrizia Porta², Bruno Marche², Rosa DeAngelis²,
Giancarlo Scoppettuolo³

¹ Department of Surgery, Catholic University Hospital, Rome - Italy

² Day Hospital of Oncology, Catholic University Hospital, Rome - Italy

³ Department of Infectious Diseases, Catholic University Hospital, Rome - Italy



Controversie sui PICC

~~Flussi elevati non possibili~~

~~Impianto difficile~~



Controversie sui PICC

~~Flussi elevati non possibili~~

~~Impianto difficile~~

~~Alto tasso di TVP~~



Controversie sui PICC

~~Flussi elevati non possibili~~

~~Impianto difficile~~

~~Alto tasso di TVP~~

Critical Care Nurse 2011;31:70-75

Use of peripherally inserted central catheters as an alternative to central catheters in neurocritical care units

Christi DeLemons, Judi Abi-Nader, Paul T. Akins.

33 pazienti → 649 cath-days

CR-DVT 1/33 (3%)

CRBSI 0/33

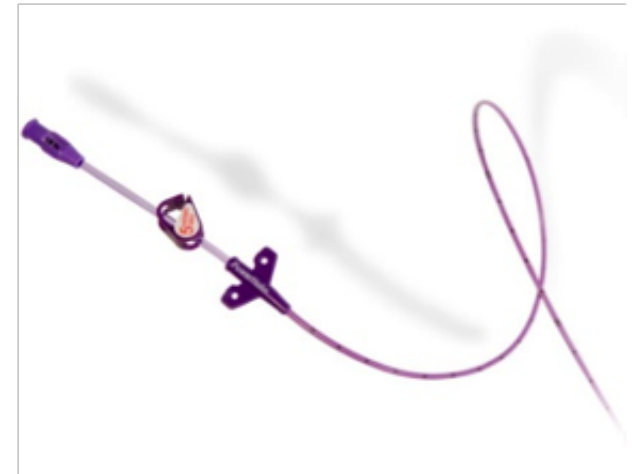
Controversie sui PICC

~~Flussi elevati non possibili~~

~~Impianto difficile~~

~~Alto tasso di TVP~~

~~Alto tasso di occlusione e/o malfunzionamento~~



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Controversie sui PICC

~~Flussi elevati non possibili~~

~~Impianto difficile~~

~~Alto tasso di TVP~~

~~Alto tasso di occlusione e/o malfunzionamento~~

~~Alto tasso di malposizionamento primario~~



Controversie sui PICC

~~Flussi elevati non possibili~~

~~Impianto difficile~~

~~Alto tasso di TVP~~

~~Alto tasso di occlusione e/o malfunzionamento~~

~~Alto tasso di malposizionamento primario~~

~~No monitoraggio emodinamico~~

Central venous pressure measurements: Peripherally inserted catheters versus centrally inserted catheters

Ian H. Black, MD; Sandralee A. Blosser, MD, FCCM; W. Bosseau Murray, MB, ChB, FFA (RCS)(Eng.), MD

Objective: To determine whether central venous pressure measurements taken from a peripherally inserted central catheter (PICC) correlate with those from a centrally inserted central catheter (CICC).

Design: A pilot bench study followed by a prospective, non-blinded, clinical comparison.

Setting: A 16-bed medical coronary intensive care unit and a 30-bed surgical intensive care unit at a university hospital.

Patients: Seven surgical intensive care unit patients and five medical coronary intensive care unit patients.

Interventions: During the bench study, a simple manometer system was set up to test the catheters. During the clinical study, measurements of central venous pressure were recorded from patients who had an indwelling CICC and PICC concomitantly. Positions of the catheter tips in the chest were verified by radiography. Paired central venous pressure measurements were taken from 19-gauge dual-lumen PICCs and from 7-Fr, 16-gauge, 16-gauge, and pulmonary artery catheter CICCs, all with continuous pressure infusion devices.

Measurements and Main Results: Bench work showed that

PICCs, because of their longer length and narrower lumen, have a higher inherent resistance, which can be overcome with a continuous infusion device. During the clinical study, three to 12 paired, digital, central venous pressure measurements were recorded from each of 12 patients for a total of 77 data pairs. Measurements were recorded at end-expiration. Mean central venous pressure from the CICCs was 11 ± 7 mm Hg, and from the PICCs was 12 ± 7 mm Hg. PICC pressure versus CICC pressure correlated ($r = 0.96$) for all data pairs. Analysis by repeated measures showed PICC central venous pressure more than CICC central venous pressure by 1.0 ± 3.2 mm Hg ($p = 0.02$).

Conclusions: PICCs can be used to measure central venous pressure and to follow trends in a clinical setting when used with a pressure infusion device to overcome the natural resistance of the PICC. Central venous pressure recorded via PICCs is slightly higher, but the difference is clinically insignificant. (Crit Care Med 2000; 28:3033-3038)

Key Words: central venous pressure; central venous catheterization; peripheral catheterization; indwelling catheters

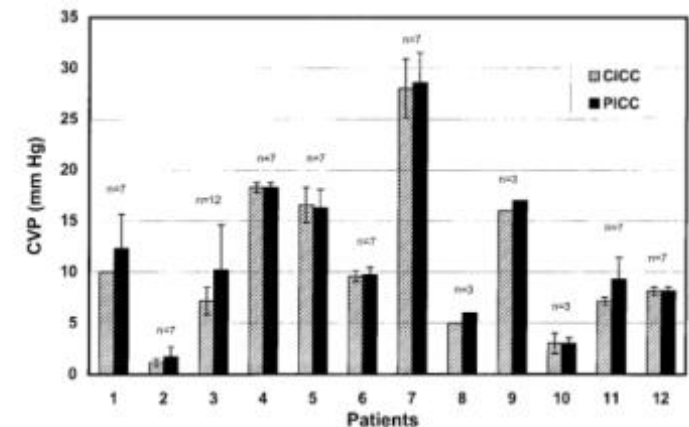


Figure 1. Mean central venous pressure measurements $\pm$ SD from the centrally inserted central catheter (CICC) and the peripherally inserted central catheter (PICC) for each patient ($n = 77$ data sets for 12 patients). Patients without SD bars have SD = 0.

PICC



Vantaggi US-PICC vs CVC

- Facilità di impianto



Vantaggi US-PICC vs CVC

- Facilità di impianto



Vantaggi US-PICC vs CVC

- Facilità di impianto



Vantaggi US-PICC vs CVC

- Facilità di impianto



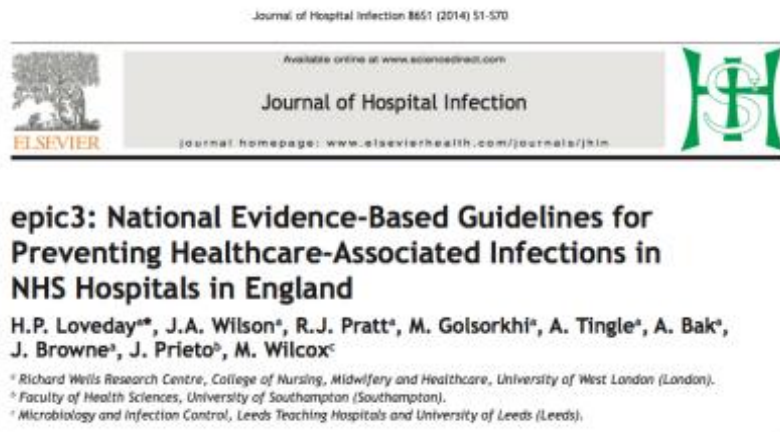
Vantaggi US-PICC vs CVC

- Facilità di impianto
- Basso costo di inserimento



Vantaggi US-PICC vs CVC

- Facilità di impianto
- Basso costo di inserimento
- Basso tasso di CRBSI



Pittiruti et al. *Critical Care* 2012, **16**:R21
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RESEARCH

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Clinical experience with power-injectable PICCs in intensive care patients

Mauro Pittiruti¹*, Alberto Brutti², Davide Celentano², Massimiliano Pomponi², Daniele G Biasucci², Maria Giuseppina Annetta² and Giancarlo Scoppettuolo³

Journal of Patient Safety 2007;3(3):142-148

Impact of peripherally inserted central catheters on catheter-related bloodstream infections in the intensive care unit

Patel BM, Dauenhauer CJ, Rady MY, Lanson JS, Benjamin TR, Johnson DJ, Helmers RA.

Vantaggi US-PICC vs CVC

- Basso tasso di CRBSI



Vantaggi US-PICC vs CVC

- Facilità di impianto
- Basso costo di inserimento
- Basso tasso di CRBSI
- Exit site più confortevole
- Maggiore durata



Vantaggi US-PICC vs CVC

- Facilità di impianto
- Basso costo di inserimento
- Basso tasso di CRBSI
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Vantaggi US-PICC vs CVC

- Facilità di impianto
- Basso costo di inserimento
- Basso tasso di CRBSI
- Exit site più confortevole
- Maggiore durata
- Appropriato anche per gestione extraospedaliera





Complication rates among peripherally inserted central venous catheters and centrally inserted central catheters in the medical intensive care unit[☆]



Matthew E. Nolan, MD^a, Hemang Yadav, MBBS^a, Kelly A. Cawcutt, MD^b, Rodrigo Cartin-Ceba, MD^{a,*}

Analisi retrospettiva:

- 200 PICCs vs 200 CICs
- Follow up – ICU discharge / Hospital discharge

PICC posizionati da infermieri, eco guida, micro-introdotto, best-site con regola 3:1, tip location con Chest X ray, clorexidina 2%

CVC posizionati da medici con ecoguida e clorexidina 2%

Table 2

Central venous catheter site

	PICC (n = 200)	CICC (n = 200)
Right arm, n (%)	150 (75%)	
Left arm, n (%)	50 (25%)	
Right internal jugular, n (%)		135 (68%)
Left internal jugular, n (%)		47 (24%)
Right subclavian, n (%)		6 (3%)
Left subclavian, n (%)		2 (1%)
Right femoral, n (%)		7 (4%)
Left femoral, n (%)		3 (2%)

Table 3

Complication rates for PICCs and CICCs followed from MICU insertion until hospital discharge

		PICC (n = 200)	CICC (n = 200)	P value
Indwelling hospital catheter days	Total days	1730	637	
	Median days (IQR)	5.9 (3.5-11.1)	2.4 (1.3-4.6)	<.001*
	n (%)	8 (4%)	2 (1%)	.055
CRDVT	Per 1000 hospital catheter-days	4.6	3.1	
	Median time-to-DVT (range), d	5.2 (2.3-18.8)	3.3 (1.7-4.8)	
	n (%)	1 (0.5%)	0 (0%)	>0.999
CLABSI	Per 1000 hospital catheter-days	0.46	0	

* $P \leq .05$.

Table 4

Complication rates for PICCs and CICC followed from MICU insertion until MICU discharge

		PICC (n = 200)	CICC (n = 200)	P value
Indwelling MICU catheter days	Total days	750	535	
	Median days (IQR)	2.3 (1.0-4.5)	2.0 (1.1-3.8)	.266
CRDVT	n (%)	4 (2%)	2 (1%)	.685
	Per 1000 MICU catheter-days	5.3	3.7	
	Median time-to-DVT (range), d	6.1 (2.3-18.8)	3.3 (1.7-4.8)	
CLABSI	n (%)	0	0	–
	Per 1000 MICU catheter-days	0	0	

“...Half of PICC-related DVTs occurred while on the general floor, and as with any central catheter placed in the ICU, PICCs should be aggressively discontinued when no longer absolutely needed.”

Limiti dei PICC in ICU

- Regime di emergenza/urgenza
- Necessità di accesso venoso > 3 lumi
- IRC 3b-5, pz portatori/candidati a fistola AV per dialisi
- Controindicazioni locali: alterazioni scheletriche, cutanee e linfatiche del braccio
- Assenza di vene di calibro adeguato
- Plegia dell'arto su base neurologica (paraplegia, SLA, etc.)
- Necessità di emodialisi/feresi/diafiltrazione

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Limiti dei PICC in ICU

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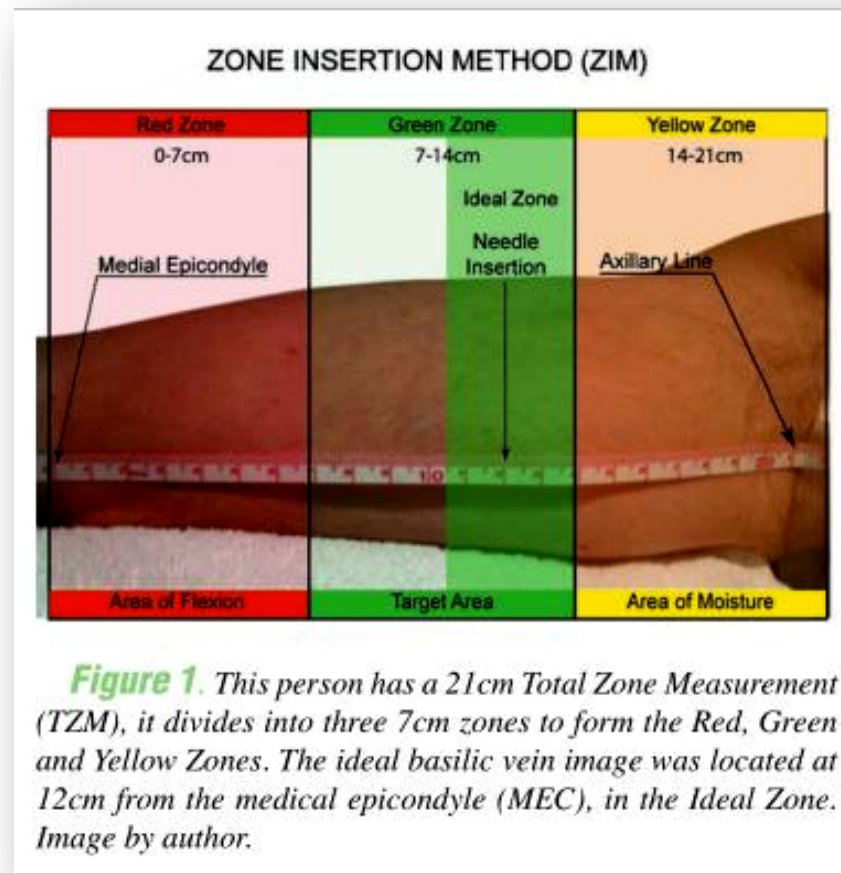
**PICC Zone Insertion Method™ (ZIM™):
A Systematic Approach to Determine the Ideal Insertion
Site for PICCs in the Upper Arm**

Robert B. Dawson
MSA, BSN, RN, CRNI, CPUI, VA-BC

JAVA, 2011

Limiti dei PICC in ICU

- Assenza di vene di calibro adeguato



Limiti dei PICC in ICU

- Assenza di vene di calibro adeguato



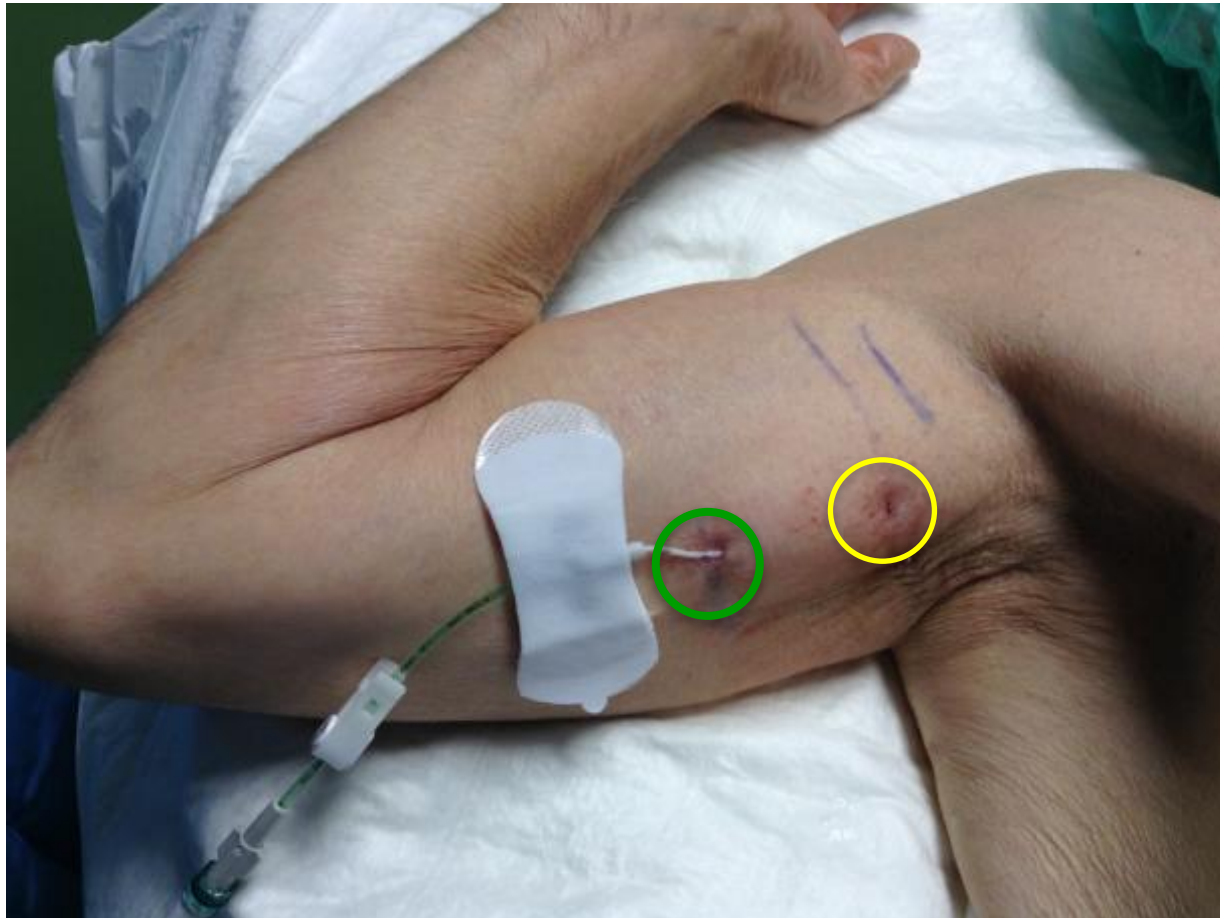
Limiti dei PICC in ICU

- Assenza di vene di calibro adeguato



Limiti dei PICC in ICU

- Assenza di vene di calibro adeguato



Limiti dei PICC in ICU

- Assenza di vene di calibro adeguato



Quale Accesso Venoso Centrale?

Paziente Ospedalizzato



Elezione



- I: PICC
- II: CICC regione sottoclaveare
- III: CICC regione sovraclaveare
- IV: FICC tunnellizzato

Emergenza



FICC o CICC:
rimossi dopo 48 h

CICC regione sottoclaveare



CICC regione sottoclaveare



CICC regione sottoclaveare



CICC regione sovraclaveare



Perché non tunnellizzare?

FICC tunnellizzati



FICC tunnellizzati



Indicazione PICC in ICU

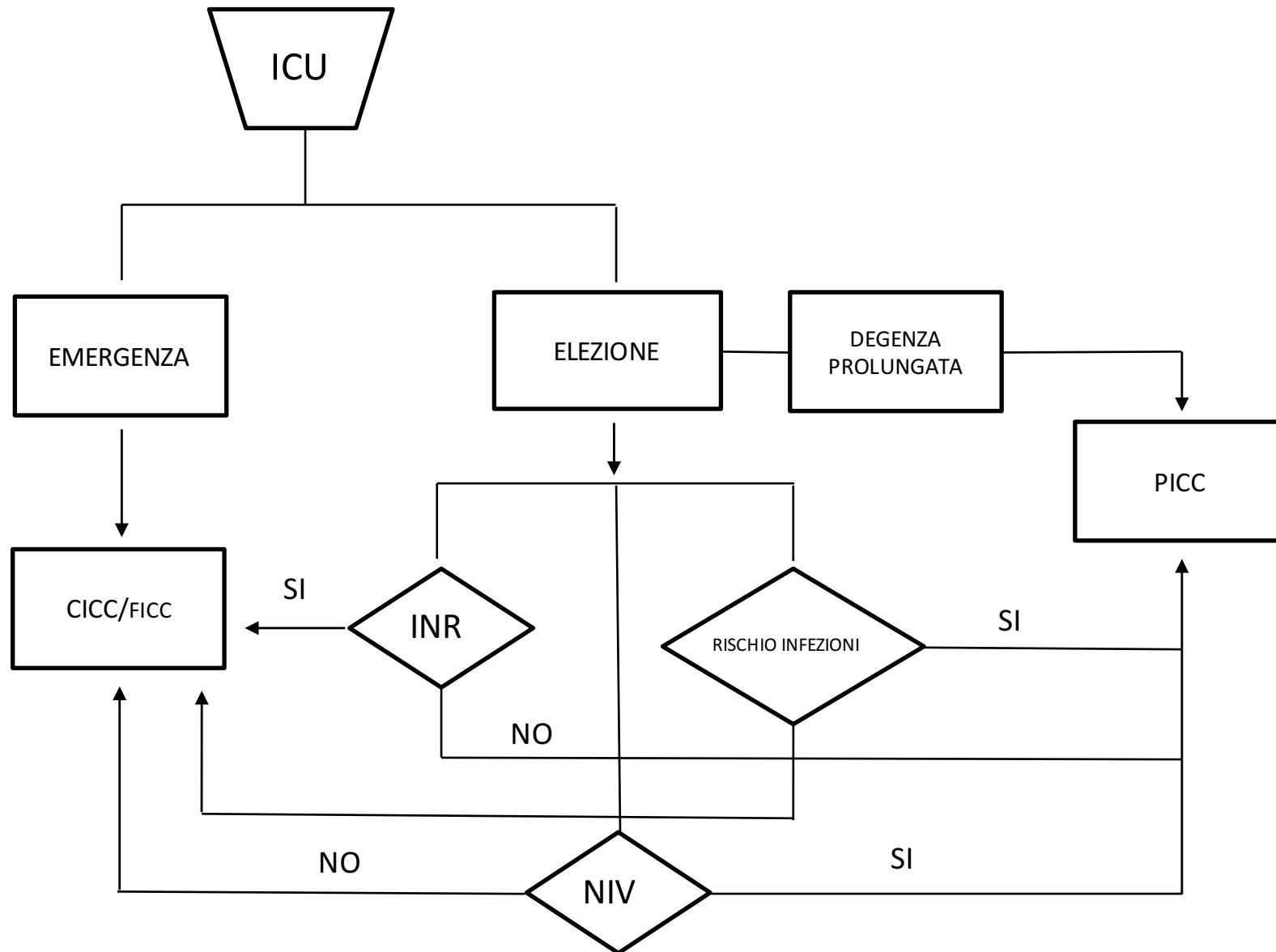
- Alto rischio infettivo del sito di emergenza in sede cervicale o sopra/sotto clavicola (es. Tracheostomia)
- Scarsa agibilità dell'area cervicale/clavicola (es. Caschi per NIV, collari, etc.)
- Disordini della coagulazione
- Degenza ICU prolungata
- Inserimento semplice e sicuro: personale medico ed infermieristico addestrato

Indicazione PICC in ICU

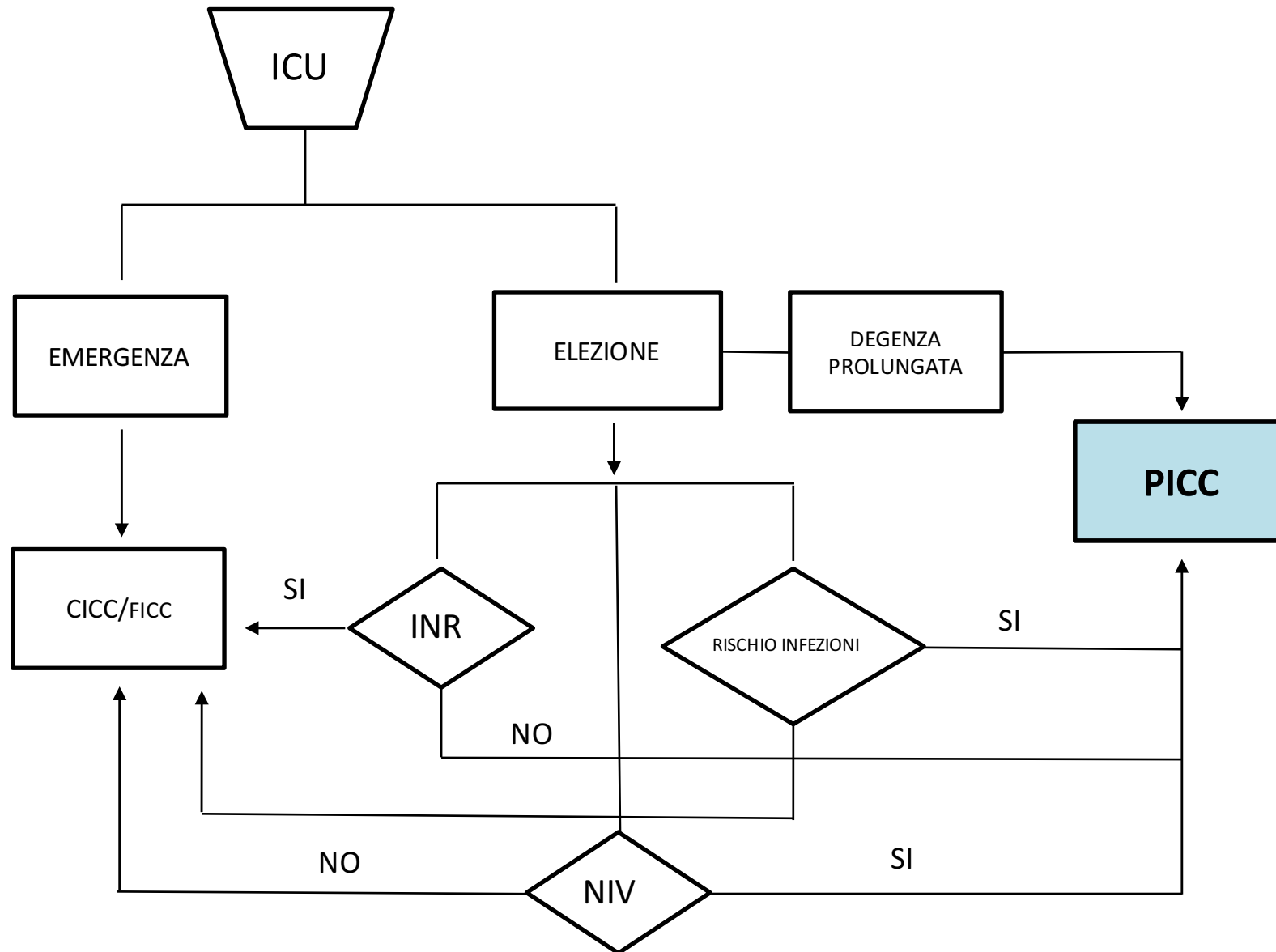
Utilizzo sempre più ampio in terapia intensiva pediatrica



PICC in ICU: Algoritmo Decisionale



PICC in ICU: Algoritmo Decisionale



Grazie per l'attenzione



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