SO DI ANESTESIA PEDIATRICA

SEDAZIONE IN PEDIATRIA

DR. FURLAN

SABATO 09 MARZO 2013

TRIESTE

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09 MARZO 2013

La sedazione in anestesia pediatrica è un momento importante per eseguire procedure anche minime che normalmente nell' adulto si effettuano a paziente sveglio

La sedazione nei bambini e neonati e' una procedura quasi indispensabile per il vissuto del bambino e della sua famiglia

OBIETTIVO

1. Raggiungimento di situazione di benessere
2. Controllo del dolore
3. Controllo del disagio psicologico
4. Approccio individualizzato

TABELLA 26.1. DEFINIZIONE ASA DEI LIVELLI DI SEDAZIONE/ANALGESIA E DI ANESTESIA GENERALE.

	Sedazione lieve (ansiolisi)	Sedazione/analgesia moderata (sedazione cosciente)	Sedazione/analgesia profonda	Anestesia generale
Capacità di risposta	Normale risposta allo stimolo verbale	Appropriata* risposta alla stimolazione verbale o tattile	Appropriata* risposta solo dopo stimoli ripetuti o dolorosi	Non risvegliabile neppure con stimoli dolorosi
Vie aeree	Non interessate	Nessun intervento richiesto	Intervento talvolta richiesto	Intervento spesso richiesto
Ventilazione spontanea	Non interessata	Adeguata	Talvolta inadeguata	Frequentemente inadeguata
Funzione cardiovascolare	Non interessata	In genere mantenuta	In genere mantenuta	Potrebbe essere compromessa

* La retrazione riflessa allo stimolo algico *non* è considerata risposta appropriata.

1. Valutazione anestesiologica
2. Consenso informato
3. Norme per il digiuno
4. Accesso venoso (previa applicazione di emla o ralydan)
5. Monitoraggio

BJA
CLINICAL PRACTICE

Heated lidocaine/tetracaine patch (Synera™, Rapydan™) compared with lidocaine/prilocaine cream (EMLA®) for topical anaesthesia before vascular access

J. Sawyer[1*†], S. Febbraro[1†], S. Masud[1†], M. A. Ashburn[2†] and J. C. Campbell[1†]

OGGETTO: DIGIUNO PREOPERATORIO

DISPOSIZIONI PER IL DIGIUNO PREOPERATORIO

ALIMENTI o BEVANDE	PERIODO MINIMO DI DIGIUNO
Liquidi (acqua, caffè, the, succo di frutta senza scorie)	2 ore
Latte materno	4 ore
Formula neonati	6 ore
Cibi solidi, latte	6 ore
Tutti i cibi solidi e liquidi per i pazienti a rischio di inalazione (gravidanza, obesità, diabete, ernia jatale, reflusso, ileo, occlusione intestinale)	6 ore

Monitoraggio

- Sp O2 (pulsiossimetro)
- Frequenza cardiaca con ECG
- Pressione arteriosa incruenta

Presidi indispensabili

- Tubo endotracheale di misura adeguata
- Laringoscopio funzionante con lama adeguata
- Aspiratore funzionante con sondini di calibro adeguato (asp e.t. e gastrica)
- Maschera facciale e ambu di misura adeguata
- Cannula di Guedel di misura adeguata
- Fonte di ossigeno
- Farmaci e presidi per l'urgenza
- Presenza di personale infermieristico di supporto

zione per procedure non dolorose

Procedure radiologiche

Tac

RMN

densitometria ossea

Scintigrafia

Potenziali evocati uditivi

ne per procedure doloro se

- Colonscopia
- Gastroscopia
- Svaginamento pneumatico
- Riduzione di fratture
- Procedure di interesse oncologico

  rachicentesi

  aspirato midollare

  biopsie

Le vie di somministrazione che noi utilizziamo preferenzialmente sono

- Intranasale
- Orale
- Rettale
- Endovenosa

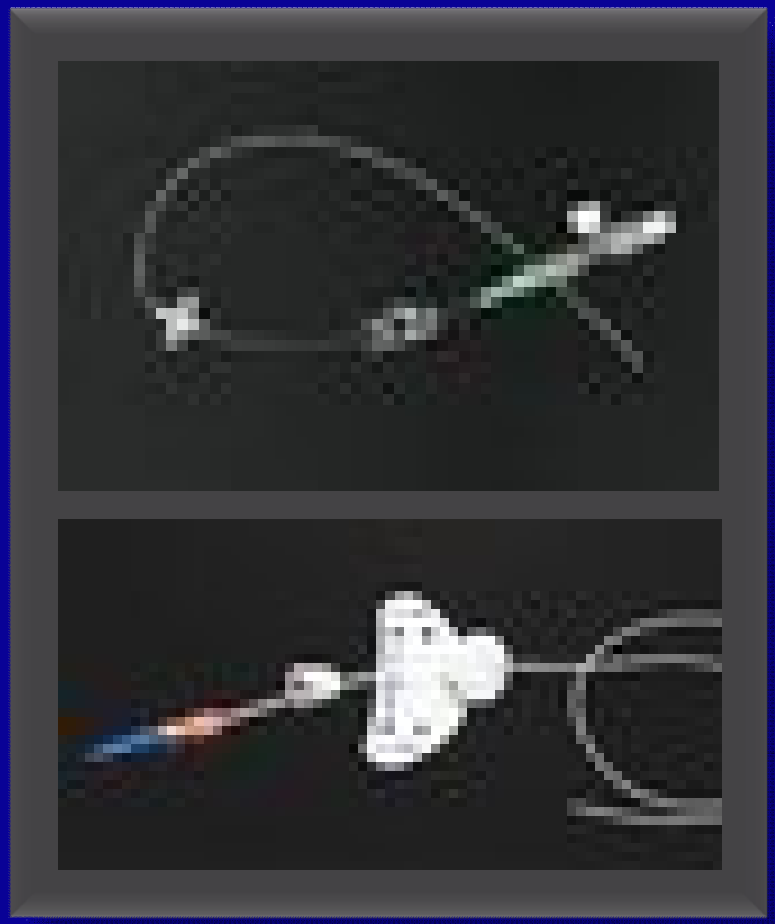
Farmaci per via orale e/o nasale

Midazolam 0.3-0.5 mg/kg
Max totale 15 mg

Da somministrare 30-40 minuti prima della procedura prevista

Per il reperimento di accesso venoso periferico e /o prelievo ematico particolarmente difficoltoso preferiamo portare il piccolo paziente in S.O. ed addormentarlo con induzione inalatoria in maschera con sevorane 3-6% e ossigeno 100% riducendo l'anestetico inalatorio al 2-3 % per il mantenimento fino al reperimento del vaso venoso…

PICC



Is defined as a catheter inserted percutaneosly via a peripheral vein with the tip residing in a central vein.

PICCs have become popular in children because they allow safe long-term intravascular access, comfort and ease of transition to home therapy.

for Inserted Central Catheter:

Tip residing in superior or inferior vena cava provides increased blood flow with increased hemodilution of infusates (INS 2006). This allows the safe delivery of more concentrated medications.

- *Osmolality factors*

Å < 450 mOsm/kg rarely cause chemical phlebitis

Å450-600 mOsm/kg moderate risk

Å> 600 mOsm/kg always lead to chemical phlebitis

- *pH factors*

Å< 5 or > 9 lead to vein damage

- *Chemical/ irritant factors*

Åsome medications irritate the vein and leading to phlebitis and thrombosis.

for infusion therapy

Central venous access devices

- The cephalic, basilic or median cubital veins of the adult patient's arm can be used for the insertion of a PICC (Dougherty and Watson, 2008; Gabriel, 2008).
- In neonates and children, the external jugular, axillary, long and short saphenous, temporal and posterior auricular veins can be used for PICC insertion (Bravery, 2008).
- Use of 2D ultrasound imaging is recommended for all routine placements of central venous access devices using the internal jugular routes (NICE, 2002).
- Central catheters should have the distal tip dwelling in the lower third of the superior vena cava or right atrium (Nightingale *et al.*, 1997; Wise *et al.*, 2001; Vesely, 2003; Chantler, 2009).

Standards for infusion therapy, RCM 2010

IPHERALLY INSERTED CENTRAL CATHETERS

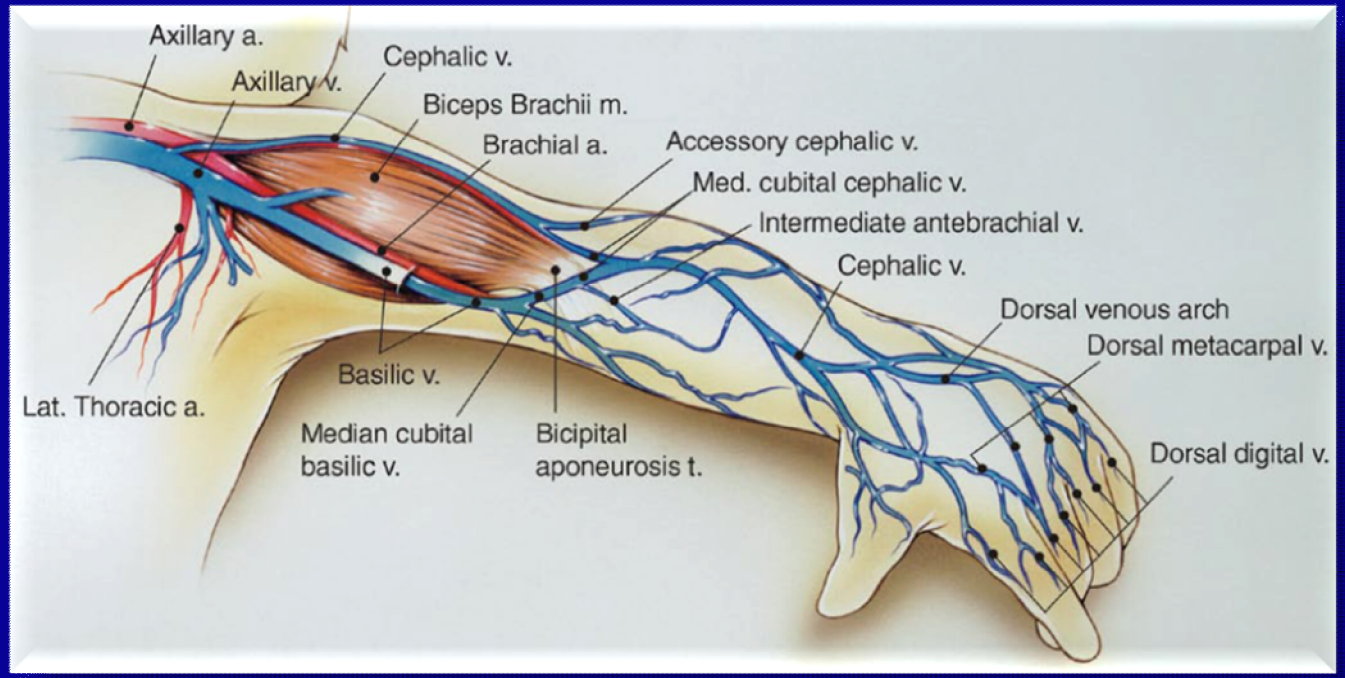
GUIDELINE FOR PRACTICE, 2nd Edition

Procedure for PICC Insertion in an Infant

Select vein

Basilic and median cubital basilic vein [redacted]

The basilic vein is a large vein in the arm that is straighter and less tortuous than the cephalic vein in the arm. It is easily accessible, is easy to thread the catheter through, requires less time for insertion, and allows a secure dressing to be placed. It has a low incidence (4.7%) of reported phlebitis (Nakamura et al., 1990; Neubauer, 1995).



www.NANN.org, guidelines 2007

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GUIDELINE FOR PRACTICE, 2nd Edition

Procedure for PICC Insertion in an Infant

Size catheter

Determining factors include the infant's weight, the size of the vein, the type of fluids to be infused, rate of infusion, and the need for blood sampling or administration.
Place the smallest size catheter that will meet the infant's needs (INS, 2006).

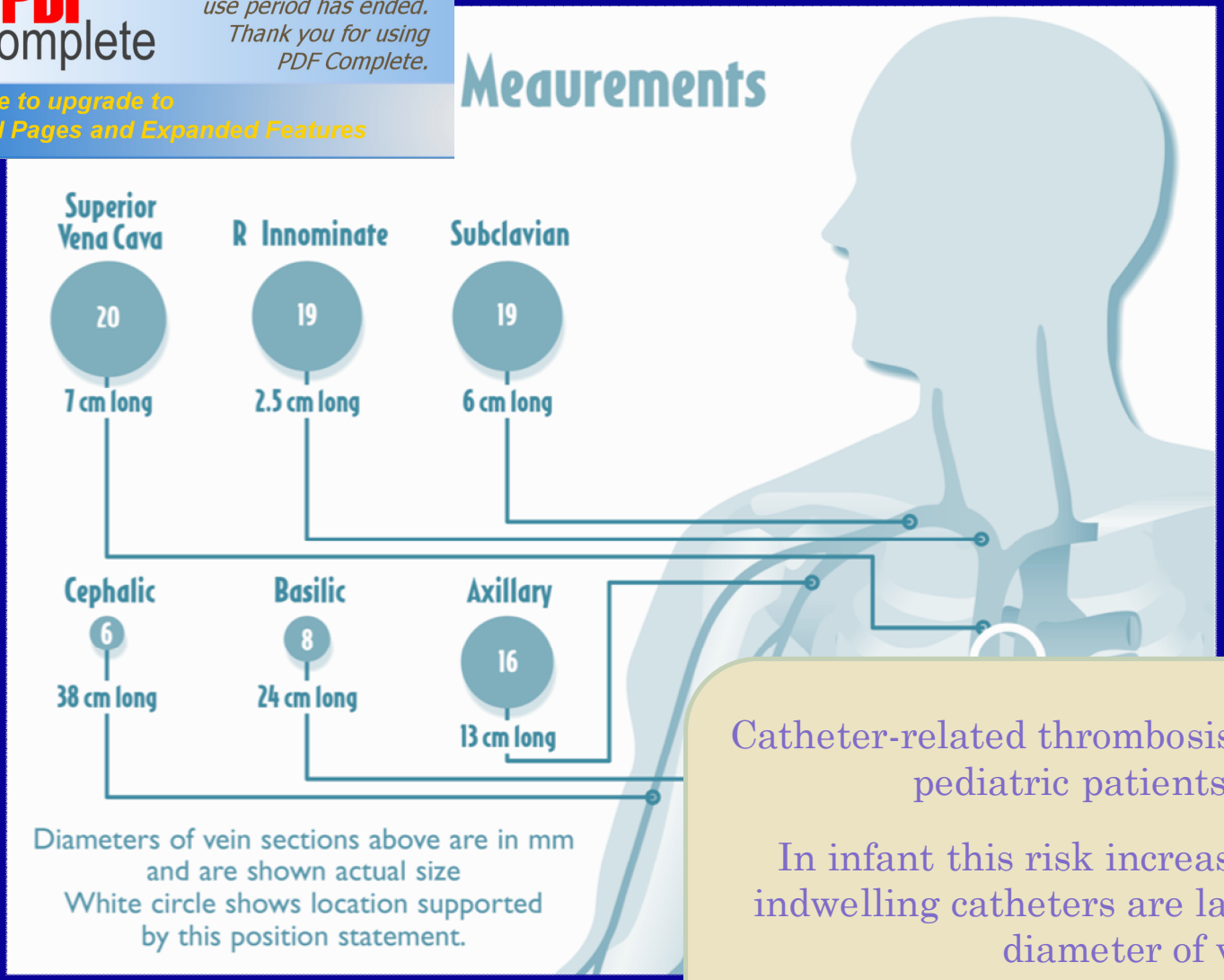
3 fr 4 fr 5 fr con tecnica seldinger

23 G 20 e 33 cm su agocannula 22

27 G 20 cm su agocannula 24

www.NANN.org, guidelines 2007

Meaurements



Catheter-related thrombosis occurs in **10-45%** of pediatric patients with CVC.

In infant this risk increased by the fact that indwelling catheters are large compared to the diameter of vessel.

Vasc Heal Risk Manag 2008 Review:4(6) 1337-48

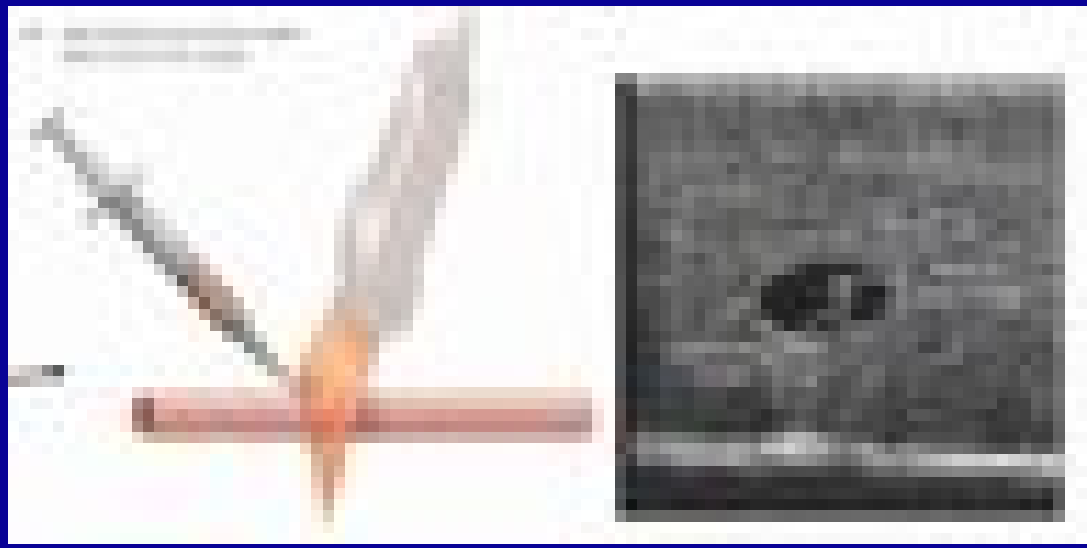
Performing Ultrasound Guided Vascular Recommendations of the American Society of Echocardiography and the Society of Cardiovascular Anesthesiologists

12.1. Recommendation for Peripheral Venous Access

Although ultrasound may identify the presence, location, and patency of peripheral veins, *the council does not recommend routine real-time ultrasound use for peripheral venous cannulation*, although there is category B, level 2 (suggestive observational studies) support for the use of ultrasound for PICC insertion. Ultrasound is most effectively used to identify the location and patency of suitable veins for peripherally inserted central venous catheters.

Anesth Analg 2012 Vascular Cannulation GL JASE 114(1): 46-72

2 D Imaging Ultrasound: Short Axis View



Advantage of SAX view:

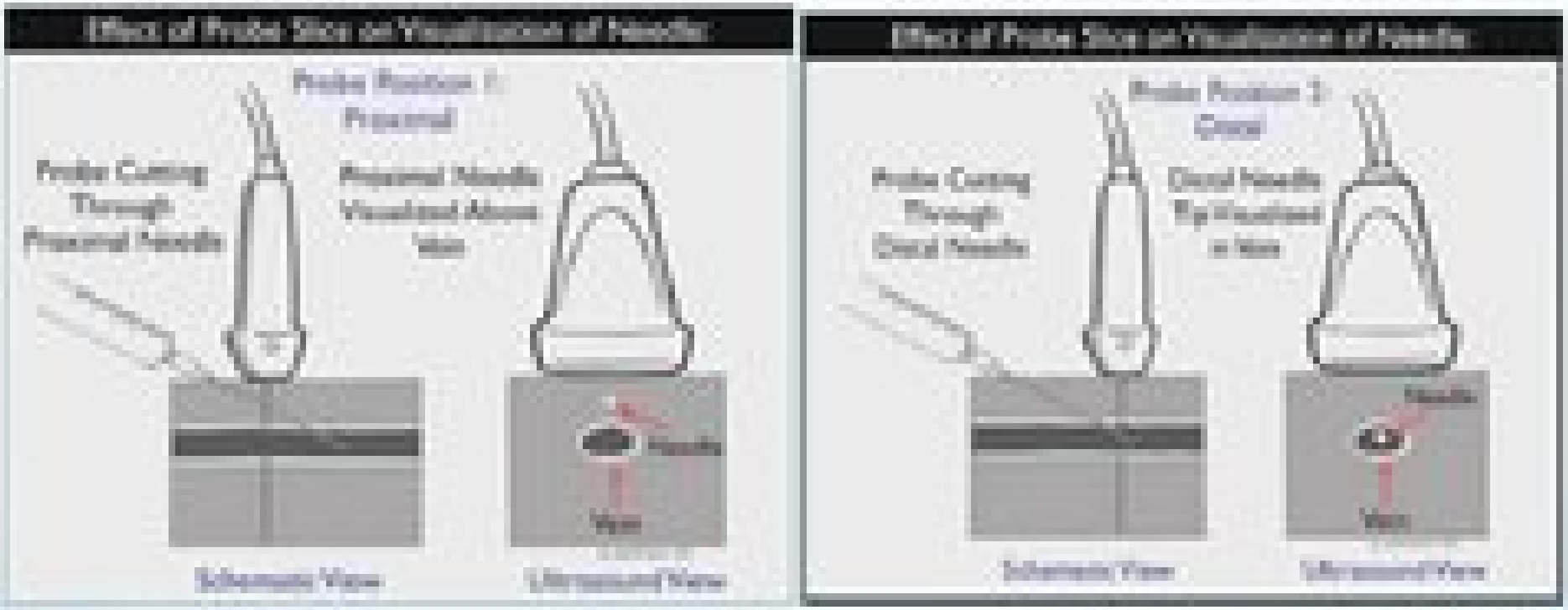
Åbetter visualization of surrounding structures and their relative positions to the needle

Åidentification of the arterial vascular structures

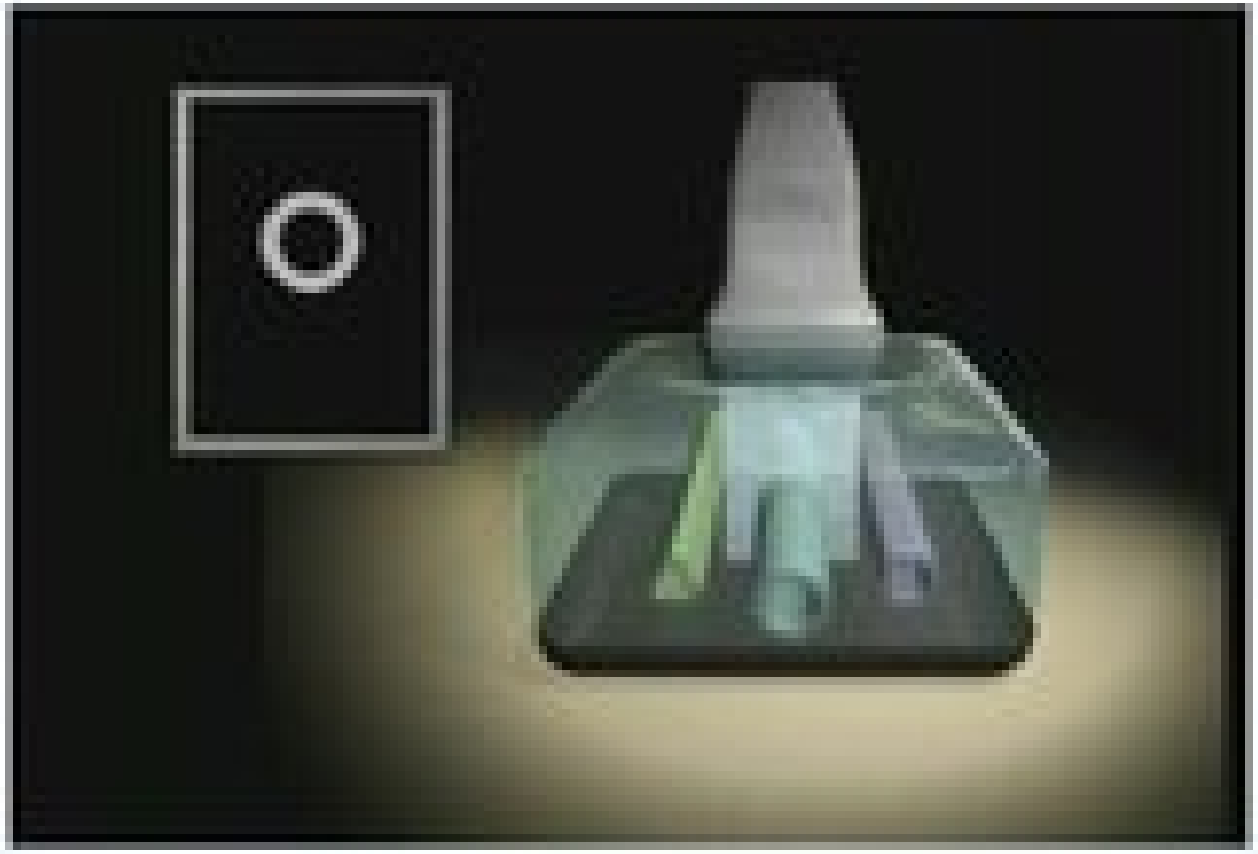
Åeasier to direct the cannulating needle toward the target vessel.

Anesth Analg 2012 Vascular Cannulation GL JASE 114(1): 46-72

amento sonda ago out of plane

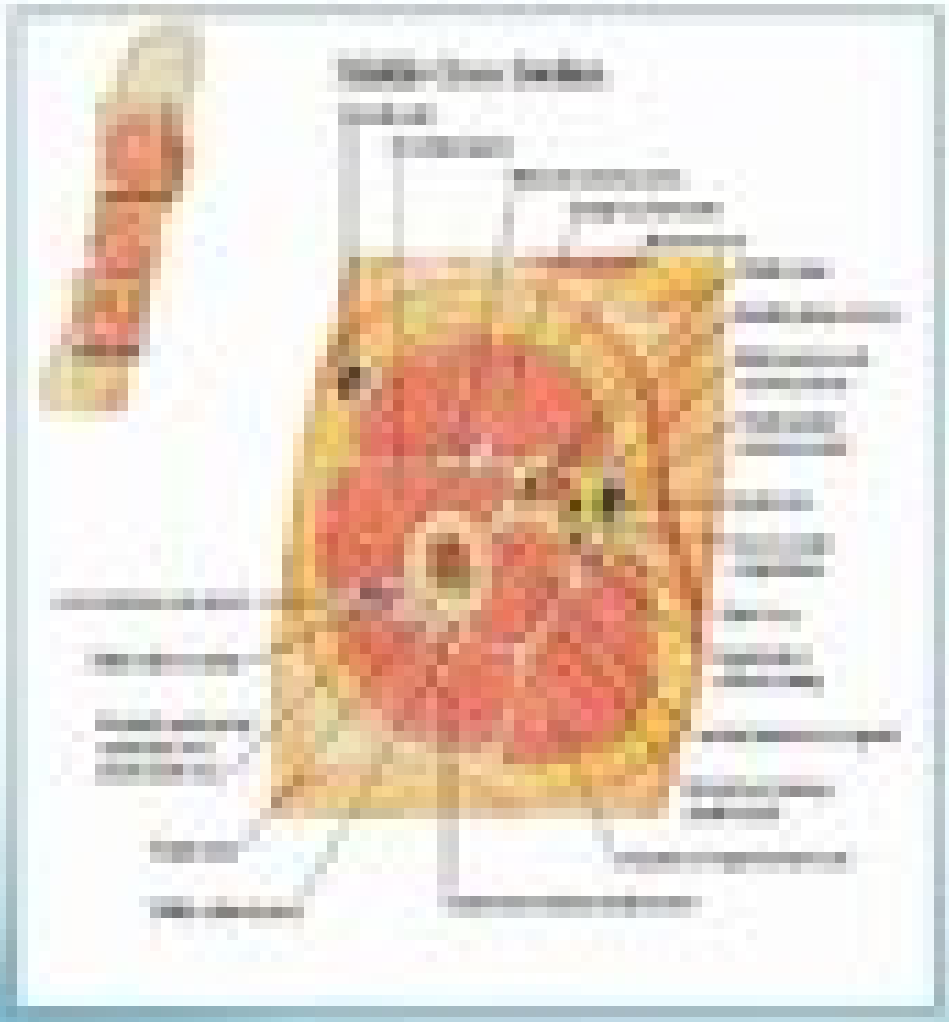


Orientamento sonda



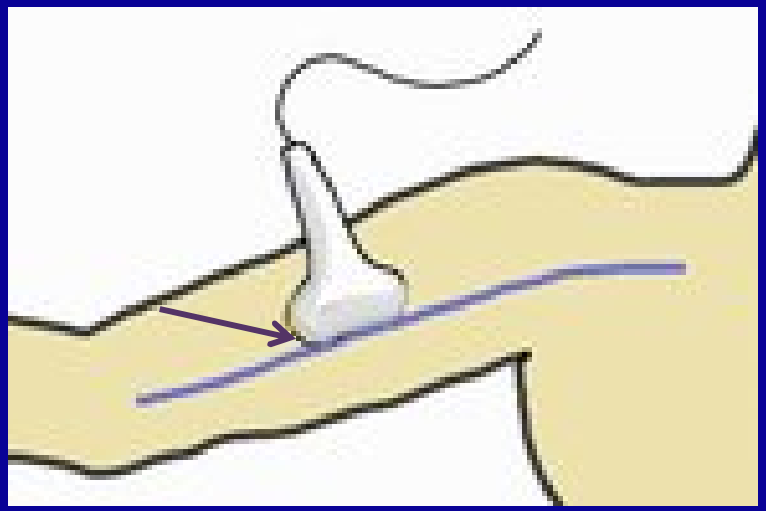
Visione in asse corto

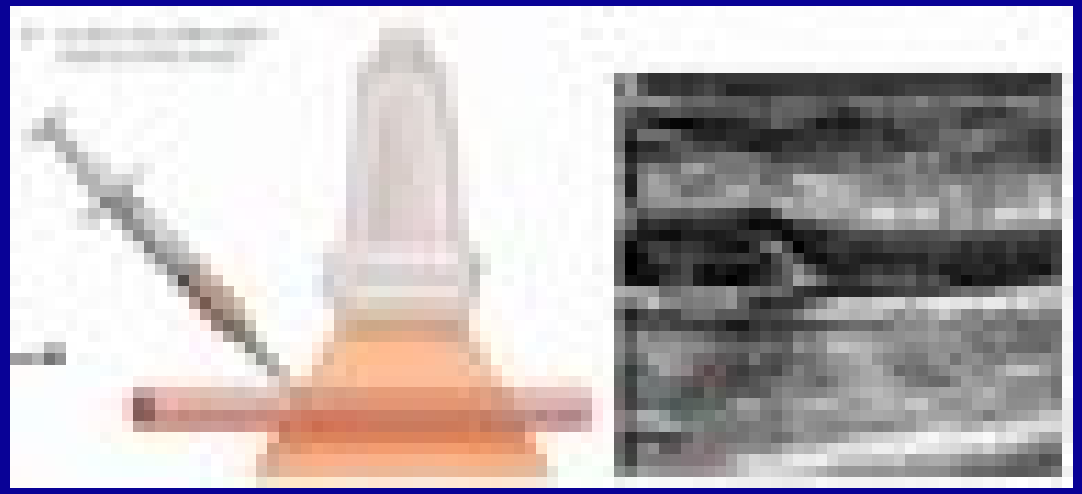
Sonda asse corto



Piano di scansione PARASTERNALE

2 D Imaging Ultrasound: Long Axis View



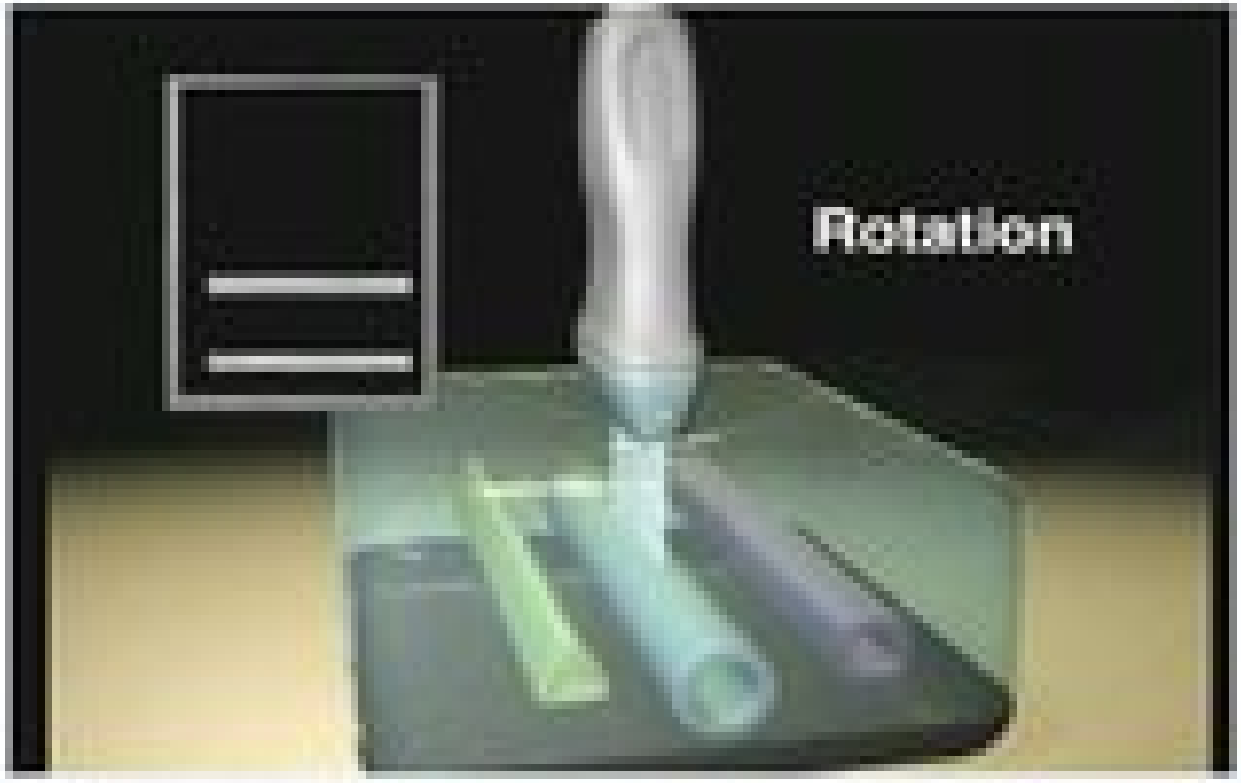


Advantage of LAX view:

Å better visualization of the needle throughout its course and depth of insertion, avoiding insertion of the needle beyond the target vessel.

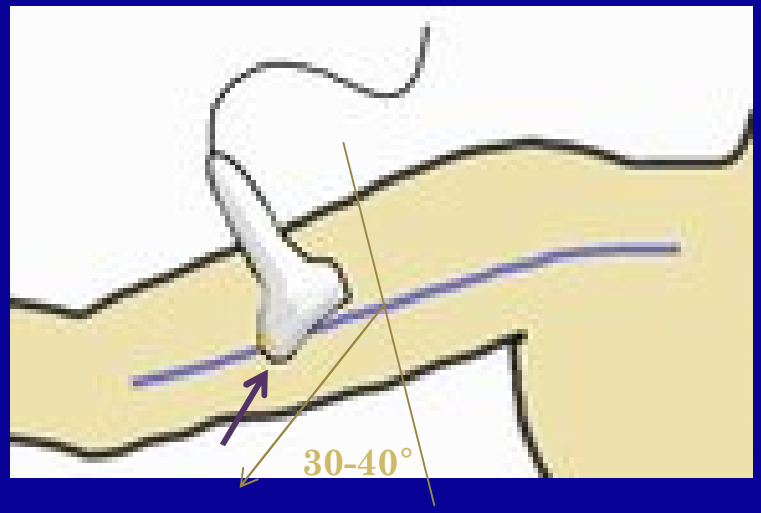
Anesth Analg 2012 Vascular Cannulation GL JASE 114(1): 46-72

Orientamento sonda



Visione in asse lungo. Scansione longitudinale.

2 D Imaging Ultrasound: Oblique Axis View

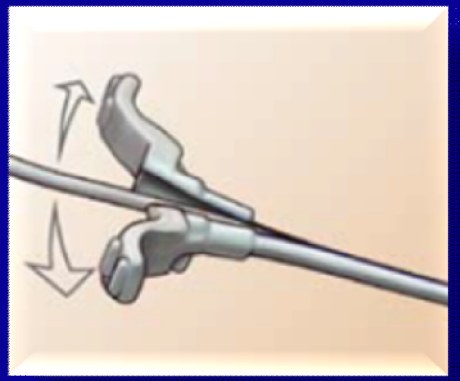


Advantage of OAX view (30-40°):

Å allow better visualization of the needle shaft and tip and offers the safety of imaging surrounding structures in the same view.

Anesth Analg 2012 Vascular Cannulation GL JASE 114(1): 46-72

Modified Seldinger Technique



Peelaway sheath introducer

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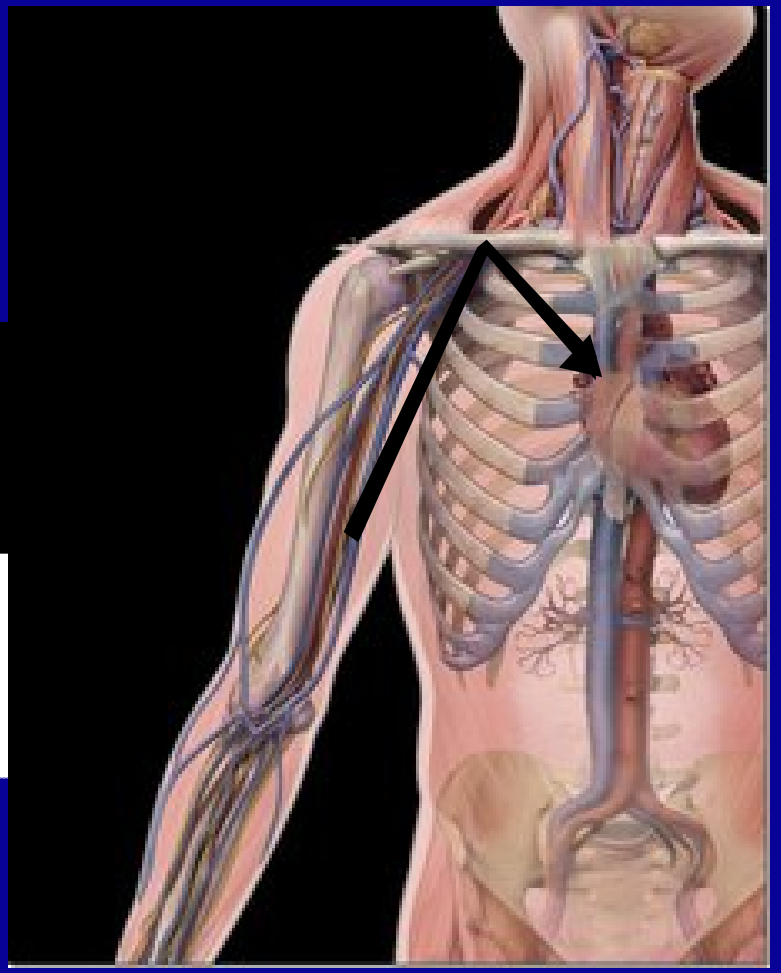
GUIDELINE FOR PRACTICE, 2nd Edition

Procedure for PICC Insertion in an Infant

Measure the length of the catheter to be inserted.
For upper-body insertion, measure from the insertion site along the course of the vein, to the right of the sternal border, to the third intercostal space. If insertion is through an arm vein, extend the arm at a 90° angle for measuring.



www.NANN.org, guidelines 2007

NSERTED CTERS

GUIDELINE FOR PRACTICE, 2nd Edition

Procedure for PICC Insertion in an Infant

Verify the location of the catheter tip with a chest radiograph.

[redacted] The catheter tip must be adequately visualized before the catheter is used.

NAVAN [redacted] to recommend that "the most appropriate location for the tip of peripherally inserted central catheters (PICCs) is the lower one third of the superior vena cava (SVC), close to the junction of the SVC and the right atrium." [redacted]

J Vasc Access Dev Summ 1998; 3:11-17

www.NANN.org, guidelines 2007

Ultrasound Guided Vascular
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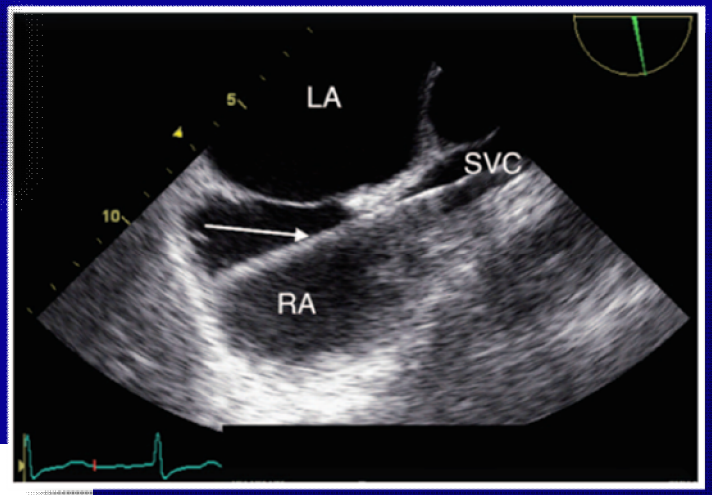
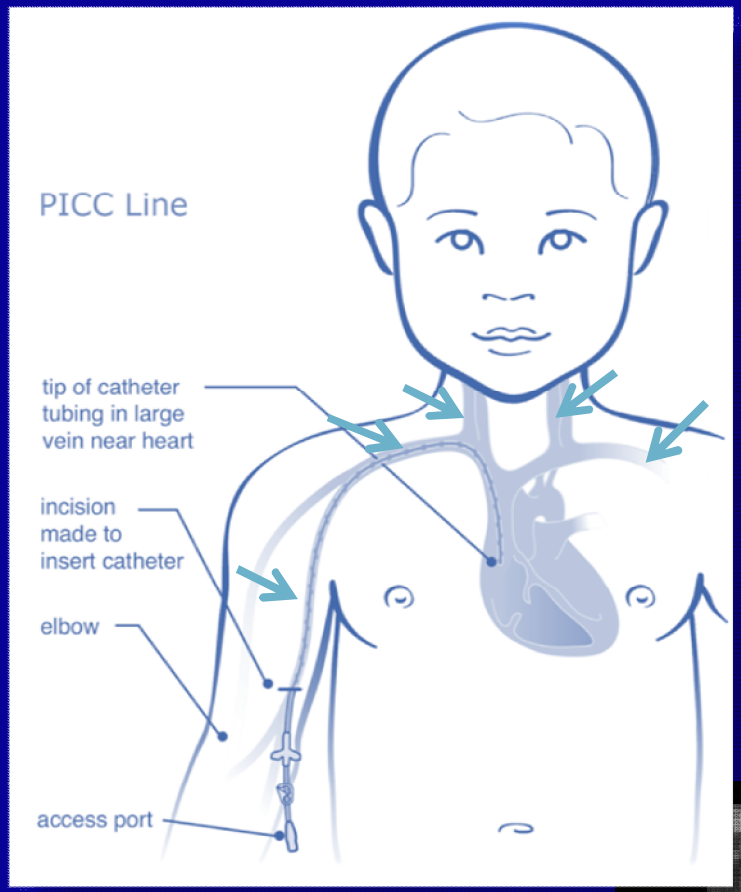
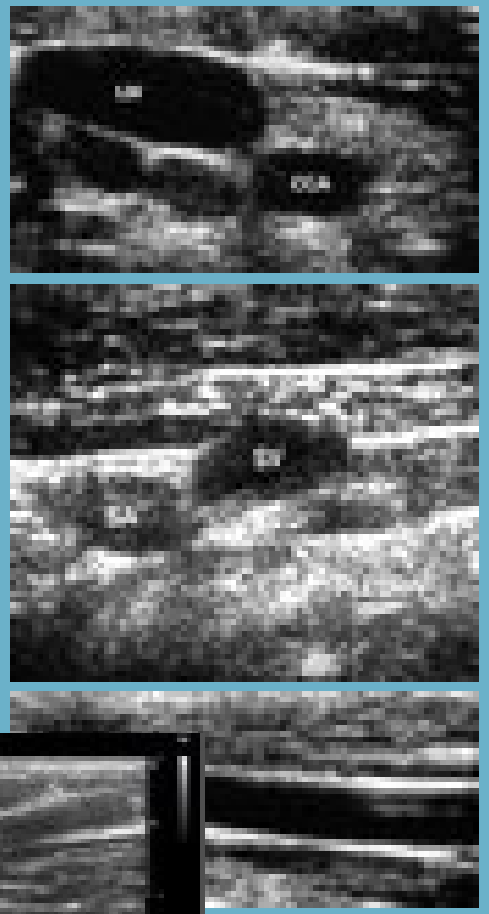


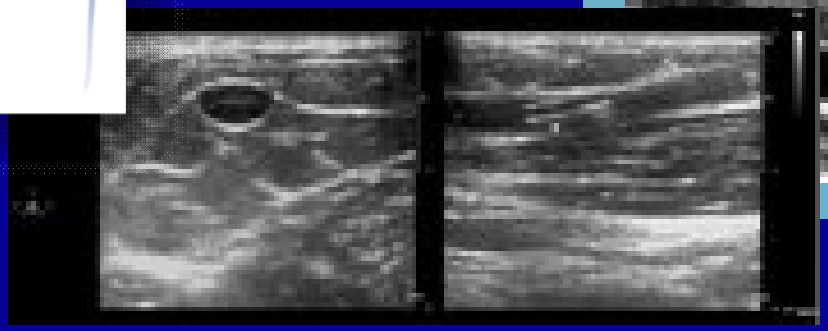
14.1. Recommendations for Vascular Access Confirmation

The council recommends that real-time ultrasound be used for confirmation of successful vessel cannulation. It is vitally important for the guide wire to be visualized in the target vessel and that the adjacent structures be visualized to confirm the absence of the guide wire. Because there may be ambiguity of the guide wire tip with SAX ultrasound imaging alone, manometry with a fluid-filled catheter through a flexible catheter in the vessel is recommended when LAX imaging is not used for confirmation of venous catheter placement.[93] When available, transesophageal echocardiographic or fluoroscopic imaging of the guide wire in the superior vena cava or inferior vena cava provides definitive confirmation of placement into the central venous system [redacted]

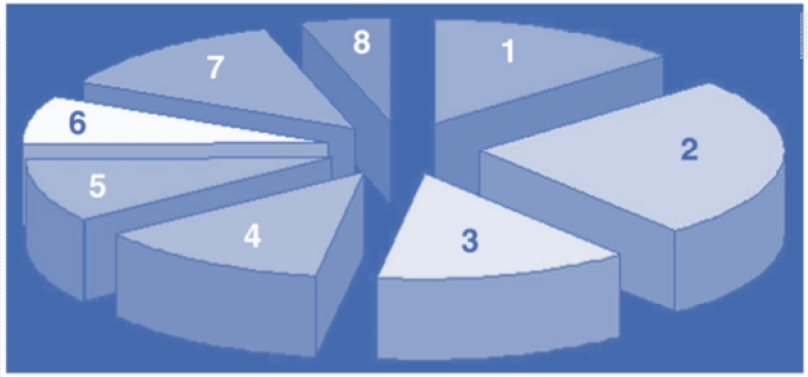
...ltrasound may detect ...malposition of catheter?



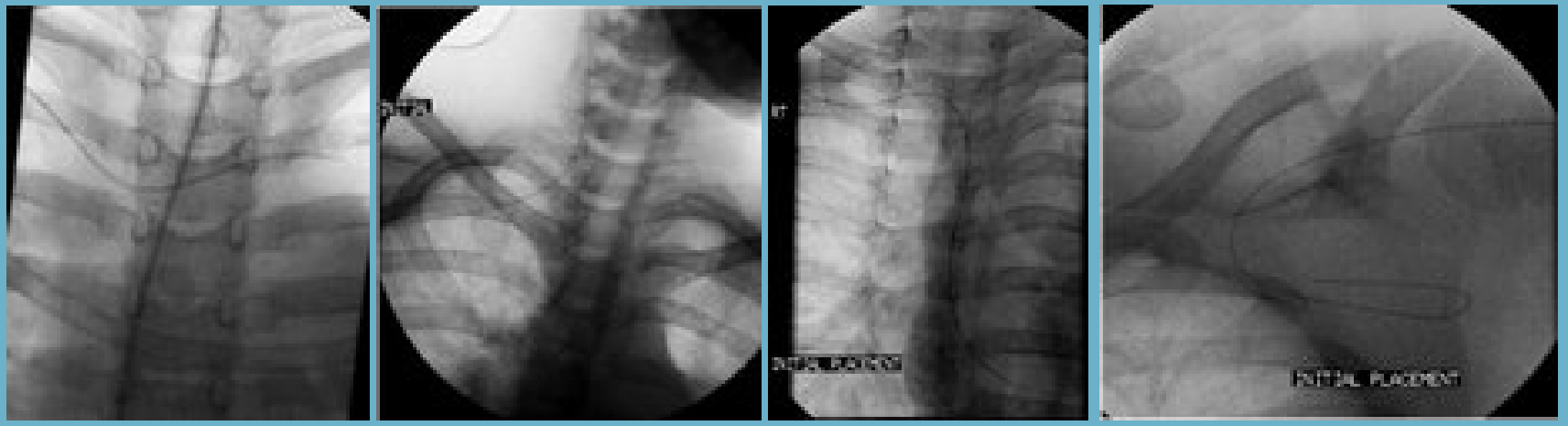




eripherally l Catheters without Fluoroscopy in Children: Initial Catheter Tip Position[1]



1–Superior Vena Cava 14%
2–Right Atrium 26%
3–Brachiocephalic 14%
4–Jugular 13%
5–Subclavian 9%
6–Axillary 8%
7–Basilic, Cephalic, Other 11%
8–Unsuccessful 5%



Radiol 2005; 234: 887-892

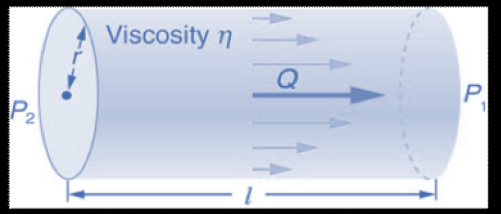
lly Inserted Central Catheters: Complication Rates Related to Catheter Tip Location

Complication	Central $n = 1096$	Noncentral $n = 170$	P Value
Phlebitis	16 (1.5%)	17 (10.0%)	<.001
Occlusion	19 (1.7%)	11 (6.5%)	<.001
Leaking	1 (.1%)	19 (11.2%)	<.001
Mechanical	4 (.3%)	2 (1.2%)	.187
Infection	2 (.2%)	0	1.000
Total	42 (3.8%)	49 (28.8%)	<.001

Poiseuille's law Thus, slight changes in the radius of a vessel result in large changes in the vessel's ability to conduct blood. In adults estimated blood flow in the large superficial veins of the upper [redacted] times less than flow in the SVC [redacted]

Decreased complication rates with centrally versus noncentrally located PICC tips is likely related to a combination of factors including vessel size, blood flow rate, turbulent flow, and endothelial injury.

$$= \frac{\pi \Pr^4}{8\eta l}$$

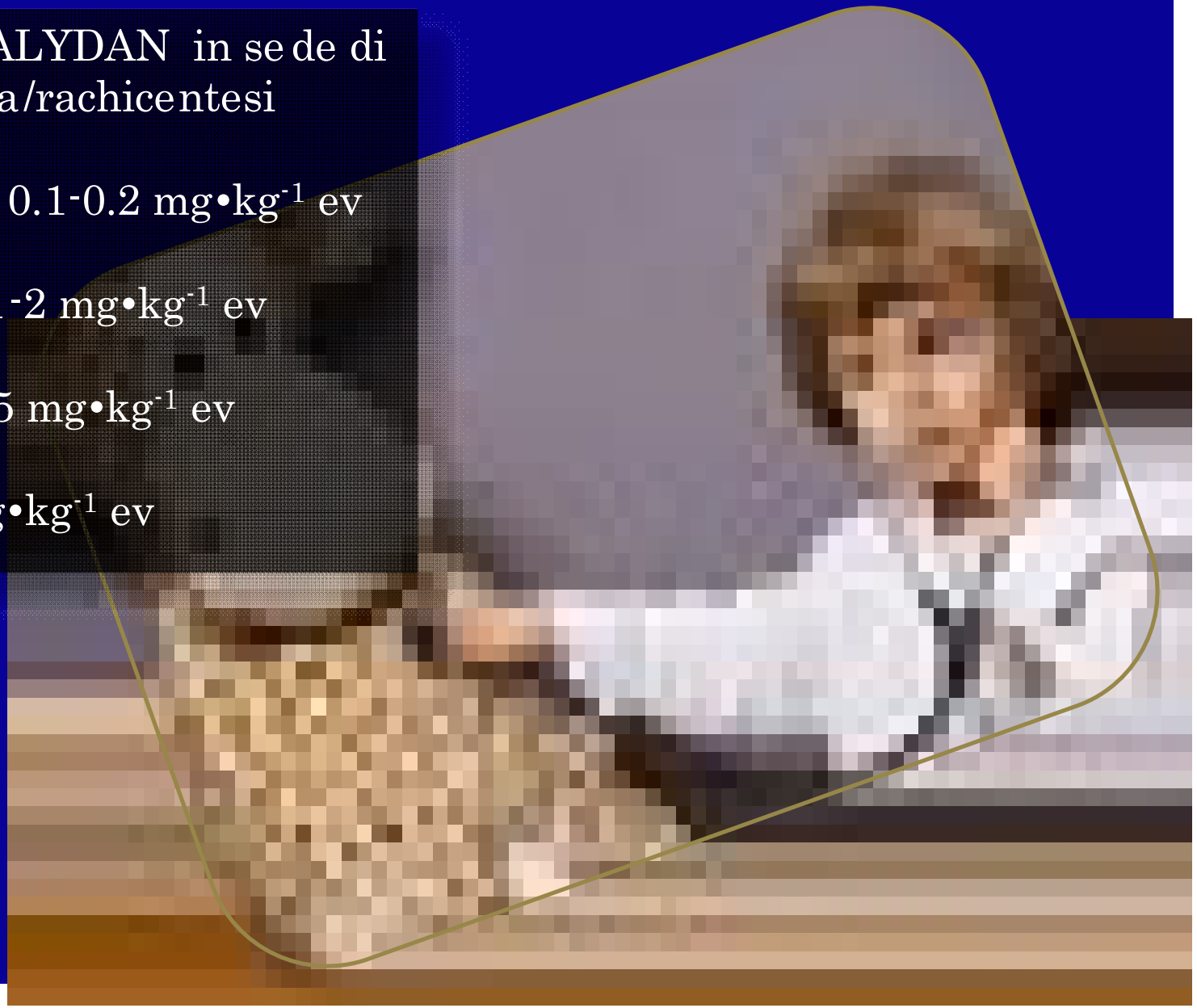


BISOGNA SOSTENERE IN MODO PARTICOLARE IL LATO PSICOLOGICO DEL BAMBINO CERCANDO DI CREARE , DURANTE L'ATTESA , UN AMBIENTE DI GIOCO IDONEO ALLA SUA ETA', LASCIANDOLO COMUNQUE SEMPRE ACCANTO AD UN GENITORE

- accompagnati da un genitore
- con il giocattolo preferito
- con l'EMLA da almeno un'ora sulla sede prescelta per la venipuntura
- valutare l'induzione in maschera per reperire l'accesso venoso
- fissaggio ottimale dell'accesso venoso
- massima collaborazione da tutto il personale
- PREANESTESIA ?

Procedurale

- EMLA o RALYDAN in sede di venipuntura/rachicentesi
- Midazolam 0.1-0.2 mg•kg^{-1} ev
- Ketamina 1-2 mg•kg^{-1} ev
- Propofol 1-5 mg•kg^{-1} ev
- TPS 3-5 mg•kg^{-1} ev



isveglio e dimissioni

- L'ANESTESISTA DEVE PERSONALMENTE VALUTARE IL RECUPERO DEL LIVELLO DI COSCIENZA DEL PICCOLO PAZIENTE PRIMA DELLA DIMISSIONE.
- LA PRESENZA DI RIFLESSI DI PROTEZIONE DELLE VIE AEREE E STABILITA' DEI PARAMETRI VITALI
- DEVE INOLTRE RASSICURARE I GENITORI E FORNIRE LORO TUTTE LE INFORMAZIONI DA ESSI RICHIESTE PER L'IMMEDIATO POSTOPERATORIO

Linee guida SIAARTI