ACCESSO ECOGUIDATO ALL' IMPIANTO DI DEVICES: LUSSO O LINEE-GUIDA ?

Giovanni Deluca , Vincenzo Massari
Domenico Gianfrancesco

BISCEGLIE –ASL BT -

Accessi venosi centrali (e periferici) ecoguidati

GAVeCeLT

Gli Accessi Venosi Centrali a Lungo Termine

Giovanni Deluca
nato a Barletta

Evoluzione nel posizionamento degli accessi venosi:

- Venolisi
  - Anni 70 - 80
- Venipuntura 'blind'
  - Anni 80 - 2000
- Venipuntura ecoguidata
  - Dal 2000 in poi

Complicanze più frequenti da venipuntura centrale “blind”

- Legate alla venipuntura
  - Pneumotorace
  - Puntura arteriosa accidentale, ematoma locale, emotorace, emomediastino, etc.
  - Punture ripetute
  - Fallimento
- Legate al passaggio della guida metallica
  - Percorsi anomali, aritmie

I 6 postulati della venipuntura ‘blind’

1. La vena c’è
2. La vena è nella posizione anatomica TIPICA e lontana da zone “ a rischio”
3. La vena è PERVIA
4. La vena è di CALIBRO adeguato
5. I reperi cutanei sono BEN DEFINITI
6. La vena non collassa significativamente in fase inspiratoria

Ecografia interventistica

Verduci Ed., 2007

Daniele G. Biasucci[1], *Antonio La Greca*[2], *Mauro Pittiruti*[2], *Americo Testa*[1]

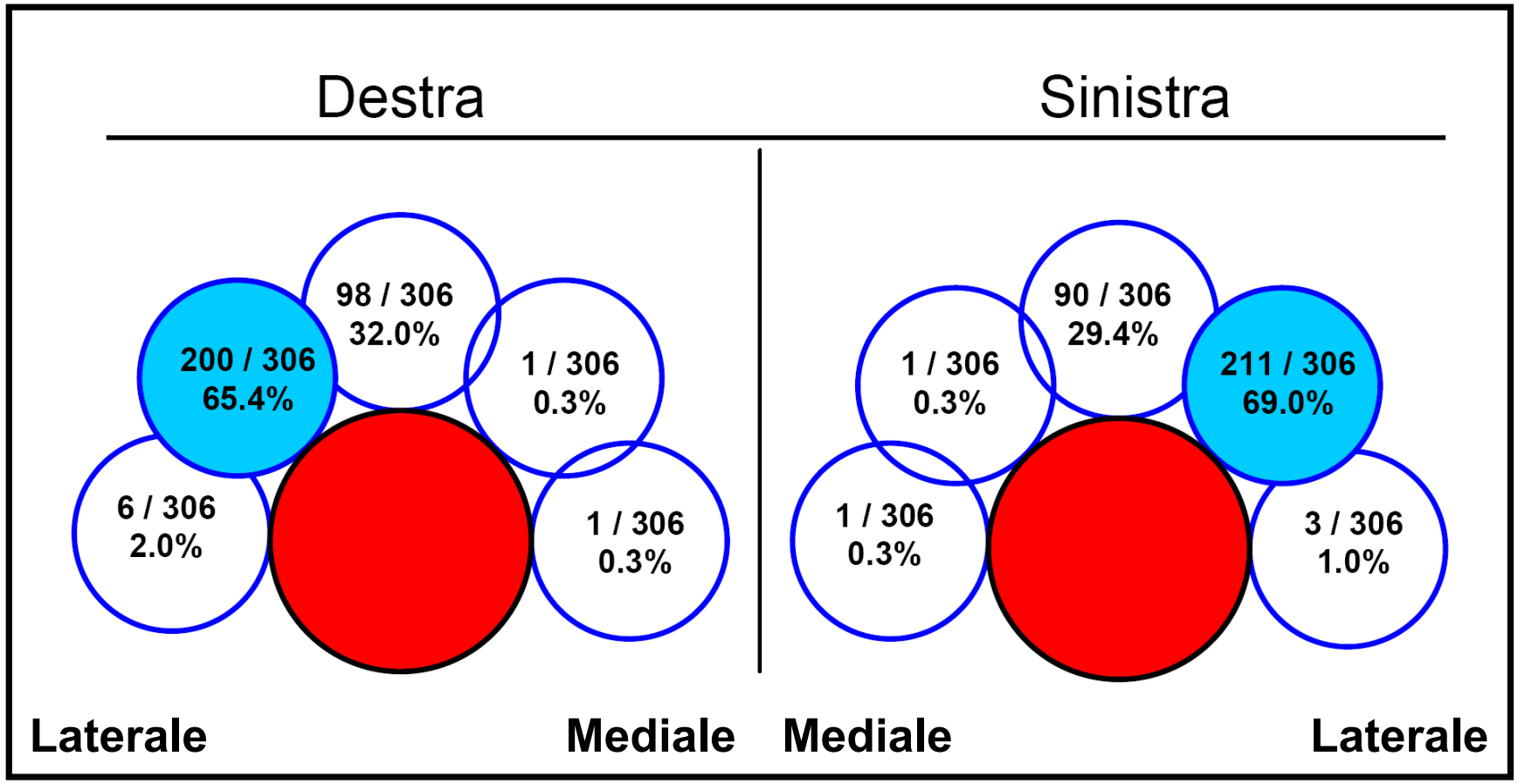
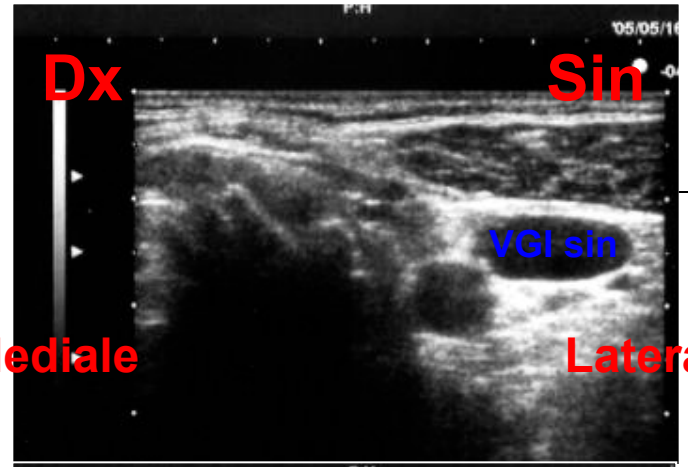
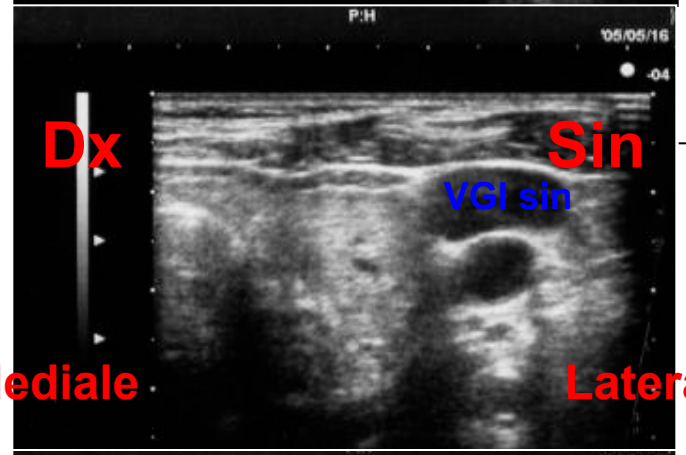


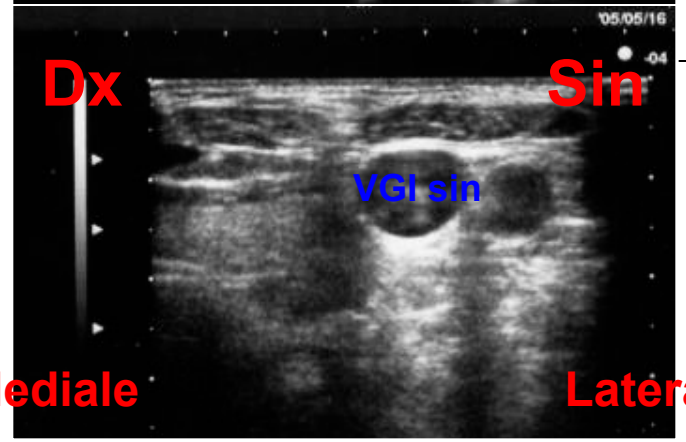
Fig. 34-10. Schema della variabilità anatomica della posizione della VGI rispetto all'ACC



A 5 cm. dal giugulo



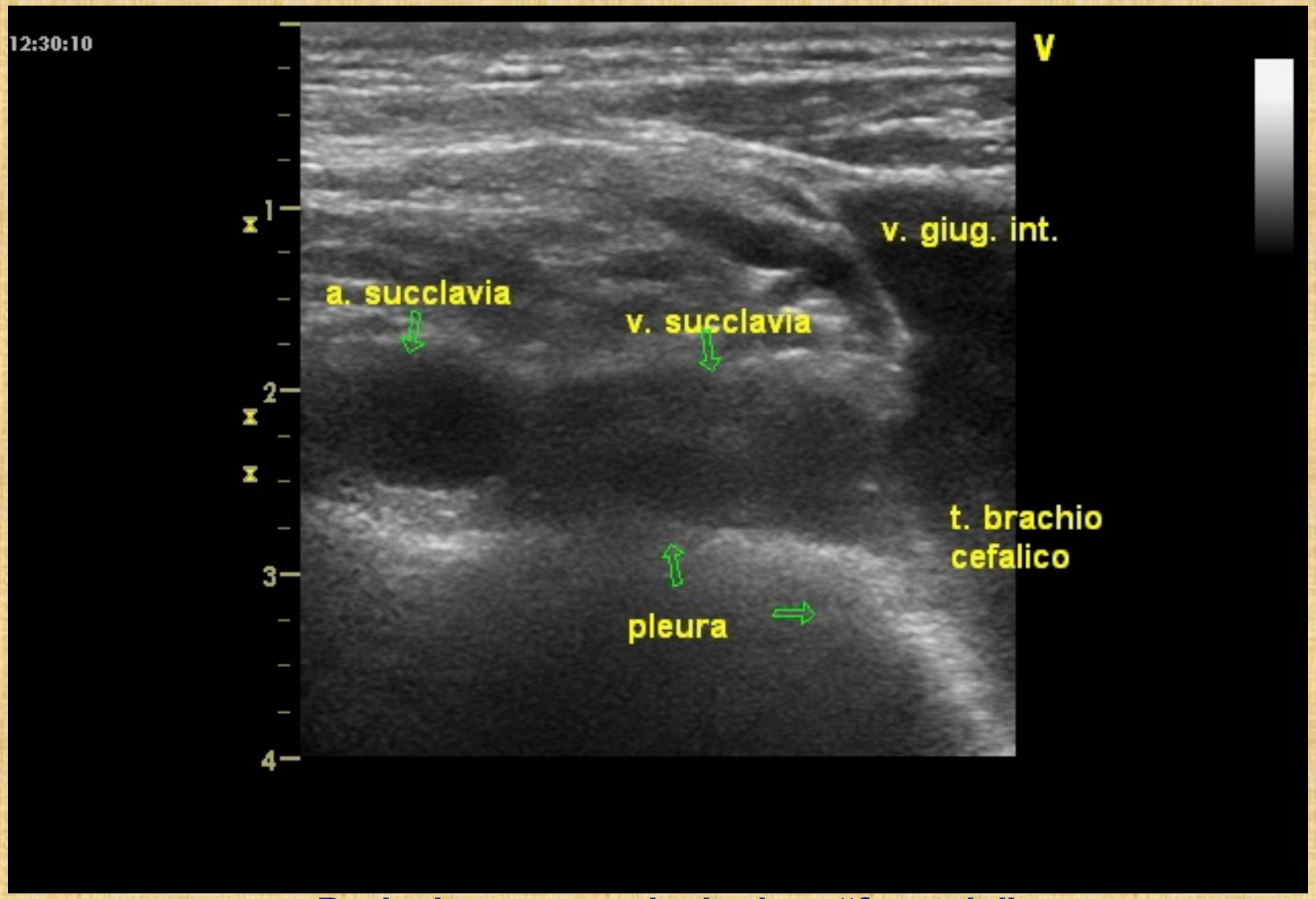
A 3 cm. dal giugulo



A 1 cm. dal giugulo

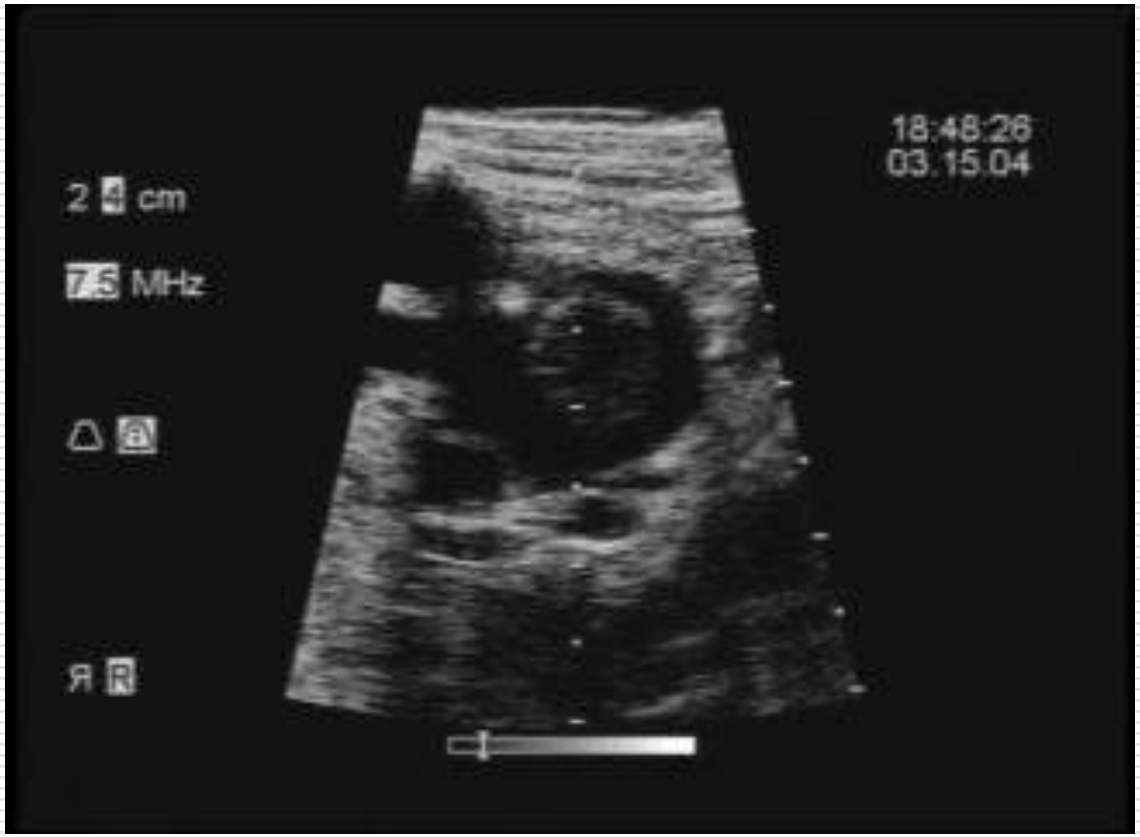
Biasucci D, Testa A, La Greca A, Pittiruti M
Rinpe Gallery 2005

Art. e Vena succlavia (e pleura) ……molto, molto vicine (torace stretto, deforme)



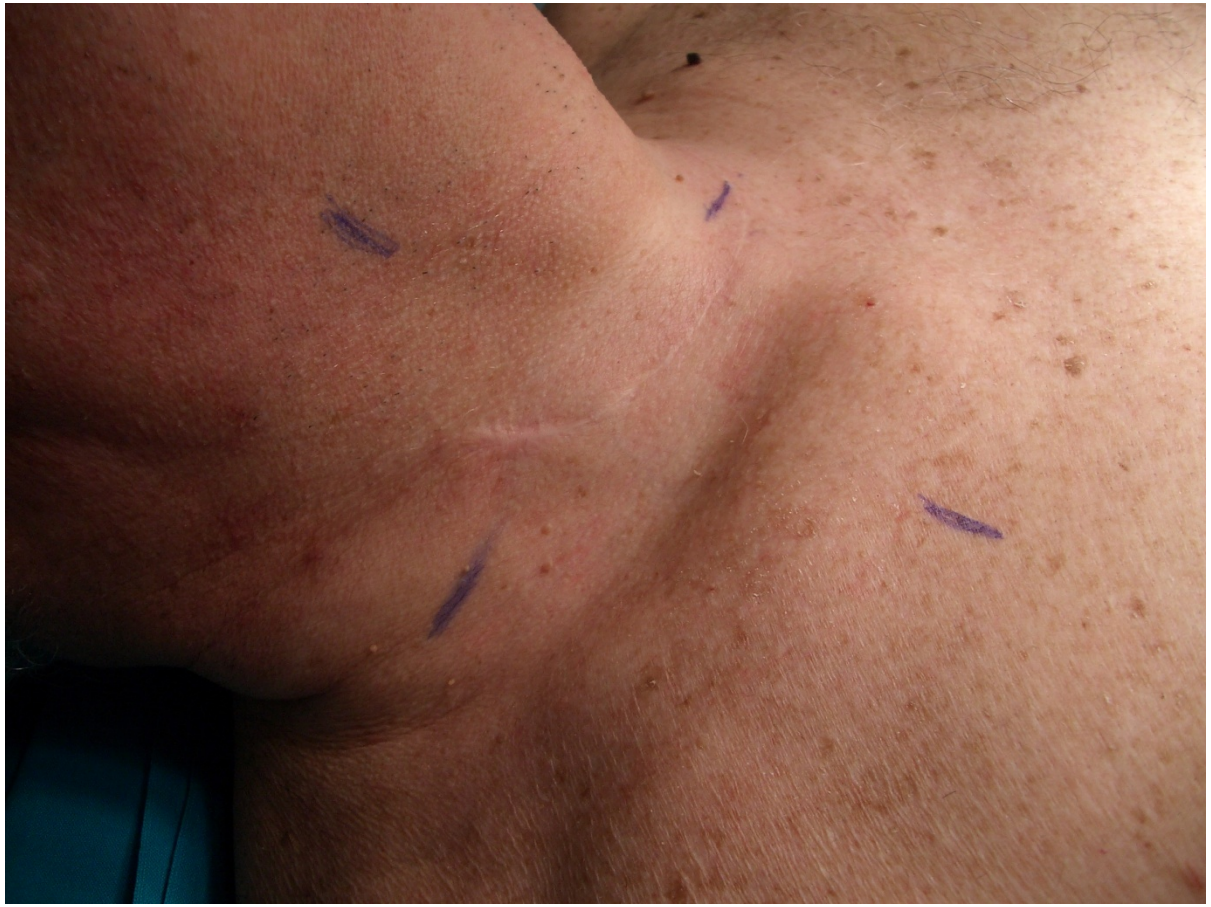
Proiezione sovraclavicolare “frontale”

The vein is PATENT..?

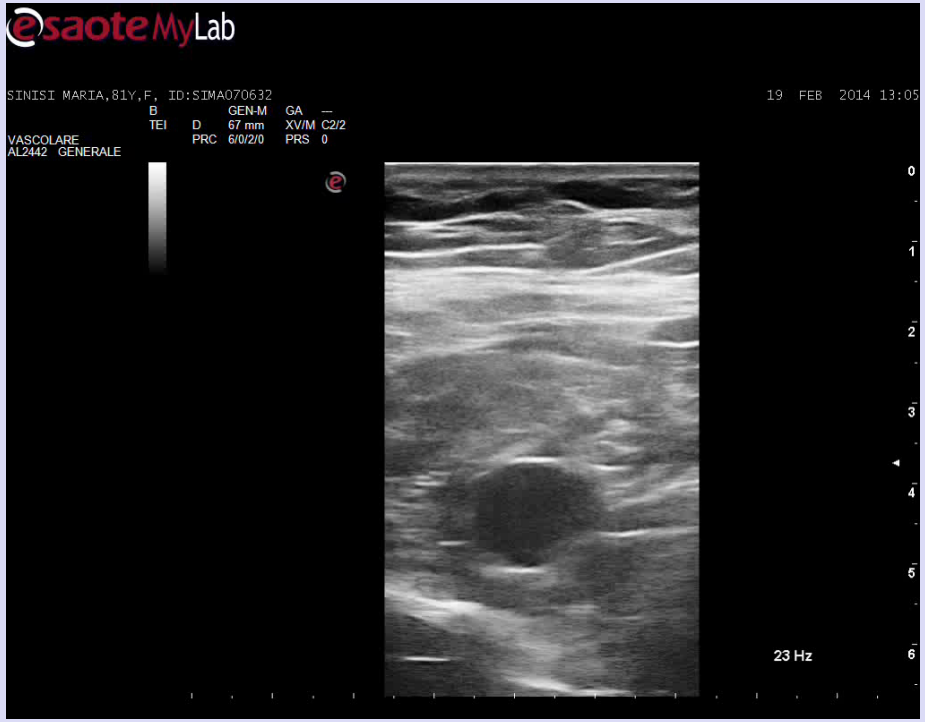


Thrombus in FV

5 - I reperi cutanei sono BEN DEFINITI…

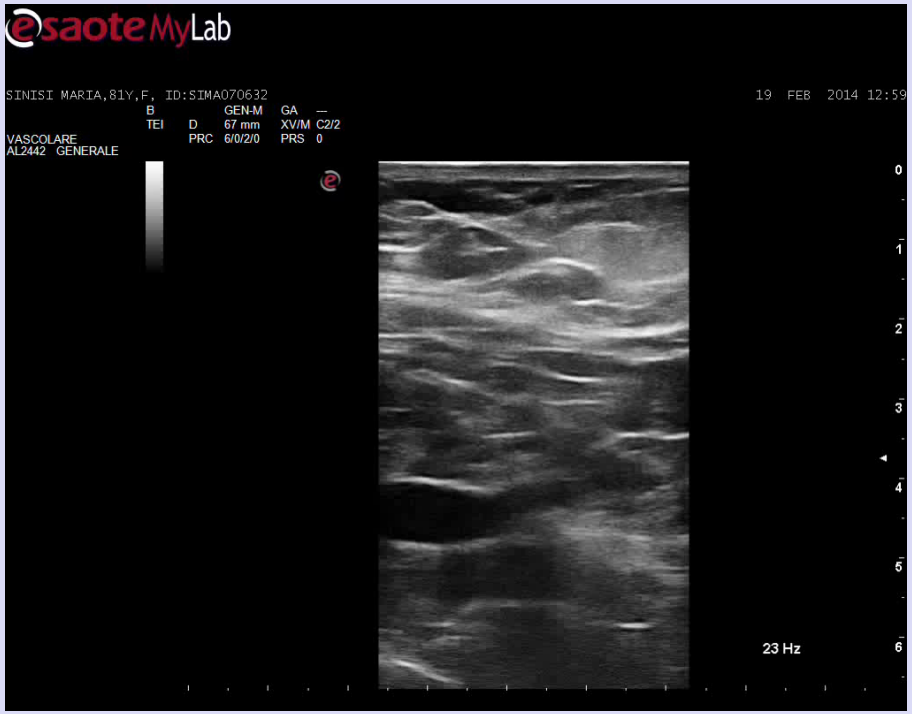


La vena non collassa significativamente in fase inspiratoria



Asse corto

Donna di 90 Kg
Grande obesa
Collo e Tronco: un tutto indistinto



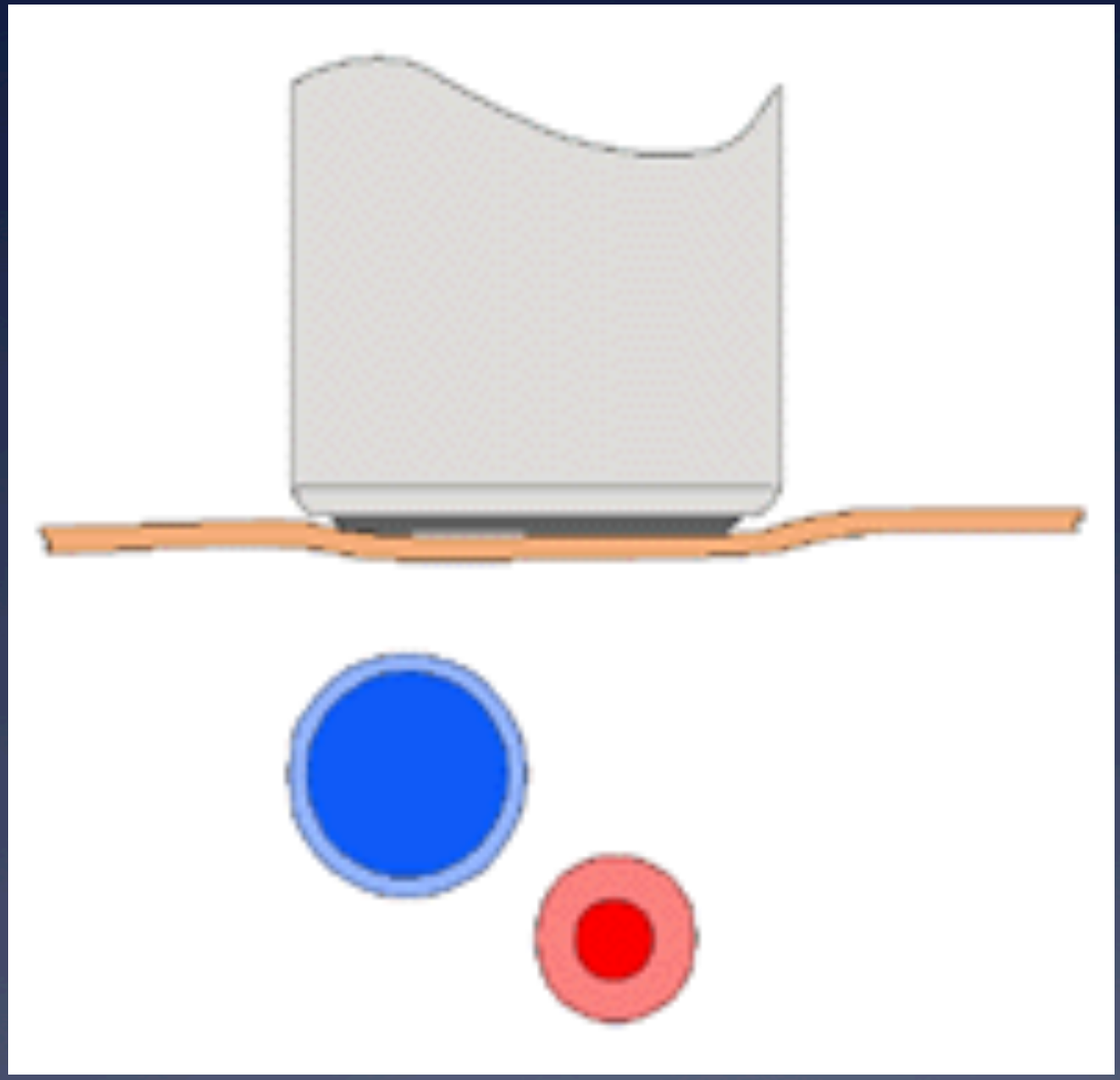
Asse lungo

DURANTE RESPIRAZIONE SPONTANEA

- Perché LA VENIPUNTURA ECOGUIDATA
  - **C'è sempre maggiore evidenza che gli US facilitano la cateterizzazione venosa centrale, riducendo:**
    - **La % di fallimenti**
    - **Il tempo medio per eseguire la manovra**
    - **Il numero di tentativi prima del successo**
    - **La % di punture arteriose accidentali**
    - **La % di complicanze (pneumotorace, emotorace, ematomi, fistole, pseudoaneurismi)**
    - **Riduzione del rischio infettivo**
    - **Il costo complessivo della manovra**

US imaging for venous access

- Vein:
  - Anechoic
  - COMPRESSIBLE
  - NOT PULSATILE!
  - Oval or variable shape
- Artery:
  - Anechoic
  - NOT COMPRESSIBLE!
  - PULSATILE!
  - Circular Shape



TECNICHE DI VISUALIZZAZIONE

Standardizzare la terminologia

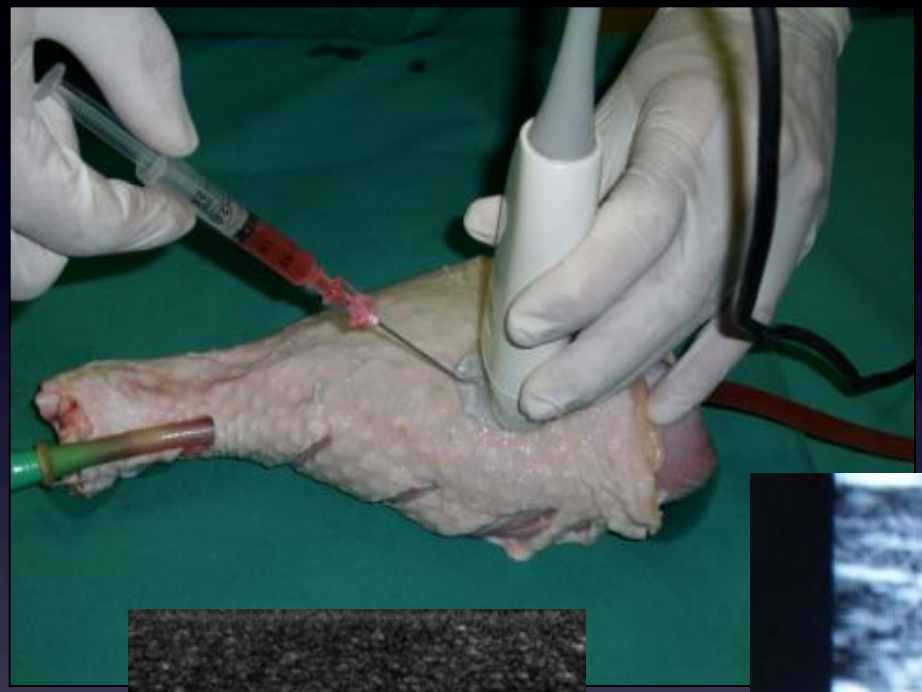
VISUALIZZAZIONE VENA

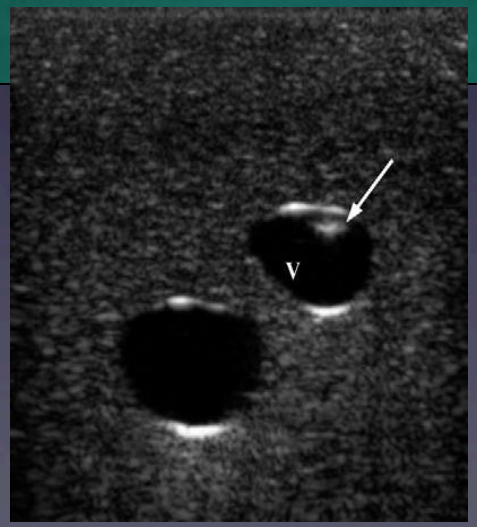
1. Asse corto (trasversale)
2. Asse lungo (longitudinale)
3. Asse obliquo (PER OPERATORI ESPERTI)

VISUALIZZAZIONE AGO

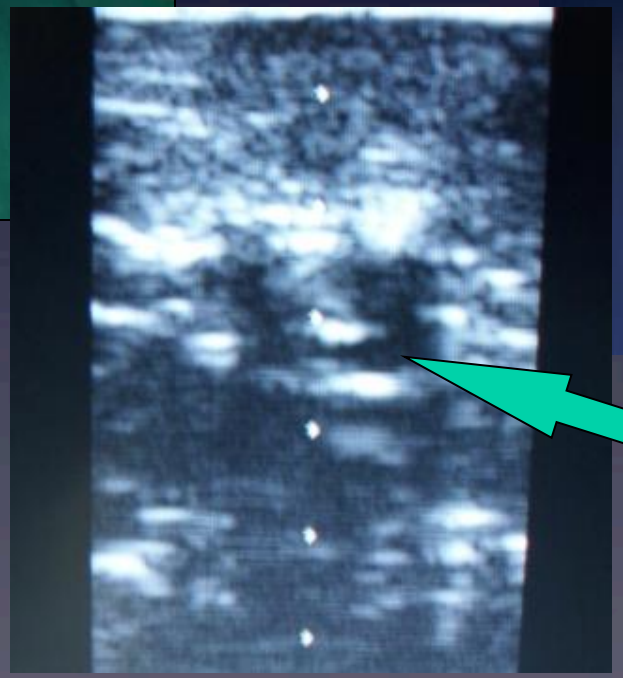
1. In plane (nel fascio di ultrasuoni)
2. Out of plane (attraverso il fascio di US)

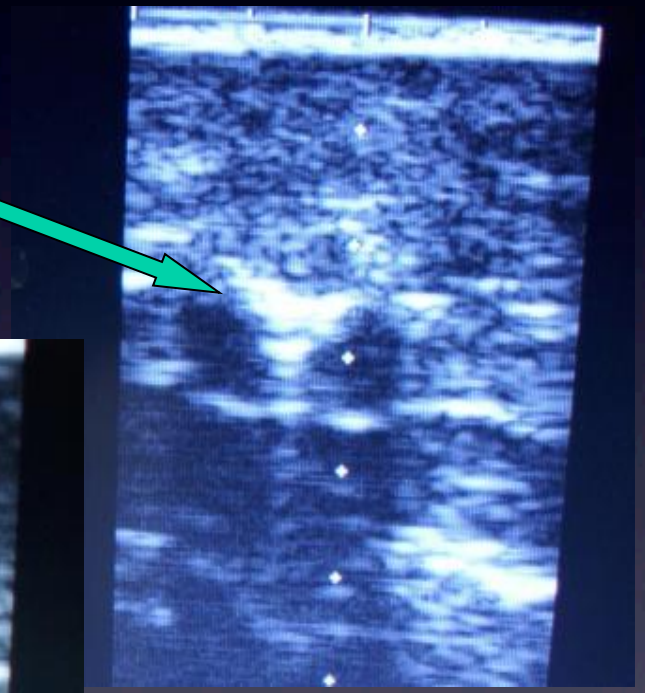
VISUALIZZAZIONE VENA + AGO





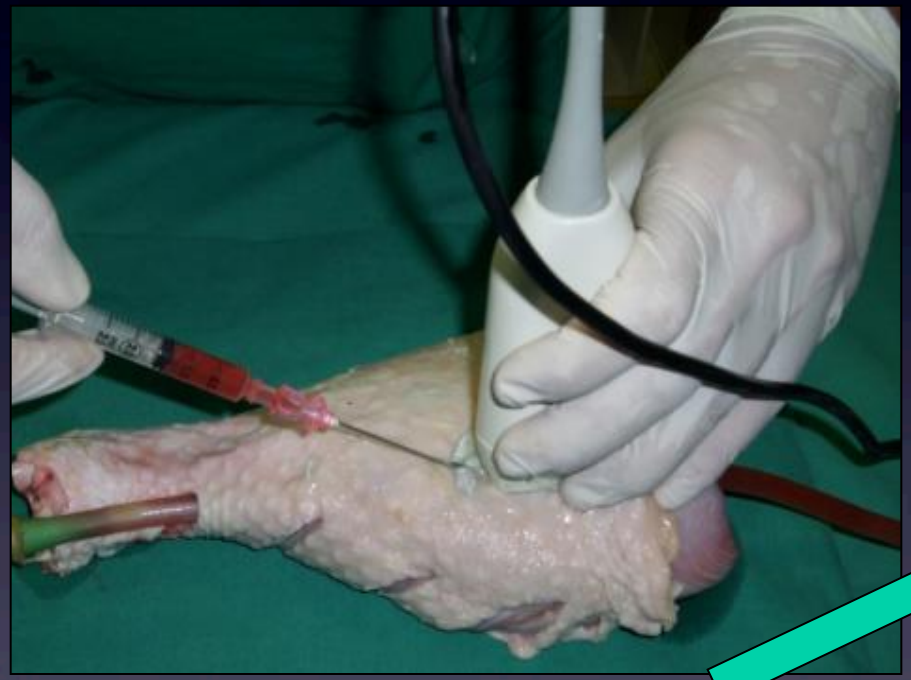
ASSE CORTO + OUT OF PLANE

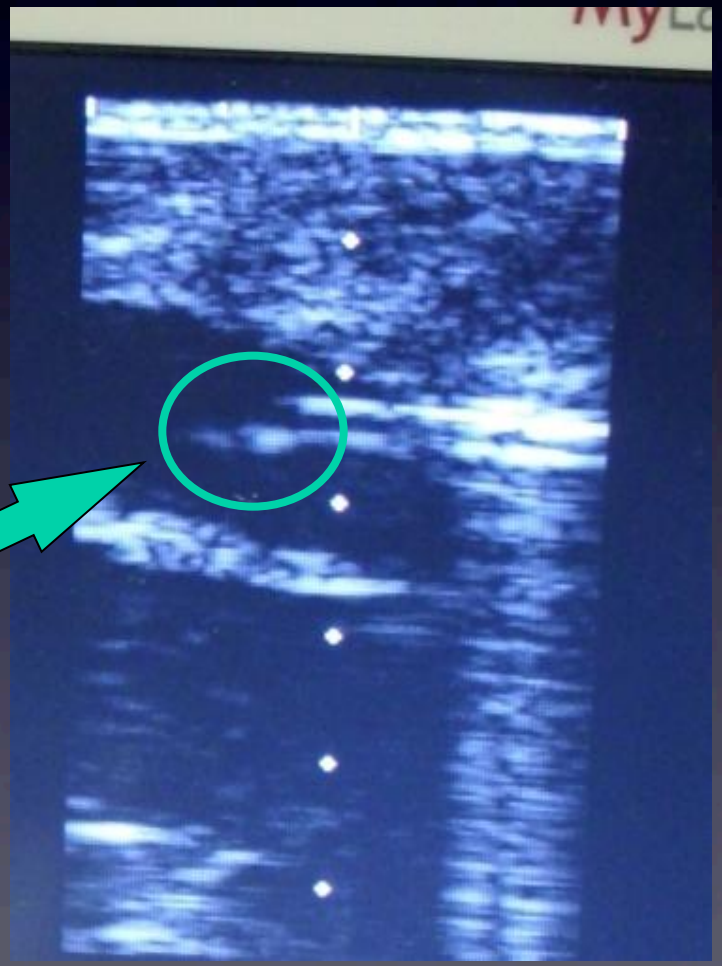




VISUALIZZAZIONE VENA + AGO

ASSE LUNGO + IN PLANE

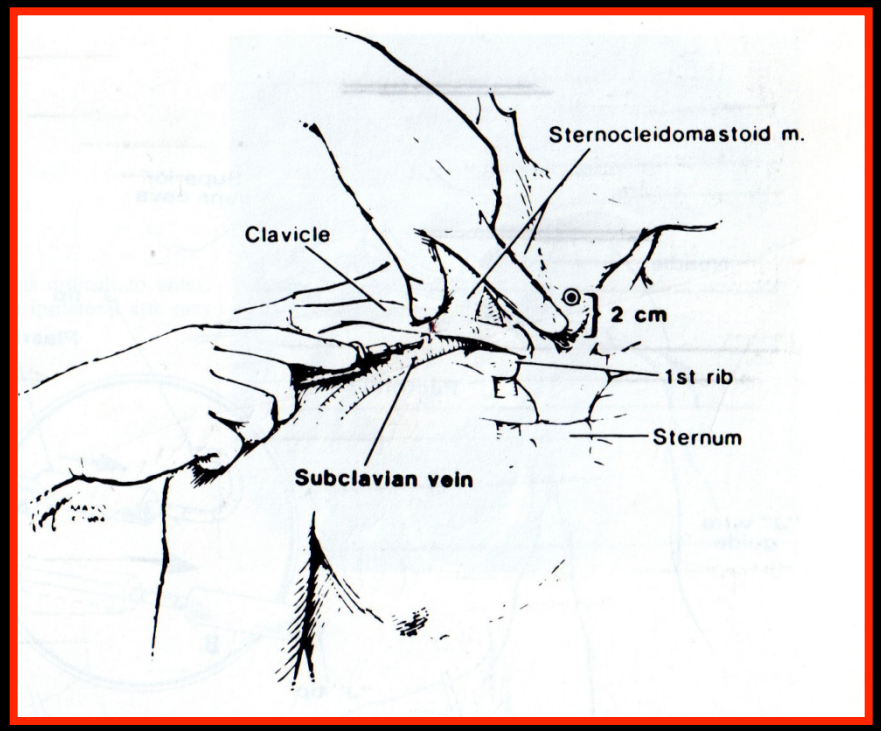




Chi si occupa di questa materia ??

- Anestesisti e Rianimatori
- Medici dei Dipartimenti di Emergenza/Urgenza
- Medici dedicati alla Nutrizione Parenterale
- Medici dedicati alle terapie oncologiche
- Chirurghi Generali e Chirurghi vascolari
- ecc.


E i cardiologi interventisti ?

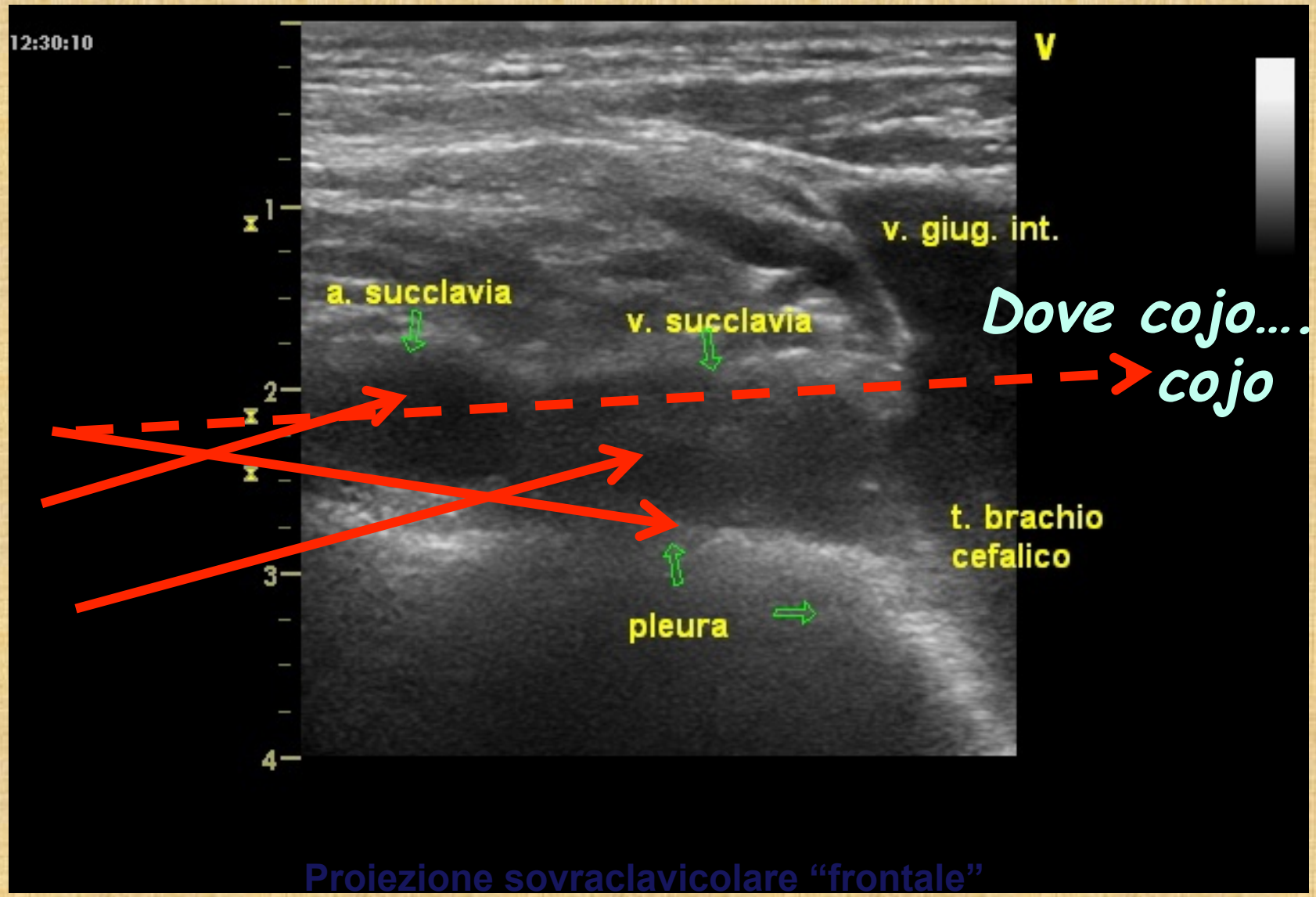


Landmark-guided approach to SC vein cannulation (BLIND)

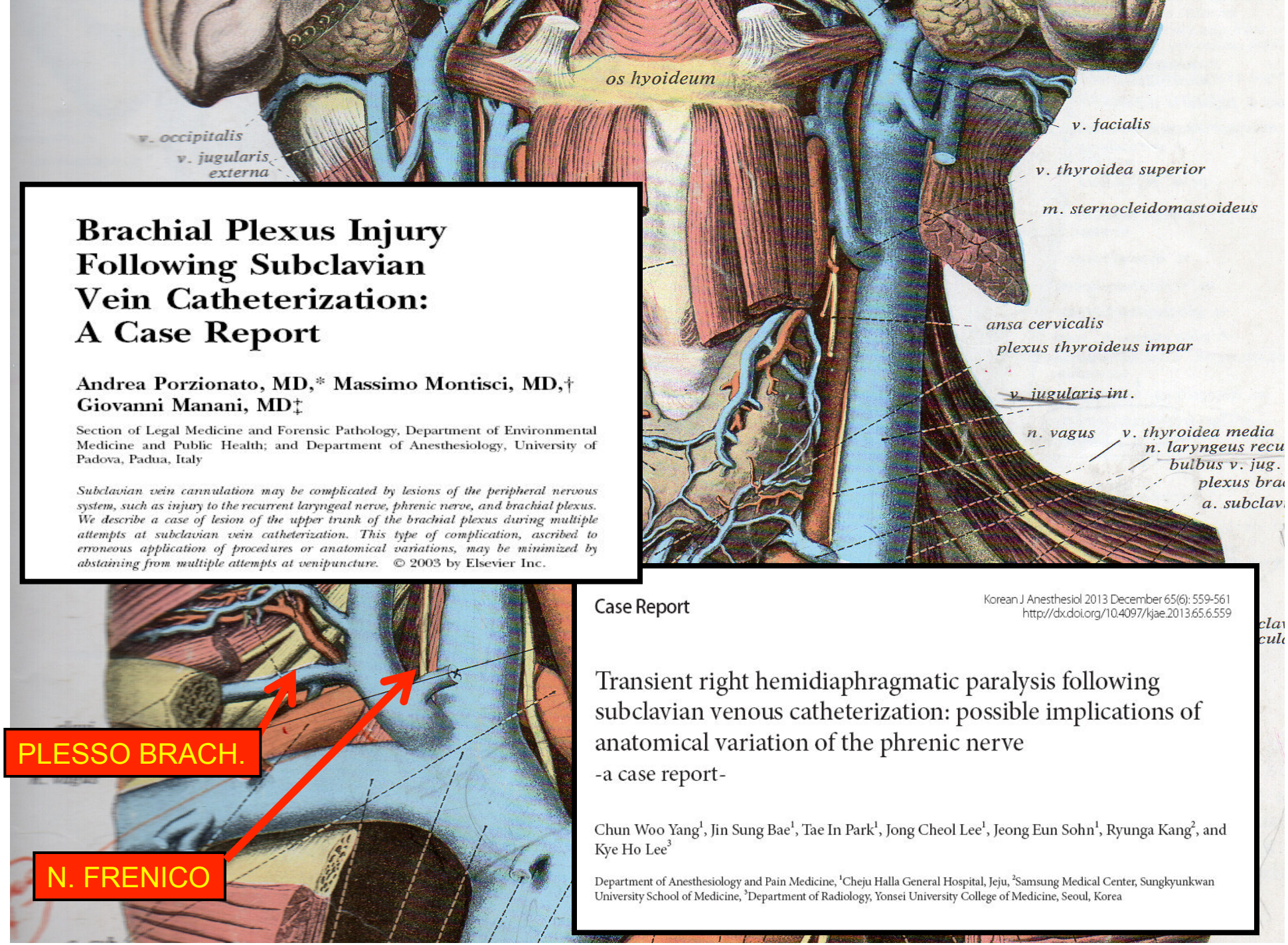
COMPLICATION: 0.3 – 12%

- Displased subclavian vein (bersaglio sbagliato; tentatici ripetuti)
- Pneumothorax; haemotorax; haemomediastinum; air embolism
- Subclavian artery compromise (haematoma, dissection,fistola AV, pseudoaneurisma)
- Phrenic nerve injury
- Injury of brachial plexus
- Subclavian crush phenomenon

Arteria, vena succlavia e pleura……molto, molto vicine; e non solo loro !



Proiezione sovraclavicolare “frontale”



Brachial Plexus Injury Following Subclavian Vein Catheterization: A Case Report

Andrea Porzionato, MD,* Massimo Montisci, MD,† Giovanni Manani, MD‡

Section of Legal Medicine and Forensic Pathology, Department of Environmental Medicine and Public Health; and Department of Anesthesiology, University of Padova, Padua, Italy

Subclavian vein cannulation may be complicated by lesions of the peripheral nervous system, such as injury to the recurrent laryngeal nerve, phrenic nerve, and brachial plexus. We describe a case of lesion of the upper trunk of the brachial plexus during multiple attempts at subclavian vein catheterization. This type of complication, ascribed to erroneous application of procedures or anatomical variations, may be minimized by abstaining from multiple attempts at venipuncture.

Case Report

Korean J Anesthesiol 2013 December 65(6): 559-561
http://dx.doi.org/10.4097/kjae.2013.65.6.559

Transient right hemidiaphragmatic paralysis following subclavian venous catheterization: possible implications of anatomical variation of the phrenic nerve

-a case report-

Chun Woo Yang[1], Jin Sung Bae[1], Tae In Park[1], Jong Cheol Lee[1], Jeong Eun Sohn[1], Ryunga Kang[2], and Kye Ho Lee[3]

Department of Anesthesiology and Pain Medicine, [1]Cheju Halla General Hospital, Jeju, [2]Samsung Medical Center, Sungkyunkwan University School of Medicine, [3]Department of Radiology, Yonsei University College of Medicine, Seoul, Korea

Real-time Ultrasound-guided Subclavian Vein Cannulation versus the Landmark Method in Critical Care Patients

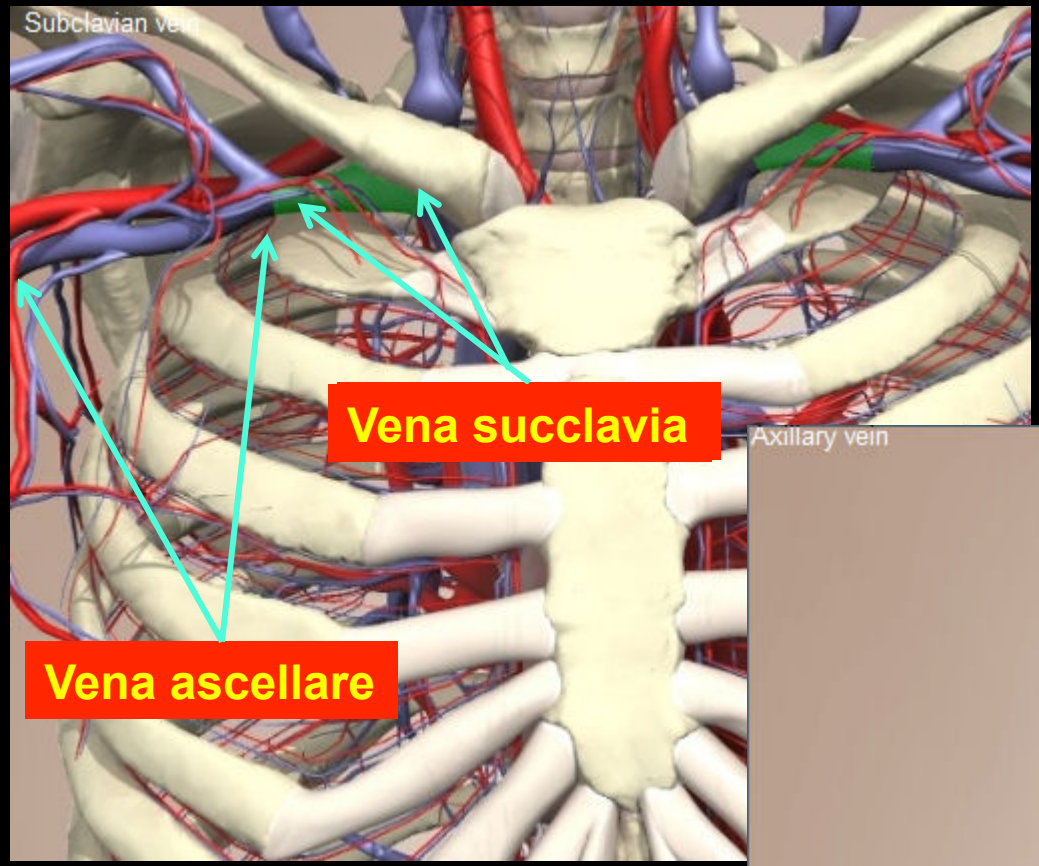
A Prospective Randomized Study

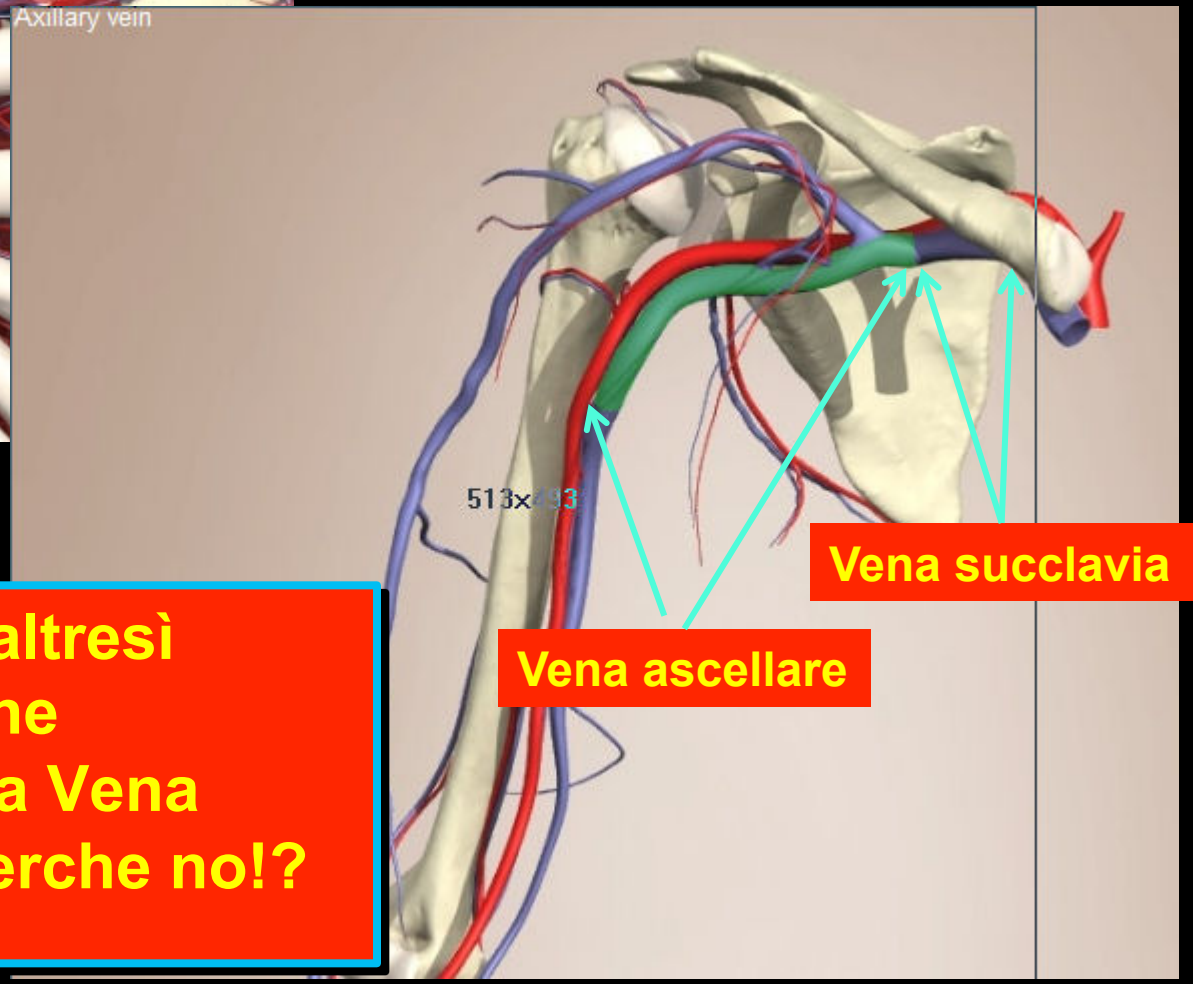
Mariantina Fragou, MD, Andreas Gravvanis, MD, PhD, Vasilios Dimitriou, MD, PhD, Apostolos Papalois, MD, PhD, Gregorios Kouraklis, MD, PhD, Andreas Karabinis, MD, PhD, Theodosios Saranteas, MD, DDS, PhD, John Poularas, MD, John Papanikolaou, MD, Periklis Davlouros, MD, PhD, Nicos Labropoulos, MD, PhD, Dimitrios Karakitsos, MD, PhD

Crit Care Med. 2011;39(7):1607-1612.

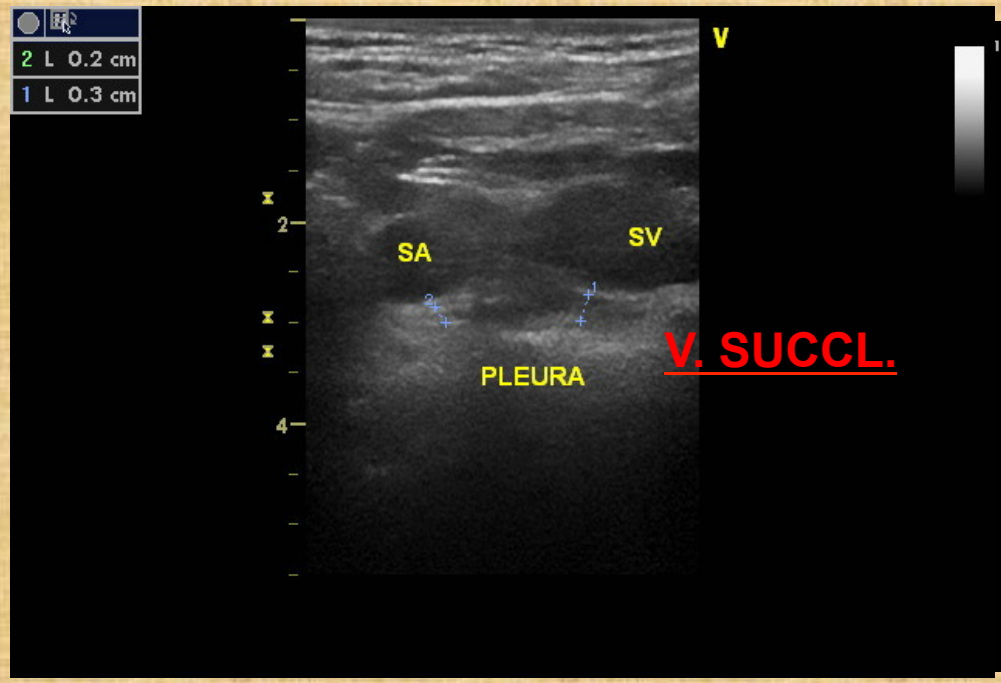
24%

Outcome M	rk 201) p
Access time (sec)	44.8 ± 54.9 (30.1–70.4)
Success rate	176 (87.5%)
Average number of attempts	1.9 ± 0.7 (1.5–2.7)
Artery puncture	11 (5.4%)
Hematoma	11 (5.4%)
Pneumothorax	10 (4.9%)
Hemothorax	9 (4.4%)
Catheter misplacement	22 (11%)
Injury of the brachial plexus	6 (2.9%)
Phrenic nerve injury	3 (1.5%)
Cardiac tamponade	1 (0.5%)

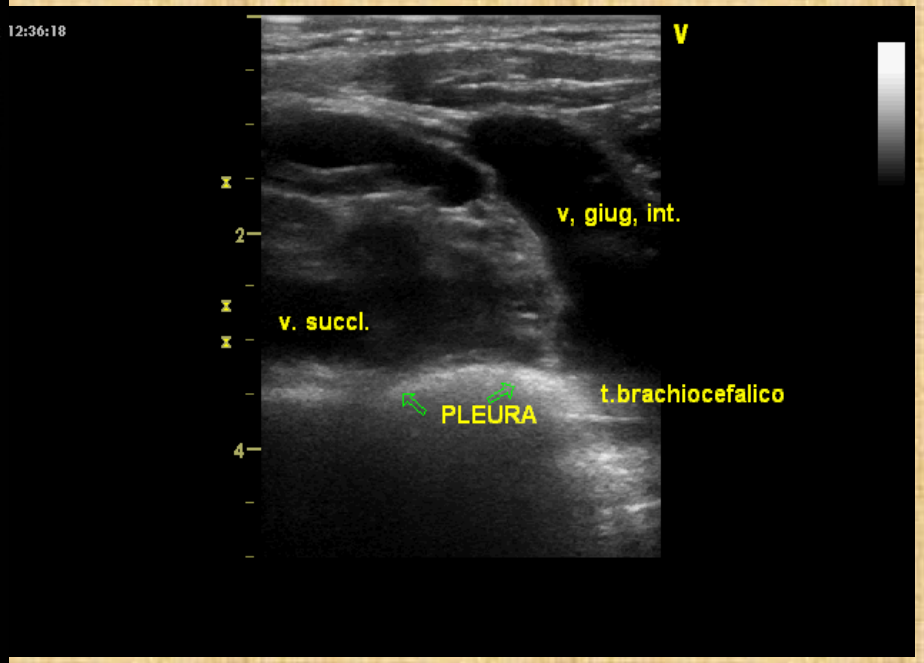


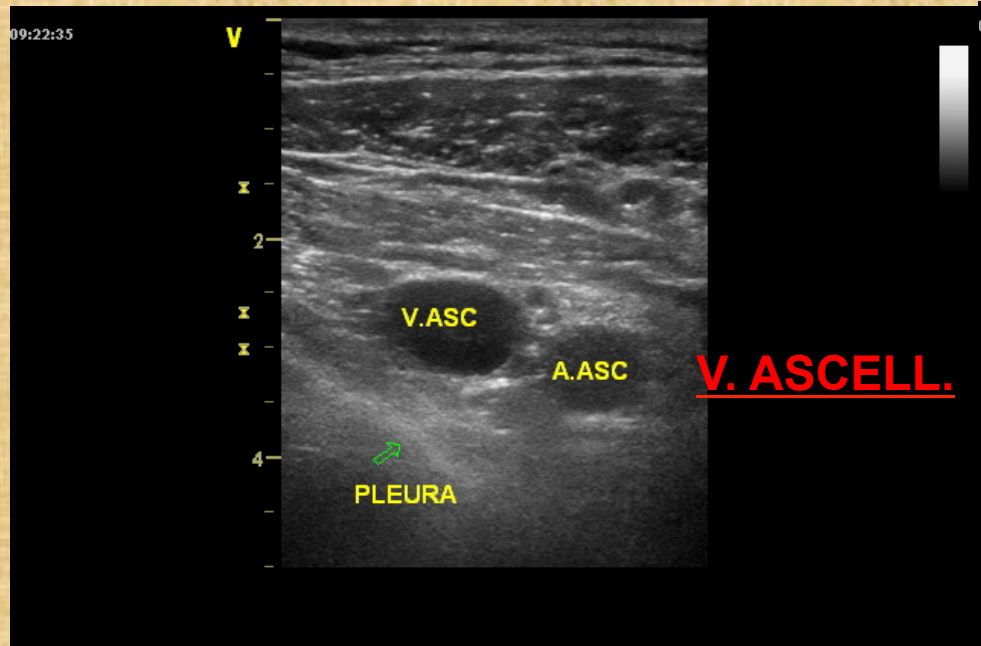


Vena Ascellare (altresì detta“porzione extratoracica della Vena Succlavia”) ?? ….. Perche no!?

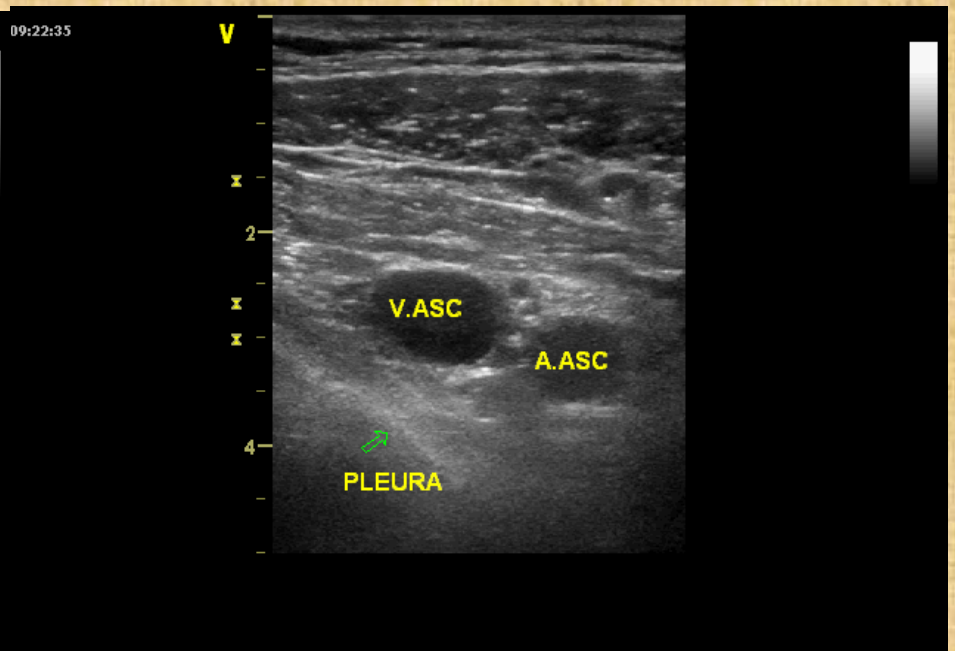


V. SUCCL.





V. ASCELL.



Vena Ascellare o “porzione extratoracica della Vena Succlavia” (approccio con punti di repere anat.)

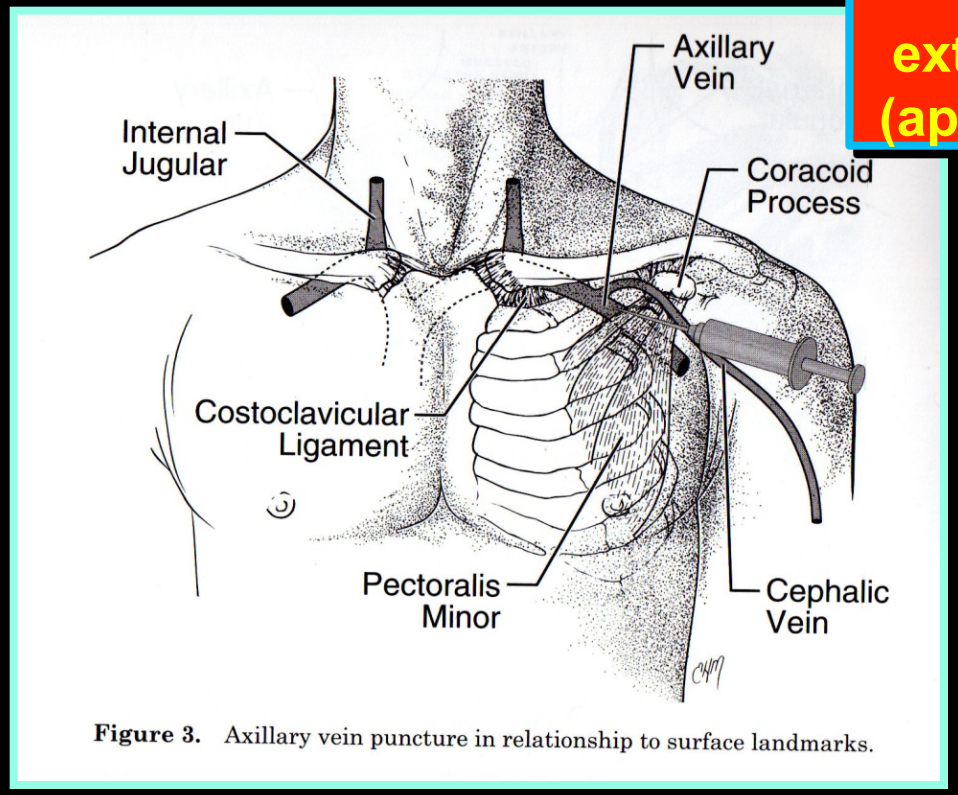
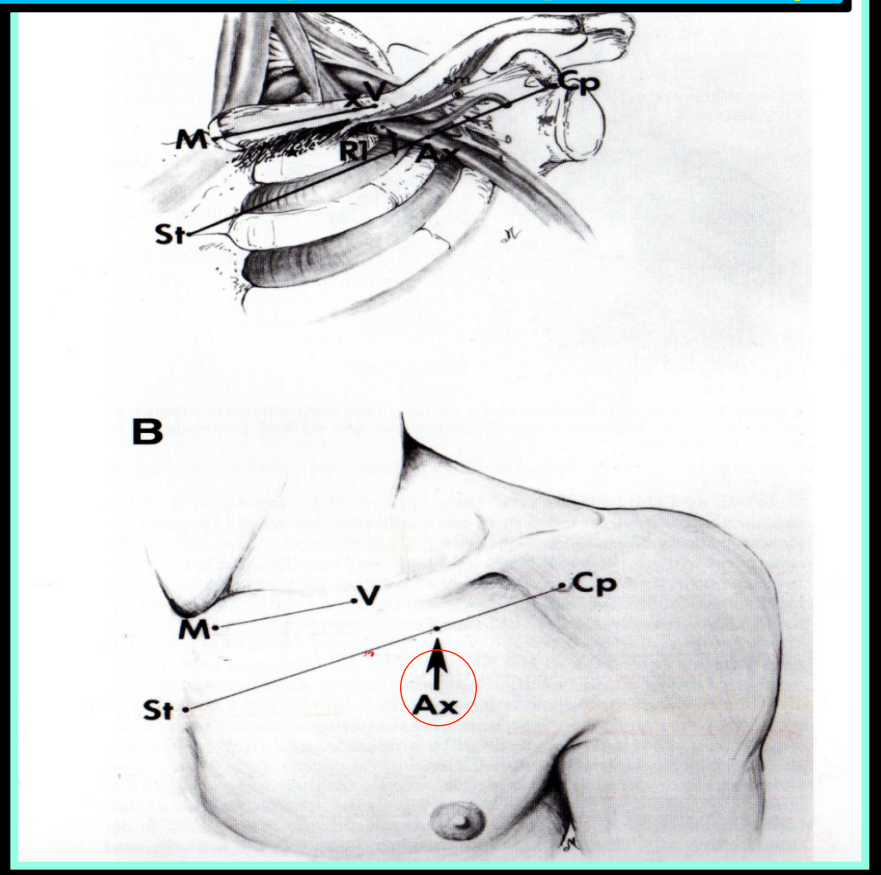


Figure 3. Axillary vein puncture in relationship to surface landmarks.



Deep and superficial anatomical relationship of the **Magney approuch** to axillary venipunture.

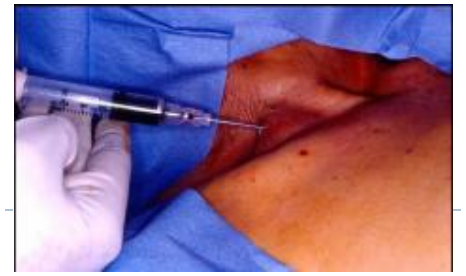
Point M indicates the medial end of the clavicle.. Route X defines a pont on the clavicle directly above the latera edges of the costoclavicular/subclavius muscle (tendon complex) R1.
Point V overlies the center o of the subclavian vein as it crosses the first rib. St is the center of the sternal angle; Cp is the coracoid process; Ax is the axillary vein ; star is the costoclavicular ligament; sm is the the subclavius muscle.

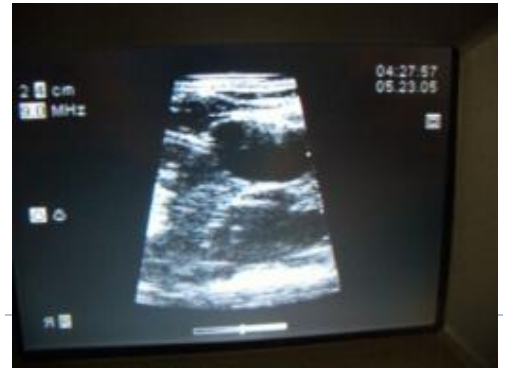
The arrow points to Magney’ s ideal point for venous entry

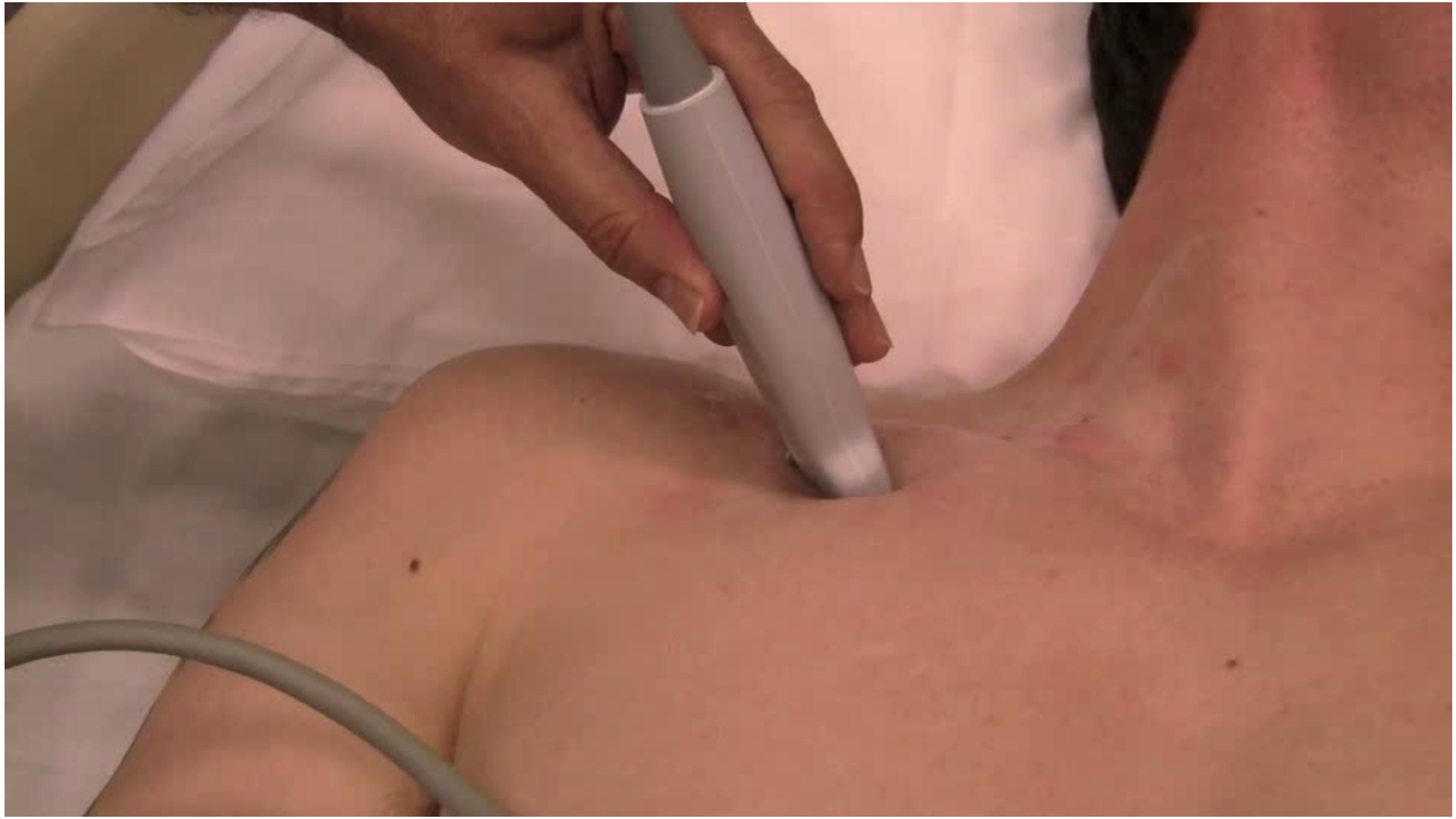
Perché non usare l' ecografo ??

- Vedere è meglio che non vedere, ad esempio quando si attraversa una strada

- …o quando si cerca di pungere una vena







6. Axillary Vein: Longitudinal

ECOGUIDA:
TIPS AND PITFALLS

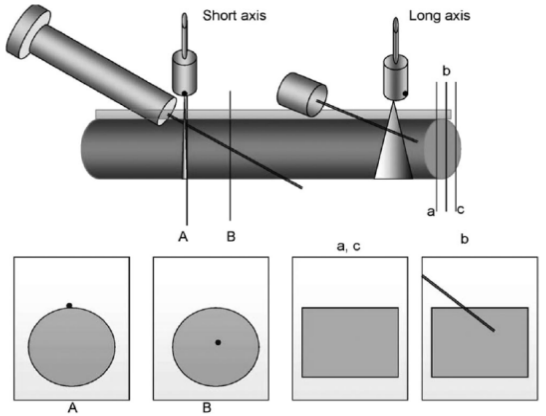
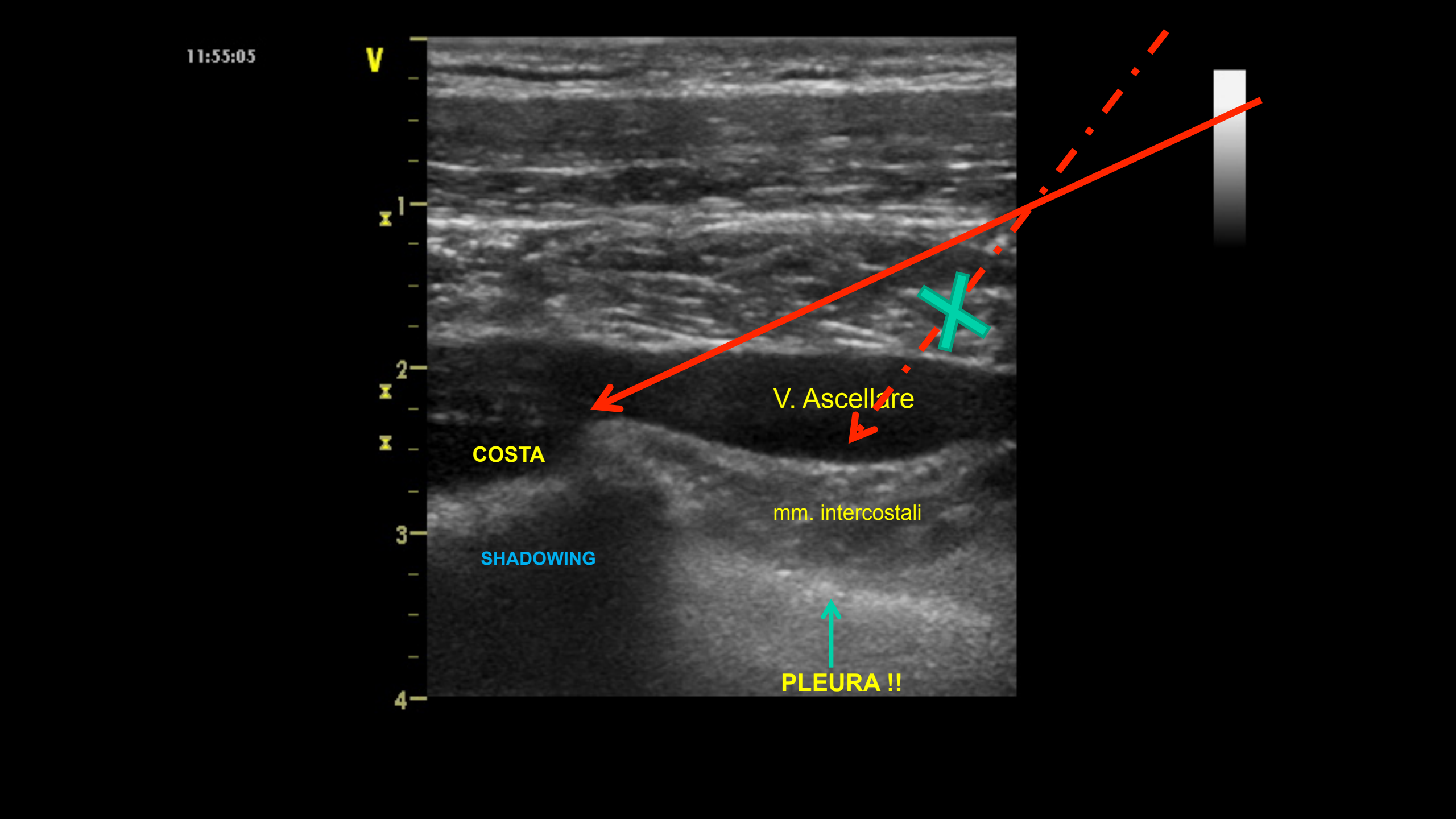


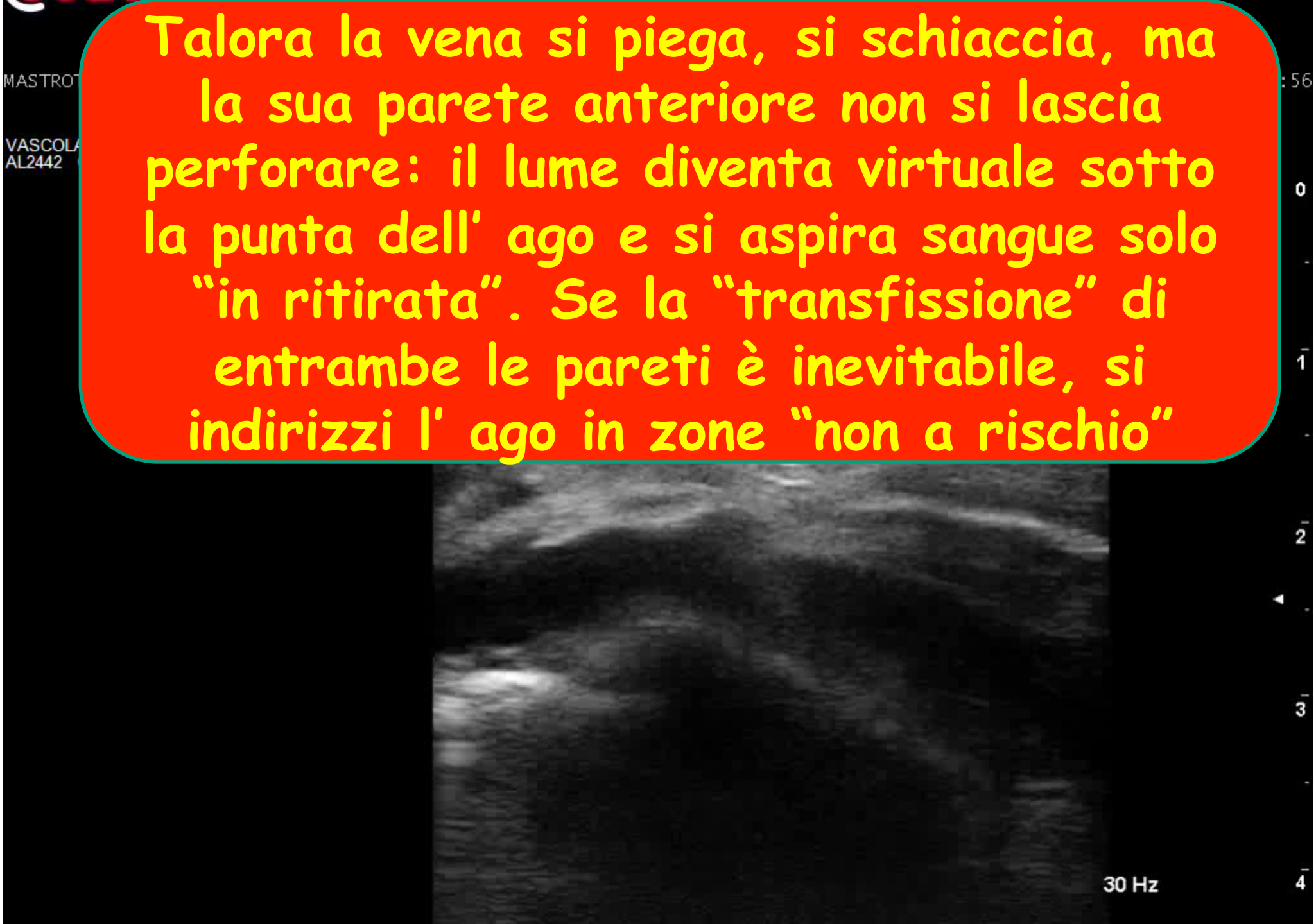
Figure 1. Difference between long- and short-axis guidance for central venous catheter placement.

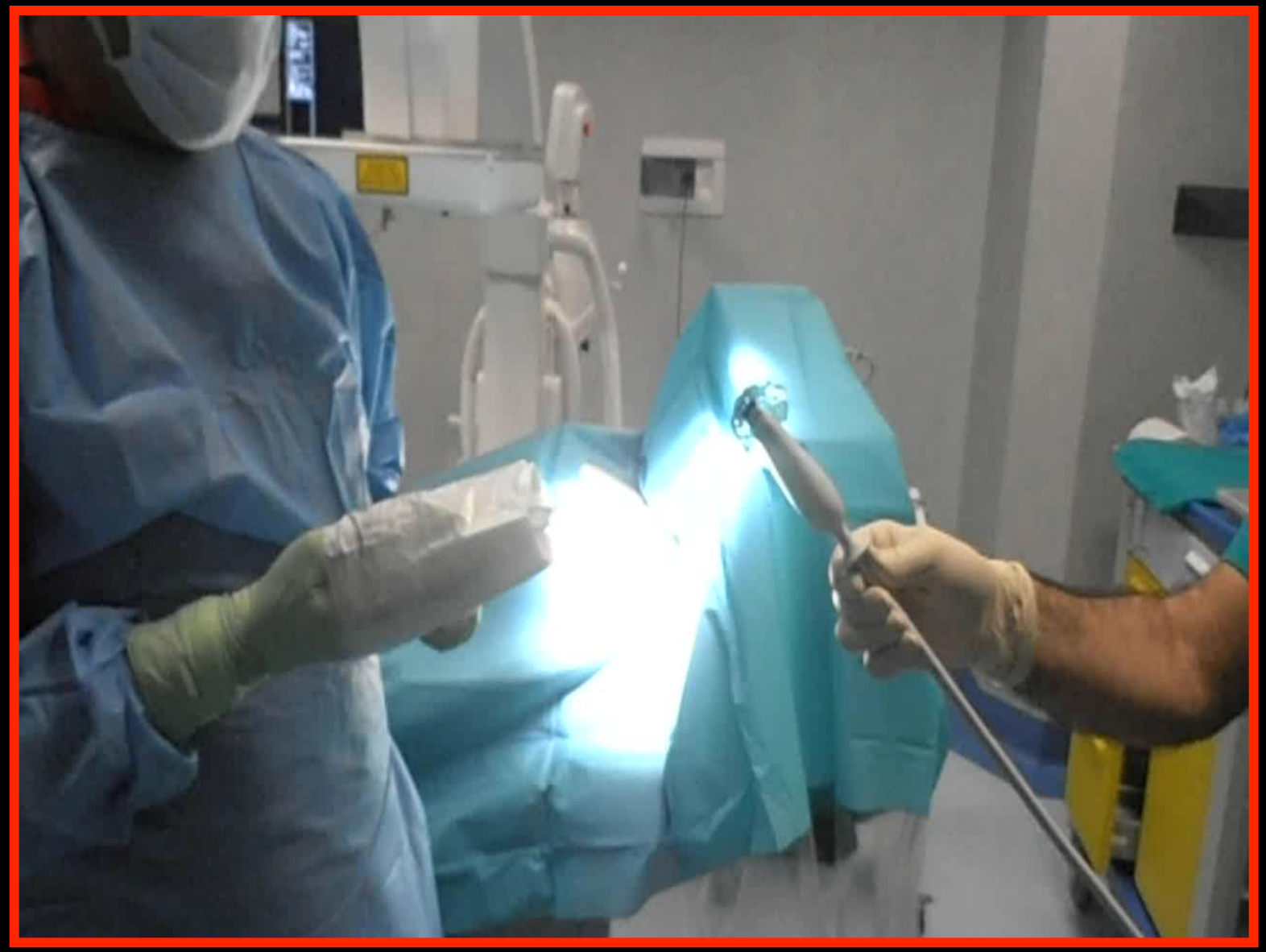
ECOGUIDA:
TIPS AND PITFALLS

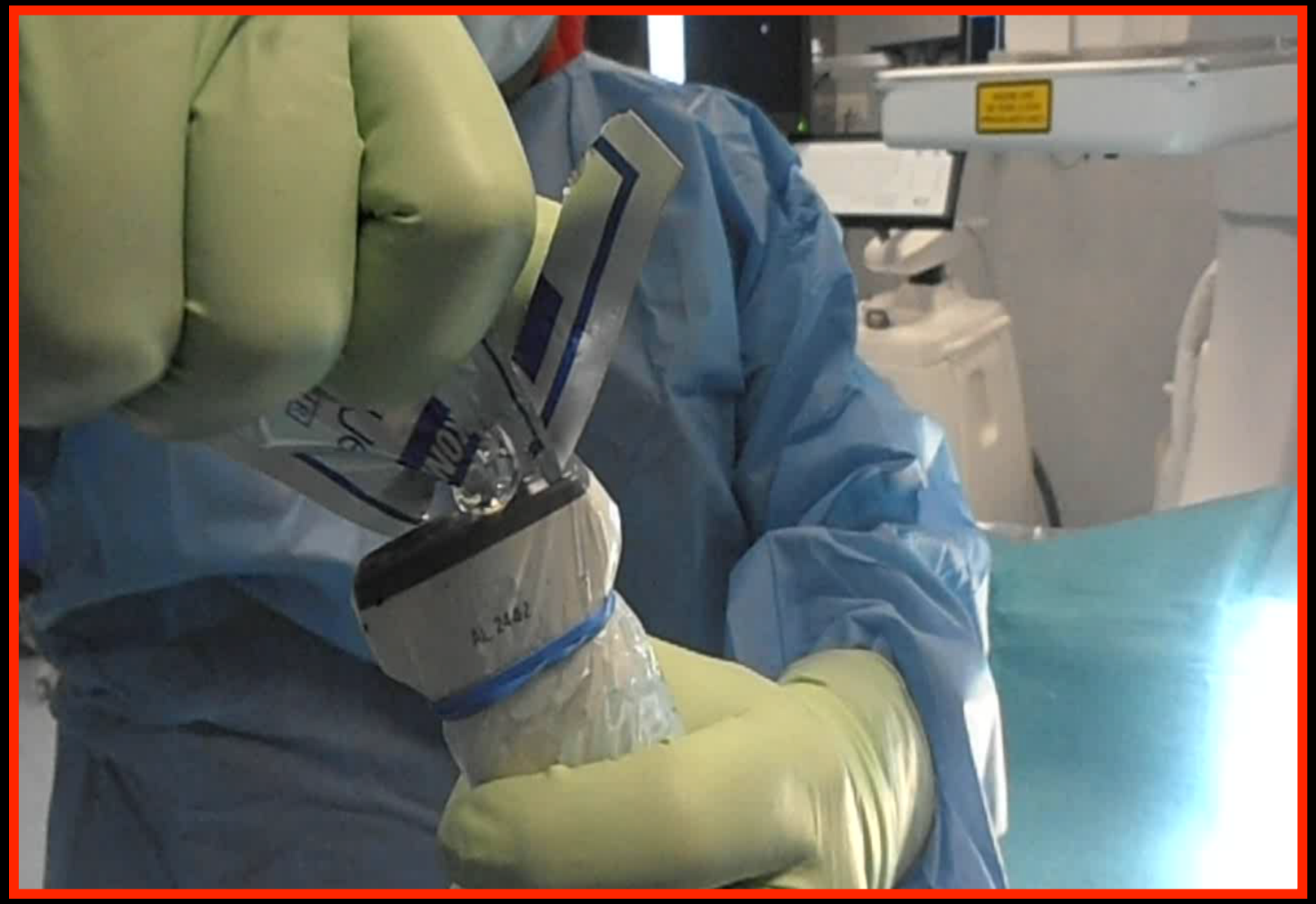
1. **VISUALIZZARE SEMPRE LA PUNTA DELL'AGO !!!**
   (finchè non raggiunge il lume della vena) (ASSE CORTO-OUT OF PLANE)

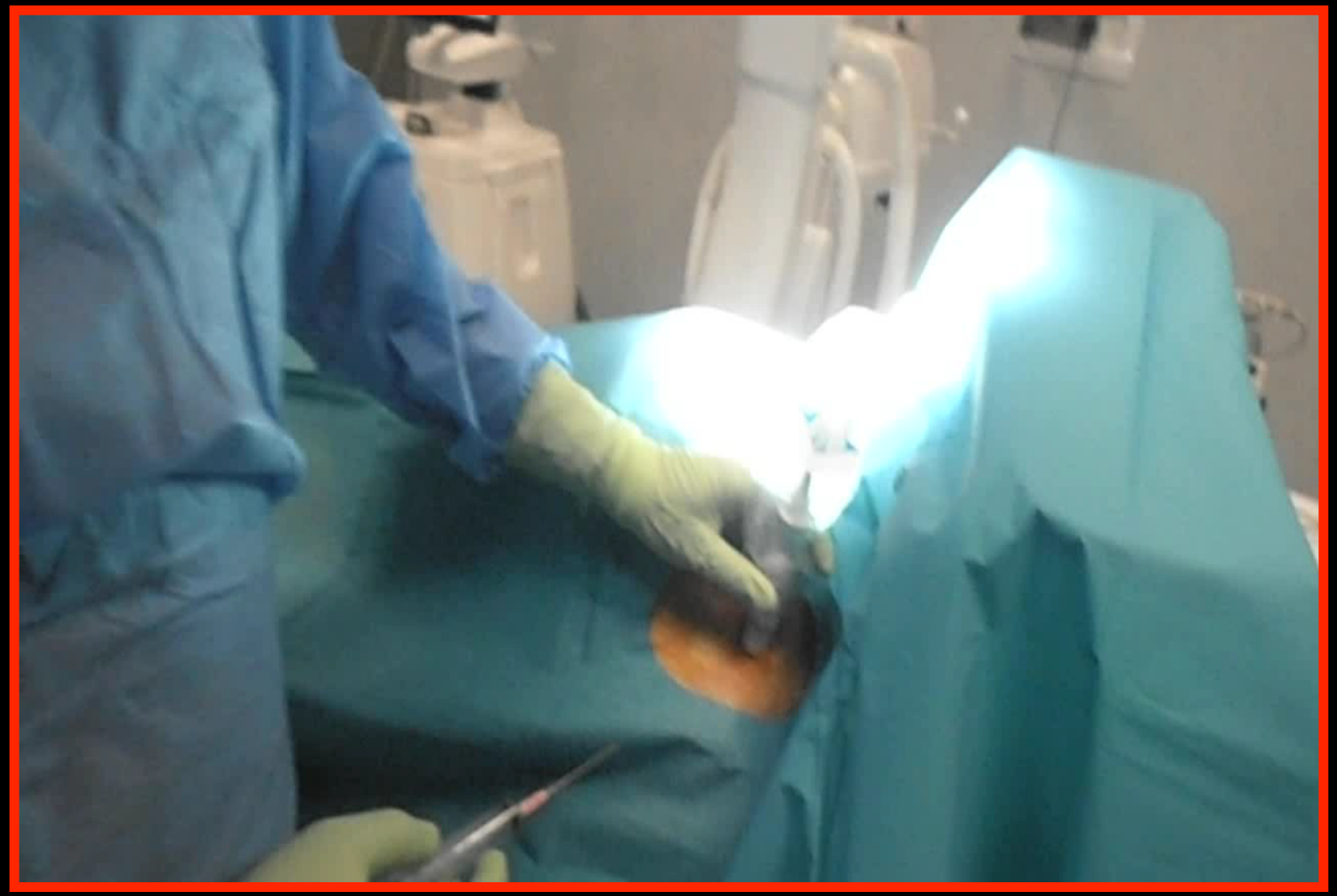
2. **VISUALIZZARE PUNTA E STAFFA DELL' AGO** (ASSE LUNGO IN PLANE)

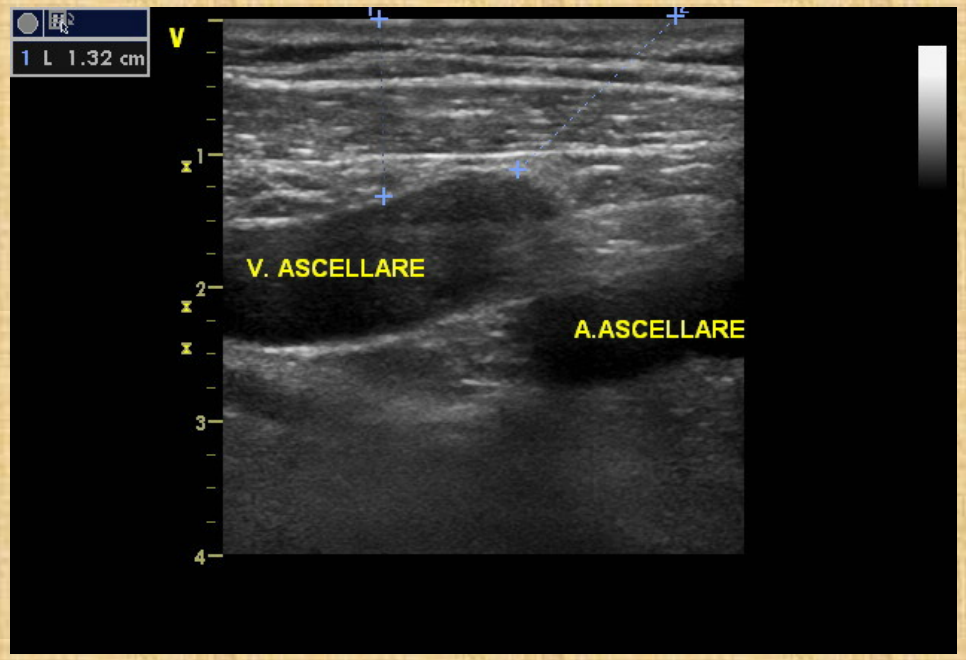

11:55:05
V
1
2
3
4
V. Ascellare
COSTA
mm. intercostali
SHADOWING
PLEURA !!

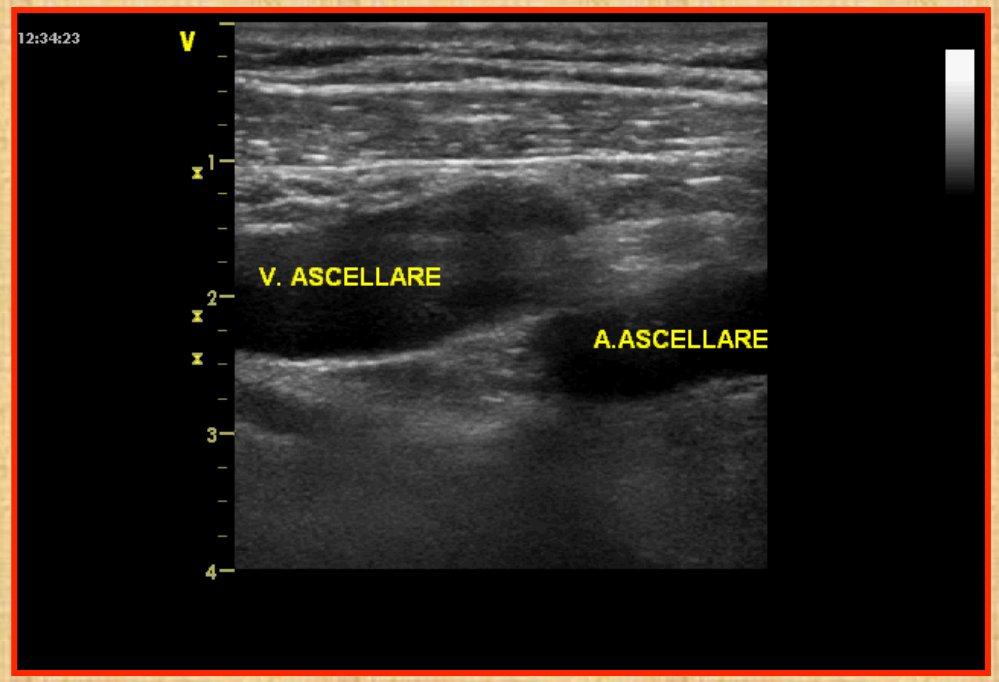

Talora la vena si piega, si schiaccia, ma la sua parete anteriore non si lascia perforare: il lume diventa virtuale sotto la punta dell' ago e si aspira sangue solo "in ritirata". Se la "transfissione" di entrambe le pareti è inevitabile, si indirizzi l' ago in zone "non a rischio"
MASTRO
VASCOLA
AL2442
30 Hz

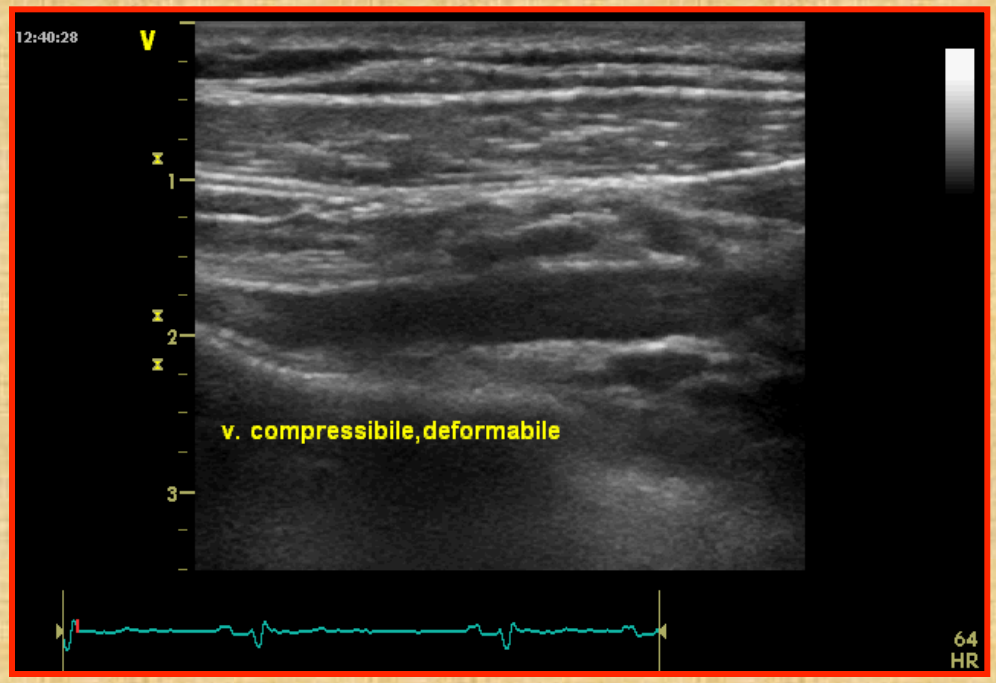




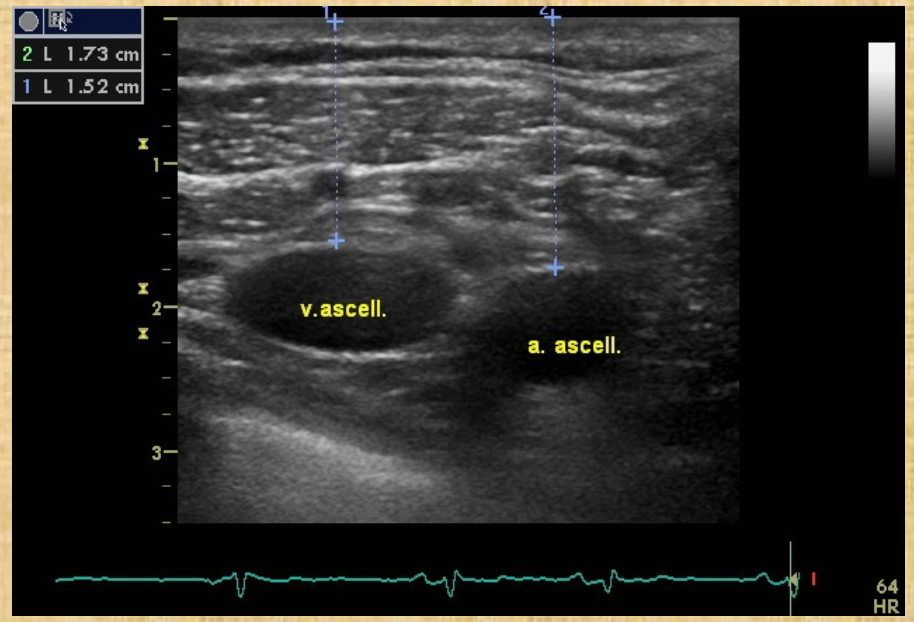


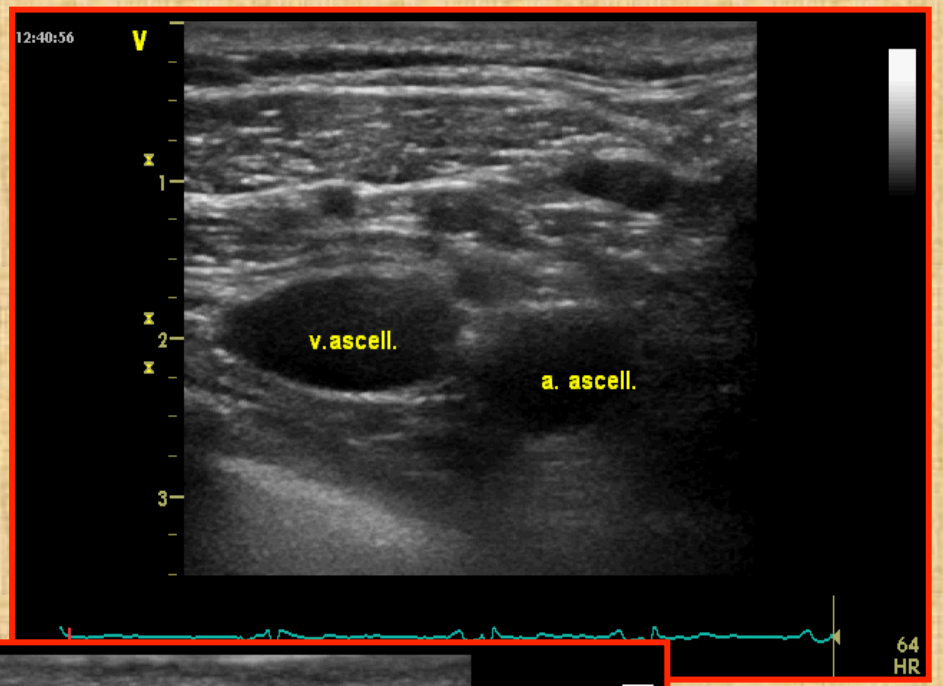

1 L 1.32 cm
V
V. ASCELLARE
A.ASCELLARE

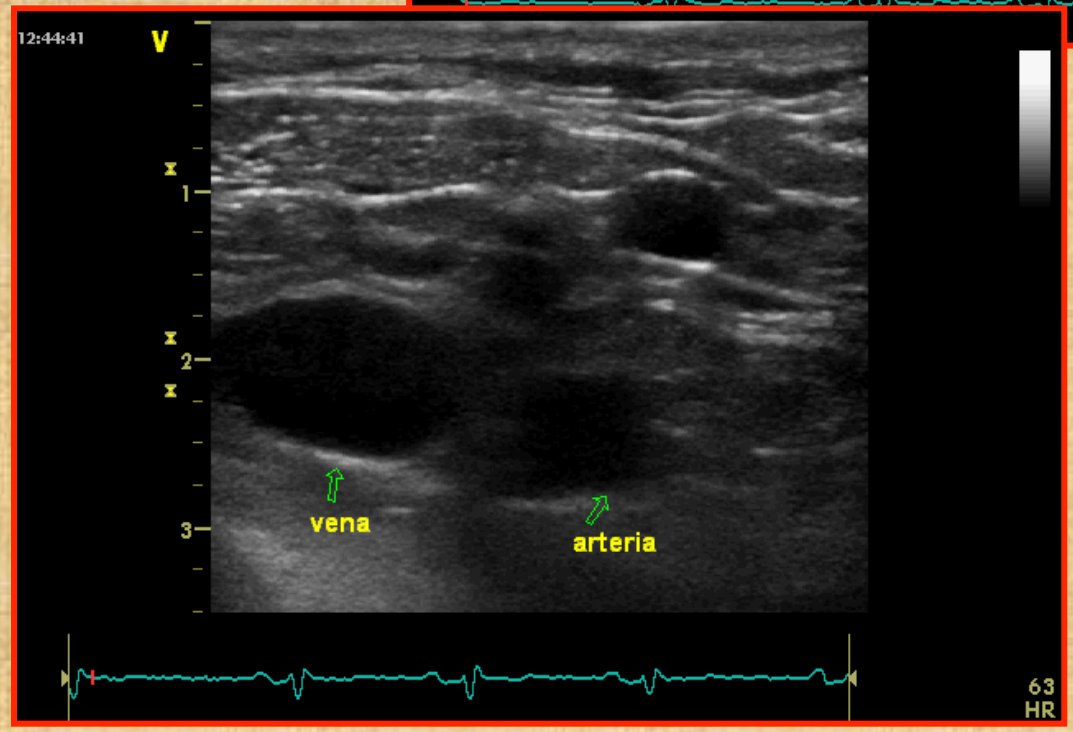

12:34:23
V
V. ASCELLARE
A.ASCELLARE


12:40:28
V
v. compressibile,deformabile
64
HR

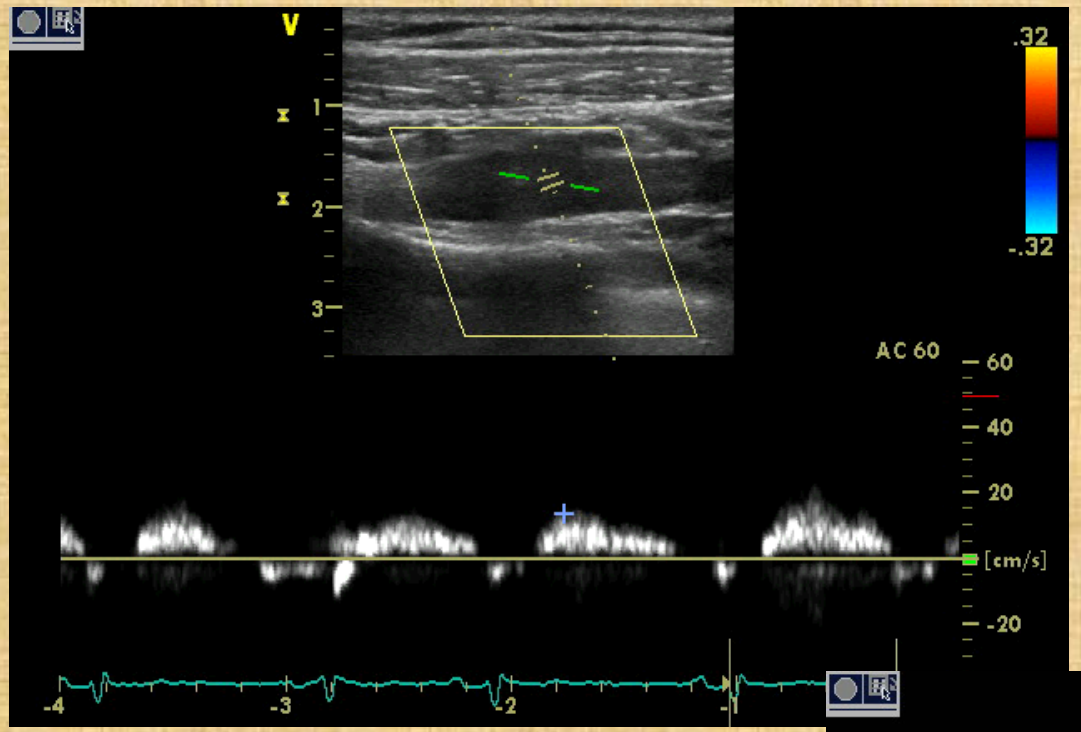
ASSE LUNGO

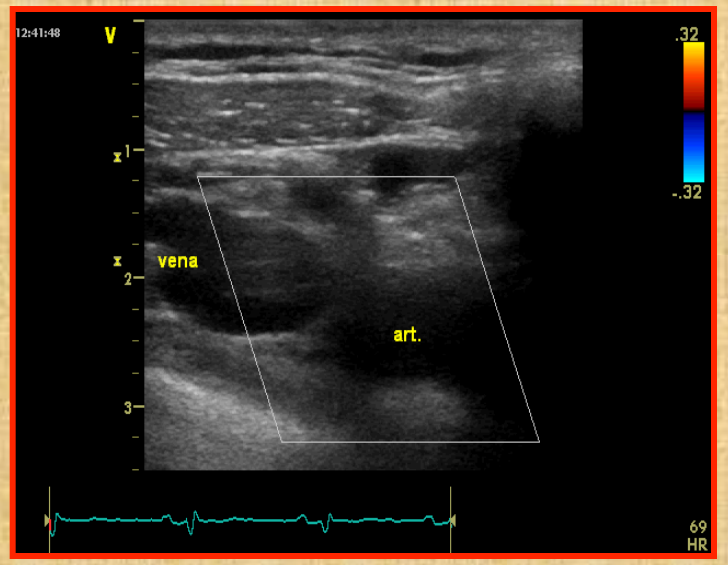

2 L 1.73 cm
1 L 1.52 cm
v.ascell.
a. ascell.
64
HR


12:40:56
V
v.ascell.
a. ascell.
64
HR

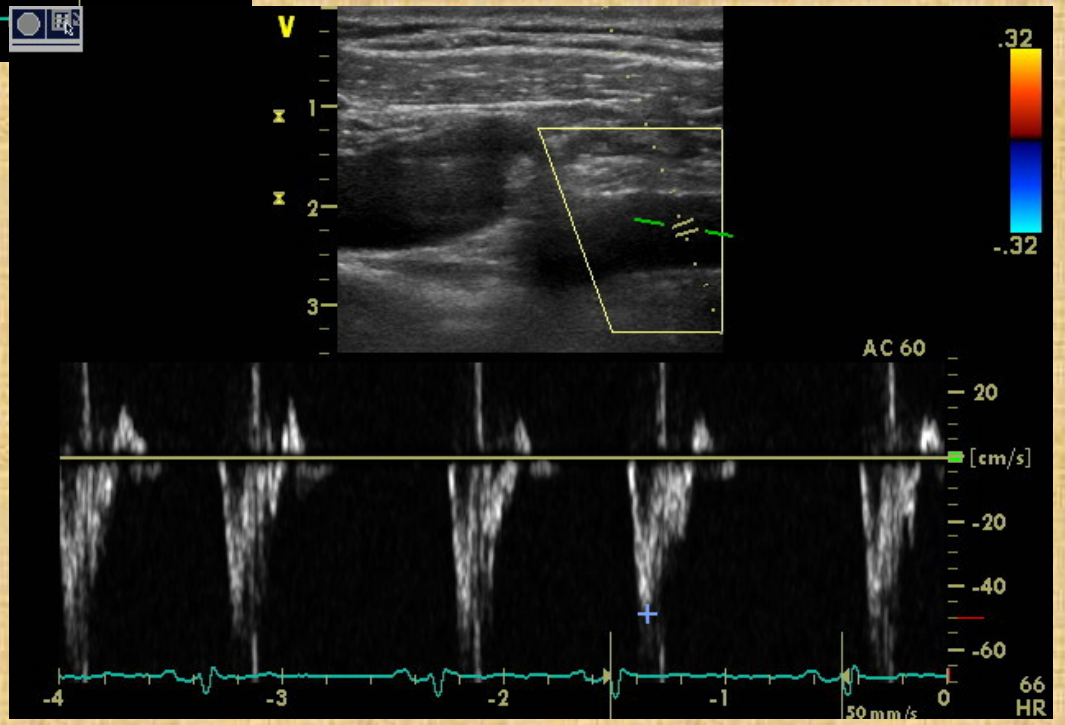

12:44:41
V
vena
arteria
63
HR

ASSE CORTO

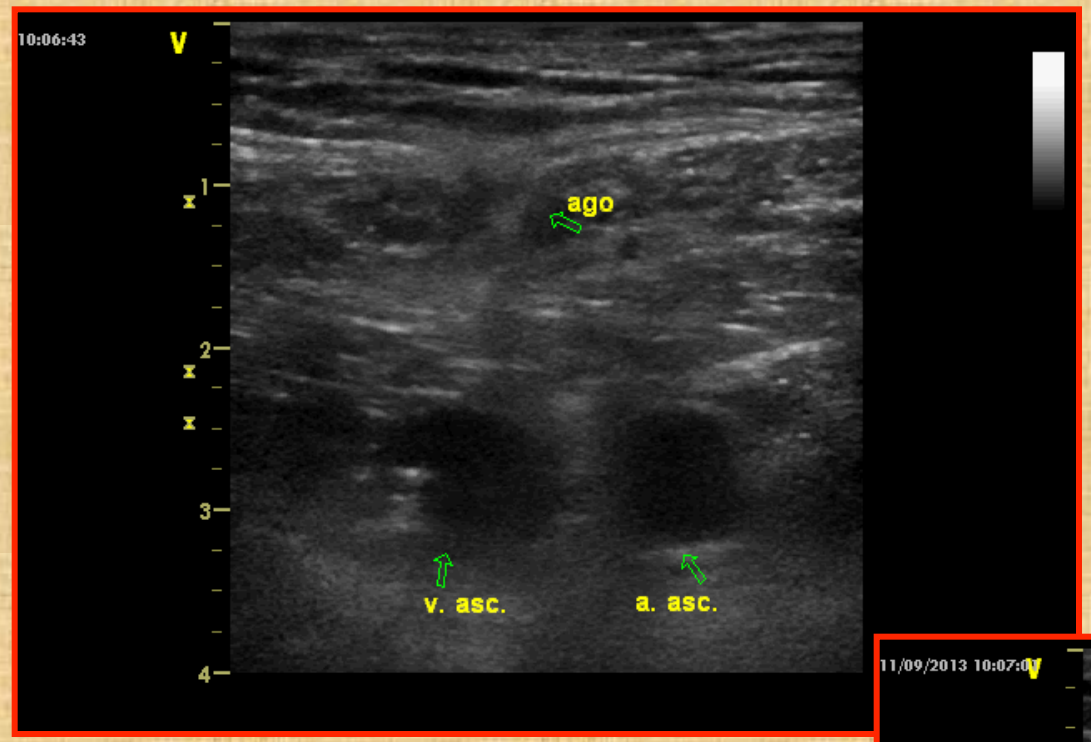




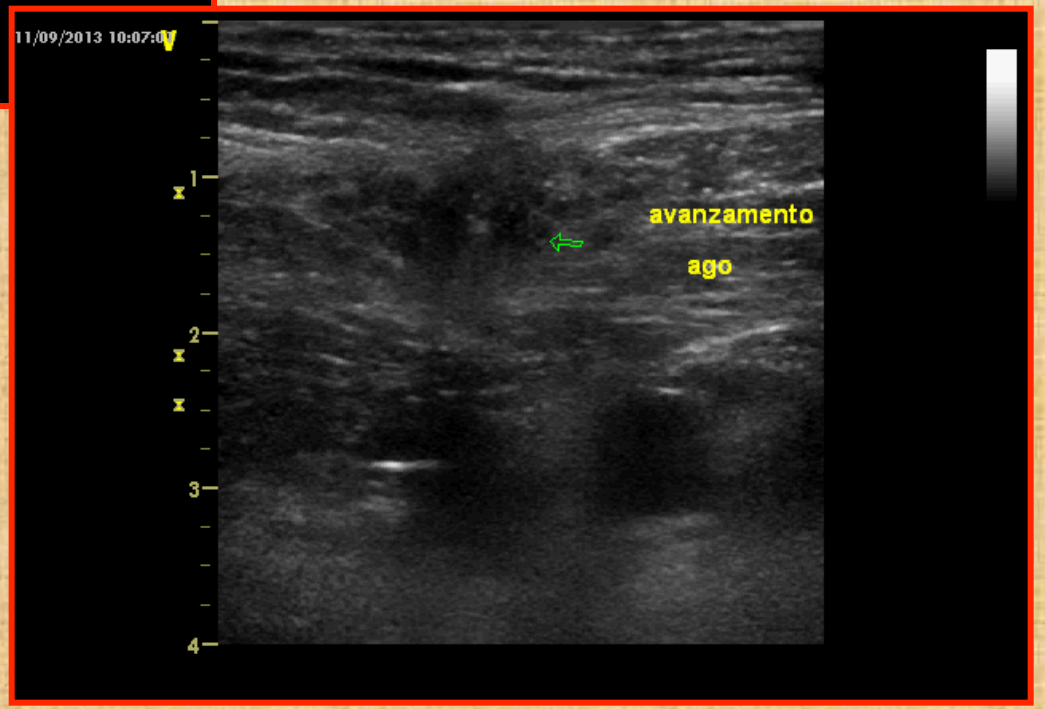
C'è bisogno del Doppler ??



INCANNULAZIONE VENOSA ECOGUIDATA “REAL TIME”



ASSE CORTO
OUT FO PLANE



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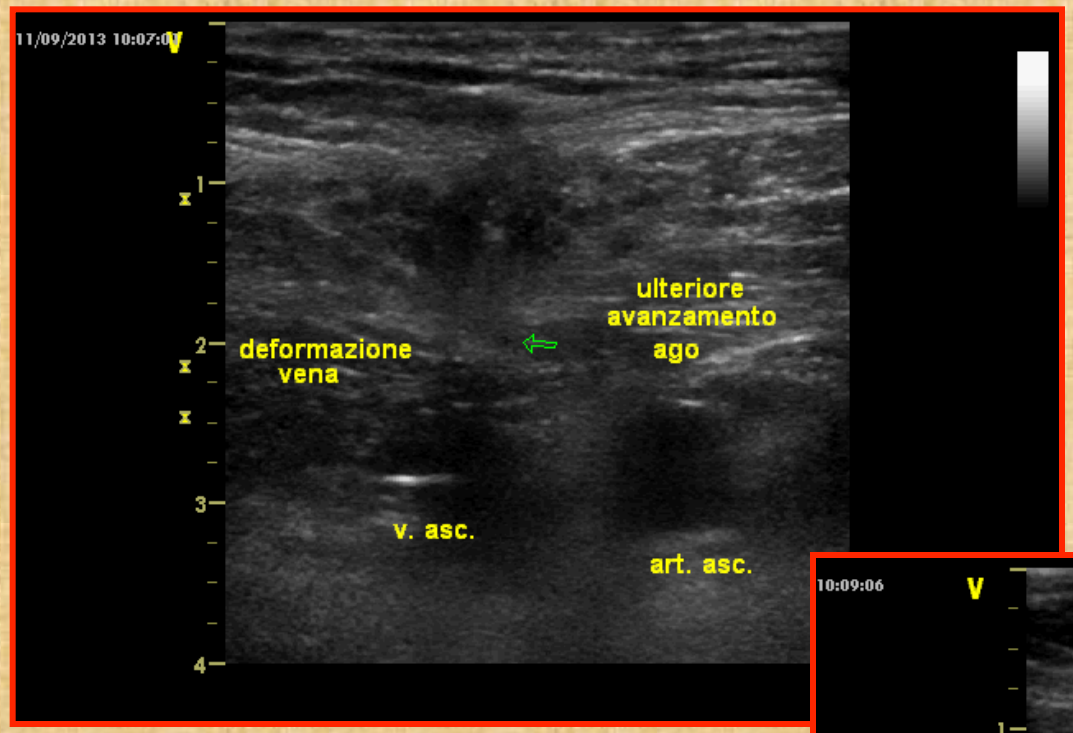
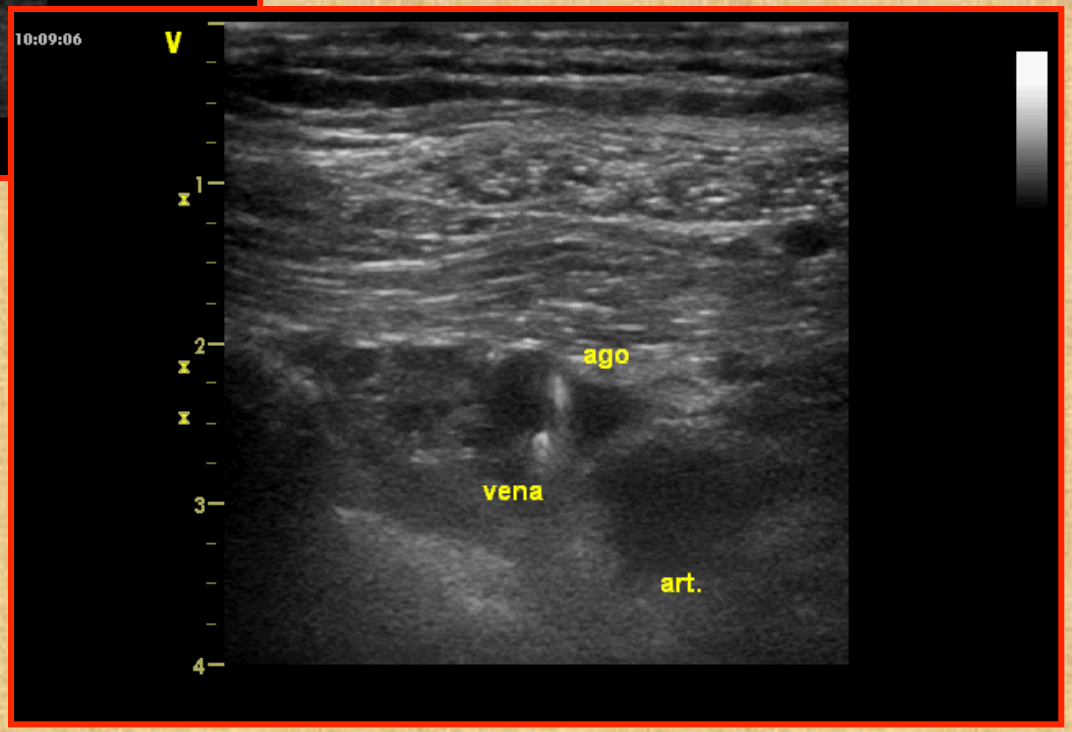


ASSE CORTO
OUT FO PLANE



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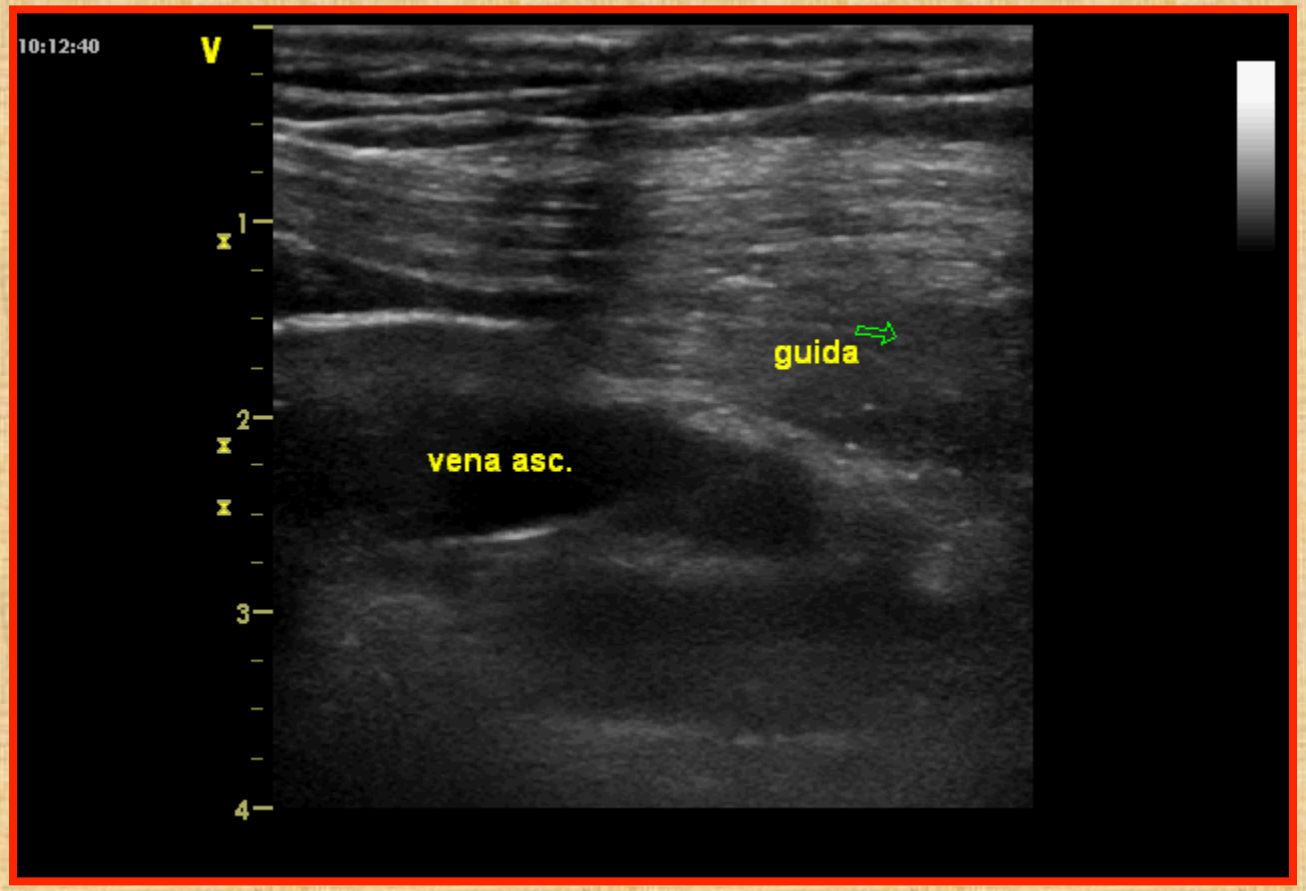

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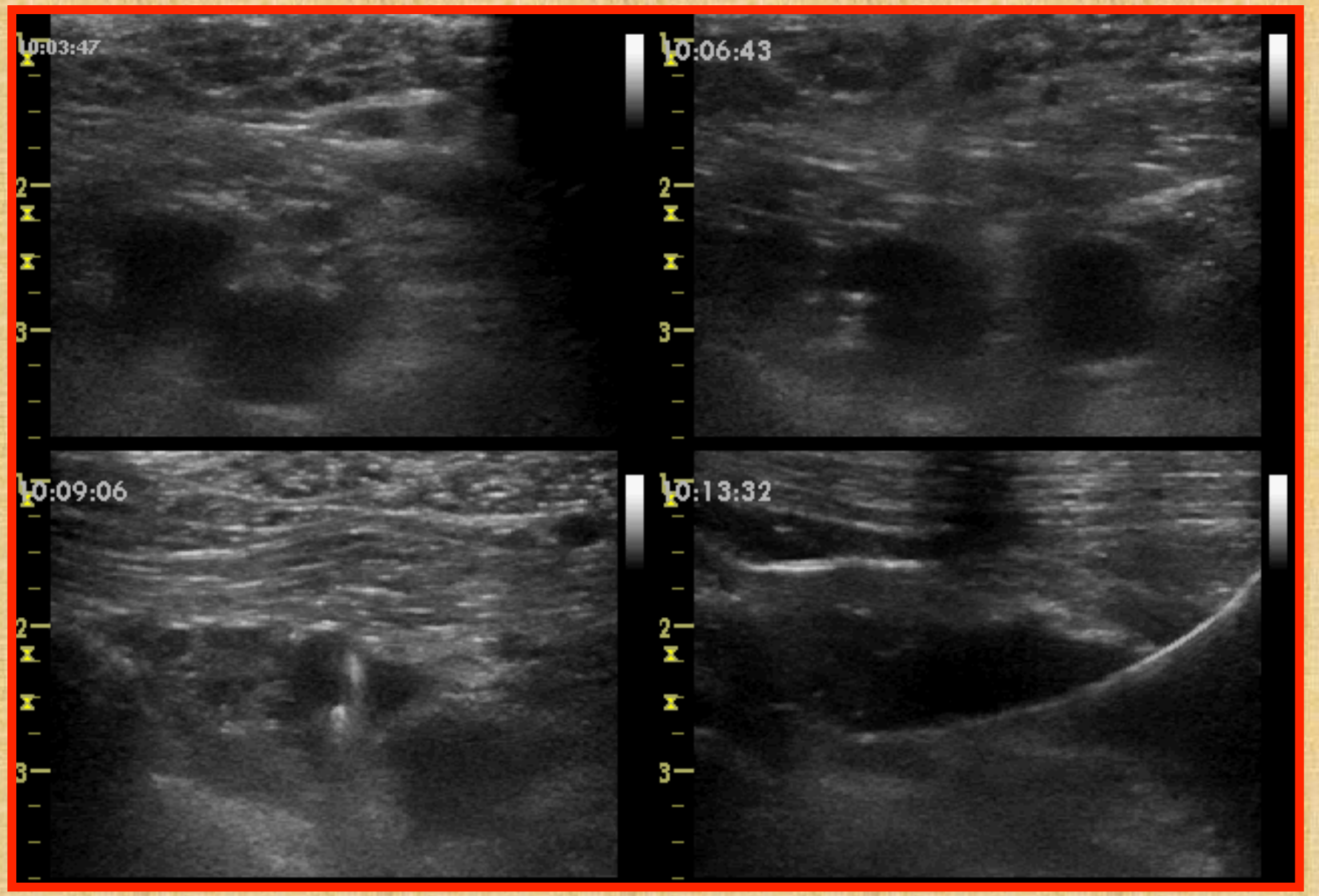

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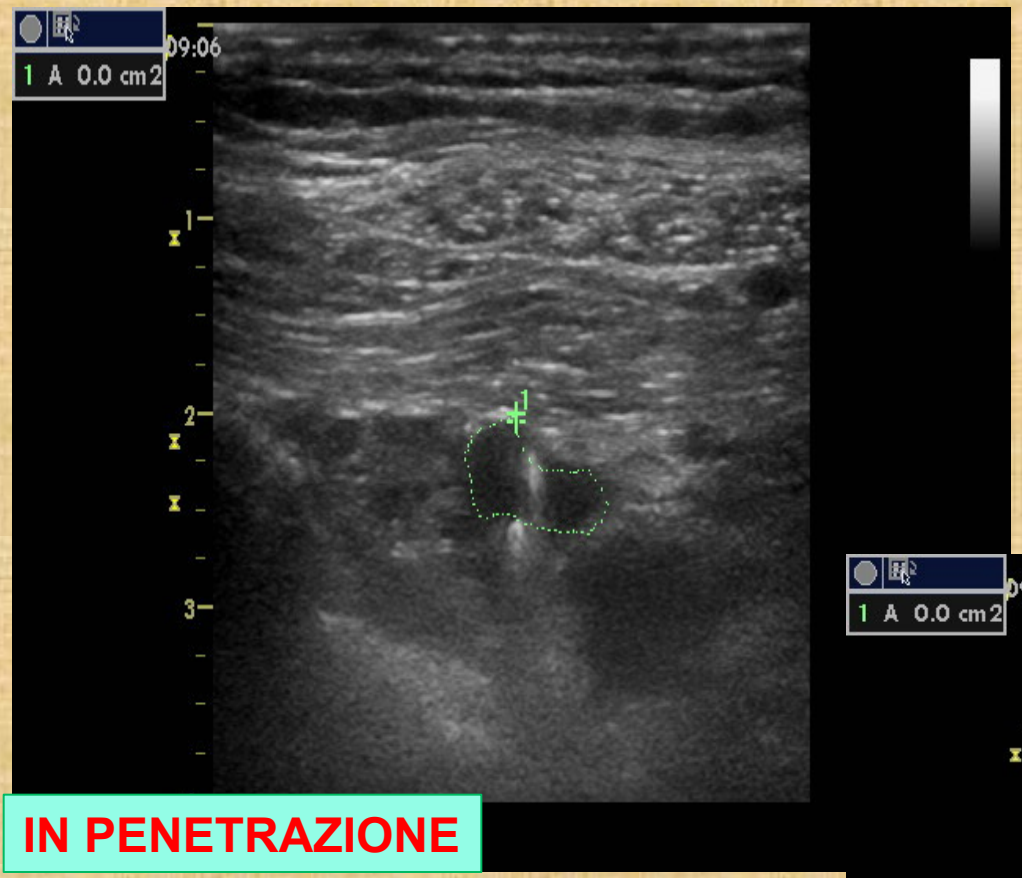
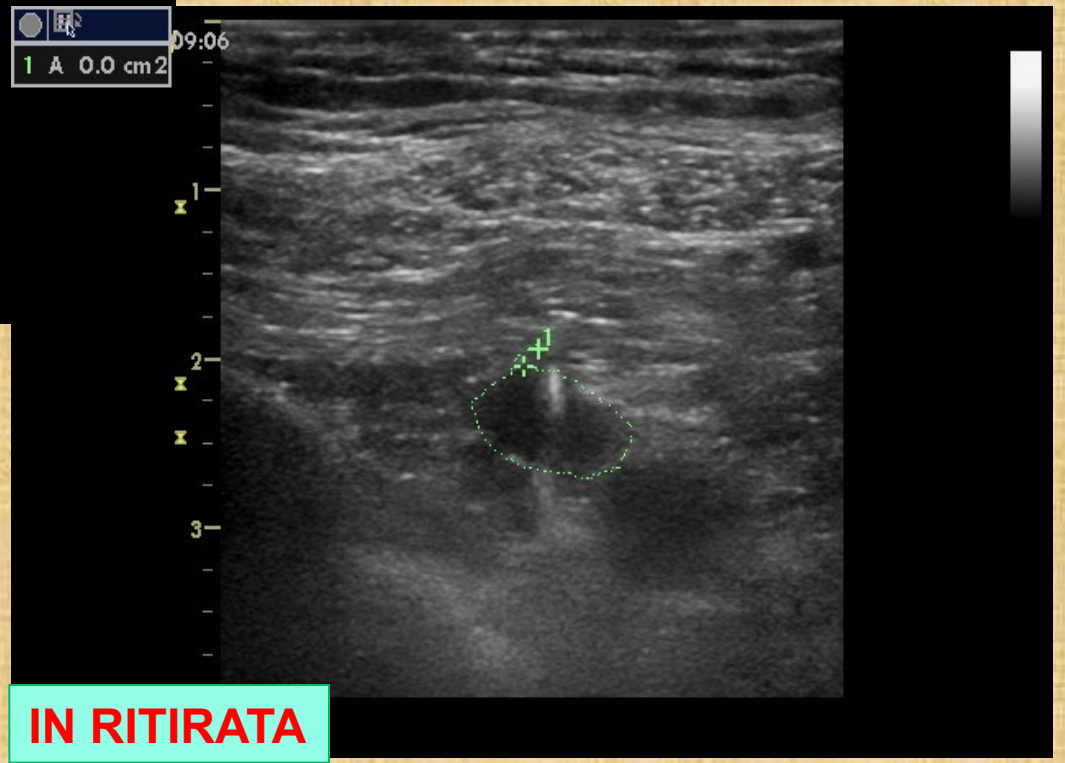


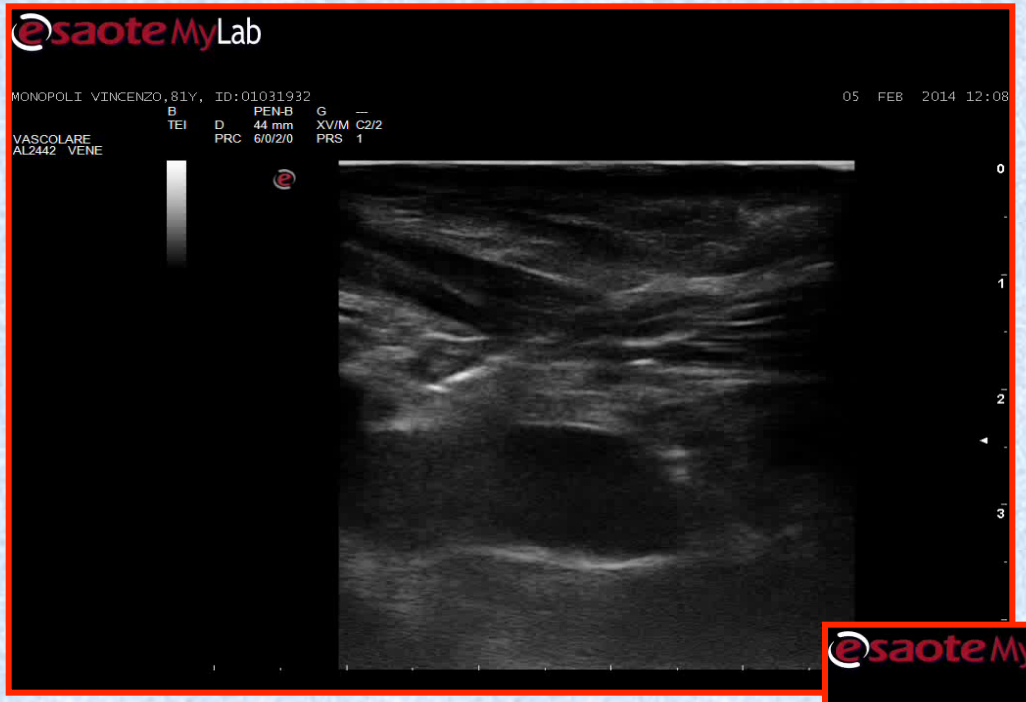
IN PENETRAZIONE

ASSE CORTO
OUT FO PLANE

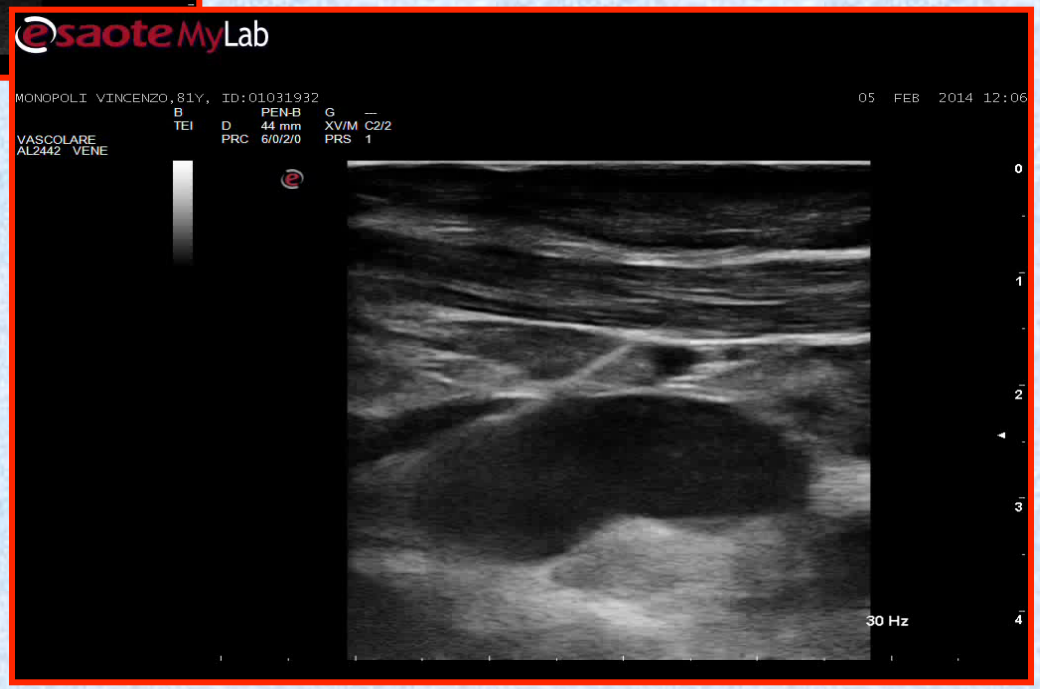


IN RITIRATA

INCANNULAZIONE VENOSA ECOGUIDATA “REAL TIME”



ASSE LUNGO
IN PLANE
(doppia puntura)



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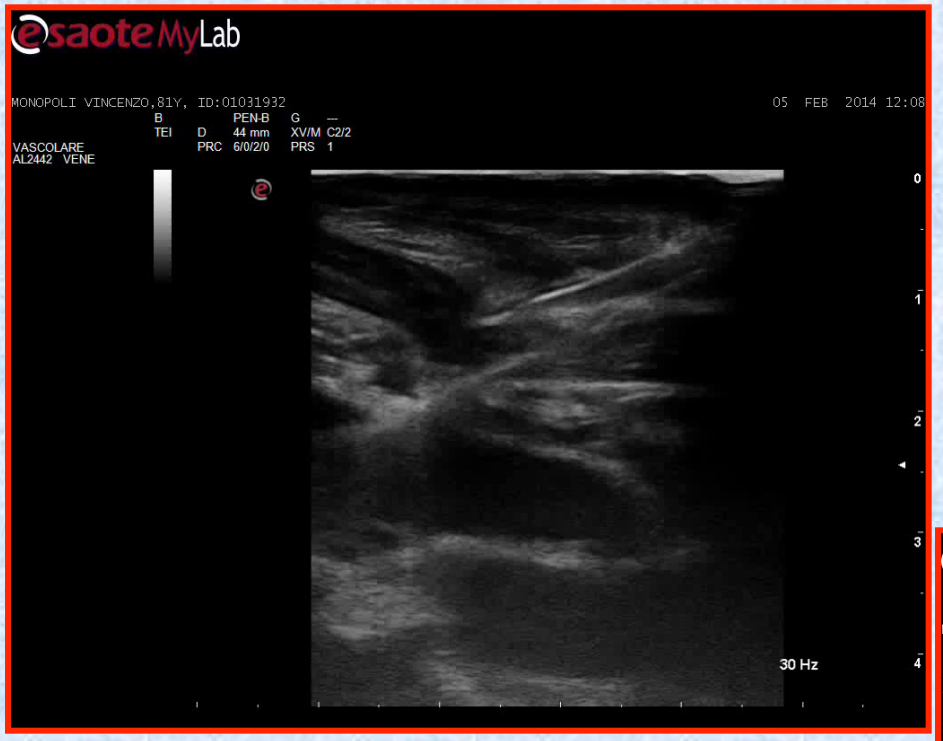
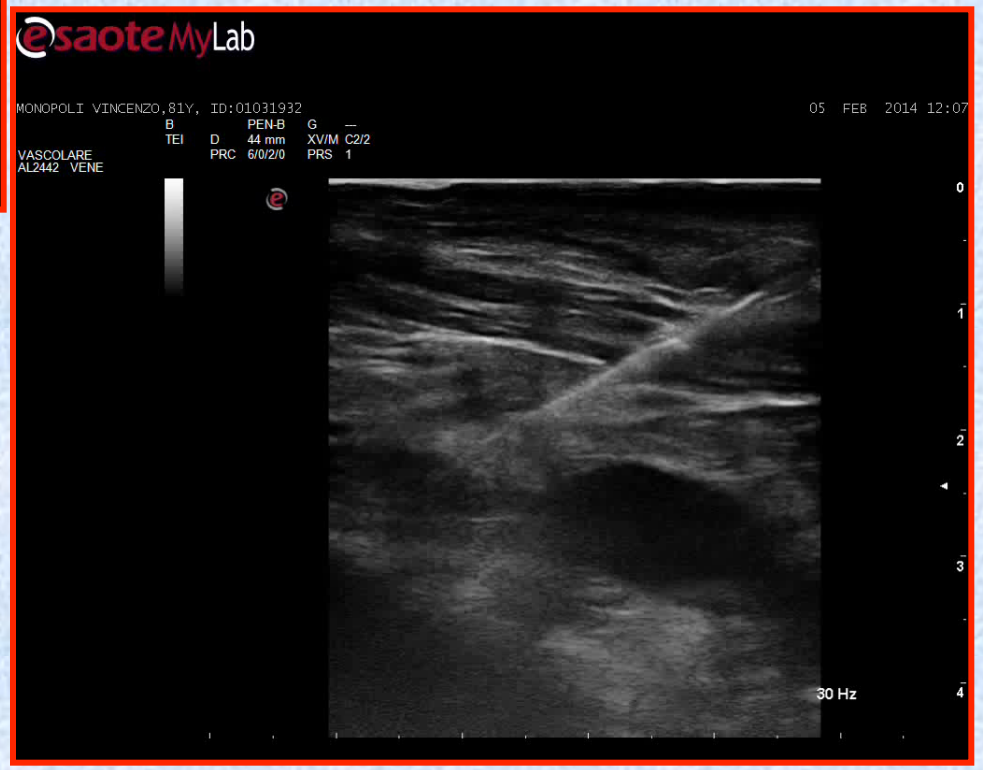


ASSE LUNGO
IN PLANE
(doppia puntura)

Seconda puntura
e Guida posizionata



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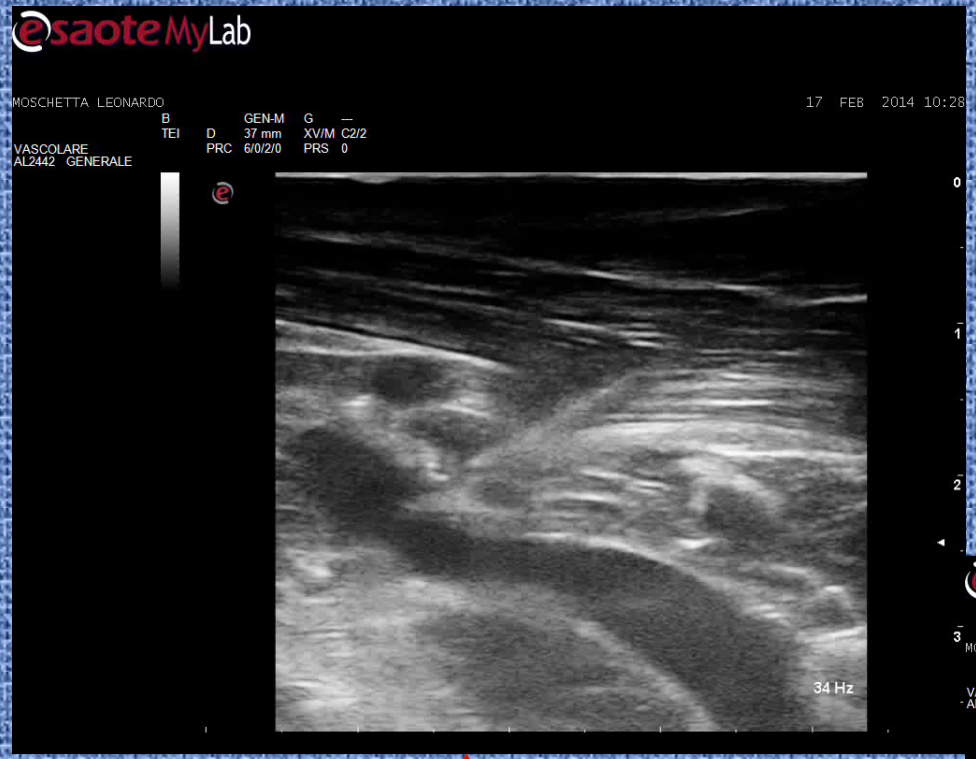
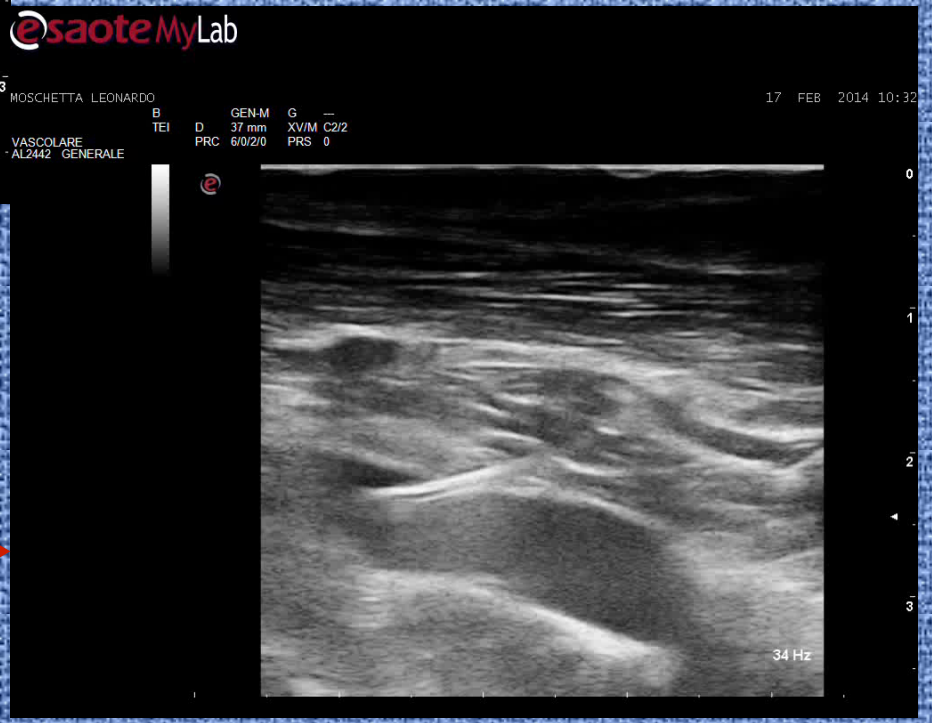


ASSE LUNGO
IN PLANE
(doppia puntura)

AGO N° 1

GUIDA N° 1



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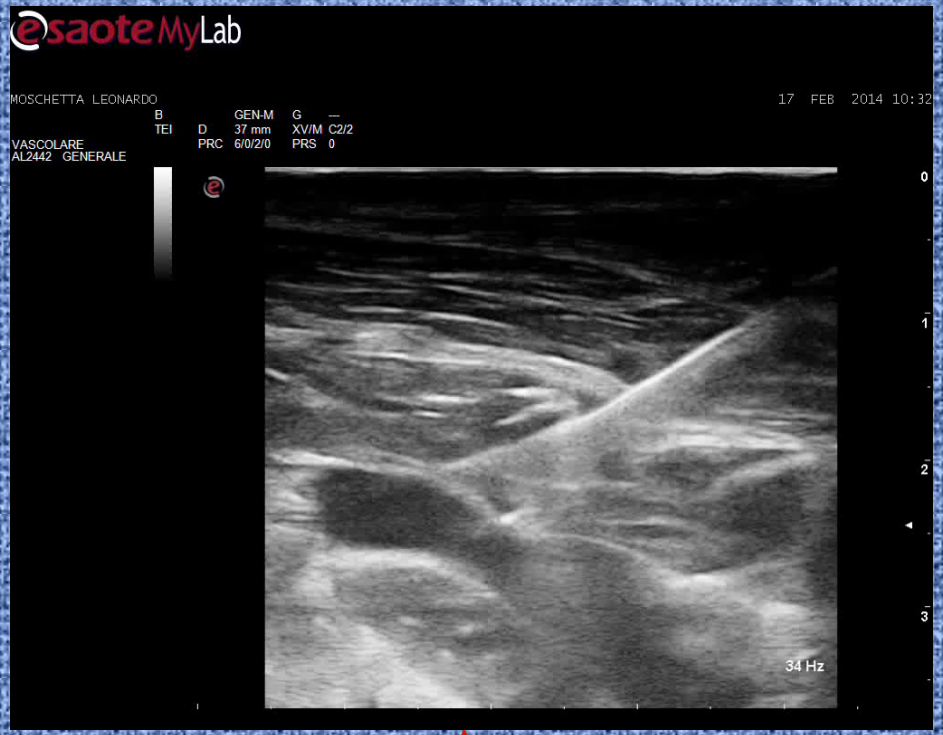
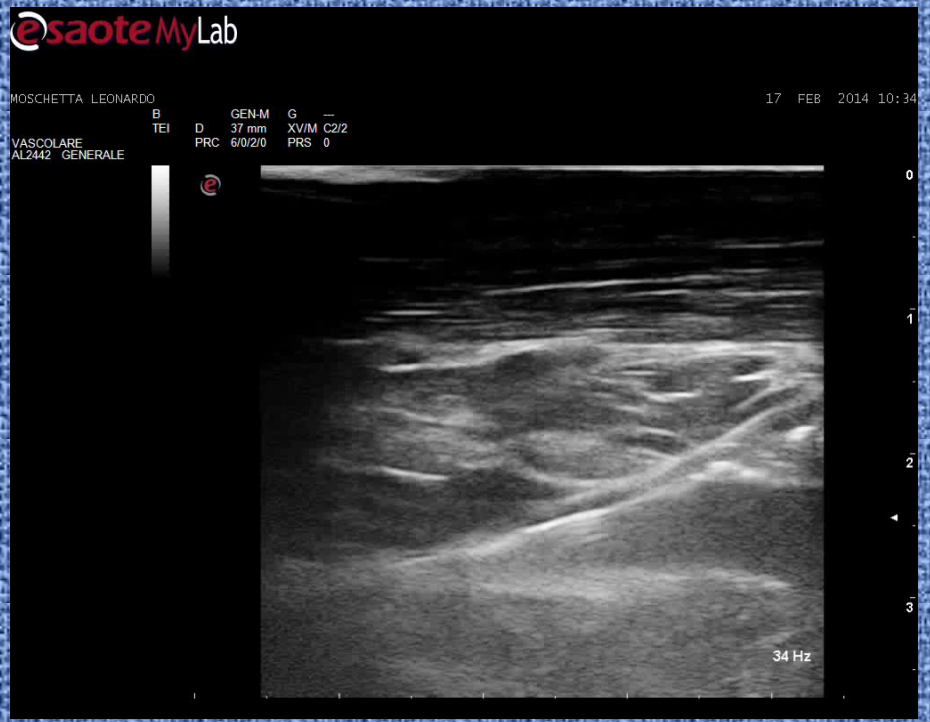


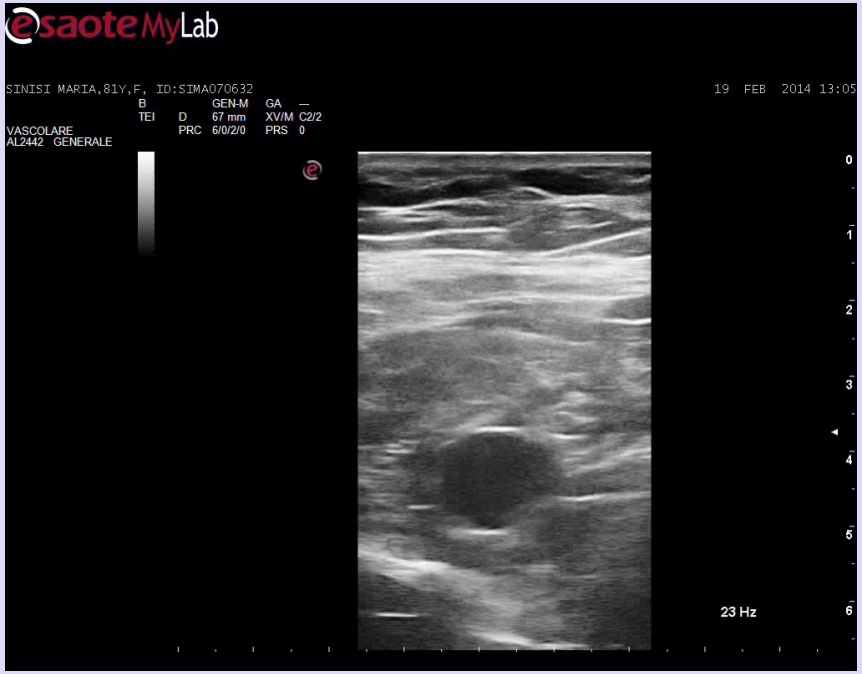
ASSE LUNGO
IN PLANE

Seconda puntura
Prima Guida

Due Guide



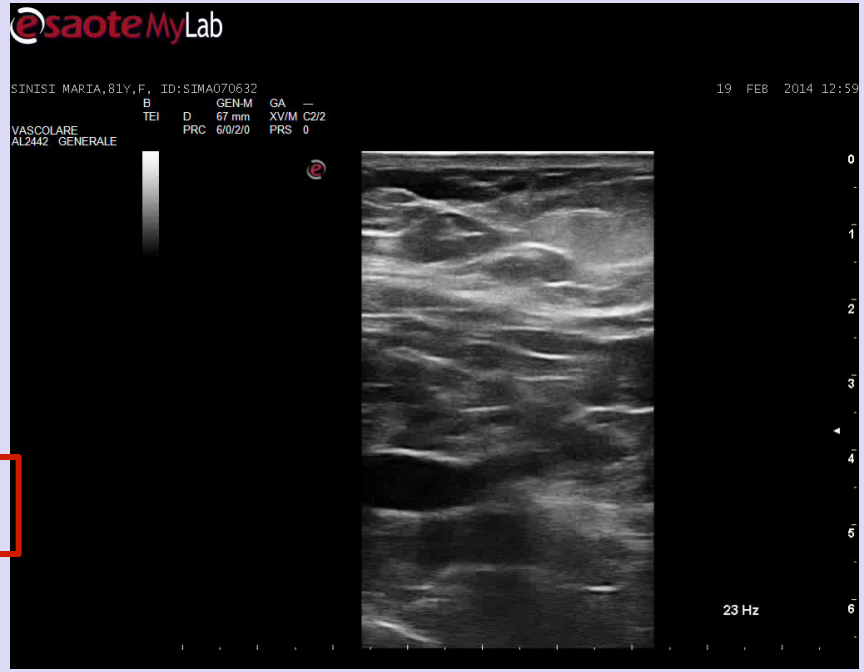
collasso completo in fase inspiratoria



Asse corto

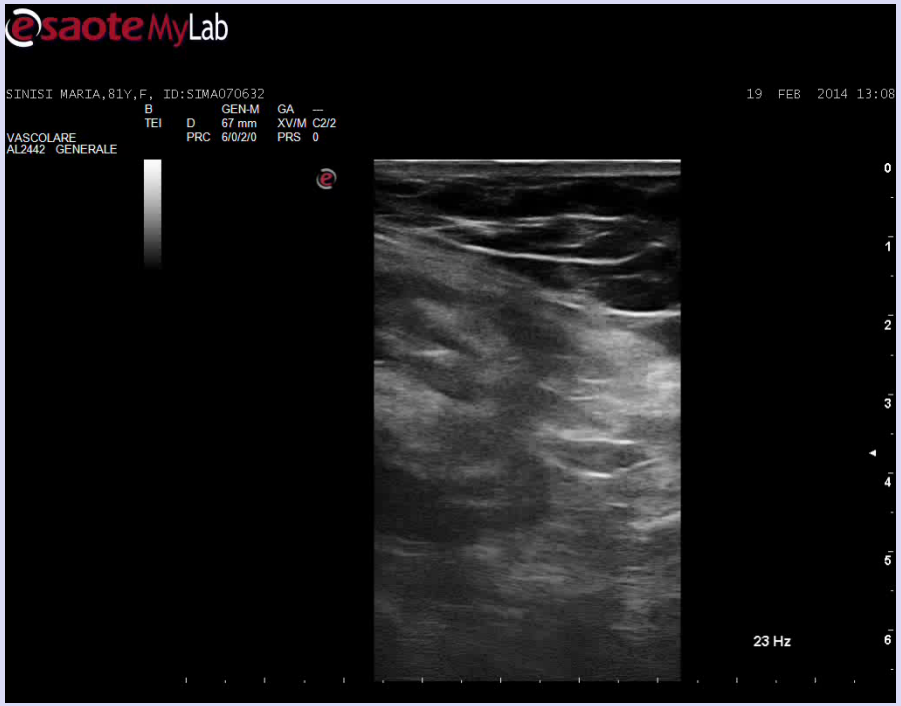
Donna di 90 Kg
Grande obesa
Collo e Tronco: un tutto indistinto

RESPIRAZIONE SPONTANEA



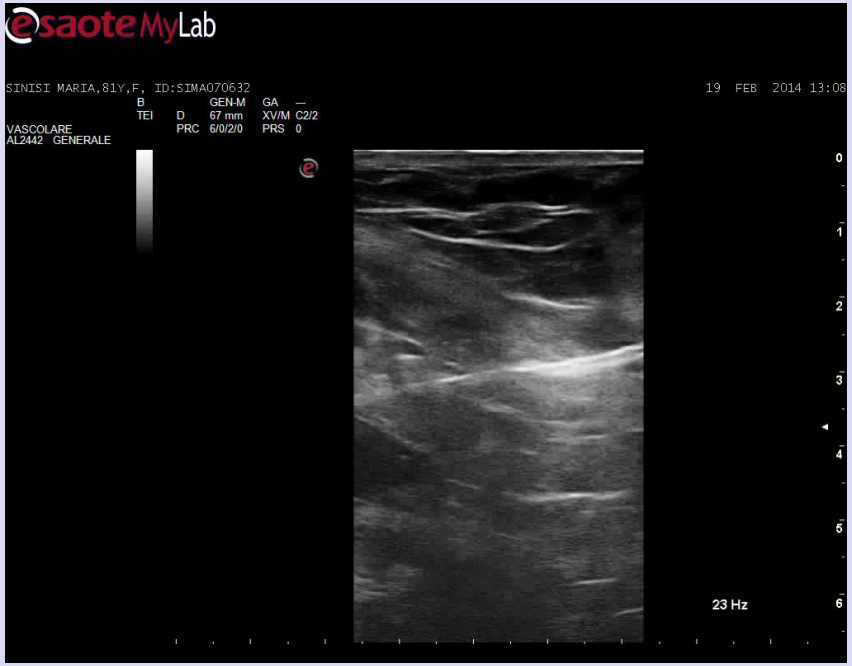
Asse lungo

La vena non collassa significativamente in fase inspiratoria

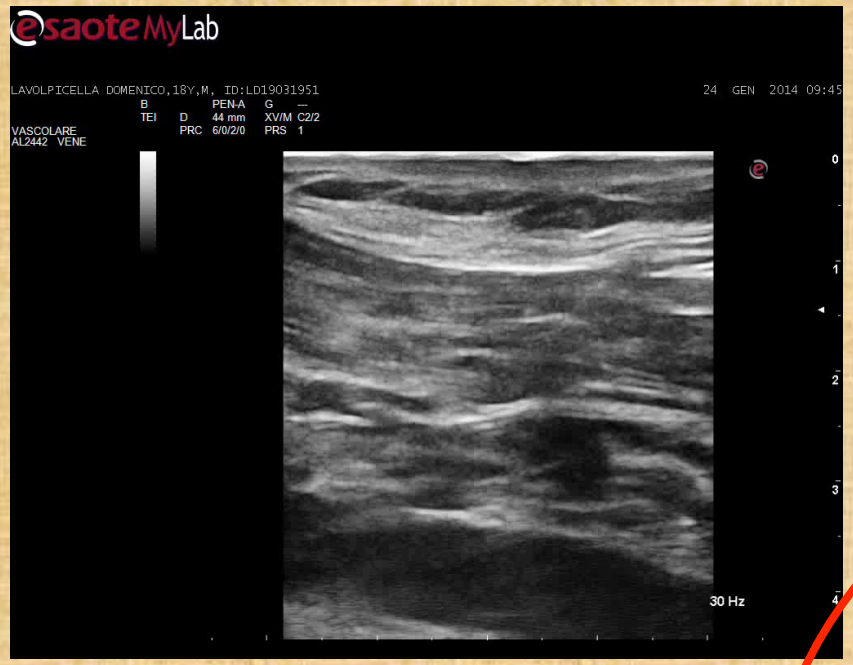


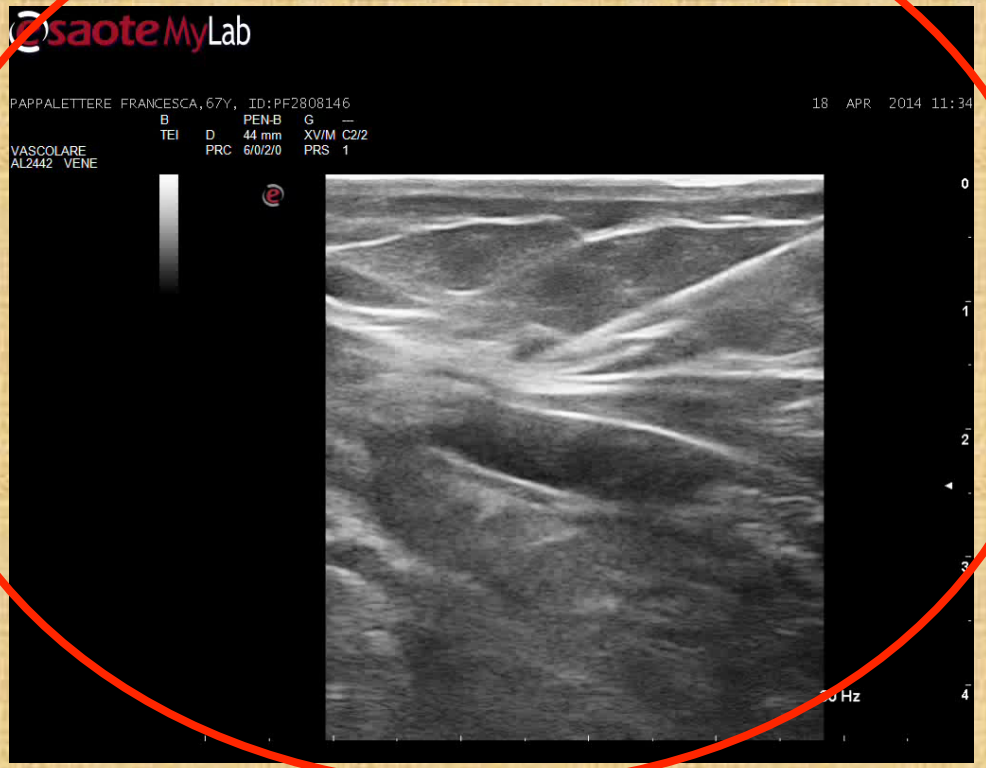
Donna di 90 Kg
Grande obesa
Collo e Tronco: un tutto indistinto

ASSE LUNGO IN PLANE



AGO NORMALE AGO vs TOTALMENTE ECORIFLETTENTE





Perché non adottare la venipuntura centrale ecoguidata ?

- Motivazioni di superficie
  - ***Non ne sento il bisogno, sono già bravo, raramente ho avuto complicazioni ….***
  - ***Non abbiamo ecografi …***
  - ***La manovra diventa troppo lunga, indaginosa, costosa …***
  - ***Non sono convinto che sia più efficace o più sicura*** …

- Motivazioni profonde
  - **Ignoranza della letteratura e disinteresse**
    - Mancanza di motivazione
  - **Refrattarietà a cambiare/migliorare le proprie tecniche abituali**
    - Pigrizia – apatia – mancanza di motivazione
    - Protezione istintiva dei propri comportamenti
  - **Relativo disinteresse per la sicurezza del paziente**
    - Fatalismo – mancanza di motivazione

Convegno a Viterbo, 24 maggio 2008:

a proposito della venipuntura ecoguidata, ecco le proteste di A.C., primario anestesista lombardo che potrebbero essere le stesse di un cardiologo interventista, molto abile nella puntura "blind".

- *Faccio l'anestesista da 30 anni, non posso mettermi a fare l'ecografista… è possibile che si debba imparare tutto?*

  Peraltro le complicanze veramente serie sono state rare.
- *Non abbiamo soldi per l'ecografo… abbiamo i respiratori del 1982, dobbiamo lavorare con quello che c'è ….*
- *Mettiamo i CVC nei reparti, non possiamo portarci mica l'ecografo appresso…*
- *Ho parlato con un mio amico medico legale, che mi ha detto che le* ***linee guida USA-Europee in Italia non contano ….***

Quanti vostri colleghi conoscete che ragionano così?

Linee guida internazionali di riferimento

- Raccomandazioni AHRQ 2001
- Linee guida NICE 2002
- Linee guida pediatriche ESPEN 2005
- Linee guida BCSH 2006
- Linee guida EPIC 2007
- Position Statement AVA 2008
- Position Statement ACS 2008
- Linee guida ESPEN 2009
- Linee guida CDC Atlanta 2011
- Standards INS 2011
- Position Statement ASE – SCA 2011
- Consensus GAVeCeLT – WINFOCUS – WoCoVa 2012

Commentary *Critical Care* 2006, **10**:175

Can you justify not using ultrasound guidance for central venous access?

Andrew R Bodenham

Department of Anaesthesia, Leeds General Infirmary, Leeds, LS1 3EX, UK

Corresponding author: A R Bodenham, Andy.Bodenham@leedsth.nhs.uk

Published: 22 November 2006
This article is online at http://ccforum.com/content/10/6/175

See related research by Karakitsos *et al.*, http://ccforum.com/content/10/6/R162

If a complication occurs and a legal litigation develops, you could be asked:
- **could this complication have been prevented using US ?**
- **if yes, why didn't you use US ?**

"In the past, it was possible to defend clinicians who did not use ultrasound on the basis that it was not yet routine or of proven benefit, but I believe that this position will become increasingly untenable in the future."

AVA Congress, September 2007

2007-2008 campaign to educate HCWs to use ultrasound guidance for CVCs placement

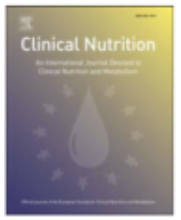
NO MORE BLIND STICKING !

Association for Vascular Access

Contents lists available at ScienceDirect

Clinical Nutrition

journal homepage: http://intl.elsevierhealth.com/journals/clnu



ESPEN Guidelines on Parenteral Nutrition: Central Venous Catheters (access, care, diagnosis and therapy of complications)

Mauro Pittiruti [a], Helen Hamilton [b], Roberto Biffi [a], John MacFie [c], Marek Pertkiewicz [d]

'there is strong statistical evidence to indicate that US-guided insertion of central catheters is more effective and safer than blind techniques in both adults and children. It may therefore now be considered ***unethical or lacking in common sense*** *to withhold the use of this option'*

l'aspetto medico-legale...

arrived at her bedside for a transfusion.

Her death in August 2005 could have been avoided if doctors at Manchester Royal Infirmary had used ultrasound to locate the vein, as recommended by the National Institute for Health and Clinical Excellence, the inquest at Manchester Coroner's Court heard.

Dr Jaydeep Mandal, a registrar in anaesthetics at the hospital at

patient was low risk, so the landmark technique was agreed upon."

The inquest continues.

MEN SYN

Sally Thompson died before a transfusion could be carried out


Ba…!
Finchè non si
accorgono di noi……
……tiramm 'nnanz !
….Ebbe
di cam iare ?
'the
US-
ters is more
eff
mnd techniques in both
adults
. It may therefore now be considered
unethical o lacking in common
sense to withhold the use of this option'

…la venipuntura ecoguidata

- E' oramai tassativa, in tutti gli accessi venosi centrali…
  - …nell'interesse del paziente
  - …nell'interesse dell'operatore
  - …nell'interesse della azienda ospedaliera

- Ce la impongono:
  - …le evidenze pubblicate (meta-analisi, RCTs)
  - … le linee guida internazionali
  - …**il buon senso**

ADIOS