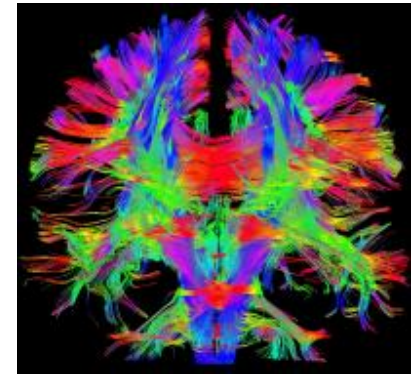




L'accesso ideale per il CICC in terapia intensiva: l'approccio ecoguidato alla vena ascellare

Massimo Lamperti MD, MBA
Clinical Professor of Anesthesiology
Cleveland Clinic Lerner College of Medicine
Chief of General Anaesthesiology Department
Cleveland Clinic Abu Dhabi

Disclosures

- No conflict of interest to declare related to this topic

Q/A

- Catheter or patient?
- How much I want to invest?
- Identity of the axillary vein
- Do we have evidence?
- Will my patient benefit from a catheter placed in the AxV?

Choice of the vein

- 68M, DM2, HTN, Pancreatic CA
- #Post2 Whipple's surgery with lymph node dissection, duodenal resection
- Consulted for HYPOtension, HYPOxia, FEVER
- Requires admission to ICU and IV insulin, TPN, antibiotics

Which catheter?

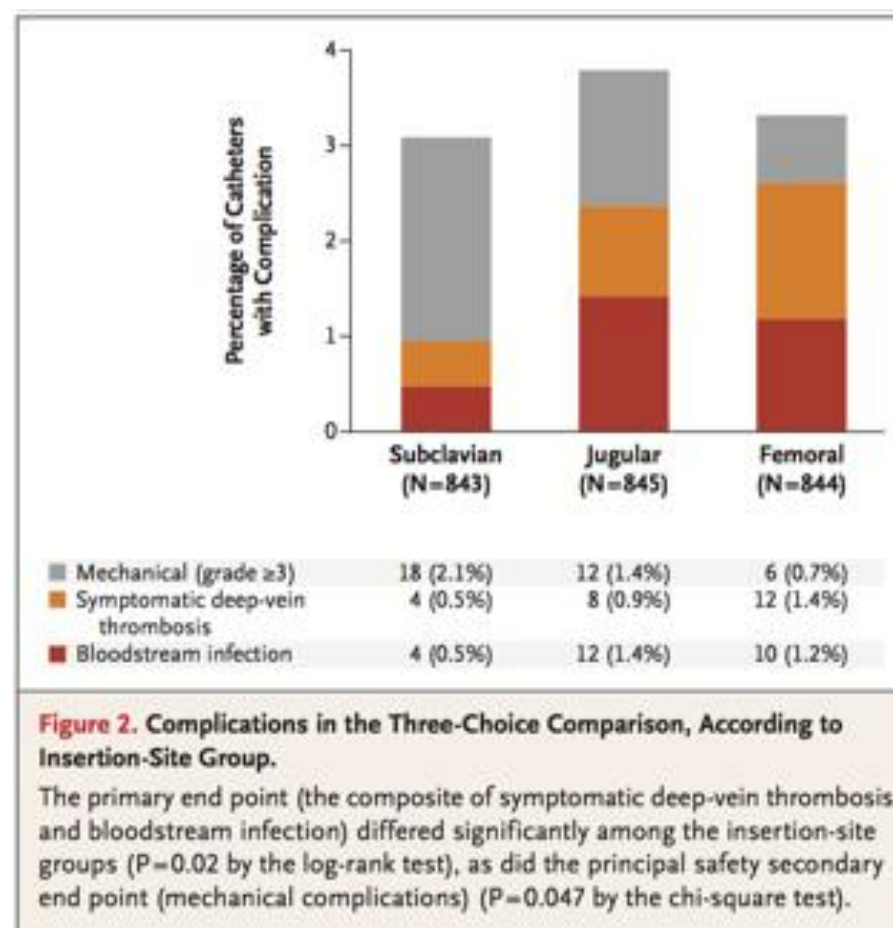
- Fluids
- Vasopressors
- Antibiotic (probably long term)
- Intubation?
- High risk for DVT
- High risk for infection

ORIGINAL ARTICLE

Intravascular Complications of Central Venous Catheterization by Insertion Site

Jean-Jacques Parienti, M.D., Ph.D., Nicolas Mongardon, M.D.,
 Bruno Mégarbane, M.D., Ph.D., Jean-Paul Mira, M.D., Ph.D.,
 Pierre Kalfon, M.D., Ph.D., Antoine Gros, M.D., Sophie Marqué, M.D.,
 Marie Thuong, M.D., Véronique Pottier, M.D., Michel Ramakers, M.D.,
 Benoît Savary, M.D., Amélie Seguin, M.D., Xavier Valette, M.D.,
 Nicolas Terzi, M.D., Ph.D., Bertrand Sauneuf, M.D.,
 Vincent Cattoir, Pharm.D., Ph.D., Leonard A. Mermel, D.O.,
 and Damien du Cheyron, M.D., Ph.D., for the 3SITES Study Group*

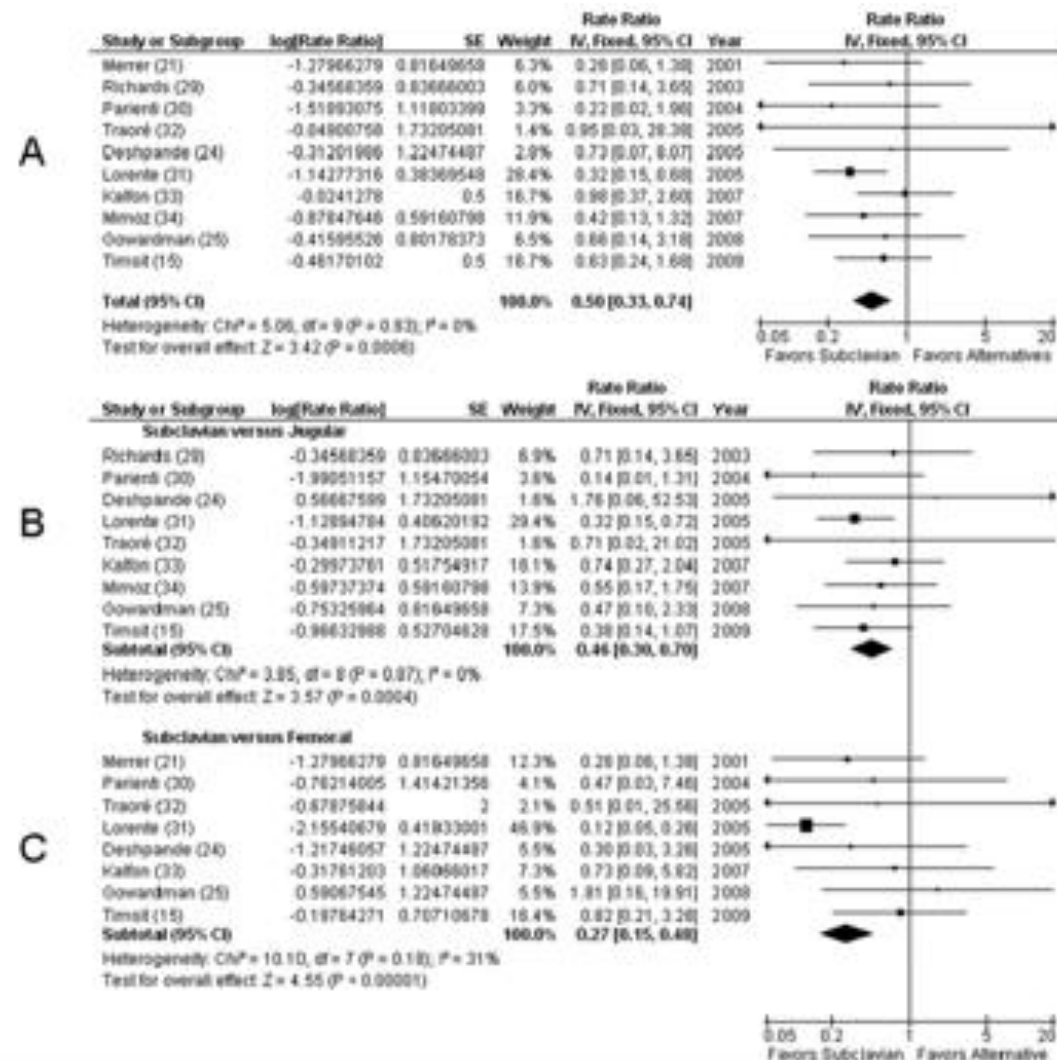
N Engl J Med 2015;373:1220-9.



Meta-analysis of subclavian insertion and nontunneled central venous catheter-associated infection risk reduction in critically ill adults*

Jean-Jacques Parienti, MD, PhD; Damien du Cheyron, MD, PhD; Jean-François Timsit, MD, PhD; Ousmane Traoré, MD; Pierre Kalfon, MD; Olivier Mimoz, MD, PhD; Leonard A. Mermel, DO, ScM, AM (Hon)

Crit Care Med 2012;40: 1627–1634)



Meta-analysis of subclavian insertion and nontunneled central venous catheter-associated infection risk reduction in critically ill adults*

Jean-Jacques Parienti, MD, PhD; Damien du Cheyron, MD, PhD; Jean-François Timsit, MD, PhD; Ousmane Traoré, MD; Pierre Kalfon, MD; Olivier Mimoz, MD, PhD; Leonard A. Mermel, DO, ScM, AM (Hon)

Crit Care Med 2012; 40: 1627–1634)

- Our analysis suggests that the subclavian site may be associated with a lower risk of catheter-associated infection
- However, a large, randomised, controlled trial comparing each catheter site complication is warranted before the subclavian site can be unequivocally recommended as a first choice for central venous catheter insertion.
- SCV CLABSI was 1.3/1000 days of catheterisation

Meta-analysis of subclavian insertion and nontunneled central venous catheter-associated infection risk reduction in critically ill adults*

Jean-Jacques Parienti, MD, PhD; Damien du Cheyron, MD, PhD; Jean-François Timsit, MD, PhD; Ousmane Traoré, MD; Pierre Kalfon, MD; Olivier Mimoz, MD, PhD; Leonard A. Mermel, DO, ScM, AM (Hon)

Crit Care Med 2012; 40: 1627–1634)

- The sample size calculation assuming a CLABSI rate of 0.0013 and a reduction to 0.006 is 300000 patients per group
- The comparison between the 3SITES should be a 4SITES (including PICC)

EMCrit

parienti

The Case of the Blind Allocator

September 29, 2015 by Rory Spiegel — 1 Comment



In the modern world of evidence based medicine we exist in a perpetual state of doubt, continually attempting to perceive truths through the veil of science. Far too often our sample cohort deviates from the population it intends to represent. Hypothesis testing and frequentist statistics are tools intended to quantify the extent to which the observed results are due to random ... [\[Read more...\]](#)

EMCrit

parienti

As discussed, the major flaw in the Marik et al meta-analysis was the fact that the majority of the data was obtained from non-randomized cohort data, making it extremely difficult to account for the confounding variables that might have influenced site selection. Ideally randomization should eliminate these biases. Unfortunately because of a number methodological concerns, the Parienti et al trial failed to control for bias as well as we would have hoped.

For randomization to be valid, it is vital the participating clinicians are not aware of patient group assignment prior to randomization. This is what is called *allocation concealment*. Prior knowledge of such events will lead to a *selection bias*, as there is a tendency for clinicians to exclude certain patients based on their own beliefs regarding the validity of the treatments being examined (5,6). For example, a patient with severe respiratory distress may not be enrolled in the trial if the physician had prior knowledge that the patient would be randomized to SC site insertion, primarily due to potential for pneumothorax. Improper allocation concealment will exclude a certain subset of patients and produce results that systematically deviate from reality (6). Although Parienti et al did attempt to conceal allocation prior to randomization by the utilization of a permuted-block randomization with varying block sizes, they allowed the treating physicians to exclude one site prior to randomization, if it was deemed not suitable for clinical use. This allowance was probably unavoidable, as it is not uncommon for one or more vessels to be inaccessible in clinical practice, but this concession allows for the introduction of the very selection bias we were hoping to avoid through randomization (6).

EMCrit

parienti

The authors attempt to control for these confounders through the use of regression analysis and analyzing catheter events per catheter day, rather than per insertion. Just as we discussed regarding the Marik et al meta-analysis, these types of statistical compensations cannot support such methodological frailties.

Cost/opportunity

- Expected length of therapy
- Expected ICU-LOS
- Expected Hosp-LOS
- Risk of mortality

Cost/opportunity

- CVC (30\$) vs PICC (80\$)
- Pneumothorax (4000\$)
- 1 ICU-day (3000\$)
- CLABSI (not reimbursed/35.000\$)



What is this?



1: [Crit Care Med.](#) 1995 Apr;23(4):692-7.

Comment in:

ACP J Club. 1995 Sep-Oct;123(2):47.

[Crit Care Med.](#) 1996 Jan;24(1):183-4.

Subclavian venous catheterization: greater success rate for less experienced operators using ultrasound guidance.

[Gualtieri E](#), [Deppe SA](#), [Sipperly ME](#), [Thompson DR](#).

Department of Critical Care Medicine, University of Pittsburgh School of Medicine, PA, USA.

- 33 pts. in ICU
- RCT: landmark vs US
- 53 cannulations: Landmark 42% success vs US 92% success and 40% US rescue-landmark
- No major complications?
- US required less venipunctures

DID THEY PUNCTURE THE SCV?

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; 39:1607–1612]

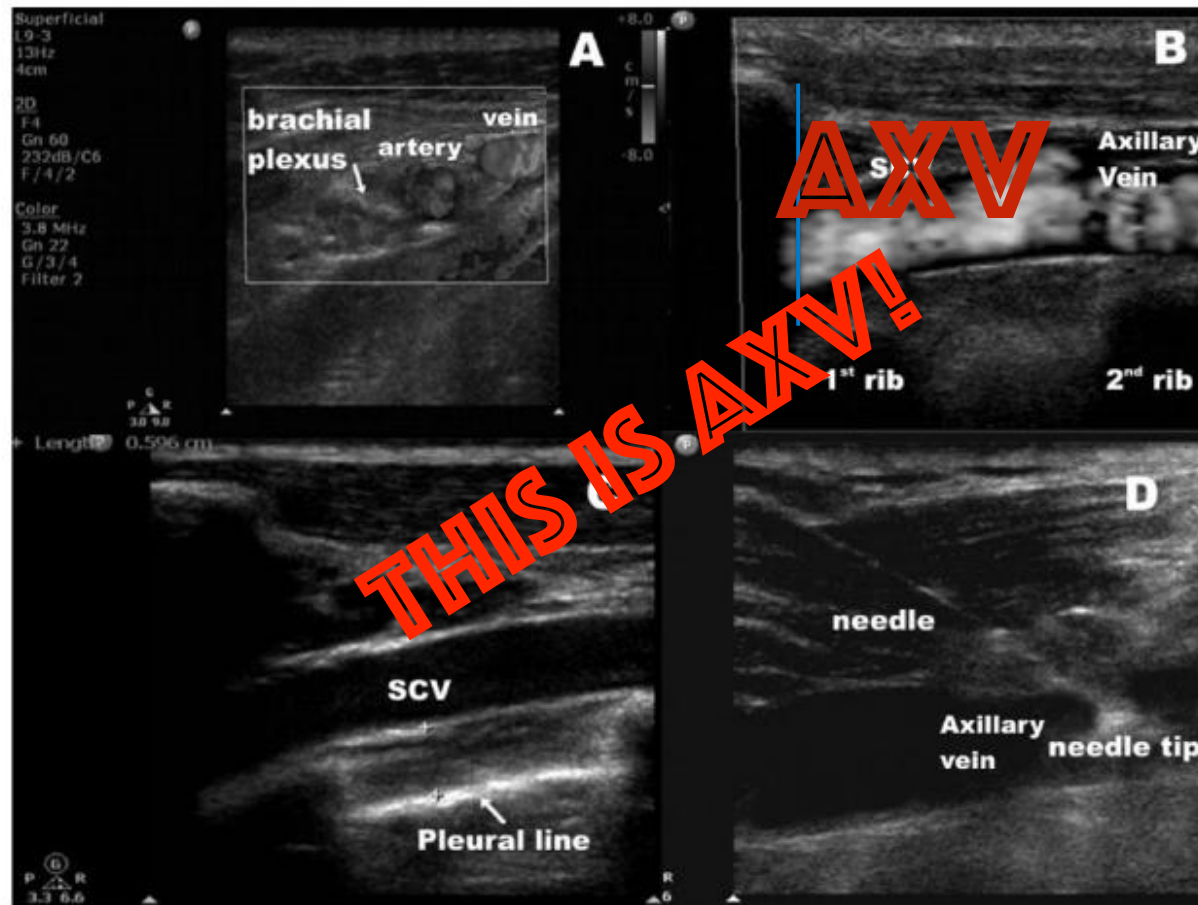


Figure 1. Two-dimensional infraclavicular views depicting the axillary vein and accompanying artery and the brachial plexus (*arrow*) (A), the subclavian vein (SCV) and the acoustic shadows of the thoracic ribs (B), the pleural line (C), and the real-time catheterization (D)

Evidence

Cardiologia. 1958;32(5):291-4.

[Cardiac catheterization through the axillary vein].

[Article in German]

LUTHY E.

- The infraclavicular access, originally described by Nickalls, was studied initially among a very small group of patients
- The technique was characterised by determination of a fixed distance of 5 cm (or 'three fingers') below the inferior aspect of the coracoid process

Evidence


US National Library of Medicine
National Institutes of Health

PubMed

Create RSS Create alert Advanced

Search

Help

Article types
Clinical Trial
Review
Customize ...
Text availability

Format: Summary ▼ Sort by: Most Recent ▼ Per page: 20 ▼

Send to ▼ Filters: [Manage Filters](#)

Search results
Items: 1 to 20 of 448

<< First < Prev Page 1 of 23 Next > Last >>

PMC Images search for axillary vein cannulation

Infraclavicular axillary vein cannulation using ultrasound in a mechanically ventilated general intensive care population

H Glen, I Lang, L Christie

Intensive Care Unit, Wishaw General Hospital, Wishaw, Scotland

*Anaesthesia
and Intensive Care*

- The axillary vein can be seen on US just distal to the subclavian vein and placement of a CVC at this site gives a result which is functionally indistinguishable from a subclavian CVC
- 125 consecutive US-guided axillary CVC procedures in ventilated patients in an adult intensive care setting
- 94% first time success even in patients with coagulopathies and morbid obesity, no major complications

**Ultrasound imaging of the axillary vein—anatomical basis for
central venous access**

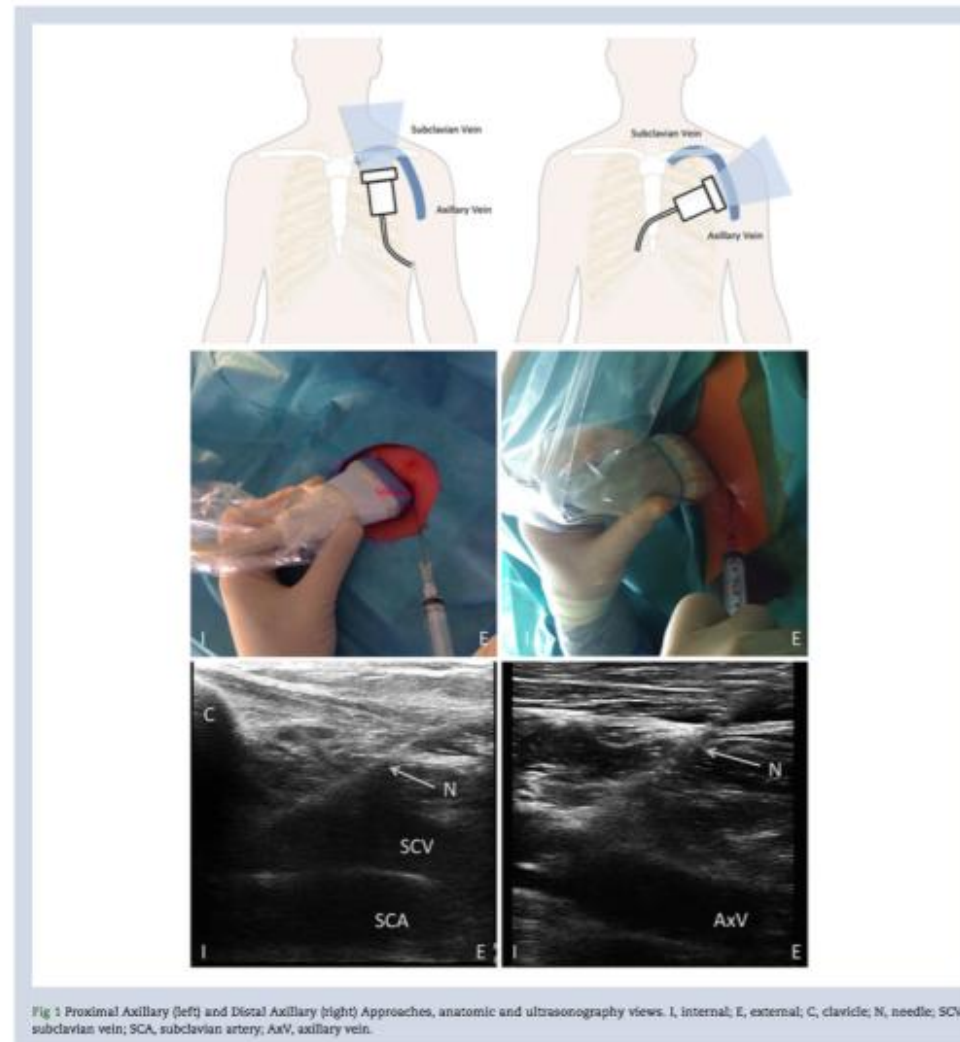
S. Galloway and A. Bodenham*

- AxV was visible in 93% pts.
- Mean depth 1.9cm- overlap is almost 100% medially.
- Abduction of the arm can change the A/V overlap.

Comparison of two ultrasound guided approaches for axillary vein catheterization: a randomized controlled non-inferiority trial

G. Buzançais^{1,2}, C. Roger^{1,4,*}, S. Bastide³, P. Jeannes¹, J. Y. Lefrant^{1,4}
and L. Muller^{1,4}

British Journal of Anaesthesia, 116 (2): 215–22 (2016)

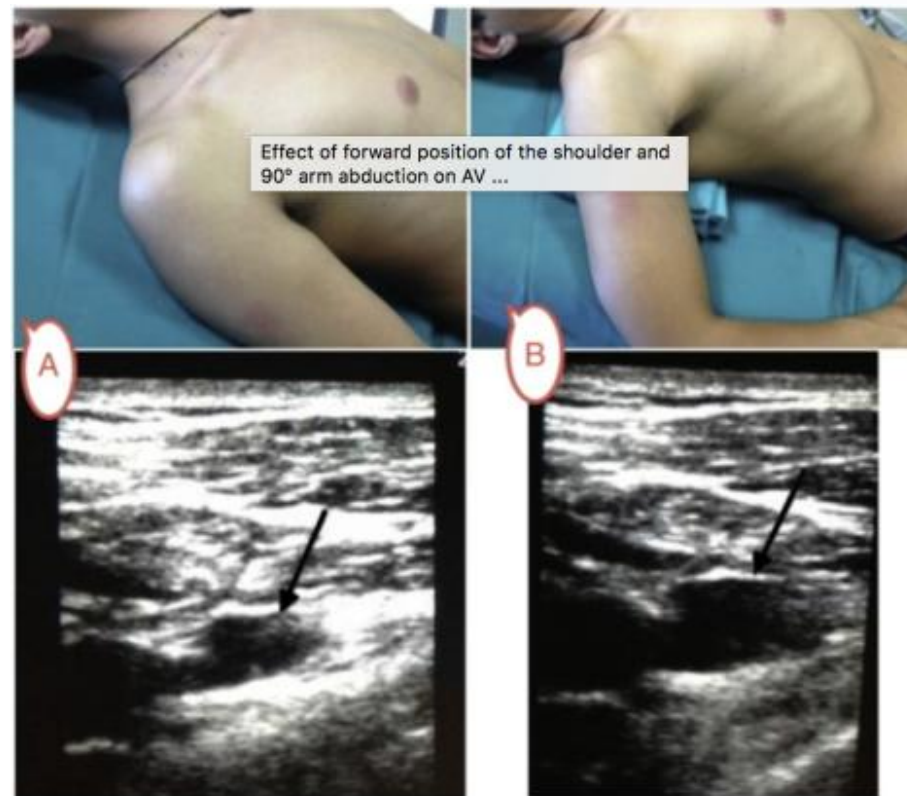


How to make the axillary vein larger? Effect of 90° abduction of the arm to facilitate ultrasound-guided axillary vein puncture ☆

Mauro Pittiruti, MD^a, Daniele Guerino Biasucci, MD^b, , , Antonio La Greca, MD^a, Alessandro Pizza, MD^b, Giancarlo Scoppettuolo, MD^c

Journal of Critical Care

Volume 33, June 2016, Pages 38–41



a 90° abduction of the arm, particularly if associated with a forward position of the shoulder, facilitates the visualisation of the axillary vein, making its ultrasound-guided venipuncture easier

Ultrasound Guided Out-of-Plane Versus In-Plane Transpectoral Left Axillary Vein Cannulation

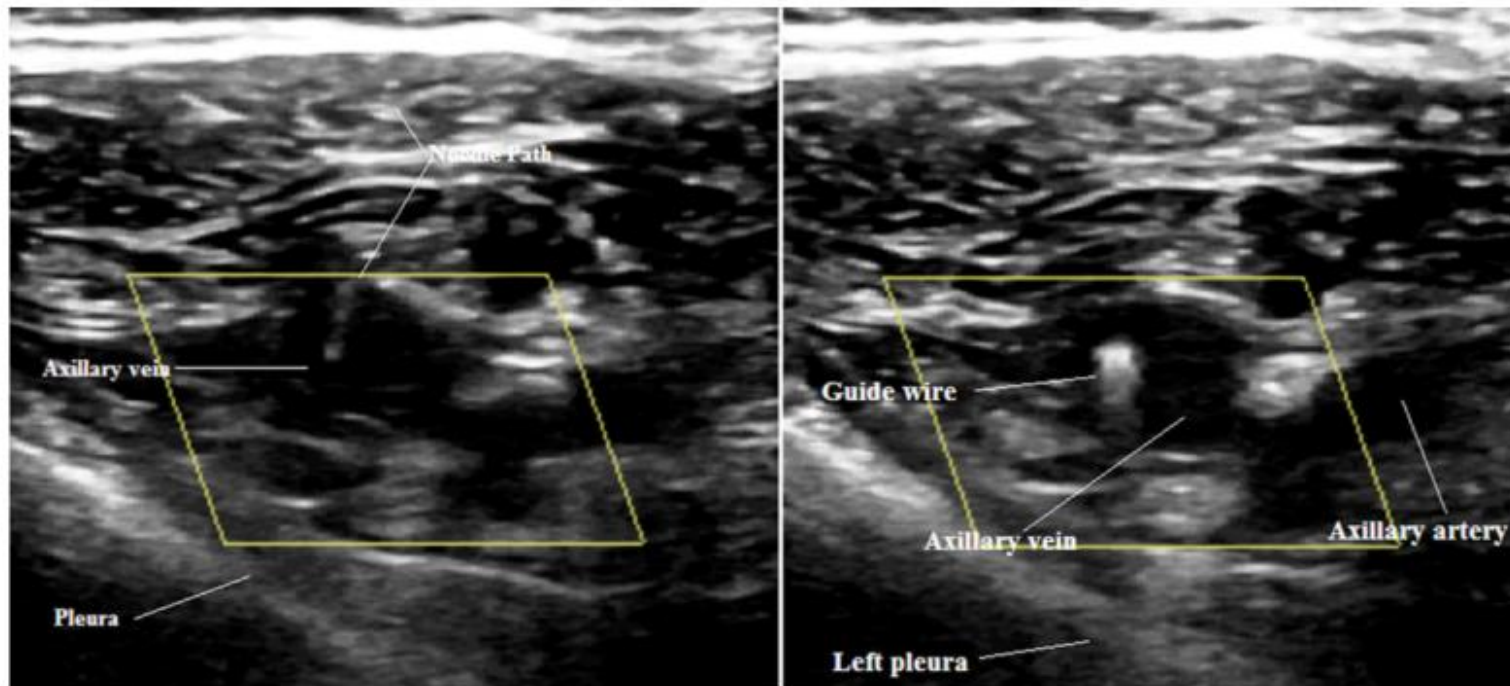
Madan Mohan Maddali, MD^{*,1}, Nishant Ram Arora, MD^{*},
Nilay Chatterjee, DM[†]

^{*}Department of Cardiac Anesthesia, National Heart Center Royal Hospital, Muscat, Oman

[†]Department of Anesthesia, Khoula Hospital, Muscat, Oman



- RCT: 43 OOP - 43 IP
- First attempt success higher in OOP
- Number of success higher in OOP

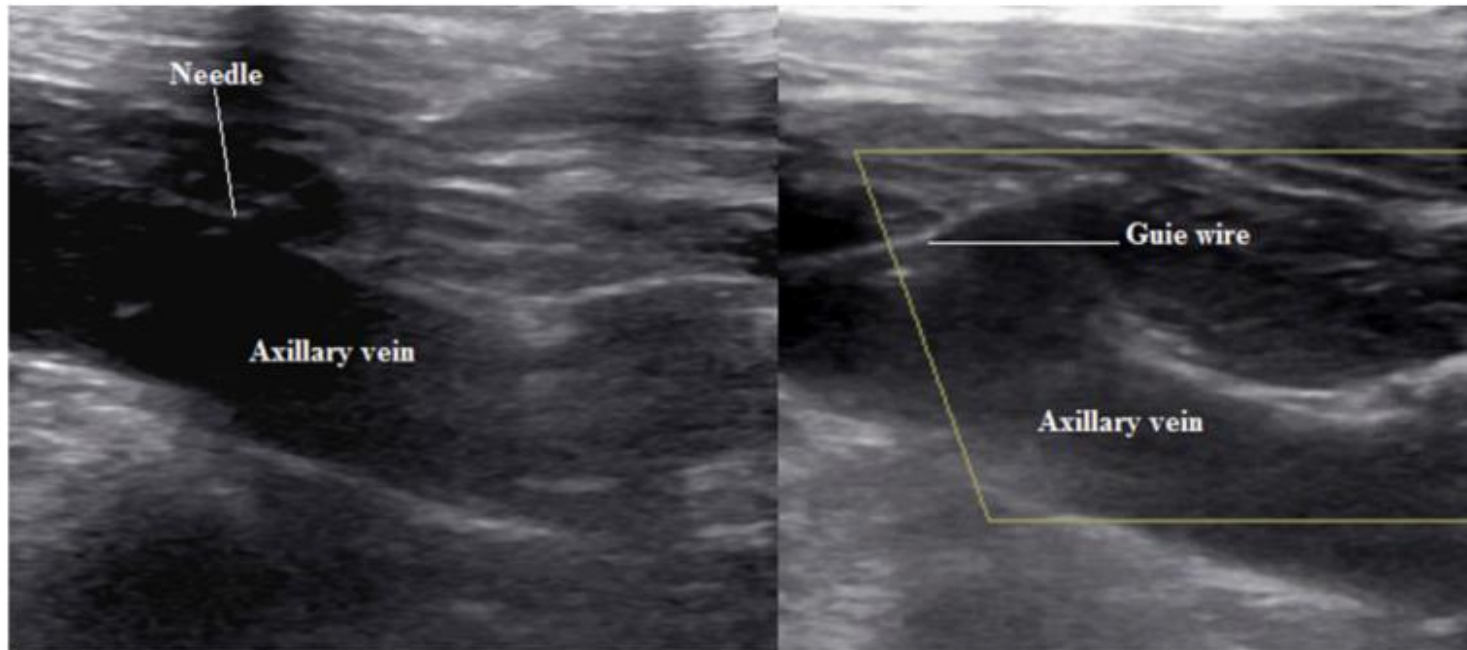


Ultrasound Guided Out-of-Plane Versus In-Plane Transpectoral Left Axillary Vein Cannulation

Madan Mohan Maddali, MD^{*,1}, Nishant Ram Arora, MD^{*},
Nilay Chatterjee, DM[†]

^{}Department of Cardiac Anesthesia, National Heart Center Royal Hospital, Muscat, Oman*

[†]Department of Anesthesia, Khoula Hospital, Muscat, Oman



Long-axis ultrasound image of axillary vein showing the needle path (left image) and the position of the guidewire in the vein (right image).

Ultrasound Guided Out-of-Plane Versus In-Plane Transpectoral Left Axillary Vein Cannulation

Madan Mohan Maddali, MD^{*,1}, Nishant Ram Arora, MD^{*},
Nilay Chatterjee, DM[†]

^{}Department of Cardiac Anesthesia, National Heart Center Royal Hospital, Muscat, Oman*

[†]Department of Anesthesia, Khoula Hospital, Muscat, Oman



Comparison of First-Attempt Success Between Groups in the Initial 10 Patients and Subsequent 33 Patients

Variable		Out-of-Plane	In-Plane	p Value
First-attempt success	First 10 patients	9/10 (90%)	4/10 (40%)	0.02 [*]
	Subsequent 33 patients	25/33 (76%)	16/33 (49%)	0.04 [*]



REVIEW ARTICLE

Real-time Ultrasound-guided Axillary Vein Cannulation

¹Bahareh Khatibi, ²Nav Parkash Sandhu

- Authors' conclusion: "compared to US subclavian cannulation, it has less risks of pneumothorax or hemothorax. Long-term studies on AxV cannulation show comparable rates of infection and DVT compared to IJV catheterisation".

A comparison of longitudinal and transverse approaches to ultrasound-guided axillary vein cannulation by experienced operators

Yi-Zhou He, Ming Zhong, Wei Wu, Jie-Qiong Song, Du-Ming Zhu

Department of Intensive Care Unit, Zhongshan Hospital, Fudan University, Shanghai 200032, China

J Thor Disease 2017;4

- Retrospective study on 236 pts. undergoing US cannulation: longitudinal vs transverse.
- 100% success in both methods: longitudinal has significant higher first-time success.
- Transverse approach group had shorter operation time than the longitudinal group (184.7 ± 8.1 vs. 287.5 ± 19.6 seconds, $P=0.000$).
- Arterial puncture occurred in 1 of 120 longitudinal and 2 of 116 transverse attempts and this difference was no significant ($P=0.541$). No pneumothorax occurred in the two groups.

A comparison of longitudinal and transverse approaches to ultrasound-guided axillary vein cannulation by experienced operators

Yi-Zhou He, Ming Zhong, Wei Wu, Jie-Qiong Song, Du-Ming Zhu

Department of Intensive Care Unit, Zhongshan Hospital, Fudan University, Shanghai 200032, China

J Thor Disease 2017;4

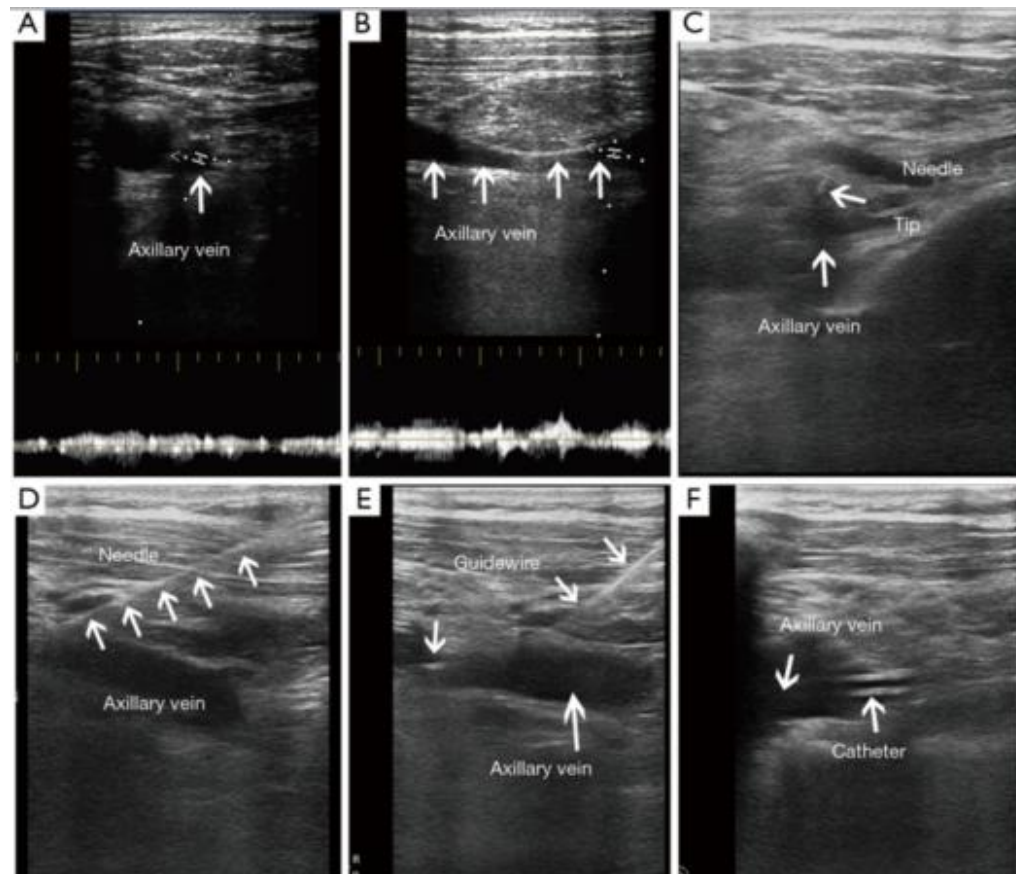


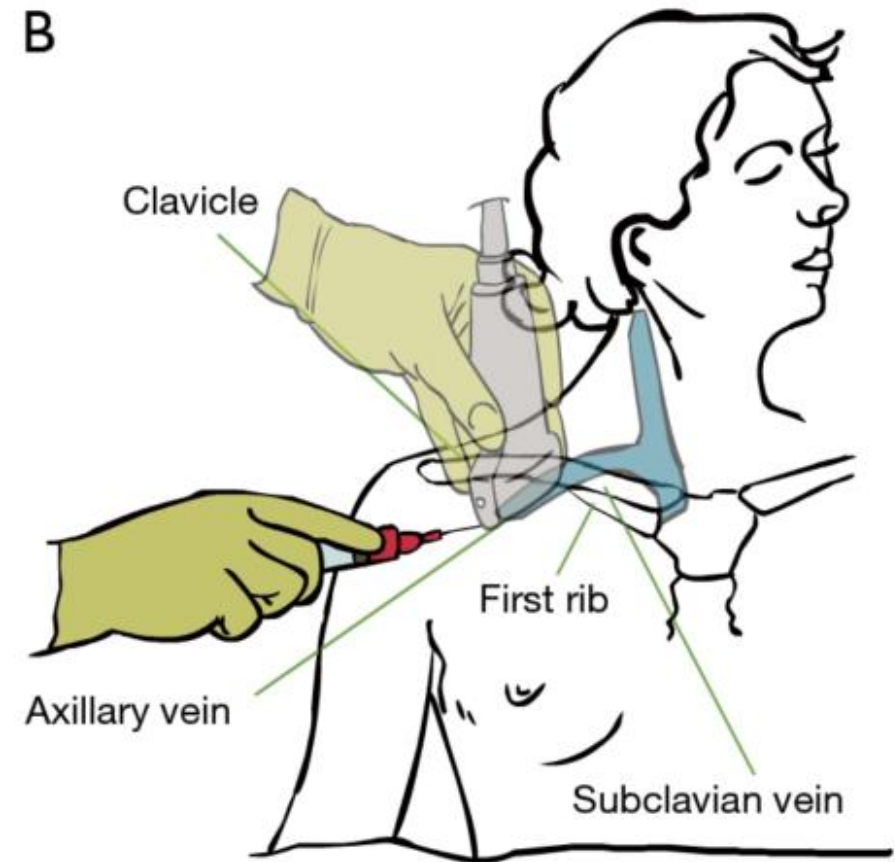
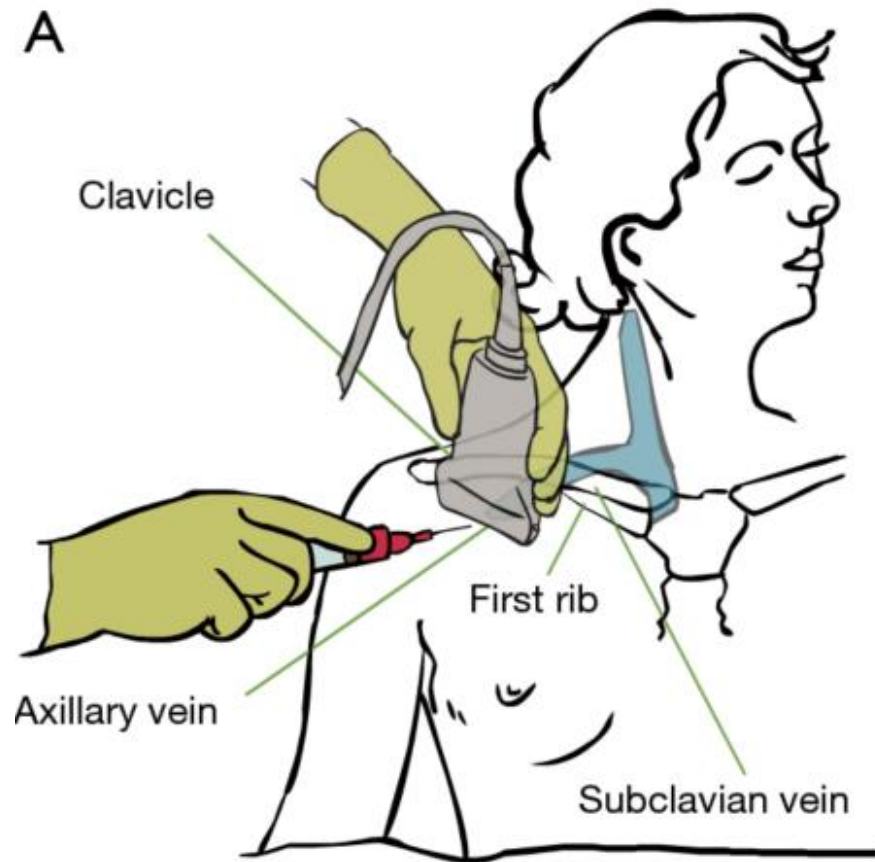
Figure 1 Two-dimensional views depicting the axillary vein cannulation. (A) Transverse view of the blood flow in the axillary vessel with pulsed-waved Doppler focused at the axillary vein; (B) longitudinal view of the blood flow in the axillary vessel with pulsed-waved Doppler focused at the axillary vein; (C) needle tip; (D) needle; (E) guidewire; (F) catheter.

A comparison of longitudinal and transverse approaches to ultrasound-guided axillary vein cannulation by experienced operators

Yi-Zhou He, Ming Zhong, Wei Wu, Jie-Qiong Song, Du-Ming Zhu

Department of Intensive Care Unit, Zhongshan Hospital, Fudan University, Shanghai 200032, China

J Thor Disease 2017;4

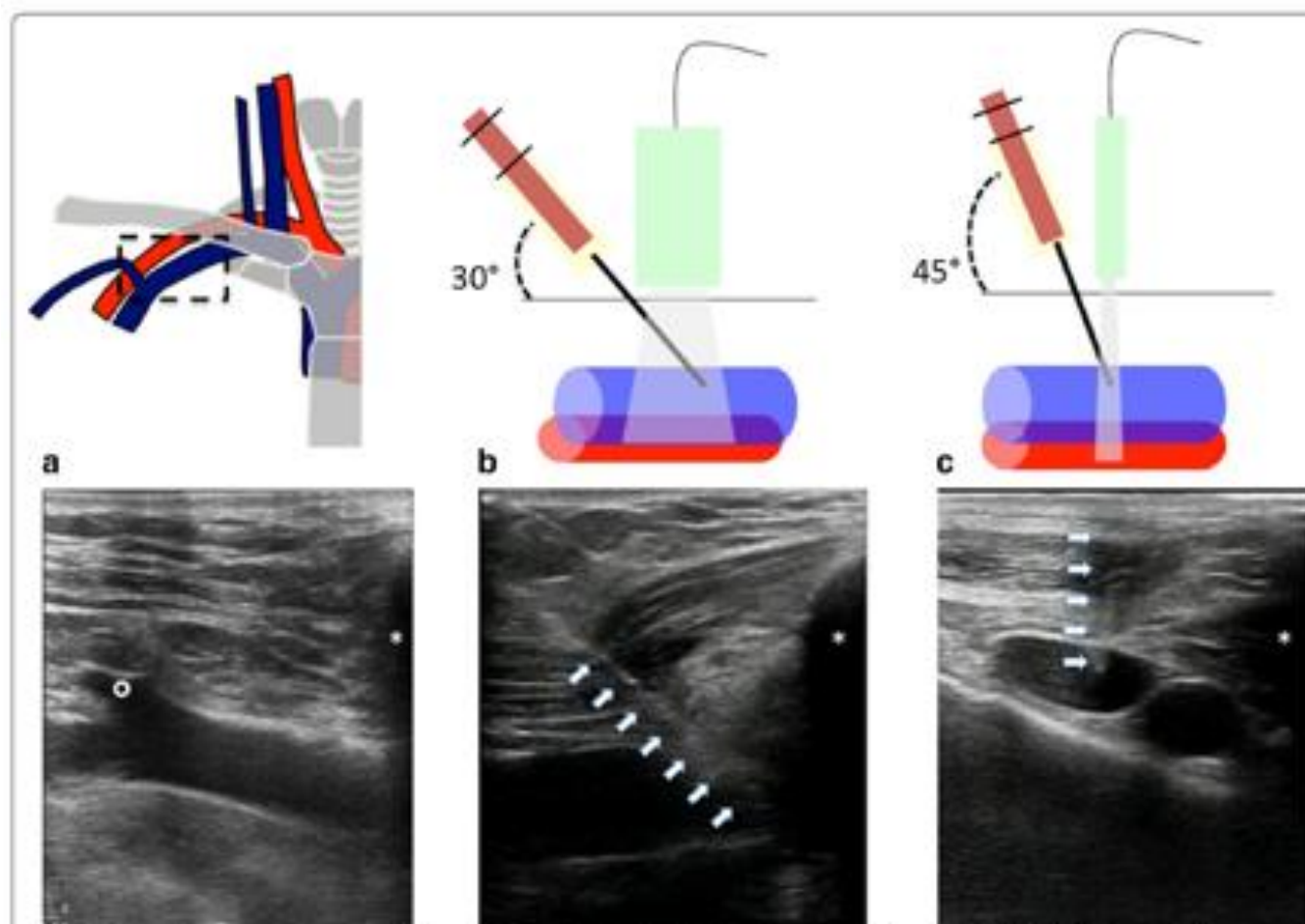


ORIGINAL



A randomized clinical trial of ultrasound-guided infra-clavicular cannulation of the subclavian vein in cardiac surgical patients: short-axis versus long-axis approach

Antonella Vezzani¹, Tullio Manca², Claudia Brusasco², Gregorio Santoni³, Luca Cantadori⁴, Andrea Ramelli⁵, Gianluca Gorzi⁵, Francesco Nicolini⁵, Tiziano Gherli¹ and Francesco Corradi^{2*}



AxV cannulation protocol

1. Bilateral imaging of the AxV (through RACEVA)
2. Identification of AxV and AxA
3. Ultrasound insertion of the needle w/o vein puncture
4. Visualisation of the AxA
5. US-guided puncture of AxV
6. Insertion of the guide wire and its US confirmation
7. Exclusion of the presence of the guide wire in the IJV
8. Insertion of the catheter in the AxV and its US confirmation
9. Confirmation of the catheter's tip (EKG- TTE)

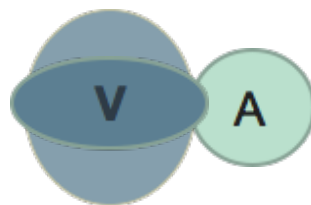
AxV cannulation bundle

- Ultrasound Imaging (RACEVA)
- Ultrasound-guidance
- Micropuncture
- Direct/indirect Seldinger technique
- EKG confirmation/TTE
- Tunnelling (when appropriate)
- Dermabond- Sutureless devices

A comparison of US-guided central venous access

	IJV	ScV	AxV
Anatomical Approach	Reliable	Reliable	Unreliable
US ease	Excellent	Poor	Good
PNX risk	Low	Increased	Low
Infectious risk	Increased	Low	Low
Thrombosis risk	Increased	Low	Low
Brachial plexus risk	Low	Low	Increased
Malposition risk	Left>right	Right>left	Right>left
Compressible site	Yes	Difficult	Yes
Micropuncture Ability	Yes	Difficult	Yes
ESRD +/- Dialysis	Acceptable	Not preferred	Not preferred
Head/neck surgery	Not preferred	Acceptable	Acceptable
Full beard	Not preferred	Acceptable	Acceptable

The “dynamics” of AxV



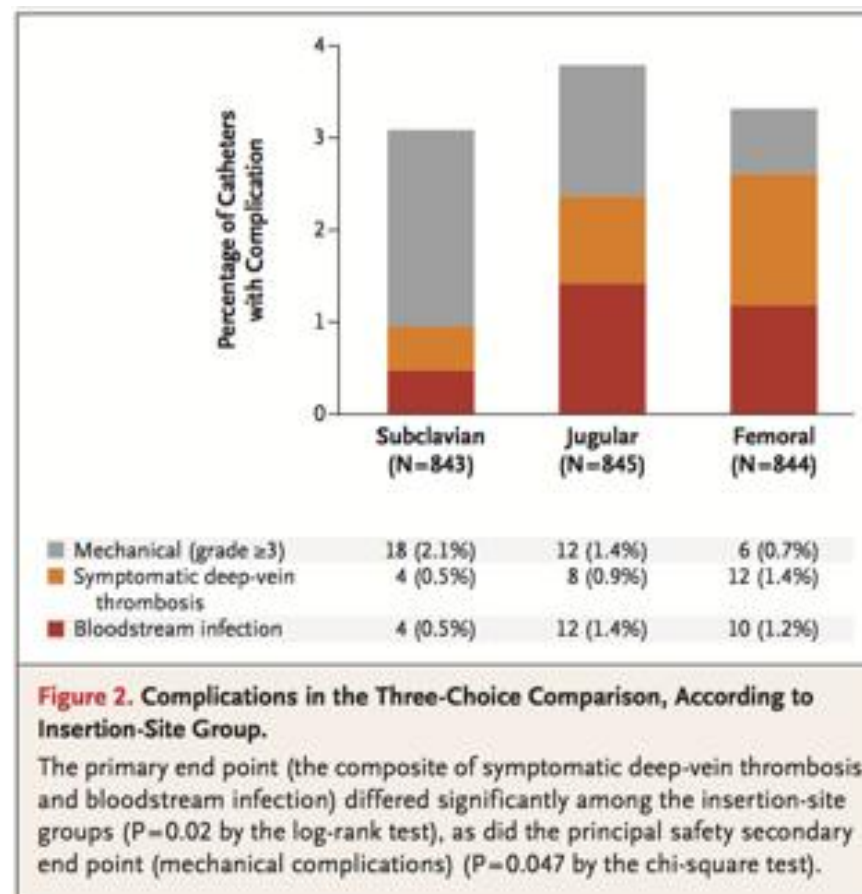
Is the AxV the new
choice in ICU?

ORIGINAL ARTICLE

Intravascular Complications of Central Venous Catheterization by Insertion Site

Jean-Jacques Parienti, M.D., Ph.D., Nicolas Mongardon, M.D.,
 Bruno Mégarbane, M.D., Ph.D., Jean-Paul Mira, M.D., Ph.D.,
 Pierre Kalfon, M.D., Ph.D., Antoine Gros, M.D., Sophie Marqué, M.D.,
 Marie Thuong, M.D., Véronique Pottier, M.D., Michel Ramakers, M.D.,
 Benoît Savary, M.D., Amélie Seguin, M.D., Xavier Valette, M.D.,
 Nicolas Terzi, M.D., Ph.D., Bertrand Sauneuf, M.D.,
 Vincent Cattoir, Pharm.D., Ph.D., Leonard A. Mermel, D.O.,
 and Damien du Cheyron, M.D., Ph.D., for the 3SITES Study Group^a

N Engl J Med 2015;373:1220-9.



Meta-analysis of subclavian insertion and nontunneled central venous catheter-associated infection risk reduction in critically ill adults*

Jean-Jacques Parienti, MD, PhD; Damien du Cheyron, MD, PhD; Jean-François Timsit, MD, PhD; Ousmane Traoré, MD; Pierre Kalfon, MD; Olivier Mimoz, MD, PhD; Leonard A. Mermel, DO, ScM, AM (Hon)

Crit Care Med 2012;40: 1627–1634)

- Our analysis suggests that the subclavian site may be associated with a lower risk of catheter-associated infection
- However, a large, randomised, controlled trial comparing each catheter site complication is warranted before the subclavian site can be unequivocally recommended as a first choice for central venous catheter insertion.
- SCV CLABSI was 1.3/1000 days of catheterisation

Meta-analysis of subclavian insertion and nontunneled central venous catheter-associated infection risk reduction in critically ill adults*

Jean-Jacques Parienti, MD, PhD; Damien du Cheyron, MD, PhD; Jean-François Timsit, MD, PhD; Ousmane Traoré, MD; Pierre Kalfon, MD; Olivier Mimoz, MD, PhD; Leonard A. Mermel, DO, ScM, AM (Hon)

Crit Care Med 2012;40: 1627–1634)

- The sample size calculation assuming a CLABSI rate of 0.0013 and a reduction to 0.006 is 300000 patients per group
- The comparison between the 3SITES should be a 5SITES including PICC

Time for action

EMCrit

parienti

The Case of the Blind Allocator

September 29, 2015 by Rory Spiegel — 1 Comment



In the modern world of evidence based medicine we exist in a perpetual state of doubt, continually attempting to perceive truths through the veil of science. Far too often our sample cohort deviates from the population it intends to represent. Hypothesis testing and frequentist statistics are tools intended to quantify the extent to which the observed results are due to random ... [\[Read more...\]](#)

Fab5 sites project

- Random allocation of the Fab5 sites to ICU patients requiring central venous access
- **Fab5: IJV, ScV, AxV, FemV, PICC**
- Composite primary outcome: Infection-Mechanical
- US-Guidance as main technique apart from ScV
- Number of allocation per group is around 3000 patients
- Interim analysis mandatory



I WANT

FAB 5 Sites

docmassimomd@gmail.com



