

IV Forum

Reducing Risk in Vascular Access

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Vascular Access Outcomes

- Successfully complete infusion therapy
- Reduced VAD related complications
- Reduced number of venepunctures per patient
- Patient Satisfaction
- Optimizing use of Technology

The Right Line > The Right Patient > The Right Time > The Right Securement



Current Trends in VA

- Compliance with National Standards
- Peripheral Cannulation
- Midline Catheters
- Specialised Teams
- Influence of Ultrasound
- Tip location technology
- Pressure indicated devices

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National Safety and Quality Health Service Standards



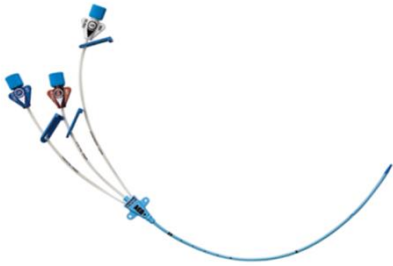
Standard 3 – Preventing and Controlling Healthcare Associated Infections

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Central Line Associated Bloodstream Infection Issues

- **17%** of Australian ICU patients receive CVCs¹
- 3500 annual reported cases
- Clinicians do not comply with evidence-based infection control practice recommendations
 - compliance with the clinician bundle between 61% to 90% & with the patient bundle between 74.1% to 91.8%²
 - overall hand hygiene compliance in Australia is only **78.3%** (CI 95% 78.2-78.3)³
- Limited data regarding line management, securement, access and management

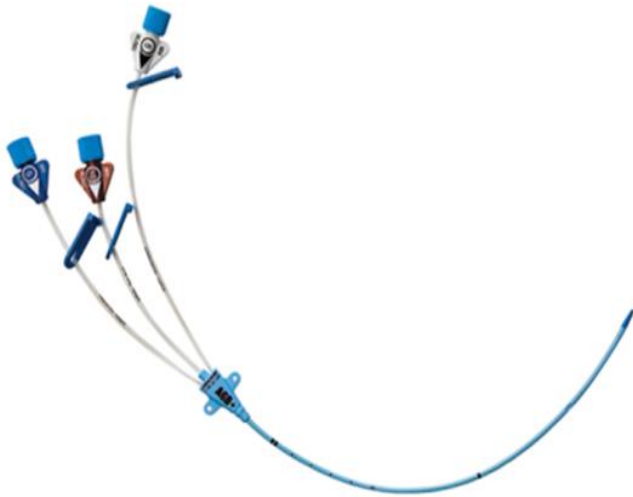
1. Halton, K. A., Cook, D. A., Whitby, M., Paterson, D. L., & Graves, N. (2009). Cost effectiveness of antimicrobial catheters in the intensive care unit: addressing uncertainty in the decision. *Critical care*, 13, R35.
2. McLaws, M. L., & Burrell, A. R. (2012). Zero risk for central line-associated bloodstream infection: are we there yet? *Critical care medicine*, 40, 388-393.
3. Hand Hygiene Australia, National Data Period Two, 2013 <http://www.hha.org.au/LatestNationalData.aspx> Accessed 06/10/2013



Source: Infect Med © 2004 Cliggett Publishing, Division of SCP Communications

Recommended Protection

Use a chlorhexidine /silver sulfadiazine or minocycline /rifampin impregnated CVCs in patients whose catheters are expected to be > 5 days (Category 1A)



Antiseptic



Antibiotic

Peripheral IV Access

- **72 hour change**
 - **Hand insertion**
 - **Unknown failure rate**
 - **Elimination of IV teams**
-

Routine versus clinically indicated replacement of peripheral intravenous catheters: a randomised controlled equivalence trial

Claire M Rickard, Joan Webster, Marianne C Wallis, Nicole Marsh, Matthew R McGrail, Venessa French, Lynelle Foster, Peter Gallagher, John R Gowardman, Li Zhang, Alice McClymont, Michael Whitby

Summary

Lancet 2012; 380: 1066-74 **Background** The millions of peripheral intravenous catheters used each year are recommended for 72-96 h

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Midline Catheters

The Use of Midline Catheters in the Adult Acute Care Setting – Clinical Implications and Recommendations for Practice

Evan Alexandrou, Lucie M. Ramjan, Tim Spencer, Steven A. Frost, Yenna Salamonson, Patricia M. Davidson, Ken M. Hillman

Abstract

The safety and efficacy of midlines compared to peripherally inserted central catheters for adult cystic fibrosis patients: A retrospective, observational study

Rebecca Sharp^{a,*}, Adrian Esterman^a, Helen McCutcheon^b, Neville Hearse^c, Melita Cummings^c

^a School of Nursing and Midwifery, University of South Australia, Adelaide, Australia

^b Florence Nightingale School of Nursing & Midwifery, King's College London, United Kingdom

^c Department of Radiology, Royal Adelaide Hospital, Adelaide, Australia

Specialised Teams

Central Venous Catheter Placement by Advanced Practice Nurses Demonstrates Low Procedural Complication and Infection Rates—A Report From 13 Years of Service

Evan Alexandrou, RN, MPH^{1,2,3,4,5,6}; Timothy R. Spencer, RN BHealth^{2,3,4}; Steven A. Frost, RN, MPH^{1,2,4,7,8}; Nicholas Mifflin, RN BNursing^{3,4}; Patricia M. Davidson, RN, PhD⁵; Ken M. Hillman, MD^{4,7,8}

Nurse-led central venous catheter insertion—Procedural characteristics and outcomes of three intensive care based catheter placement services

Evan Alexandrou^{a,c,d,g,h,i,*}, Margherita Murgob^b, Eda Calabria^b, Timothy R. Spencer^{c,d,g}, Hailey Carpen^e, Kathleen Brennan^{d,f}, Steven A. Frost^{a,g}, Patricia M. Davidson^h, Ken M. Hillman^{d,j}

Ultrasound Use

100 + articles to support use

- Patient comfort
- Risk reduction
- Vessel assessment

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Vessel Assessment



- C\I\V Ratio
- Depth
- Structure

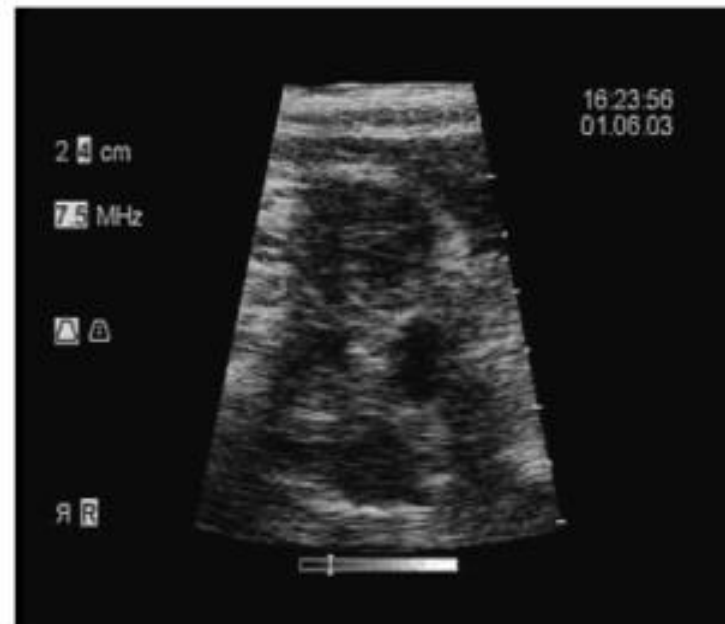
Assumptions of Blind CVC Insertion

Central vein is patent

Normal Anatomy



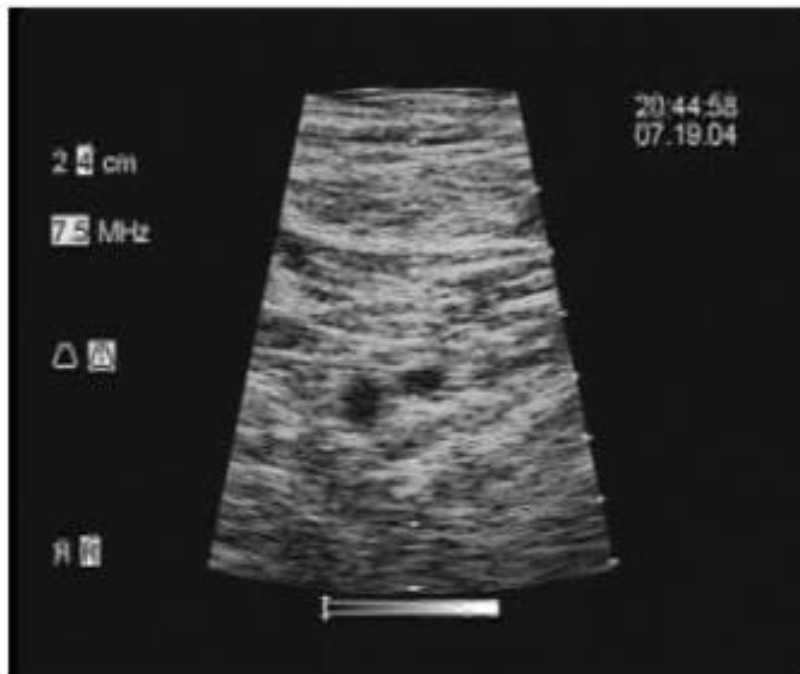
Vein is Thrombosed



Assumptions of Blind CVC Insertion

The calibre (size) of the vein is acceptable

0.25 cm



1.6 cm



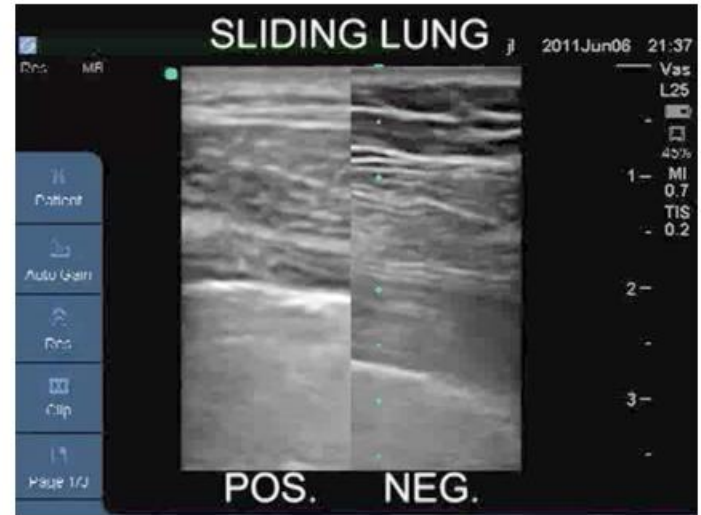
Would you want to know?

Assumptions of Blind CVC Insertion

External landmarks are well-defined



Maximize US Use



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Simulation First

Simulation in Healthcare : Journal of the Society for Simulation in Healthcare 2013 Apr; 8 (2) : 67-71.

First-year residents outperform third-year residents after simulation-based education in critical care medicine.

Benjamin D Singer, Thomas C Corbridge, Clara J Schroedl, Jane E Wilcox, Elaine R Cohen, William C McGaghie, Diane B Wayne

PMID: [23222546](https://pubmed.ncbi.nlm.nih.gov/23222546/)



The Right

Insertion Safety

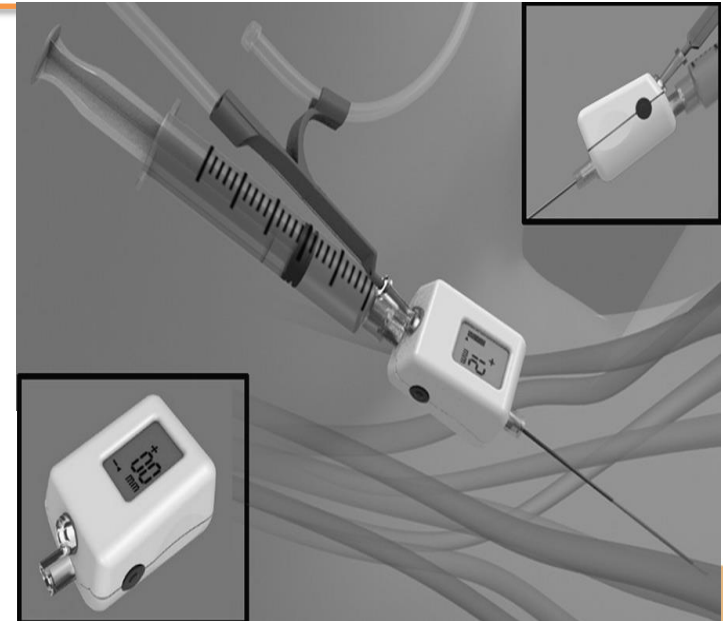
A Multicenter Evaluation of a Compact, Sterile, Single-Use Pressure Transducer for Central Venous Catheter Placement

Kei Togashi, MD,* Koichiro Nandate, MD, PhD,* Carli Hoaglan, MD,† Benjamin Sherman, MD,‡ and Andrew Bowdle, MD, PhD*

Vascular Complications of Central Venous Catheter Placement: Evidence-Based Methods for Prevention and Treatment

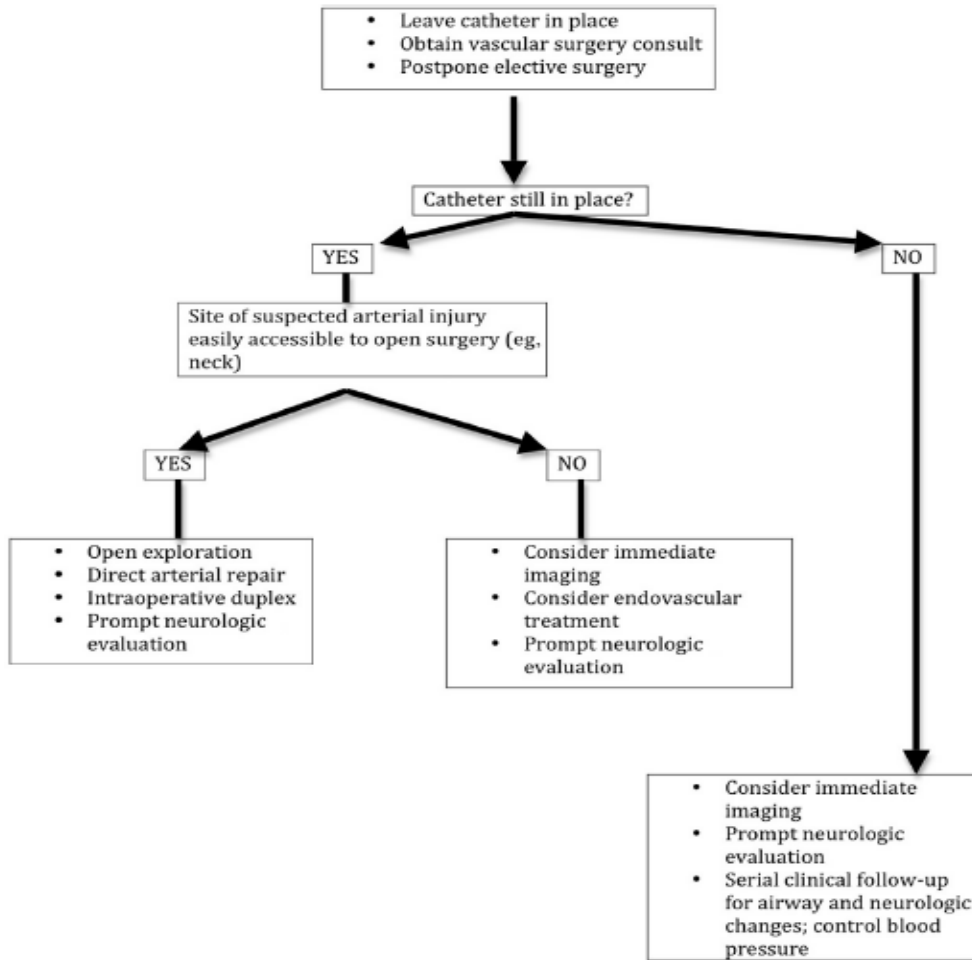
Andrew Bowdle, MD, PhD

Table 3. 'Pull-and-Pressure' Versus Surgical or Endovascular Repair of Inadvertent Arterial Cannulation¹⁶



Management	Complications
Catheter removal and compression	Patient had massive stroke and died
Catheter removal and compression	Arteriovenous fistula requiring surgical repair
Catheter removal and compression	Left hemothorax requiring blood transfusion
Catheter removal and compression	Pleural effusion, lung collapse, thoracic surgery to repair arterial injury and lung decortication
Catheter removal and compression	Hematoma and uncontrolled bleeding requiring open surgery to repair jugular vein and carotid artery
6 cases of open surgical repair	No complications
2 cases of endovascular repair	No complications

Risk Management



Tip Location Technology

- ECG/ Magnetic
- ECG/Doppler
- ECG

The Accuracy of Electrocardiogram-Controlled Central Line Placement

Ralf E. Gebhard, MD*

Peter Szmuk, MD†

Evan G. Pivalizza, MBChB,
FFASA‡

Vladimir Melnikov, MD‡

Christianne Vogt, MD‡

Robert D. Warters, MD‡

BACKGROUND: Electrocardiogram (ECG) guidance to confirm accurate positioning of central venous catheters (CVC), placed before surgery in the operating room, is rarely used in the United States. We designed this randomized, controlled trial to investigate whether the use of this technique impacts the accuracy of CVC placement.


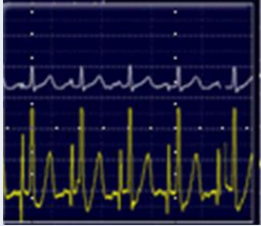
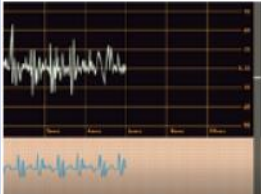

METHODS: Patients in group ECG ($n = 147$) had a CVC placed using right-atrial ECG to guide catheter tip positioning. CVCs in group NO-ECG ($n = 143$) were positioned without this technique.

RESULTS: Overall, guidewire-ECG control resulted in more correctly positioned CVCs (96% vs 76%, $P \leq 0.001$) without increasing placement time. Significantly more CVCs were placed in the middle of the superior vena cava in group ECG ($P \leq 0.001$), although placement into the right atrium or right ventricle and into other vessels occurred significantly more often in group NO-ECG ($P \leq 0.001$). Twenty patients in group NO-ECG required repositioning of their CVC after surgery, whereas this maneuver was necessary only in three patients in group ECG ($P \leq 0.001$).

CONCLUSIONS: ECG guidance allows for more accurate CVC placement, and should be considered to increase patient safety and reduce costs associated with repositioning procedures.

(Anesth Analg 2007;104:65-70)

Methods of Tip Termination

Chest X-RAY		2D image, Variations occur with respiration, patient position, quality of x-ray, general lack of agreement on location of SVC/RA junction
ECG		Useful in patients with normal p-wave only, p-wave change as indicator of tip position, assumes SA Node is in "normal location" and is primary pacemaker, 70-90% accuracy, optimum p-wave change occurs ± 5 cm of SVC/RA junction
ECG + Doppler		Combination of ECG and Flow, computer assisted determination of tip location with optimal tip position ± 2.33 cm of SVC/RA Junction, ability to use with all patients
Fluoroscopy		Real-time radiography, thought to be very accurate though patient position may cause variation, user interpretation dependent

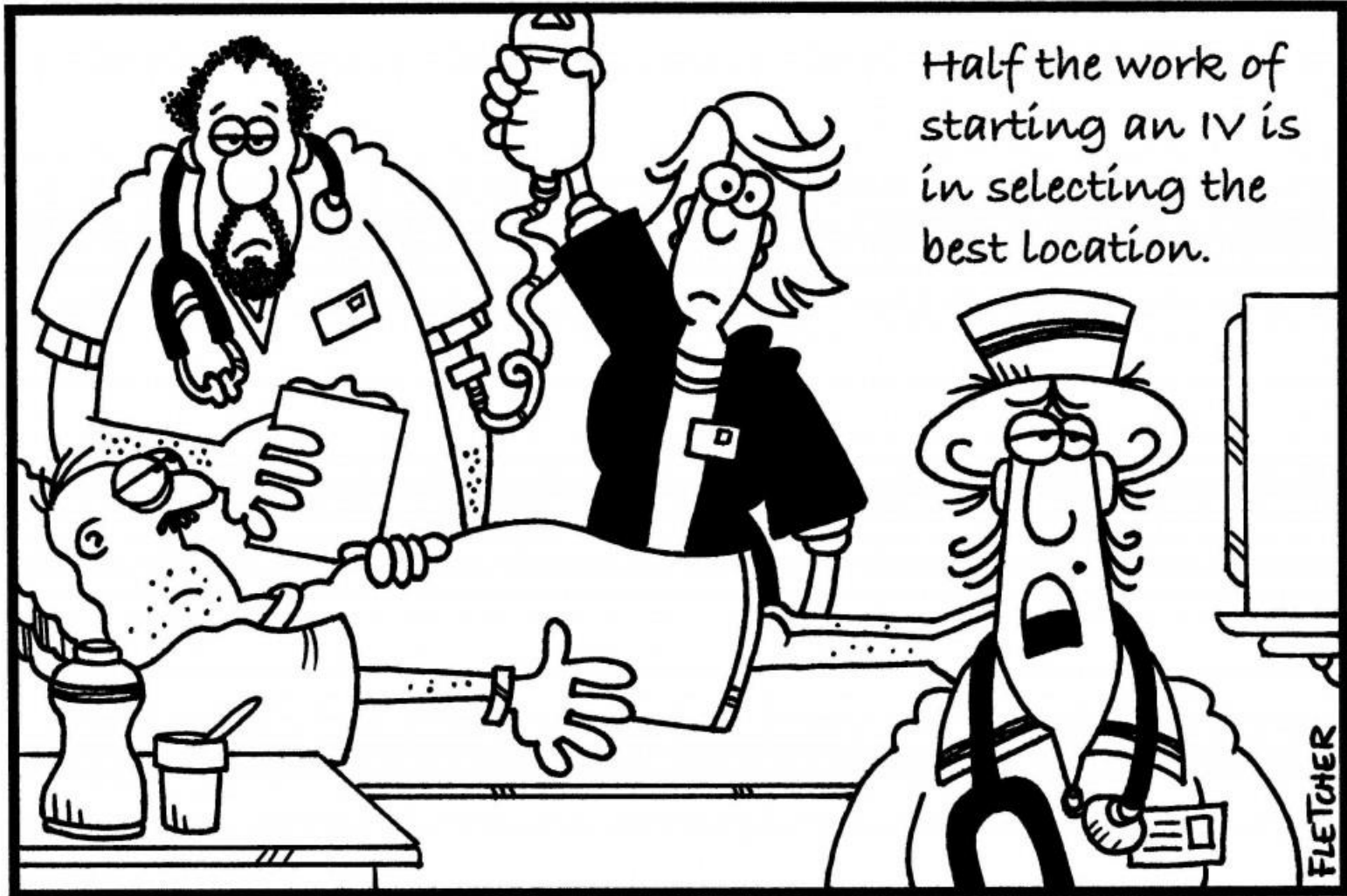
Dual Vector



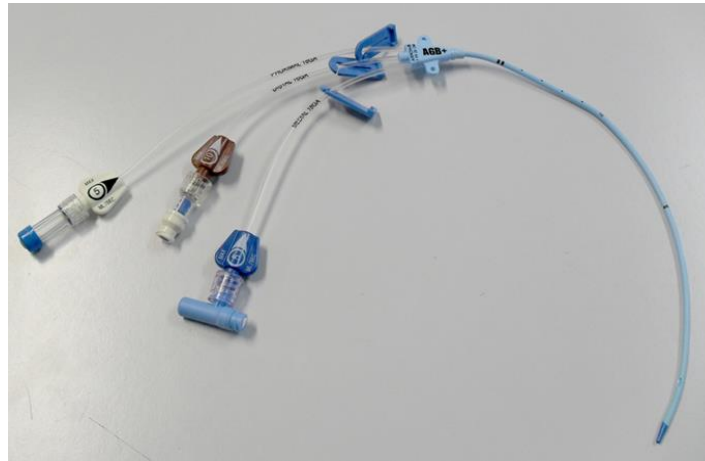
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NURSE MARGE IN CHARGE

By Fletcher



Pressure Indicated Devices

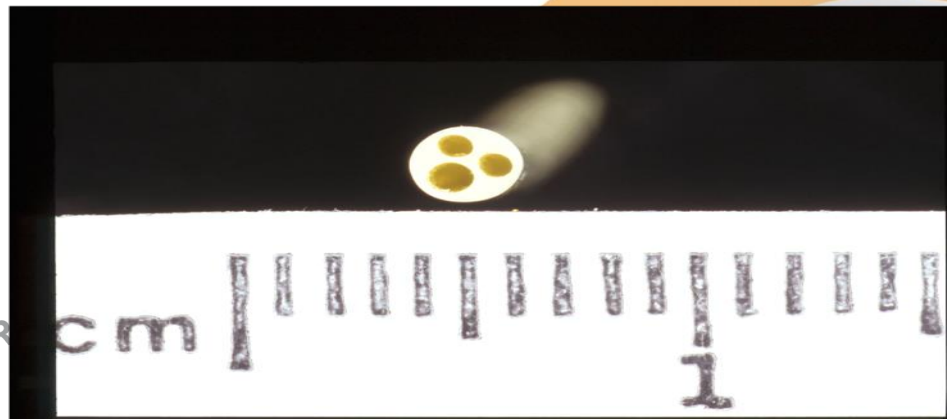


- 15psi

- 300psi



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Engage in VA

- WoCoVa - Berlin, Germany June 18-21
- Association for Vascular Access Sept 7-10th
- Professional Interest Groups= AVAS

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2014

Association for Vascular Access
ANNUAL SCIENTIFIC MEETING
September 7-10 - National Harbor, MD