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2018

Central Venous Catheter Confirmation by Ultrasonography: A Novel Instructional Protocol

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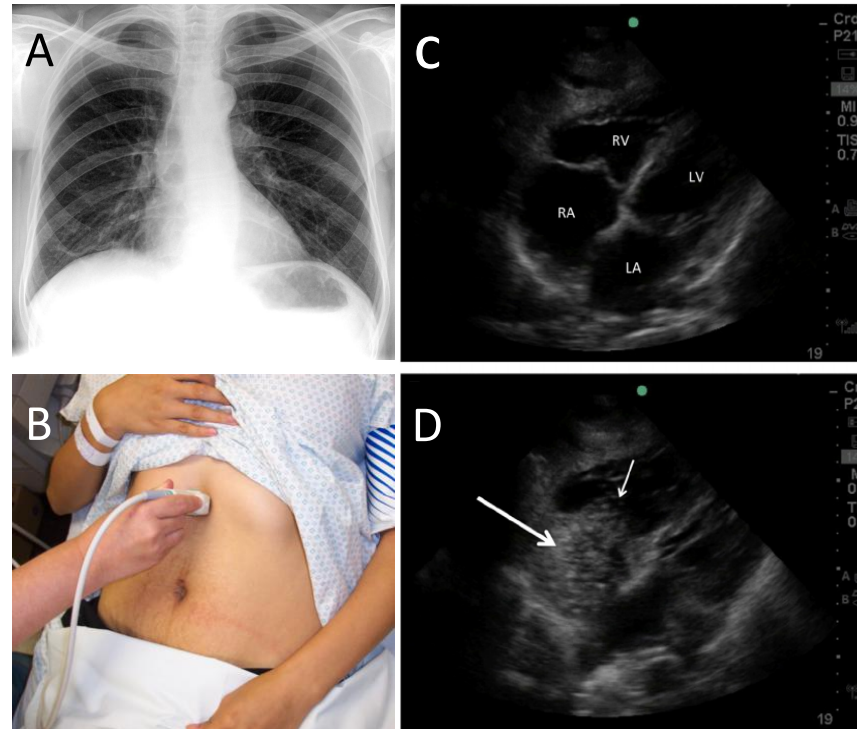
Purpose

- Multiple studies within last 10 years examining feasibility, speed and accuracy of ultrasound for central venous catheter malposition
- Recent systematic review and meta-analysis from Ablordeppey, et al:
 - Ultrasound is fast (2min vs 58min)
 - Ultrasound is highly sensitive and specific for detecting catheter malposition
 - Re-demonstrates high sensitivity and specificity for detecting pneumothorax
- Should be used as first line CVC confirmation technique
- Need for dissemination of technique to practitioners

Methods

- Prospective educational cohort didactic and simulation study, with convenience sample of 47 EM residents and attendings at Level 1 academic trauma attending
 - A X O₁ O₂
- Online didactic session followed by immediate online testing
- Follow-up simulation session with testing within 2 weeks
- Focused on identification of the rapid atrial swirl sign (RASS) and importance of timing from flush to visualization (see image D)
 - <2sec = appropriately placed CVC
 - >2sec = venously misplaced CVC
 - No RASS = not in venous system

Figures

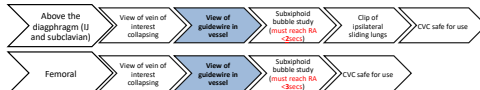


Results

- 47 EM physicians completed the online didactic session, 24 followed up to complete the simulation testing
- All 47 participants scored 94% or greater on 7 question post didactic quiz
 - Demonstrates adequate knowledge acquisition
- All 24 participants scored 100% accuracy on follow up simulation scenarios 2 weeks later
 - Various RASS timing
 - Detection of PTX
 - Demonstrates short term retention
- All participants "agreed" or "strongly agreed" that the educational module improved their understanding of CVC confirmation using ultrasound and "strongly agreed" that they plan to incorporate this skill into their clinical practice

Conclusions

- A brief didactic session is satisfactory for dissemination of knowledge regarding ultrasound confirmation for central line placement
- Immediate and short term retention is adequate
- Participants highly satisfied with module and plan to incorporate skill into practice
- Future chart review to study if use of this technique is occurring in practice



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