

**Bedside ultrasound is faster than radiography at identifying pneumothorax after central venous catheter insertion. When a central venous catheter malposition exists, bedside ultrasound will identify four out of every five earlier than chest radiography” Ablordeppey et al (2016).**

Abstract:

OBJECTIVE: We performed a systematic review and meta-analysis to examine the accuracy of bedside ultrasound for confirmation of central venous catheter position and exclusion of pneumothorax compared with chest radiography.

DATA SOURCES: PubMed, Embase, Cochrane Central Register of Controlled Trials, reference lists, conference proceedings and ClinicalTrials.gov.

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STUDY SELECTION: Articles and abstracts describing the diagnostic accuracy of bedside ultrasound compared with chest radiography for confirmation of central venous catheters in sufficient detail to reconstruct  $2 \times 2$  contingency tables were reviewed. Primary outcomes included the accuracy of confirming catheter positioning and detecting a pneumothorax. Secondary outcomes included feasibility, interrater reliability, and efficiency to complete bedside ultrasound confirmation of central venous catheter position.

DATA EXTRACTION: Investigators abstracted study details including research design and sonographic imaging technique to detect catheter malposition and procedure-related pneumothorax. Diagnostic accuracy measures included pooled sensitivity, specificity, positive likelihood ratio, and negative likelihood ratio.

DATA SYNTHESIS: Fifteen studies with 1,553 central venous catheter placements were identified with a pooled sensitivity and specificity of catheter malposition by ultrasound of

0.82 (0.77-0.86) and 0.98 (0.97-0.99), respectively. The pooled positive and negative likelihood ratios of catheter malposition by ultrasound were 31.12 (14.72-65.78) and 0.25 (0.13-0.47). The sensitivity and specificity of ultrasound for pneumothorax detection was nearly 100% in the participating studies. Bedside ultrasound reduced mean central venous catheter confirmation time by 58.3 minutes. Risk of bias and clinical heterogeneity in the studies were high.

**CONCLUSIONS:** Bedside ultrasound is faster than radiography at identifying pneumothorax after central venous catheter insertion. When a central venous catheter malposition exists, bedside ultrasound will identify four out of every five earlier than chest radiography.

Reference:

Ablordeppey, E.A., Drewry, A.M., Beyer, A.B., Theodoro, D.L., Fowler, S.A., Fuller, B.M. and Carpenter, C.R. (2016) Diagnostic Accuracy of Central Venous Catheter Confirmation by Bedside Ultrasound Versus Chest Radiography in Critically Ill Patients: A Systematic Review and Meta-Analysis. *Critical Care Medicine*. December 5th. .

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