Transthoracic echocardiography and lung ultrasound are noninferior to chest x-ray for screening of pneumothorax and accurate central venous catheter positioning” Amir et al (2017).

Abstract:

OBJECTIVES: Although real-time ultrasound guidance during central venous catheter insertion has become a standard of care, postinsertion chest radiograph remains the gold standard to confirm central venous catheter tip position and rule out associated lung complications like pneumothorax. We hypothesize that a combination of transthoracic echocardiography and lung ultrasound is noninferior to chest radiograph when used to accurately assess central venous catheter positioning and screen for pneumothorax.

SETTING: All operating rooms and surgical and trauma ICUs at the institution.

DESIGN: Single-center, prospective noninferiority study.

PATIENTS: Patients receiving ultrasound-guided subclavian or internal jugular central venous catheters.

INTERVENTIONS: During ultrasound-guided central venous catheter placement, correct positioning of central venous catheter was accomplished by real-time visualization of the guide wire and positive right atrial swirl sign using the subcostal four-chamber view. After insertion, pneumothorax was ruled out by the presence of lung sliding and seashore sign on M-mode.

MEASUREMENTS AND MAIN RESULTS: Data analysis was done for 137 patients. Chest radiograph ruled out pneumothorax in 137 of 137 patients (100%). Lung ultrasound was performed in 123 of 137 patients and successfully screened for pneumothorax in 123 of 123 (100%). Chest radiograph approximated accurate catheter tip position in 136 of 137 patients (99.3%). Adequate subcostal four-chamber views could not be obtained in 13
patients. Accurate positioning of central venous catheter with ultrasound was then confirmed in 121 of 124 patients (97.6%) as described previously.

CONCLUSIONS: Transthoracic echocardiography and lung ultrasound are noninferior to chest x-ray for screening of pneumothorax and accurate central venous catheter positioning. Thus, the point of care use of ultrasound can reduce central venous catheter insertion to use time, exposure to radiation, and improve patient safety.

Reference:

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