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Focused Point of Care Ultrasound for central venous catheter position confirmation and pneumothorax exclusion

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We appreciate the commentary of Brogi et al (1) in their letter entitled: “Lung ultrasonography as the first confirmation method for central venous catheterisation: how far are we?” Achieving faster and accurate diagnostic certainty with point of care ultrasound (POCUS) has an important role in the management of critically ill patients. Regarding central venous catheter (CVC) insertion, ultrasound has demonstrated superiority compared to landmark or anatomic techniques and is now strongly recommended during CVC insertion (2). Regarding the evaluation of mechanical complications after CVC insertion (most commonly catheter malposition and pneumothorax), the diagnostic accuracy of ultrasound versus chest radiography (CXR) is garnering increased attention in the literature. Since our meta-analysis on this subject (3), there have been several recently published studies supporting the role of ultrasound for CVC position confirmation and pneumothorax exclusion. These data are consistent with our findings and suggest that when compared to supine CXR, ultrasound: 1) allows for faster results compared to CXR, 2) can confirm CVC catheter position with acceptable sensitivity and excellent specificity, and 3) can exclude pneumothorax with excellent sensitivity and specificity. Thus, signaling that clinical concern for mechanical complications after CVC insertion can be evaluated by CXR if a first screen ultrasound technique is unfeasible or inconclusive. Based on these findings, we echo Brogi et al (1) in stating that ultrasound should be considered as an alternative first line screening modality after routine CVC insertion.

The role of POCUS in CVC insertion and confirmation cannot be achieved without adequate education and standardization of protocols. Our meta-analysis demonstrated no statically

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significant difference between ultrasound experts and non-experts, thus demonstrating that after some basic training in ultrasound, accurate image acquisition and interpretation can be achieved by most providers. Non-experts in our meta-analysis were defined as clinicians who needed additional training in ultrasound prior to study enrollment. POCUS, since its inception, requires the clinician to both pose and answer the diagnostic question by personal acquisition and interpretation of ultrasound images. These tasks necessitate focused and structured training in the indication, acquisition, and interpretation of the sonographic image. We absolutely agree that without standardization and maintenance of ultrasound training and operator skill, ultrasound guided CVC position confirmation and pneumothorax exclusion as an alternative to chest radiography, cannot achieve widespread implementation. There are model curriculums (4,5) discussed in the literature that should be considered for development of focused POCUS.

We also agree that structured critical care ultrasound training, which highlights the sonographic examinations that are part of the ultrasound protocol for CVC position confirmation and pneumothorax exclusion, is paramount. Understanding the steps to achieving widespread POCUS utilization in procedural and diagnostic applications is important. We hypothesize that there are three crucial elements to attaining widespread acceptance of POCUS by the clinician. These include: 1) ultrasound knowledge and skill competence, 2) comfort, and 3) confidence. Understanding these processes may be useful in early adoption of ultrasound guided CVC position confirmation and pneumothorax exclusion.

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