Commentary: Noncardiac uses of chest ultrasonography other than pleural effusion

The knowledge of ultrasonography (US) in the chest, especially for noncardiac structures, has significantly improved in the recent years beyond the diagnosis of collection in the pleural cavity and for evaluation of superficial chest masses.[1] Previously, it was thought that air-filled structures such as lungs prevent imaging of the chest beyond the chest wall. However, chest sonography has evolved. The artifacts from the air in the lung and the pleural interface help in diagnosing the pathologies. Among the pathologies, identification of pneumothorax in critical care or emergency department is the most important application.[2] Usually, a high-frequency probe is chosen and the scan is performed in the upper three intercostal spaces in comparison to the contralateral chest. Various signs to diagnose pneumothorax include absent lung sliding sign, absent granular appearance on M mode, broadening distance between the pleural line and A-lines, and loss of comet tail artifacts/B-lines.[3-5]

The pleural reflection is identified as a prominent echogenic line, and the lung beneath is seen sliding with respiration. If this is absent, then it is called as “absent lung sliding sign.” On M-mode, the region of the lung appears granular, but this appearance is lost in cases of pneumothorax (and few other pathologies) and only a series of straight lines appear. This is called “barcode” sign. The A-lines are normal horizontal lines which are parallel to the echogenic pleural reflection and these are absent or the distance between the pleural reflection and normal A-lines increases in cases of pneumothorax. The other line described is the B-lines which are normal comet tail artifacts (perpendicular to the pleural reflection). These are absent in pneumothorax.

Other pathologies that can be identified on US include consolidation of lungs and interstitial edema/severe interstitial diseases although the accuracy is not as good as high-resolution computed tomography. The lung US is not without pitfalls. Presence of bullae, severe emphysema, pleurodesis, and acute respiratory distress syndrome can mimic pneumothorax on ultrasound. Nevertheless, the role of US will definitely be significant in critically ill patients especially in ruling out or ruling in pneumothorax and radiologists should be aware of the various signs.

References