



# Application of transthoracic shear-wave ultrasound elastography in lung lesions

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**Transthoracic shear-wave ultrasound elastography can help in differentiating malignant from benign subpleural lung lesions. Tissue proofing should be considered in pulmonary hypoechoic or air bronchogram lesions with high elasticity.** <https://bit.ly/3liKvBr>

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## ABSTRACT

**Introduction:** Tissue stiffness information may help in the diagnosis of lung lesions. This study aimed to investigate and validate the application of transthoracic two-dimensional shear-wave ultrasound elastography in differentiating malignant from benign subpleural lung lesions.

**Methods:** This study involved one retrospective observational derivation cohort from January 2016 to December 2017 and one prospective observational validation cohort from December 2017 to December 2019. The inclusion criterion was radiographic evidence of pulmonary lesions. The patients were categorised into air bronchogram and hypoechoic groups based on B-mode grayscale images. The elasticity of subpleural lung lesions with acceptable shear-wave propagation was measured. Diagnoses were made on the basis of pathology, microbiological studies or following up the clinical course for at least 6 months.

**Results:** A total of 354 patients were included. Among the 121 patients in the derivation cohort, a receiver operating characteristic curve was constructed and the cut-off point to differentiate benign from malignant lesions was 65 kPa with a Youden index of 0.60 and an accuracy of 84.3%. Among the 233 patients in the validation cohort, the diagnostic performance was maintained, with a Youden index of 0.65 and an accuracy of 86.7%. Upon applying the cut-off point to the air bronchogram group, the Youden index was 0.70 and the accuracy was 85.0%.

**Conclusions:** This study validated the application of transthoracic shear-wave ultrasound elastography for assessing lung malignancy. A cut-off point of 65 kPa is suggested for predicting lung malignancy. Furthermore, for pulmonary air bronchogram lesions with high elasticity, tissue proofing should be considered because of the high possibility of malignancy.