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Comment on “Esophageal dilatation and interstitial lung disease in systemic sclerosis: A cross-sectional study”

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Interstitial lung disease is the leading cause of death in systemic sclerosis (SSc) [1]. Despite this, many transplant programs exclude SSc patients from transplantation consideration due to concern for gastroesophageal reflux induced pulmonary injury via esophageal dysfunction [1]. Recent studies that examined lung transplantation outcomes in SSc patients do not support this categorical exclusion [2]. We investigated the esophageal diameter on high-resolution computed tomography (HRCT) of the thorax that is associated with ILD in patients with SSc.

The definition of esophageal dilation in SSc patients varies. Pitrez et al. [3] and Bhalla et al. [4] cite a radiographic textbook that defined an esophageal diameter below the aortic arch > 10 mm on coronal images as dilated [2,5]. Pitrez et al. generated receiver operating characteristic (ROC) curves to determine the esophageal diameter associated with esophageal dysmotility as assessed by radionuclide scintigraphy. They found that an esophageal diameter below the aortic arch 9 mm had 83.1% (95% CI: 71.0–91.5) sensitivity and 94.1% (95% CI: 71.2–99.0) specificity for dysfunction. Subsequent studies extrapolated the 9 mm or 10 mm esophageal diameter cut-point to study the association with radiographic ILD on HRCT, and yielded conflicting results [6–8]. Vonk et al. (< 10mm) [8] and Pandey et al. (< 9mm) [7] did not find a significant association between esophageal dilation and ILD, while Patiwetwitoon et al. (< 10mm) [6] found an association between esophageal dilation and honeycombing ($r = 0.30$, $p < 0.01$). Given the controversy, we

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conducted a cross-sectional study of 270 subjects who fulfilled 2013 ACR SSc criteria to determine the association of esophageal diameter with radiographic ILD.

Using axial HRCT images, a thoracic radiologist quantified ILD in five lung lobes according to the published methods [9]. Esophageal dilation was assessed at three levels—above the aortic arch, between the right inferior pulmonary vein and the aortic arch, and between the diaphragmatic hiatus and the right inferior pulmonary vein [10]. ILD was defined as present if the total lung disease score was ≥ 14 , as this cut-point had the highest specificity for radiographic ILD per manual review by an experienced thoracic radiologist (RA) [9]. We treated esophageal diameter as a continuous variable and generated an ROC curve to identify the esophageal diameter that had high sensitivity and specificity for associated ILD (Fig.). An esophageal diameter (mucosa to mucosa) ≥ 19 mm provided the highest sensitivity (67.74%) and specificity (63.28%) (likelihood ratio: LR $-$ 0.5098, LR $+$ 1.8477) for ILD. Interestingly, there was no esophageal diameter below which ILD was uniformly absent. This suggests that aspiration precautions may be important in all SSc patients. A diameter of ≥ 10 mm yielded a sensitivity and specificity of 91.40% and 17.51% for ILD, respectively. At ≥ 9 mm, the specificity decreased to 13.56%, with a sensitivity of 92.47%. Thus, both 9 mm and 10 mm esophageal diameter cut-points have low specificity for associated ILD. This may explain the lack of association in prior studies.

We found that a ≥ 19 mm esophageal diameter cut-point is most sensitive and specific for associated radiographic ILD in patients with SSc. Our finding may have important implications for lung transplantation evaluation in SSc patients. Further, longitudinal analyses will permit determination of the risk of ILD progression in SSc patients with esophageal dilation.

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Fig. Receiver operating characteristic (ROC) curve demonstrate the performance of various widest esophageal diameter thresholds (mm) for associated radiographic interstitial lung disease in patients with SSc.