

Ultrasound lung comets in systemic sclerosis: a useful tool to detect lung interstitial fibrosis

Sirs,

Systemic sclerosis (SSc) is a connective tissue disease characterised by diffuse fibrosis and vascular abnormalities in the skin and internal organs, particularly the esophagus, heart, lung and kidney. Pulmonary involvement is second in frequency only to esophageal involvement with a wide range of manifestations. Interstitial lung disease (ILD) and pulmonary arterial hypertension are the most frequent major types of lung involvement (1) and the most common cause of death in SSc patients (2-3).

ILD is a frequent complication of diffuse cutaneous SSc (3), but it can occur also in limited cutaneous disease or even in patients without cutaneous sclerosis (SSc sine scleroderma) (4). High resolution computed tomography (HRCT) is considered the gold standard to investigate the severity of ILD (5) but it involves high radiation exposure. The use of ultrasound (US) to study the lung is increasing rapidly and specific findings, the so-called US lung comets (ULCs) also called B-lines (Fig. 1), have been demonstrated when thickened interlobular septa (both for fibrosis or water) are present (6). Recently, using a sector cardiac probe, we have demonstrated that ULCs are often found in SSc according to HRCT information (7). However, no data exist on the use of a linear probe with a higher frequency to evaluate the ULCs.

Twenty-five [out of the thirty-three studied in the previous paper (7)] unselected patients with a diagnosis of SSc, according to the ACR classification criteria (8) (mean age 53 ± 10.5 years, M:F=3:22), referring to our Clinic, were scanned by US using both a Optigo Philips (with a 2.5–3.5 MHz cardiac sector probe) (US1) and a Toshiba Powervision 6000 (6–12 MHz linear probe used at 6 MHz) (US2), in order to assess the reliability of the two different types of equipment. All the patients, enrolled in the study, underwent HRCT as normal screening in our clinic at the first assessment of disease activity, independently of the presence or absence of dyspnea. The ultrasonographers were not informed about the clinical symptoms of the patients. The scanning protocol has previously been described (7), but in this study we did not perform mid axillary line scanning because, given the width (6 cm) of the linear probe footprint, ULCs may be numbered twice. The ULC sign was defined as reported by Picano *et al.* (9). The sum of the number of ULCs in each intercostal space was the ULCs total score, reflecting the extent of ILD.



Fig. 1. Grey-scale US of the lung with the probe on the anterior axillary line showing US lung comet, or B-lines, (arrow heads). White arrows indicate pleural line.

HRCT was performed in all of the patients (7) and the Warrick score (10) was used to evaluate ILD. HRCT and US, read blindly by two independent operators, were performed within a week.

After data standardisation, a significant intra-class correlation (ICC) was found between ULCs obtained with both of the transducers (US1 and US2) (ICC=0.681), with better results for the anterior chest region (ICC=0.604) than for the posterior side (ICC=0.550). Moderate to good intra-class correlation were shown between US1 and HRCT (ICC=0.547) and US2 and HRCT (ICC=0.600).

Pathologic cut-offs were calculated for US score and, based on the Youden's J statistic, the best cut-off was 5 for US1 and 11 for US2. Specificity and sensitivity of US with respect to the HRCT were 70% (IC 0.35–0.93) and 85% (IC 0.55–0.98) for US1, while 60% (IC 0.35–0.93) and 85% (IC 0.55–0.98) for US2. Higher US cut-off determined lower sensitivity, without improvement in specificity.

This study, even though performed on

a small group of patients, demonstrates that US of the lung, and more specifically ULCs, correlating with Warrick score, may represent an easy tool to study ILD in SSc, with the additional value of being a radiation-free imaging technique. This approach does not seem to be related to a specific US machine (both sector cardiac and linear probe, with higher frequency, had provided good results), even if it is necessary to set the specific cut-off for each type of US equipment. Further studies are necessary to clarify many questions and, first of all, to establish whether ULCs correlate with HRCT even in a larger number of patients.

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