VALIDATION OF VECTOR (VELCRO CRACKLES DETECTOR) FOR THE DIAGNOSIS OF INTERSTITIAL LUNG DISEASE IN PATIENTS WITH CONNECTIVE TISSUE DISEASES

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Background: Interstitial lung disease (ILD) represents one of the most frequent pulmonary manifestations in connective tissue diseases (CTD) and it is characterized by severe implications in morbidity and overall prognosis. However, a routinely assessment of ILD is not so common in all CTDs. Velcro-type crackles are typical of lung fibrosis and have been proposed for the early diagnosis of the disease. Recently, we validated the algorithm VECTOR (VELCRO Crackles detector) developed to detect the presence of velcro-crackles in pulmonary sounds recorded by an electronic stethoscope (ES) in RA-ILD patients as screening for the diagnosis of interstitial lung involvement, showing a diagnostic accuracy, a sensitivity and a specificity of 93.9%, 93.2% and 76.9%, respectively.

Objectives: The aim of the present study was to evaluate the diagnostic accuracy of VECTOR in a population of CTDs, compared with the reference standard of high-resolution computed tomography (HRCT), in a monocentric study.

Methods: CTD patients who underwent HRCT in the last 12 months were enrolled. They were auscultated with an ES (Littmann 3200TM 3M, USA), bilaterally, at dorsal level, in at least 3 pulmonary fields (apical, medium and basal). All tracks recorded were analyzed by suitably developed software (VECTOR) capable of recognizing pathological crackles in lung sounds. Results were compared with HRCT findings detected in a blind manner by an expert radiologist.

Results: Ninety CTD patients were enrolled, namely 27.8% systemic sclerosis (SSc), 31.1% primary Sjögren’s syndrome (pSS), systemic lupus erythematosus 11.1%, 7.8% polymyositis, 6.6% dermatomyositis, and 15.5% undifferentiated CTD (UCTD). Male/female ratio was 1:3.1 and a mean age of 63.9±12.7 years; among them 45 (50%) showed ILD at HRCT. The algorithm correctly classified 73/90 patients, with a sensitivity and specificity of 93.3% and 68.9%, respectively, and a diagnostic accuracy of 81.1% (figure 1).

Conclusion: These data confirm the diagnostic accuracy of VECTOR in detection of ILD in CTDs patients, as previously described also for RA-ILD. In some CTDs such as SSc, a careful evaluation of lung involvement is quite different, while for other CTDs, for example pSS or UCTD, ILD remains often underestimated, with a delay in diagnosis and treatment. Since lung complications represent one of the most serious and frequent cause of poor prognosis for all CTDs patients, the search for a simple, repeatable and radiation-free tool for the screening of these patients is mandatory. The routine employment of an ES and VECTOR, combined to clinical findings (cough, dyspnea) and respiratory lung function tests, could increase our ability to early identify ILD in CTD patients.