Quantitative radiographic analysis of interstitial lung disease associated with rheumatoid arthritis

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Background/Purpose: Quantitative analysis of fibrotic patterns provides an objective measurement of treatment efficacy in interstitial lung disease (ILD). We aimed to measure the extent of ILD in rheumatoid arthritis (RA) patients by computer-aided analysis of high-resolution chest CT (HRCT), and to identify correlation with the visual assessment by radiologist and results of pulmonary function test (PFT). **Methods:** Twenty-six RA patients with ILD who had two HRCTs with matched PFT result within 3 months were enrolled in this retrospective study. Demographic, clinical, laboratory information were obtained through a medical chart review. Quantitative analysis of HRCT image was conducted by the Radiology Core at University of California at Los Angeles. Quantitation was expressed as parameters in detail such as ground-glass opacity (QGG), lung fibrosis (QLF), honeycombing (QHC), and their summation (QILD). **Results:** Baseline demographics and clinical characteristics of the patients with rheumatoid arthritis-associated interstitial lung disease were not different when analyzed by interval progression evaluated by radiologist, except for body mass index (progressive group 20.0±3.7; non-progressive group 25.5±3.6 kg/m^2, $p = 0.001$), time interval between HRCTs (progressive group 2.0±1.2; non-progressive group 1.1±0.6 years, $p = 0.047$), and all-cause mortality (progressive group 50.0%; non-progressive group 7.1%, $p = 0.031$). Negative correlation between PFT results and QILD scores at whole lung or zone of maximal involvement were significant (Fig. 1). Correlation between the evaluation of radiologist and QILD scores at whole lung was significant on QLF score (progressive group 3.38±4.15; non-progressive group -1.01±2.64, $p = 0.004$) (Fig. 2). More involvement of ILD on upper and middle zone of lung (versus lower zone) would predict progression of ILD (Fig. 3). **Conclusion:** QILD score provides reliable estimate of ILD status and prognosis in RA patients when compared to PFT and assessment of radiologist.

Carotid plaque formation is predicted by BMD, fracture history and disease activity in RA

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Background: The incidence of cardiovascular (CV) disease is increased in patients with rheumatoid arthritis (RA) compared with the general population, which is related to atherosclerosis has an inflammatory etiology. Several studies revealed that bone mineral density (BMD) is associated with atherosclerosis and fracture. In the present study, we investigated the association between BMD, fracture history, RA disease activity and the carotid atherosclerosis in RA patients based on Kyungpook National University Hospital Atherosclerosis Risk in Rheumatoid Arthritis (KARRA) cohort study. **Methods:** After a baseline evaluation for KARRA enrollment, all RA patients were prospectively followed up for 5 years or until deaths. We analyzed the demographic findings, bony fracture history, conventional CV risk factors, RA disease activity and BMD. Carotid ultrasound at baseline and year 5 was performed to evaluation of the intima-medial thickness (IMT) and presence and progression of carotid plaque. BMD was measured at the lumbar spine, femur neck and distal forearm, and low BMD was defined as a T score of -1.0 or less. **Results:** A total of 417 patients were included in the baseline KARRA cohort, and 325 patients were followed for 5 years. Among the 325 patients, 87 patients (26.8%) had a fracture history. Factors associated with plaques at year 5 included fracture history, IMT, mean blood pressure, and total and LDL cholesterols at baseline, DAS28-ESR at year 5 and 5-year ESR area under the curve. The BMD in the L-spine, femur, and radius was significantly lower in patients with carotid plaques (n = 152), compared to those without plaques (n = 171) ($p = 0.016$) for L-spine ($p < 0.001$) for femur; ($p < 0.001$) for radius). Multivariate logistic regression analysis revealed that DAS28-ESR at year 5 (OR 1.24 [95% CI 1.03-1.6; $p = 0.040$]), 5-year ESR area under the curve (OR 1.09 [95% CI 1.00-1.32; $p = 0.048$]), fracture history (OR 1.70 [95% CI 1.02-3.20; $p = 0.030$]), Low BMD at L spine (OR 1.02 [95% CI 1.00-1.66; $p = 0.045$]) were independent risk factors for carotid plaque formation. **Conclusion:** This study shows that carotid plaque at year 5 is predicted by BMD, fracture history and suboptimal disease activity control in RA.