ORIGINAL RESEARCH

Assessment of CT signs in usual interstitial pneumonia pattern of interstitial lung disease

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ABSTRACT

Background: Interstitial lung disease (ILD) is a broad category of lung diseases that includes more than 130 disorders which are characterized by scarring and/or inflammation of the lungs. The present study was conducted to assess CT signs in usual interstitial pneumonia pattern of interstitial lung disease. **Materials & Methods:** 56 patients of interstitial lung disease of both genders were included. Cases were classified as connective tissue disease (CTD) and non- connective tissue disease (CTD). CT scan was performed in one of these three multi-slice CT scanners. CT scans were considered diagnostic quality if whole of thorax in full inspiration is covered. Parameters such as anterior upper lobe sign, exuberant honeycombing sign, straight edge sign etc. were recorded. **Results:** Group I had 18 males and 10 females and group II had 16 males and 12 females. Anterior upper lobe sign was present in 35%in group I and 62% in group II, exuberant honeycombing sign was present in 36% in group I and 63% in group II and straight edge sign was present in 30% in group I and 71% in group II. The difference was significant (P< 0.05). Sensitivity of CT in diagnosis of anterior upper lobe sign was 35%, exuberant honeycombing sign was 50% and straight edge sign was 40%. specificity of CT in diagnosis of anterior upper lobe sign was 82%, exuberant honeycombing sign was 74% and straight edge sign was 85%. **Conclusion:** EHC sign was the most sensitive sign and SE sign was the most specific sign.

Key words: anterior upper lobe sign, Interstitial lung disease,straight edge sign

INTRODUCTION

Interstitial lung disease (ILD) is a broad category of lung diseases that includes more than 130 disorders which are characterized by scarring (i.e. "fibrosis") and/or inflammation of the lungs. ILD accounts for 15 percent of the cases seen by pulmonologists (lung specialists).[1] In ILD, the tissue in the lungs becomes inflamed and/or scarred. The interstitium of the lung refers to the area in and around the small blood vessels and alveoli (air sacs). This is where the exchange of oxygen and carbon dioxide take place. Inflammation and scarring of the interstitium disrupts this tissue. This leads to a decrease in the ability of the lungs to extract oxygen from the air.[2]

Usual interstitial pneumonia (UIP) pattern on chest computed tomography (CT) has varied causes, with the common causes being idiopathic pulmonary fibrosis (IPF), connective tissue disease (CTD), chronic hypersensitivity pneumonitis (HP), asbestosis, and drug toxicity.[3] The clinical practice guidelines put forward in 2018 by the American Thoracic Society (ATS), the European Respiratory Society (ERS), the Japanese Respiratory Society (JRS), and the Latin American Thoracic Association (ALAT) are used for the diagnosis of UIP patterns on chest CT.[4]Some of the imaging findings which suggest a possible secondary cause for UIP include the presence of pleural plaques, dilated esophagus, distal clavicular erosions, and pleural effusions/thickening.[5]The present study was conducted to assess CT signs in usual interstitial pneumonia pattern of interstitial lung disease.

MATERIALS & METHODS

The present comprised of 56 patients of interstitial lung disease of both genders. All were enrolled in the study with their written consent.

Data such as name, age, gender etc. was recorded. CT scan was performed in one of these three multislice CT scanners. CT scans were considered diagnostic

quality if whole of thorax in full inspiration is covered. All the CT scans were viewed in 1 to 2 mm high spatial algorithm, reconstructed in different planes. Parameters such as anterior upper lobe sign, exuberant honeycombing sign, straight edge sign etc. were recorded. Cases were classified as connective tissue disease (CTD) and non- connective tissue disease (CTD). Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I: Distribution of patients

Gender	Group I (CTD)	Group II (non- CTD)
Male	18	16
Female	10	12

Table I shows that group I had 18 males and 10 females and group II had 16 males and 12 females.

Table II: Assessment of parameters

Parameters	Variables	Group I	Group II	P value
anterior upper lobe sign	Present	35%	62%	0.05
	absent	65%	38%	
exuberant honeycombing sign	Present	36%	63%	0.04
	absent	64%	37%	
straight edge sign	Present	30%	71%	0.02
	absent	70%	29%	

Table I shows that anterior upper lobe sign was present in 35%in group I and 62% in group II, exuberant honeycombing sign was present in 36% in group I and 63% in group II and straight edge sign was present in 30% in group I and 71% in group II. The difference was significant (P< 0.05).

Graph I: Assessment of parameters

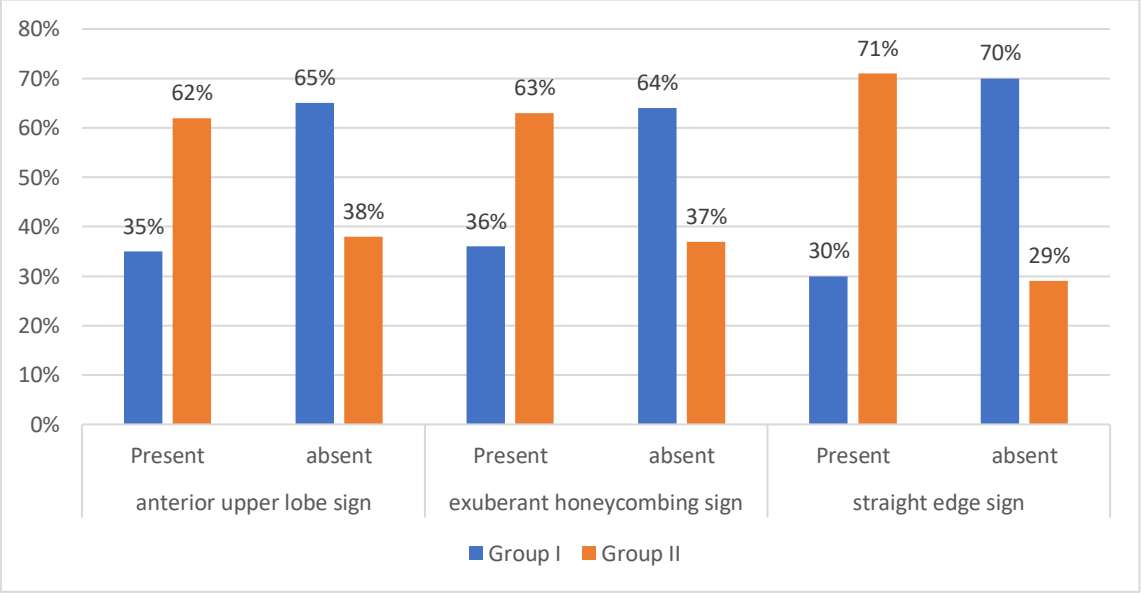

Table III: CT signs in the diagnosis of CTD-related UIP

CT signs	Sensitivity	Specificity
anterior upper lobe sign	35%	82%
exuberant honeycombing sign	50%	74%
straight edge sign	40%	85%

Table III shows that sensitivity of CT in diagnosis of anterior upper lobe sign was 35%, exuberant honeycombing sign was 50% and straight edge sign was 40%. specificity of CT in diagnosis of anterior upper lobe sign was 82%, exuberant honeycombing sign was 74% and straight edge sign was 85%.

DISCUSSION

The progression of ILD varies from disease to disease and from person to person. It is important to determine the specific form of ILD in each person because what happens over time and the treatment may differ depending on the cause. Each person responds differently to treatment, so it is important for your doctor to monitor your treatment.A number of

radiological and histological clues may help distinguish IPF from other conditions with a UIP pattern of fibrosis, but their appreciation requires extensive expertise in interstitial lung disease (ILD) as well as an integrated multidisciplinary approach involving pulmonologists, rheumatologists, radiologists, and pathologists.[6]

The AUL sign is concentration of fibrosis in anterior aspect of upper lobes with relative sparing of rest of the upper lobes along with concomitant lower lobe involvement.[7] EHC sign is extensive honeycomb-like cyst formation in more than 70% of fibrotic portion of lungs.[8] SE sign is fairly straight and abrupt interphase between fibrotic lung bases and normal lung without extension along the lateral margins of lung on coronal images.[9]The present study was conducted to assess CT signs in usual interstitial pneumonia pattern of interstitial lung disease.

We found that group I had 18 males and 10 females and group II had 16 males and 12 females. Augustine et al[10] retrospectively studied all patients who had UIP pattern of ILD on CT thorax done. Of the 156 patients included, 76 had CTD. The incidence of CT signs were significantly higher in CTD-related UIP. The specificities of AUL, EHC, and SE were 82.5, 75, and 85%, respectively. The EHC sign had highest sensitivity of 48.7%. Inclusion of more than one sign increased the specificity of diagnosis of CTD-related UIP; however, the sensitivity decreases. There was excellent interobserver agreement (0.81–0.87) for each of these signs.

We found that anterior upper lobe sign was present in 35%in group I and 62% in group II, exuberant honeycombing sign was present in 36% in group I and 63% in group II and straight edge sign was present in 30% in group I and 71% in group II. In the study by Chung et al[11] which studied CT features of UIP, 32% of cases were CTD related and the rest IPF.

We found that sensitivity of CT in diagnosis of anterior upper lobe sign was 35%, exuberant honeycombing sign was 50% and straight edge sign was 40%. specificity of CT in diagnosis of anterior upper lobe sign was 82%, exuberant honeycombing sign was 74% and straight edge sign was 85%.Corte et al[12]studied the clinical and prognostic utility of a diagnosis of undifferentiated CTD (UCTD) in patients with biopsy-proven IIP. IIP patients undergoing surgical lung biopsy (1979-2005) were studied (nonspecific interstitial pneumonia (NSIP), n = 45; idiopathic pulmonary fibrosis, n = 56). UCTD was considered present when serum autoantibodies were present and symptoms or signs suggested CTD. The relationship between UCTD and NSIP histology was evaluated. A clinical algorithm that best predicted NSIP histology was constructed using a priori variables. The prognostic utility of UCTD, and of this algorithm, was evaluated. UCTD was present in 14 (31%) NSIP and seven (13%) IPF patients. UCTD was not associated with a survival benefit. The algorithm predictive of NSIP (OR 10.4, 95% CI 3.21-33.67; $p<0.0001$) consisted of the absence of typical high-resolution computed tomography (HRCT) features for IPF and 1) a compatible demographic profile (females aged <50 yrs) or 2) Raynaud's phenomenon. In patients with an HRCT scan not typical for IPF, this algorithm predicted improved survival (hazard ratio 0.35, 95% CI 0.14-0.85; $p = 0.02$) independent of IIP severity. UCTD is associated with NSIP histology. However, the diagnostic and prognostic significance of UCTD in IIP patients remains unclear.

The limitation the study is small sample size.

CONCLUSION

Authors found that EHC sign was the most sensitive sign and SE sign was the most specific sign.

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