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TANAFFOS

Chest High Resolution Computed Tomography Findings in Connective Tissue Diseases

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Background: Lung disorders are important for prognosis of connective tissue disease (CTD). Thus, chest radiography, High Resolution Computed Tomography (HRCT) of the chest and ultrasonic echocardiogram are suggested after the diagnosis of these conditions. The purpose of this study was to evaluate chest HRCT findings in patients with CTD.

Materials and Methods: In this descriptive cross-sectional study, we evaluated HRCT findings in patients with (CTD) hospitalized in Imam Reza Hospital in Mashhad from 2006- 2011. Patients' age, sex, type of rheumatic disease and HRCT results were collected and analyzed by SPSS version 16.0 software.

Results: out of 75 patients (78.67% females, 21.33% males with a mean age of 41.6 years), 56% had respiratory symptoms. Scleroderma was the most common disease (38.6%) followed by rheumatoid arthritis (26.6%) and systemic lupus erythematosus (14.6%). Interstitial tissue involvement of the lung was the most frequent finding in patients with scleroderma, dermatomyositis, polymyositis and Sjogren's syndrome (48.3%, 57.1%, 60% and 66.7%, respectively). Pleural thickening was the most common finding in patients with rheumatoid arthritis (45%). Pleural effusion was the most frequent finding in patients with systemic lupus erythematosus (45.4%). Lymphadenopathy and bronchiectasis had the lowest prevalence (1.3%).

Conclusion: Our data shows that interstitial tissue involvement**,** pleural thickening and pleural effusion are common in patients with rheumatic diseases which is consistent with some previous studies.

Key words: High resolution computed tomography, Connective tissue diseases, Interstitial tissue involvement

INTRODUCTION

Connective tissue diseases can cause pulmonary parenchymal involvement as well as vascular and pleural abnormalities due to autoimmune processes. The most frequent types of CTD that affect the pleural cavity are rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE) (1). Lung disorders can increase morbidity and mortality in these diseases (2). For evaluation of the presence and extent of parenchymal and pleural abnormalities, high-resolution computed tomography (HRCT) has been shown to be more helpful than radiography (3).The most common CTD findings have been reported in articles. The purpose of this study was to evaluate HRCT' findings in patients with CTD.

MATERIALS AND METHODS

In this retrospective descriptive cross-sectional study, we evaluated HRCT's of patients with CTD hospitalized in Imam Reza Hospital in Mashhad during 2006 - 2011. We found CTD patients with an HRCT request in their records from the hospital archives, contacted them by phone and asked them to bring their HRCTs. We interpreted the HRCTs. HRCTs had been obtained with a Neusoft spiral scanner (Neusoft, Philips, China). HRCT scans were

obtained in supine position during full inspiration, with the following parameters being used: 1-mm sections at 10-mm intervals, a high–spatial frequency algorithm, 512x512 matrix, 140 kvp, and 130 mas. The examination was performed from the apices of the lung to the lung bases. Prone scan performed whenever subpleural lesions were observed. HRCT was reviewed with lung (window width, 2000H; window level, -700H) and soft tissue window (window width, 400H; window level, 40H) .We collected other information from the Radiology Ward. Patients' age, sex, type of CTD and HRCT results were all collected and analyzed using SPSS version 16.0 software.

RESULTS

Out of 75 patients (78.67% females, 21.33% males with a mean age of 41.6±10.4 years), 56% had respiratory symptoms. The most common disease was RA in males with 43.7% prevalence (N=7) and scleroderma in females with 41.4% prevalence (n=24) (Table 1).

Overall, scleroderma was the most common disease (38.6%, n=29) followed by RA (26.6%, n=20) and SLE (14.6%, n=11). Also, Sjogren's syndrome had the least frequency (4%, n=3).

Table 1. Gender of patients

Disease	Female N(%)	Male N(%)	Total N(%)
RA	13(17.34)	7(9.33)	20(26.7)
SLE	10(13.33)	1(1.3)	11(14.6)
Sjogren's syndrome	3(4)	0(0)	3(4)
Dermatomyositis	6(8)	1(1.3)	7(9.3)
Polymyositis	3(4)	2(2.7)	5(6.7)
Scleroderma	24(32)	5(6.7)	29(38.7)
Total	59(78.67)	16(21.33)	75(100)

RA=rheumatoid arthritis, SLE= systemic lupus erythematosus

The most frequent finding in HRCTs was interstitial tissue involvement (40%, n=30) followed by pleural fibrosis (28%, n=21) and consolidation (18.7%, n=14). Also, we did not observe honeycomb pattern (0%) (Table 2).

Interstitial tissue involvement was the most common finding in patients with scleroderma, dermatomyositis, polymyositis and Sjogren's syndrome (48.3%, 57.1%, 60% and 66.7%, respectively). Pleural fibrosis was the most common finding in patients with RA (45%). Pleural effusion was the most frequent finding in patients with SLE (45.4%). Lymphadenopathy and bronchiectasis had the lowest prevalence (1.3%).

Table 2. HRCT findings in each disease.

HRCT findings / Disease	RA	SLE	Sjogren's syndrome	Dermatomyositis	Polymyositis	Scleroderma	Total
ILD	5	2	2	4	3	14	30
pleural fibrosis	9	0	1	2	0	9	21
Consolidation	4	3	0	1	0	6	14
Pleural effusion	0	5	0	0	0	0	5
Cardiomegaly	0	1	0	0	2	0	3
Lymphadenopathy	1	0	0	0	0	0	1
Bronchiectasis	1	0	0	0	0	0	1
Total	20	11	3	7	5	29	75

RA=Rheumatoid Arthritis, SLE= Systemic Lupus Erythematosus

DISCUSSION

The connective tissue / collagen vascular diseases are a heterogeneous group of immunologically mediated diseases in which the lungs are an important target organ due to their abundant connective tissue.

Lung involvement is common in patients with connective tissue diseases causing considerable morbidity and mortality. Early detection of pulmonary involvement is important for initiating appropriate therapy.

HRCT is the imaging technique of choice for evaluation of patients with connective tissue diseases, demonstrating the presence, gross characteristics and distribution of pulmonary disease with greater sensitivity than conventional chest radiographs. In certain clinical circumstances, HRCT findings can suggest a specific diagnostic process. HTCT often allows the predominant process to be identified. However, it has some limitations. In many cases, HRCT appearance is nonspecific and may or may not be related to an underlying CTD (2). Thus, radiologic findings should never be interpreted without knowledge of the clinical picture. The best approach to evaluate connective tissue disease is to recognize and analyze different patterns of involvement, which include pulmonary, pleural and mediastinal or hilar lymph node involvement. Interstitial lung disease (ILD) is a challenging clinical entity that can be associated with multiple CTDs (2). The term ILD is used to describe heterogeneous disorders of the lungs that share common radiologic, pathologic, and clinical manifestations. In addition to ILD, other forms of lung damage involving the vasculature, airways, and lymphatic tissues can complicate connective tissue disease. Linear and reticular opacities are among the most important CT findings in connective tissue disease. Reticular pattern represents thickening of the interlobular interstitium within the secondary pulmonary lobule. In end stage disease, honeycomb pattern may be seen and represents terminal lung disease. Other patterns of pulmonary involvement include nodular opacities, ground glass opacities, air space consolidation and decreased lung opacity such as in emphysema (4).

Rheumatoid arthritis (RA) is the most common type of CTD, affecting about 1% of people worldwide. The frequency of pulmonary abnormalities found in association with RA has been shown to vary widely. Pleural involvement, either pleural effusion or pleural thickening is the most common thoracic manifestation of RA. The degree of interstitial lung involvement does not necessarily correlate with the severity of articular involvement. The radiographic findings are often subtle and chest radiographs may be normal or show only honeycombing opacities (5, 6).

Systemic lupus erythematosus (SLE) is associated with pleuropulmonary disease in more than half the patients. Pleuritis is the most common thoracic manifestation of SLE. SLE is not commonly associated with chronic diffuse ILD (4, 7).

ILD is the most common complication of scleroderma, occurring in up to 75% of cases. The HRCT findings of interstitial fibrosis in scleroderma include ground glass attenuation, subpleural reticular opacities, traction bronchiectasis, architectural distortion, pleural thickening or effusion, and centrilobular micronodules in a predominantly peripheral and basilar distribution (2,8).

In our study, the most frequent HRCT findings were interstitial tissue involvement similar to Afeltra's study (4).

Pleural thickening was the most common finding in patients with RA in our study, but in Mohd Noor et al's study reticulation followed by ground glass opacities was the most common HRCT findings (5). In Zrour's study, interstitial involvement had the highest frequency in RA patients (28%)(6). These differences may be due to variable ethnicity, disease activity and duration of disease in patients.

We showed that pleural effusion was the most frequent finding in patients with SLE which is in contrast to Fenlon et al's findings (7). This may be due to the variable severity of systemic lupus erythematosus in patients. We studied patients admitted to hospital but they worked on outpatients suffering from SLE.

In our patients with scleroderma, interstitial tissue involvement was the most common finding similar to Goldin et al's study (8). In patients with polymyositis and dermatomyositis, interstitial tissue involvement was the most common finding similar to Ikezoe et al's study (9).

In Sjogren's syndrome, interstitial involvement was the most common finding in our study which is in accord with Koyama et al's study (10).

Our study had several limitations. We did not evaluate the duration of disease, history of smoking or disease activity or severity in our patients because of incomplete patient records.

In conclusion, the most frequent HRCT finding in patients with connective tissue disease was interstitial tissue involvement.

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