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Original Research Paper

Radiodiagnosis

HRCT EVALUATION OF INTERSTITIAL LUNG DISEASES WITH CLINICAL CORRELATION: STUDY OF 50 PATIENTS IN A TERTIARY LEVEL HOSPITAL OF JHARKHAND, INDIA

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ABSTRACT

Background: Interstitial lung diseases (ILDs), also called diffuse infiltrative lung diseases, are a heterogeneous group of disorders that predominantly affect the lung parenchyma and vary widely in etiology, clinicoradiologic presentation, histopathologic features, and clinical course. High resolution computed tomography(HRCT) is the most accurate noninvasive modality for evaluation of ILD. The purpose of the study was to evaluate the relevance of HRCT along with clinical correlation in diagnosis of interstitial lung diseases.

Materials & methods: A prospective study was conducted over a period of 18 months from march 2015 to september 2016 on 50 patients who presented with clinical symptoms and x-ray features suggestive of interstitial lung diseases. HRCT chest was done in all patients on 16 slice seimens somatom CT scanner in supine position using standard HRCT protocol. Parenchymal abnormalities were detected and categorized for specific diagnosis of ILD.

Results: In the present study diffuse lung disease was most commonly found in the age group of 51-60years(38% of patients) . Males were more commonly affected(64% males). In this study 27 patients(54%) were smoker. Dust exposure was noted in 11(22%). Clinical correlation suggest that clubbing seen in 26 patients(52%). Major complaint was progressive dyspnoea(98%) followed by dry cough(82%). On auscultation crepts noted in 41(82%). Blood Oxygen saturation diminished in 32(64%). Chest x-ray was normal in 12 patients where HRCT shows abnormality. On HRCT Reticular pattern was most common finding in 36(72%). The most common interstitial lung disease found in our study was usual interstitial pneumonia(n=20,40%) followed by nonspecific interstitial pneumonia(n=8,16%) and acute interstitial pneumonia(n=6,12%).

Conclusion: HRCT is highly effective modality for visualization of the lung pathology. HRCT along with clinical findings and releavant laboratory tests help in diagnosis of ILD. Pattern of HRCT findings differ to certain extent in different studies. Most common pattern was UIP in this study.

KEYWORDS : High resolution computed tomography, Interstitial lung disease, Usual interstitial pneumonia

INTRODUCTION

Interstitial lung diseases (ILDs), also called diffuse infiltrative lung diseases, are a heterogeneous group of disorders that predominantly affect the lung parenchyma and vary widely in etiology, clinicoradiologic presentation, histopathologic features, and clinical course. (1-3) It involves the entire lung parenchyma as well as the alveolar interstitium. ILD are characterized by fibrosis of alveolar interstitium and presence of chronic alveolitis that produces derangement of the alveolar structures and ultimately leads to loss of functional gas exchange units(end stage lung)(4). Approximately two third do not have a known cause(idiopathic) while one third result from known endogenous or exogenous causes including environmental/occupational factors, infection, drugs or radiation(5). A thorough physical examination and detailed history are vital to achieving an accurate diagnosis. Diffusely abnormal chest radiograph often is the initial finding that alerts the physician to the possibility of ILD(6). HRCT has been the most important diagnostic advance in interstitial lung disease in the last two decades. The superior sensitivity and specificity of HRCT, compared to chest radiography ,is well recognized , and several studies have confirmed its diagnostic accurancy against histological findings in specific clinical contexts(7,8). , This study aims to study basic HRCT patterns associated with ILD & correlations of HRCT patterns with clinical data in differential diagnosis of disease.

MATERIALS & METHODS

The present study consists of data collected from 50 patients attending department of Radio-diagnosis, Rajendra Institute of Medical sciences(RIMS), a tertiary care centre in Ranchi,Jharkhand,India. The study was prospective and conducted over a period of 18 months (March 2015 to September 2016) . Patients presented with clinical symptoms and X-ray features suggestive of interstitial lung disease were referred from chest medicine & general medicine department to radio-diagnosis department . Patients were selected based on inclusion exclusion criteria & evaluated with High Resolution Computed Tomography of Chest on Siemens somatom sensation 16 slices CT scan machine. A provisional diagnosis was suggested after HRCT examination and these findings were correlated with clinical and X-ray findings.

INCLUSION CRITERIA

1. History of dyspnoea and non-productive cough.
2. History of exposure to organic/inorganic dust.
3. Known cases of collagen vascular disease (e.g. Rheumatoid Arthritis).
4. Abnormal lung function test
5. Abnormal chest radiograph.

EXCLUSION CRITERIA

1. Patients with acute respiratory tract infection.
2. Patients with chronic infection e.g. Tuberculosis.
3. Patients with dyspnoea due to cardiac or renal causes.
4. Patients with primary neoplasm of lung.

STATISTICAL ANALYSIS

Standard statistical analysis was done with the help of Microsoft Excel version 2007. Descriptive statistics like mean (SD) and percentages were used to interpret the results.

RESULTS

In the present study diffuse lung disease was most commonly found in the age group of 51-60years(38% of patients) . Males

were more commonly affected(64% males). In this study 27 patients(54%) were smoker. Dust exposure was noted in 11(22%). Clinical correlation suggest that clubbing seen in 26 patients(52%). The major complaint was progressive dyspnoea (n=49; 98%) , followed by dry cough(n=41, 82%) and joint pain (n= 15, 30%) . In this study 9 patients (18%) were suffering from connective tissue disorder. On auscultation crepts noted in 41(82%). 39 patients(78%) showed raised FEV1/FVC ratio.Blood Oxygen saturation diminished in 32(64%). Chest x-ray was normal in 9 patients where HRCT showed abnormality. On HRCT Reticular pattern was most common finding in 36(72%). Secondary infection &emphysema were the common additional findings.

TABLE-1 SHOWING AGE DISTRIBUTION OF ILD

Sr. No.	Age group	No. of patients(n=50)	Percentage
1.	30-40 years	3	6%
2.	41-50 years	16	32%
3.	51-60 years	19	38%
4.	61-70 years	8	16%
5.	71-80 years	3	6%
6.	81-90 years	1	2%

TABLE-2 SHOWING SEX DISTRIBUTION OF ILD

Sex	No. of case(n=50)	Percentage
Male	32	64%
Female	18	36%

TABLE-3 SHOWING VARIOUS PRESENTING SYMPTOMS

Symptom	No. of case(n=50)	Percentage
Dyspnoea	49	98%
Dry cough	41	82%
Joint Pain	15	30%
Fever	5	10%
Wet cough	4	8%
Tight skin	2	4%

TABLE-4 SHOWING CHEST X-RAY FINDINGS

Findings	Number of cases(n=50)	Pecentage
Normal	9	18%
Reticular Pattern	38	78%
Septal lines	7	14%
Nodular Pattern	5	10%
Reticulonodular Pattern	16	32%
Ground glass opacity	24	48%
Honeycombing	11	22%

TABLE-5 SHOWING HRCT FINDINGS IN ILD

Findings	Number of case (n=50)	Percentage
Reticular pattern	37	74%
Septal thickening	32	64%
Honeycombing	27	54%
Ground glass opacity	24	48%
Traction bronchiectasis	24	48%
Nodules	7	14%

The most common interstitial lung disease found in our study was usual interstitial pneumonia (UIP) / idiopathic pulmonary fibrosis (IPF) (n=22; 44%) followed by nonspecific interstitial pneumonia (NSIP) (n=10; 20%) and acute interstitial pneumonia (AIP) (n=8; 16%) .

TABLE- 6 SHOWING SPECIFIC ILD IN PRESENT STUDY

Usual Interstitial Pneumonia (UIP)/ Idiopathic Pulmonary Fibrosis(IPF)	22	44%
Nonspecific Interstitial Pneumonia (NSIP)	10	20%
Acute Interstitial Pneumonia (AIP)	8	16%
Cryptogenic organizing pneumonia (COP)	4	8%
Hypersensitivity pneumonitis (HSP)	4	8%
Coal worker pneumoconiosis (CWP)/Silicosis	2	4%

DISCUSSION

in the present study most common age group at presentation was 50-60 years with male preponderance. all patients presented with dyspnoea of varying degree. smoking(54%) & dust exposure(22%) was contributing factor in this study. most common x-ray findings were reticular pattern found in 78% of patients. most common hrct findings were reticular pattern (74%) followed by septal thickening(64%). these findings correlated with findings of muhammed sk et al(9). hrct was superior modality to chest x-ray in detection of all basic patterns and their distribution associated with ild. chest radiograph is a nonspecific investigation and can be utilized as initial investigation in work up of ild. in9 patients chest x-ray was normal where hrct showed abnormality. hrct of lungs along with clinical data is essential for the diagnosis of ild as reported by potente g etal, grenier p et al, aziz za et al, raniga s et al and ghulam shabbier et al.(10-14) in the present study most common interstitial lung disease reported on hrct was usual interstitial pneumonia(44%) followed by nsip(20%). these findinds were in accordance to those reported by muhammed sk et al in 2011. honeycombing, reticular pattern and traction bronchiectasis were common findings observed in almost all cases of uip seen predominantly in basal and subpleural regions. in nsip , hrct findings predominantly involved the lower lobes with subpleural regions like ipf but the distribution was patchy whereas in ipf findings are diffuse. honeycombing was also less common than uip. in aip, hrct showed patchy areas ground glass opacity with discrete areas of alveolar consolidation involving both lungs with predominant involvement of upper lobes and subpleural regions. in cop hrct showed ground glass opacities and consolidative areas distributed along the bronchovas cular bundlesand along subpleural lungs. in hsp, diffuse tiny centrilobular nodules with ground glass haziness seen predominantly in upper lobes. collagen vascular disease associated ild was noted in 18% of cases. collagen vascular diseases are immunologically mediated inflammatory disorders and include the following entities : rheumatoid arthritis, progressive systemic sclerosis, systemic lups erythematosus, polym yositis/dermatomyositis, mixed connective tissue diseaseand sjogren's syndrome(15). two most common conditions associated with with interstitial lung disease are rheumatoid arthritis and progressive systemic sclerosis (scleroderma)

TABLE-7 SHOWING HRCT FINDINGS OF ILD(16-21)

Finding	UIP	NSIP	AIP	COP	HSP
Honeycombing	Typical	Uncommon	In late stage	No	No
Reticulation	Usulally predominates	Common; Mild to moderate	Common in late stage	Uncommon; Mild if present	Uncommon
Ground glass opacity	Mild	Usually predominates	Common	Common	Common;can be bilateral, symmetrical or patchy

Consolidation	Uncommon	Common; usually mild	Very common	Typicalll y predominates	Uncommon
Additional findings: HSP - Numerous round centrilobular nodules(<5mm) Air trapping giving rise to mosaic attenuation CWP/Silicosis- Small nodules(2-5mm in diameter) , ill defined /well defined, Centrilobular / subpleural. Diffuse distribution with upper lobe and posterior predominance (22,23)					

CONCLUSION

In patients with progressive dyspnoea with abnormal chest x-ray ILD should be ruled out by HRCT. HRCT is highly effective modality for visualization of the lung pathology. Chest radiograph is a nonspecific investigation and can be utilized as initial investigation in work up of ILD. HRCT along with clinical findings and releavant laboratory tests help in diagnosis of ILD. Pattern of HRCT findings differ to certain extent in different studies. Most common pattern was UIP in this study.

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