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COMPARISON BETWEEN CHEST RADIOGRAPH AND HRCT CHEST IN CASES OF INTERSTITIAL LUNG DISEASE

Dr Rini Palve	Senior Resident
Dr Priyanka Verma	Second year resident
Dr Sanjay Chandnani	Second year DM resident

ABSTRACT

Introduction: The advent of High Resolution Computed Tomography(HRCT) has revolutionized our ability to detect and characterize interstitial lung diseases in vivo. Structural changes in the lungs can often be detected in patients with a normal chest radiograph. However even HRCT has its limitations. In the detection of interstitial lung diseases, its sensitivity is not 100% and the limitations of sensitivity are not well established. 10-20% of patients with interstitial lung diseases can have a normal HRCT.[1]This study therefore aims to compare conventional chest radiographs and HRCT in the evaluation of interstitial lung diseases.
Aim and Objectives: HRCT chest can detect abnormalities not visualised on chest radiograph. The study is done to compare conventional chest radiography and HRCT in diagnosis of interstitial lung disease.
Methods: The study included 30 patients after a detailed clinical workup, the patients underwent both conventional chest radiograph and HRCT. The images were evaluated and findings were compared between chest radiography and HRCT chest.
Results: The main result of the study was that HRCT detected more abnormalities than conventional chest radiograph. The difference between two modalities were found to be statistically significant in certain findings.
Discussion: Interstitial lung diseases are diverse group of diseases that predominantly affect the lung interstitium and share similar clinical and radiological manifestations.
Conclusion: HRCT chest appeared better modality of investigation than conventional chest radiography in diagnosis of interstitial lung diseases. HRCT was able to detect abnormalities even in cases when chest radiograph was normal thereby emphasizing the inherent lack of sensitivity of chest radiograph. Hence clinicians always gives HRCT the priority for diagnosis.

KEYWORDS HRCT, X-Ray, Interstitial lung diseases

Introduction:
The chest radiograph remains part of initial assessment of ILD (Interstitial lung disease), but the radiographic pattern is often non-specific, observer variation is considerable and it is relatively insensitive to early ILD. Also it has limited accuracy due to superimposition of structures and poor contrast resolution. The interstitial lung disease are a group of diffuse parenchymal lung diseases that share many features but are sufficiently different from one another to be designated as separate disease entities. They are a heterogeneous group of disorders of the lower respiratory tract that are characterised by both acute and chronic inflammation and a generally irreversible and relentless process of fibrosis in the interstitium and the alveolar walls.[2] Interstitial lung diseases are characterized by anatomical distortion of peripheral airways and interstitium, determined by a first stage of alveolitis followed by a stage of fibrosis. The natural history of several interstitial lung diseases is characterized by slow and progressive destruction of of alveolar-capillary functional units, often with respiratory failure and death [3, 4]. HRCT scanning is particularly helpful in characterizing and diagnosing these entities.

Aim and objective:
1)To compare conventional chest radiography and HRCT in diagnosis of Interstitial lung disease.
2)To analyse the efficiency of HRCT in diagnosis of ILD in the cases.
3) To study the different radiographic patterns evident in both conventional chest radiography and HRCT

Material and methods:
Source of data: Around 30 patients with clinical suspicion of interstitial lung disease who were referred to the department of Radiodiagnosis, MGM Medical Hospital for diagnosis and evaluation will be subjected to both conventional chest radiograph and HRCT. Diagnosis will be based on clinical and radiographic findings.

Method of collection of data: A cross sectional study will be performed. All ages and both sexes will be included in the study. It will be a duration based study. A minimum of 30 patients will be included in the study.

Duration of the study: study will be conducted for a period of 1 year.

Inclusion criteria:
- patients presenting with collagen vascular diseases like SLE, rheumatoid disease, systemic sclerosis
- patients of systemic vasculitis like Wegener's granulomatosis
- pulmonary tuberculosis with disseminated disease status
- industrial exposure related diseases like asbestosis, silicosis, coal worker's pneumoconiosis, etc
- medication, drugs and radiation exposure related cases
- cases of idiopathic interstitial pneumonias and hypersensitivity pneumonias
- cases of allergic bronchopulmonary aspergillosis, invasive aspergillosis and lymphangitic spread of tumors.

Exclusion criteria
Patients presented to Radiology who were unfit for the study such as pregnant patients or who were unwilling to participate.

Protocol: HRCT Scan was carried out with Toshiba Asteion's 64 slice CT machine using 120kV, 200mA with scan time per slice as 1-2 sec with slice thickness 1 mm.

Results: The present study was a prospective and observational type of cross sectional study. A total of 30 patients were evaluated.

The main result of the study was that HRCT detected more abnormalities than conventional chest radiographs. The difference between two modalities were found to be very significant in certain findings.

Discussion: The study was carried out at the department of

Radiology, MGM Medical Hospital. A total of 30 patients were evaluated. The patients were subjected to both conventional chest radiograph and HRCT scan thorax and a detailed work up of these patients was performed; their clinical history, relevant past and occupational history and any laboratory data recorded. Of the 30 patients, 18 patients were males and 12 females. The spectrum of diseases included in the study were idiopathic pulmonary fibrosis, idiopathic NSIP, rheumatoid arthritis, lymphangitis carcinomatosis, asbestosis, hypersensitivity pneumonitis, smoking related interstitial lung disease, cryptogenic organizing pneumonia, sarcoidosis, silicosis, allergic bronchopulmonary aspergillosis and tuberous sclerosis (lymphangioleiomyomatosis), drug induced interstitial lung disease, atypical usual interstitial pneumonitis.

The main observation in study was that higher number of samples with findings was detected by HRCT as compared to conventional radiography. Even when both modalities were able to detect the findings, HRCT could characterize the abnormality location much more accurately. The chest radiogram can appear completely normal in patients suffering from interstitial lung diseases. Therein lies the inherent lack of sensitivity of conventional chest radiography in the diagnosis of the conditions. In our study, 2 of the 30 patients had no abnormalities in their chest radiographs. However, HRCT was able to show changes in these patients. The most common abnormality seen on chest radiographs was reticular opacities. However, HRCT managed to detect reticular opacities in 98% of the cases, thereby implying a much greater sensitivity in the identification of these densities. Furthermore, in the detection of these reticular opacities, although conventional chest radiography was able to differentiate between medium and coarse opacities, their detection of fine reticular densities was a cause of concern. HRCT detected fine reticular opacities in the lungs when the chest radiograph revealed no such abnormalities.

HRCT findings in interstitial lung diseases are Lines and Reticular Opacities, Increased Lung Opacity, Nodules and Nodular Opacities, Decreased Lung Opacity, Cysts and Airway Abnormalities, Architectural distortion with traction bronchiectasis due to fibrosis, Mild mediastinal lymphadenopathy.

HRCT was reported to be superior to other imaging modalities with improved clarity of parenchymal abnormalities, enabling a better and more confident characterization of pathologic processes in interstitial lung diseases.[7]

It was also reported that conventional radiography is not perfect in detecting early intraparenchymatous changes and small opacities in patients of silicosis as compared to HRCT.[6]

The advent of High Resolution Computed Tomography(HRCT) has revolutionized our ability to detect and characterize interstitial lung diseases in vivo. Structural changes in the lungs can often be detected in patients with a normal chest radiograph. However even HRCT has its limitations. In the detection of interstitial lung diseases, its sensitivity is not 100% and the limitations of sensitivity are not well established. 10-20% of patients with interstitial lung diseases can have a normal HRCT.[5]

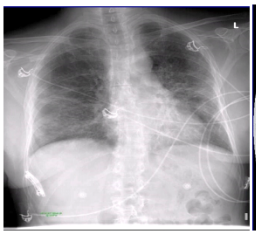

Fig. 1

Fig. 2

Figure 1 & 2: A 68-year-old male patient came with cough and shortness of breath since few months. Chest radiograph shows reticular opacities in B/L lower zones. Axial CT image through lower lungs shows predominantly bilateral ground glass attenuation with interlobular septal thickening.

Fig. 3

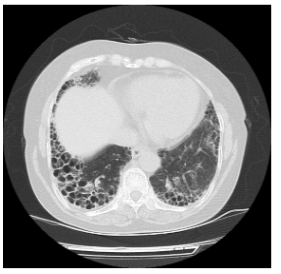

Fig. 4

Figure 3 & 4: A 73 year old female came with dry cough and breathlessness since one year. On plain radiograph reticulo-nodular opacities noted in b/l lung fields. On Axial CT shows multiple honeycombing in B/L basal and subpleural location with architechtural distortion.

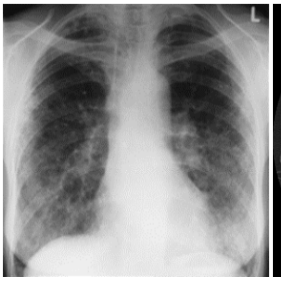

Fig. 5

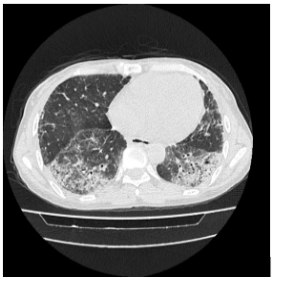

Fig. 6

Figure 5 & 6: A 45 year old female came with h/o of chronic cough and shortness of breath since few months. She was a diagnosed case of scleroderma. On plain radiograph, there is reticular opacities noted in B/L lung fields. On Axial CT there is inter and intra lobular septal thickening, honeycombing and ground glass attenuation in B/L lower lobes and lingular lobe.

References:

1. Interstitial lung disease: Clinical evaluation and keys to an accurate diagnosis. Clin Chest Med. 25:2004;409-419
2. Neurohr C, Behr J. Dtsch Med Wochenschr. Diagnosis and therapy of interstitial lung diseases, 2009; 134(11): 524-9.
3. Kevin K. Brown. Idiopathic Pulmonary Fibrosis: Current approach to diagnosis and therapy. MedSci update, 2004; 21: 1-3.
4. Crystal RG, Fulmer JD, Roberts WC, Moss ML, Line BR, Reynolds HY Idiopathic pulmonary fibrosis: clinical, histologic, radiographic, physiologic, scintigraphic, cytologic and biochemical aspect Ann InternMed, 1976; 85: 769
5. Interstitial lung disease: Clinical evaluation and keys to an accurate diagnosis. Clin Chest Med. 25:2004;409-419
6. Jinkai Sun, Dong Weng, Changshan Jin, Bo Yan, Guihua Xu, Bo Jin, Shenning Xia, Jie Chen. The value of HRCT in the diagnostics of small opacities and complications of silicosis in mine machinery manufacturing workers, compared to radiography. J Occup Health 2008; 50:400-405
7. Martin Remy-Jardin, Jacques Remy, Catherine Deffontaines, Alain Duhamel. Assessment of Diffuse Infiltrative Lung Disease: Comparison of Conventional CT and High Resolution CT. Radiology 1991; 181:157-162