ORIGINAL RESEARCH PAPER

Radiology

UTILITY OF HIGH-RESOLUTION COMPUTED TOMOGRAPHY IN ASSESSMENT OF INTERSTITIAL LUNG DISEASE

KEY WORDS: HRCT, Interstitial Lung Disease, Usual Interstitial Pneumonia, NSIP, Ground-Glass Opacity

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ABSTRACT

Background: Diffuse interstitial lung diseases (DILDs) comprise a complex spectrum of disorders characterized by inflammation and fibrosis of the lung interstitium. High-Resolution Computed Tomography (HRCT) has become the imaging modality of choice for non-invasive diagnosis and classification of DILDs, enabling identification of hallmark patterns critical for early intervention. The present study aimed to assess the diagnostic utility of HRCT in identifying and classifying ILDs and to correlate specific radiological features with final diagnoses based on histopathology or treatment response. **Methods:** A prospective cross-sectional study was conducted on 40 patients with clinically suspected ILDs. HRCT chest scans were evaluated for key features such as interlobular and intralobular septal thickening, centrilobular and perilymphatic nodules, ground-glass opacities, consolidation, honeycombing, and zonal distribution. Radiological findings were statistically analyzed and compared with final diagnoses. **Results:** UIP was the most common pattern (40%), followed by NSIP (20%) and sarcoidosis (17.5%). HRCT findings significantly correlated with specific diagnoses: interlobular septal thickening with UIP (p=0.035), intralobular thickening with sarcoidosis and UIP (p=0.002), and peribronchovascular thickening with UIP and NSIP (p=0.001). Centrilobular nodules (77.5%) and ground-glass opacities (75%) were frequently associated with UIP and NSIP (p<0.0001 and p=0.019, respectively). HRCT showed high concordance with final diagnosis for UIP (81.3%), NSIP (75%), and sarcoidosis (85.7%), confirming its reliability in ILD evaluation. **Conclusion:** HRCT demonstrated high diagnostic accuracy and subtype-specific correlation in DILDs, making it a vital non-invasive tool for diagnosis, classification, and management planning.

INTRODUCTION

Interstitial lung diseases (ILDs), also referred to as diffuse parenchymal lung diseases, constitute a heterogeneous group of pulmonary disorders characterized by varying degrees of inflammation and fibrosis affecting the lung interstitium, including alveolar walls, interlobular septa, and peribronchial connective tissue [1–3]. These diseases are pathologically marked by chronic inflammation, fibroblast proliferation, and extracellular matrix deposition, primarily collagen, leading to irreversible architectural distortion and pulmonary fibrosis if not addressed early. The progressive fibrotic changes are often associated with substantial morbidity, decreased quality of life, and increased mortality.

Over a hundred distinct ILD subtypes have been documented [4], though idiopathic pulmonary fibrosis (IPF), connective tissue disease-associated ILD, and sarcoidosis are the most frequently encountered in clinical practice. While ILDs predominantly affect adults, certain subtypes such as hypersensitivity pneumonitis and idiopathic interstitial pneumonias are also seen in pediatric populations, posing further diagnostic challenges [5]. Patients typically present with non-specific symptoms like exertional dyspnea, dry cough, chest discomfort, fatigue, and weight loss [6]. Early radiographic detection is often limited, as initial changes may be subtle or absent on standard chest X-rays. While various etiological factors-including autoimmune conditions, occupational exposures, drug toxicity (e.g., amiodarone, gold salts), smoking, and radiation-have been linked to ILD development, many cases remain idiopathic, as seen in IPF and sarcoidosis [2,7].

Historically, diagnostic evaluation relied heavily on clinical examination, pulmonary function tests (PFTs), and chest radiographs, which offered limited sensitivity for early or specific diagnosis [8]. Open lung biopsy remains the gold standard but is invasive and not always feasible [1]. The emergence of high-resolution computed tomography (HRCT), pioneered by Zerhouni et al. in 1985 [9], revolutionized the evaluation of ILDs. HRCT utilizes thin collimation and high spatial resolution algorithms, enabling detailed visualization of parenchymal abnormalities and anatomical structures with histology-like precision [10]. It identifies key radiological patterns such as ground-glass opacities, honeycombing, traction bronchiectasis, and mosaic attenuation that help differentiate inflammatory from fibrotic changes [11].

Given these capabilities, this study focuses on evaluating the utility of HRCT in diagnosing and classifying ILDs, correlating imaging findings with histopathological and therapeutic outcomes, and supporting clinical decision-making.

MATERIAL AND METHODS

This cross-sectional observational study was conducted in the Department of Radiodiagnosis at Sri Aurobindo Medical College & PG Institute, Indore (M.P), from June 1, 2023, to November 30, 2024, after obtaining ethical clearance. A total of 40 clinically suspected ILD patients referred for HRCT thorax were prospectively enrolled. Written informed consent was obtained from all participants, and confidentiality was maintained. The sample size was based on the institution's average monthly ILD referrals, ensuring feasible recruitment within the 18-month study period.

Inclusion Criteria

- Patients clinically suspected of ILD who underwent HRCT thorax imaging and had either histopathological confirmation or an evaluable treatment response.

Exclusion Criteria

- Patients unwilling to participate.
- Individuals with contraindications for CT imaging (e.g., pregnancy, severe renal impairment without dialysis).
- Critically ill patients on life support who could not undergo HRCT.

Methodology

Detailed clinical histories, including demographic data,

occupational exposure, smoking status, systemic illnesses, and drug use, were recorded. Relevant investigations such as autoimmune panels and pulmonary function tests were reviewed. Radiological interpretation was conducted independently by experienced radiologists blinded to clinical and histopathological data. Observations were recorded using a structured proforma, focusing on HRCT features such as ground-glass opacities, reticular patterns, honeycombing, traction bronchiectasis, nodules, and disease distribution.

Imaging Protocol

All Patients Underwent Hrct Using A Siemens Somatom Definition As 64-slice Multidetector Ct Scanner. The Imaging Protocol Included:

- Axial volumetric scanning with thin-slice collimation.
- Multiplanar reconstruction in coronal and sagittal planes.
- Adjunct imaging tools such as Maximum Intensity Projection (MIP) and Volume Rendering Technique (VRT).
- Lung window settings: level -600 to -700 Hounsfield Units (HU); width +1000 to +1500 HU.
- Both inspiratory and expiratory phase acquisitions were performed when indicated, especially to evaluate air trapping or mosaic attenuation.

Statistical Analysis

Collected data were compiled using Microsoft Excel and analyzed using appropriate statistical methods. Descriptive statistics were used to summarize demographic and clinical parameters. Associations between imaging findings and histopathological or treatment outcomes were assessed using the Chi-square test, with a p-value <0.05 considered statistically significant. Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of HRCT were calculated to determine its diagnostic efficacy.

RESULTS

A total of 40 patients clinically suspected of having interstitial lung disease (ILD) were evaluated in this study using high-resolution computed tomography (HRCT). The mean age of participants was 58.75 ± 15.90 years, with the majority belonging to the 60–69 years age group (40%). There was a male predominance (57.5%), and 35% of patients reported a history of smoking. The most common presenting complaints were cough (62.5%) and dyspnea (32.5%). [Table 1]

Table 1: Demographic And Clinical Profile Of Study Participants (N = 40)

Parameter	Category	No. of Patients (N)	Percentage (%)
Age (years)	Mean ± SD	–	58.75 ± 15.90
	Range	–	30 – 88
	30–39	9	22.5
	40–49	2	5.0
	50–59	4	10.0
	60–69	16	40.0
	≥70	9	22.5
Gender	Male	23	57.5
	Female	17	42.5
Smoking History	Yes	14	35.0
	No	26	65.0
Chief Complaints	Cough	25	62.5
	Dyspnoea	13	32.5
	Constitutional Symptoms	2	5.0

HRCT findings revealed that all patients (100%) demonstrated randomly distributed pulmonary nodules. Consolidation was noted in 92.5% of cases, followed by peribronchovascular septal thickening (85%), mediastinal lymphadenopathy (82.5%), and perilymphatic nodules (82.5%). Ground-glass opacities were seen in 75% of patients, suggesting ongoing inflammation or early fibrosis, while 77.5% exhibited bronchiectasis and 55% showed honeycombing, indicating irreversible fibrotic changes. The disease most commonly affected the lower lobes (70%) with subpleural (55%) and peripheral (35%) distribution. Pleural involvement was less frequent, with pleural effusion present in 22.5% and pleural thickening in only 5% of patients. Fissural abnormalities were rare, with 97.5% showing normal fissures. Associated findings included parenchymal fibrosis in 30%, collapse in 7.5%, and few cases of abscess or space-occupying lesions. Overall, HRCT proved to be a highly effective modality in detecting characteristic imaging features of ILD, aiding in accurate diagnosis, classification, and guiding appropriate clinical management. [Table 2]

Table 2: HRCT Radiological Findings in ILD Patients (N = 40)

Radiological Feature	Yes (N)	Yes (%)	No (N)	No (%)
Interlobular Septal Thickening	27	67.5	13	32.5
Intralobular Septal Thickening	22	55.0	18	45.0
Peribronchovascular Septal Thickening	34	85.0	6	15.0
Randomly Distributed Pulmonary Nodules	40	100.0	0	0.0
Centrilobular Pulmonary Nodules	31	77.5	9	22.5
Perilymphatic Nodules	33	82.5	7	17.5
Ground-Glass Opacities	30	75.0	10	25.0
Bronchiectasis	31	77.5	9	22.5
Consolidation	37	92.5	3	7.5
Honeycombing	22	55.0	18	45.0
Mediastinal Lymphadenopathy	33	82.5	7	17.5
Zonal Distribution				
Lower Lobe Involvement	28	70.0	12	30.0
Upper Lobe Involvement	12	30.0	28	70.0
Middle Lobe Involvement	0	0.0	40	100.0
Parenchymal Location				
Subpleural	22	55.0	18	45.0
Peripheral	14	35.0	26	65.0
Diffuse	4	10.0	36	90.0
Pleural Findings				
Pleural Effusion	9	22.5	31	77.5
Pleural Thickening	2	5.0	38	95.0
Normal Pleura	29	72.5	11	27.5
Fissure Findings				
Fissural Effusion	1	2.5	39	97.5
Fissural Thickening	0	0.0	40	100.0
Normal Fissures	39	97.5	1	2.5
Associated Findings				
Parenchymal Fibrosis	12	30.0	28	70.0
Collapse	3	7.5	37	92.5
Abscess	1	2.5	39	97.5
Space Occupying Lesion (SOL)	2	5.0	38	95.0
No Associated Findings	22	55.0	18	45.0

In this study of 40 patients undergoing HRCT for diffuse interstitial lung disease (DILD), Usual Interstitial Pneumonia (UIP) emerged as the most common diagnosis, seen in 40% of cases.

This was followed by Non-Specific Interstitial Pneumonia (NSIP) in 20% and Sarcoidosis in 17.5%. Less frequent diagnoses included Cryptogenic Organizing Pneumonia (COP) and Hypersensitivity Pneumonitis (HSP), each in 7.5%, while RB-ILD, Silicosis, and Asbestosis were rare, observed in only 2.5% of cases each.

These findings emphasize the diagnostic heterogeneity of DILDs and reinforce the critical role of HRCT in accurately differentiating among various subtypes for effective clinical decision-making. [Figure 1]

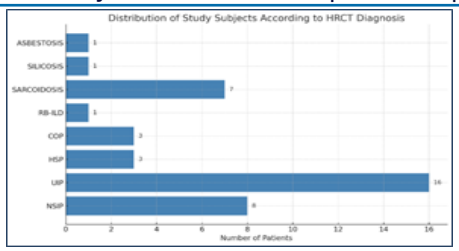


Figure 1. Distribution of participants based on HRCT diagnosis

In this study of 40 patients with diffuse interstitial lung disease (DILD), HRCT findings demonstrated significant associations with specific diagnostic subtypes. Interlobular septal thickening was seen in 67.5%, most commonly in UIP (40%) and NSIP (29.6%) ($p = 0.035$). Intralobular septal thickening (55%) correlated significantly with UIP and Sarcoidosis (27.3% each) ($p = 0.002$), while peribronchovascular thickening (85%) was strongly associated with UIP (44.1%) and NSIP (26.5%) ($p = 0.001$). Centrilobular nodules (77.5%) were notably present in UIP (48.4%), NSIP (29%), and Sarcoidosis (19.4%) ($p < 0.0001$), and perilymphatic nodules (82.5%) were observed mainly in UIP (45.5%) and NSIP (27.3%), but unexpectedly absent in Sarcoidosis ($p < 0.0001$). Ground-glass opacities (75%) were most frequent in UIP (43.3%) and Sarcoidosis (20%) ($p = 0.019$), while consolidation (92.5%) was universally seen in most subtypes but absent in COP, making it a distinguishing feature ($p < 0.0001$). Honeycombing was present in 55% but paradoxically more common in NSIP and Sarcoidosis (27.3%) than in UIP (13.3%) ($p < 0.0001$). Mediastinal lymphadenopathy was seen in 55%, predominantly in UIP (45.5%) and NSIP (27.3%), but absent in most Sarcoidosis cases ($p < 0.0001$). Bronchiectasis (55%) showed no significant diagnostic value ($p = 0.351$), and random nodules were absent in all patients. Overall, HRCT proved to be a valuable tool in differentiating DILD subtypes, particularly UIP, NSIP, and Sarcoidosis, through characteristic radiological patterns supported by statistically significant correlations.

Table 3. Diagnostic Correlation of HRCT Findings with DILD Subtypes (N = 40)

HRCT Finding	Most Associated Diagnosis	Absent in	P-Value	Interpretation
Interlobular Septal Thickening	UIP (40%)	RB-ILD, HSP	0.035	Significantly associated with UIP; helps narrow differential in fibrosing ILDs.
Intralobular Septal Thickening	UIP & Sarcoidosis (27.3% each)	NSIP (38.9 %)	0.002	Significant marker in sarcoidosis, silicosis, RB-ILD; suggests small airway involvement.
Peribronchovascular Thickening	UIP (44.1%), NSIP (26.5%)	HSP, Sarcoidosis	0.001	Strong correlation with UIP/NSIP; absence may indicate HSP or sarcoidosis.
Random Nodules	None (0%)	All cases	–	Not observed in any case; not useful in this DILD cohort.
Centrilobular Nodules	UIP (48.4%), NSIP (29.0%)	HSP, COP, RB-ILD	<0.0001	Strongly associated with UIP, NSIP, sarcoidosis; useful for airway-centered disease.
Perilymphatic Nodules	UIP (45.5%), NSIP (27.3%)	Sarcoidosis (85.7 %)	<0.0001	Unexpectedly absent in sarcoidosis; present in UIP, NSIP—may reflect atypical patterns.
Ground Glass Opacities (GGO)	UIP (43.3%), Sarcoidosis (20.0%)	NSIP (50.0 %)	0.019	Common in early fibrosing or inflammatory ILDs; GGO varied across NSIP presentations.
Bronchiectasis	UIP (32.3%), Sarcoidosis (20.0%)	HSP	0.351	Frequently seen in fibrosing ILDs; not statistically significant in this cohort.
Consolidation	UIP (40.5%), NSIP (24.3%), Sarcoidosis (16.2%)	COP (100%)	<0.0001	Present in most DILDs; absence in COP is diagnostically useful.
Honeycombing	NSIP & Sarcoidosis (27.3% each)	UIP (72.2 %)	<0.0001	Classically linked to UIP, but observed more in NSIP and sarcoidosis in this cohort.
Mediastinal Lymph Nodes	UIP (45.5%), NSIP (27.3%)	Sarcoidosis (71.4 %)	<0.0001	Surprisingly rare in sarcoidosis; suggests need for clinical correlation in atypical cases.

*Fisher's Exact Test; P value<0.05 considered statistically significant

Among 40 patients with diffuse interstitial lung disease (DILD), HRCT showed high diagnostic concordance with final diagnoses. Full agreement (100%) was observed for COP, RB-ILD, Silicosis, and Asbestosis. UIP, the most common HRCT diagnosis, was confirmed in 81.3% of cases, followed by Sarcoidosis (85.7%) and NSIP (75%). HSP had the lowest concordance at 66.7%, indicating potential overlap with other ILDs. These findings highlight HRCT's strong diagnostic reliability, especially for fibrosing and granulomatous ILDs, while emphasizing the need for clinicopathological correlation in ambiguous cases. [Figure

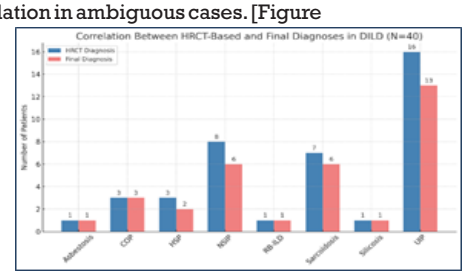


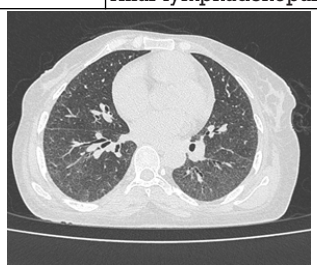
Figure 2. Correlation Between HRCT-Based and Final Diagnoses in DILD (N=40)

Among 40 patients with diffuse interstitial lung diseases (DILDs), Usual Interstitial Pneumonia (UIP) was the most common subtype, diagnosed in 16 patients (40%), typically showing basal and subpleural reticulation, honeycombing, and traction bronchiectasis. Non-Specific Interstitial Pneumonia (NSIP) was identified in 8 patients (20%), characterized by basal ground-glass opacities and reticulation, often without honeycombing. Hypersensitivity Pneumonitis (HSP) and Cryptogenic Organizing Pneumonia (COP) were each seen in 3 patients (7.5%), with HSP demonstrating upper lobe mosaic attenuation and air trapping, and COP showing patchy consolidations and reverse halo signs. One case each (2.5%) of Respiratory Bronchiolitis-Associated ILD (RB-ILD), Asbestosis, and Silicosis was reported, with RB-ILD presenting upper lobe centrilobular nodules, asbestosis showing subpleural fibrosis, and silicosis associated with calcified lymph nodes.

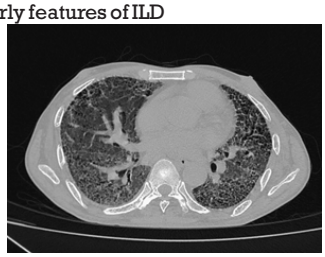
Sarcoidosis was diagnosed in 7 patients (17.5%) with characteristic perilymphatic nodules and mediastinal/hilar lymphadenopathy. Overall, HRCT proved essential in identifying ILD subtypes through characteristic imaging features, reducing the need for invasive diagnostics, and highlighting the predominance of fibrosing (UIP/NSIP: 60%), granulomatous (Sarcoidosis: 17.5%), and exposure-related ILDs in this cohort.

Table 4. Categorization on the basis on HRCT pattern/ diagnosis

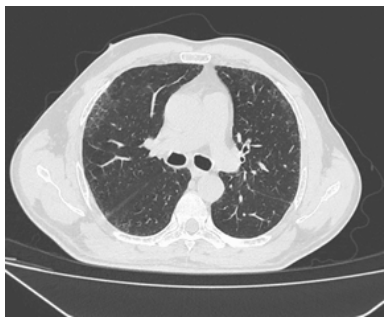
S. No	HRCT Diagnosis	Typical CT Distribution	Typical CT Finding	No. of Patients
Idiopathic Interstitial Pneumonias				
1	UIP	Peripheral, subpleural, basal	Reticular opacities, Honeycombing, Traction bronchiectasis, Architectural distortion, Focal GGO's	16
2	NSIP	Peripheral, basal, symmetric	GGO's reticulations, traction, bronchiectasis, consolidation	08
3	HSP	Upper lobe predominant	GGO's, Centrilobular nodules; Mosaic attenuation, Air trapping with or without headcheese sign	03
4	COP	Subpleural or peribronchial	Patchy consolidation, Perilobular pattern, Reverse halo sign	03
5	RB-ILD	Upper lung predominant	Bronchial wall thickening, Centrilobular nodules, Patchy GGO's	01
Pneumoconiosis				
1	Asbestosis	Subpleural Basal	Reticular opacities, honeycombing, Traction, Bronchiectasis, Architecturan, Distortion, FOCAL, GGO's	01
2	Silicosis	Upper zones posteriorly	Centrilobular nodules subpleural nodules Hilar and mediastinal Lymphnnode enlargement, calcification	01
3	Sarcoidosis	Upper lung predominant	Perilymphatic nodules with or without mediastinal or Hilar lymphadenoparthy	07



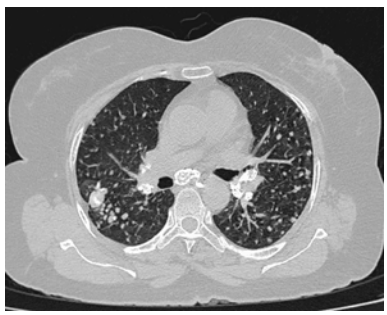
Case 1: Inter/intra lobular septal thickening with ground glass opacities in bilateral lower lobes and middle lobe-findings of early features of ILD



Case 2. UIP pattern reveals inter/ intra lobular septal thickening with fibrotic changes, honeycombing and traction bronchiectasis in bilateral lung predominantly in the sub pleural location.



Case 3- Early changes of interstitial lung disease with superimposed infection / alveolitis - Slight architectural distortion with thickening of inter/intra lobular septa, peripheral in distribution. Few patchy areas of ground-glass attenuation.



Case 4. Diffuse centrilobular nodules with chunks of calcification and enlarged calcified mediastinal and hilar lymph nodes ("eggshell calcification pattern").

Figure 3. Representative HRCT Findings in Patients with Interstitial Lung Disease (ILD)

DISCUSSION

The current study evaluated the diagnostic utility of high-resolution computed tomography (HRCT), particularly using Multi-Detector Computed Tomography (MDCT), in the detection, characterization, and classification of interstitial lung diseases (ILDs). Given the limitations of invasive diagnostic techniques such as lung biopsy, HRCT has emerged as a cornerstone in ILD assessment due to its ability to identify hallmark imaging patterns corresponding to various ILD subtypes. Our study demonstrates that HRCT, when interpreted in conjunction with clinical presentation and histopathological or treatment response data, provides a reliable and non-invasive method for diagnosing ILD subtypes.

Demographically, our findings are consistent with global trends indicating a predominance of ILDs in older adults, particularly in the 6th and 7th decades of life. The mean age of patients in this study was 58.75 years, aligning with data from Ghosh et al. [12], and Shah et al. [1]. The male predominance observed in our cohort (57.5%) corroborates previous studies by Raghu et al. [13], Bani et al. [14], and Shah et al. [1], especially in ILDs such as idiopathic pulmonary fibrosis (IPF). Additionally, the observed smoking history in 35% of patients is consistent with Antoniou et al. [15], who highlighted its association with ILDs like RB-ILD and IPF.

Clinically, cough and dyspnea were the most frequent symptoms reported, a pattern consistently documented in literature by Wells et al. [15], Mathur et al. [16], and Ghosh et al. [12]. These nonspecific symptoms, however, often delay the diagnosis of ILD, emphasizing the role of imaging in early detection.

The HRCT findings in this study align well with existing

radiological literature. Interlobular septal thickening, observed in 67.5% of cases, was strongly associated with fibrosing ILDs like UIP and NSIP, as noted by Silva et al. [17] and Mathur et al. [16]. Intralobular septal thickening (55%) was significantly associated with sarcoidosis, silicosis, and RB-ILD, reinforcing its diagnostic utility as reported by Sumikawa et al. [18]. Peribronchovascular thickening (85%), a marker of perivascular fibrosis, also showed strong correlation with UIP and NSIP, consistent with Silva et al. [17] and Sverzellati et al. [19].

Centrilobular nodules were present in 77.5% of cases, particularly in UIP, NSIP, and sarcoidosis. These findings correspond with Wells et al. [15] and Gupta et al. [4], who emphasized the significance of centrilobular nodules in airway-centric diseases like HSP and RB-ILD. However, in contrast, their absence in RB-ILD and HSP in our study might be attributed to small sample sizes or early disease detection. Interestingly, perilymphatic nodules, typically characteristic of sarcoidosis as per Judson et al. [20], were absent in all sarcoidosis cases in our cohort. This discrepancy may reflect atypical presentations, observer variability, or misclassification. Such findings underscore the challenges in diagnosing ILDs based solely on radiological features and highlight the necessity for clinicopathologic correlation.

Ground-glass opacities (GGO), seen in 75% of cases, were significantly associated with UIP, NSIP, and COP. These findings mirror the observations of Flaherty et al. [21] and Sumikawa et al. [18], where GGO was linked with early inflammation or partial alveolar filling. Similarly, bronchiectasis, seen in 55% of patients, was more common in UIP and NSIP. Although not statistically significant in this study, it remains a critical feature in fibrotic ILDs, as described by Antoniou et al. [15].

Consolidation was present in 92.5% of cases, a high prevalence that may reflect chronic inflammatory activity. Notably, its absence in COP cases contradicts traditional understanding, as COP typically presents with patchy consolidation as reported by Travis et al., [22]. This suggests either atypical radiologic patterns or underrecognition. Honeycombing, another classical feature of UIP, was detected in 55% of patients but in only 13.3% of UIP cases. While Raghu et al. [13] emphasized honeycombing as a defining criterion, our findings suggest early disease stage or observer variability as potential explanations for this underrepresentation.

Anatomically, the study reaffirmed the basal and subpleural predominance of fibrosing ILDs, particularly UIP and NSIP, consistent with the Fleischner Society's guidelines as reported by Lynch et al. [23], and findings by Silva et al. [17]. The rare involvement of the middle lobe and the predominance of subpleural changes reinforce the diagnostic specificity of HRCT patterns in ILD classification.

Pleural and fissural involvement was minimal, supporting literature by Gupta et al. [4] and Sumikawa et al. [18], which suggested that such features are uncommon in idiopathic fibrosing ILDs. The limited occurrence of pleural thickening or effusion suggests a low probability of associated connective tissue disease or exudative pathologies.

Radiological diagnosis was most concordant with final diagnoses in UIP (81.3%), NSIP (75%), and sarcoidosis (85.7%). Notably, HSP had the lowest concordance (66.7%), reflecting its diagnostic overlap with other ILDs. Flaherty et al. [21] and Sverzellati et al. [19] similarly emphasized the need for multidisciplinary evaluation in such cases.

The role of HRCT in ILD diagnosis is further supported by previous studies. Pingile et al. [7] found HRCT to be 16% more sensitive than chest X-rays. Khan et al. [24] reported CT's diagnostic accuracy with a sensitivity of 95.65% and specificity of 85.2%, and Sneider et al. [25] emphasized its importance in multidisciplinary decision-making.

Despite the valuable insights generated, several limitations merit acknowledgment. The study's limitations include a small sample size, single-center design, and lack of histopathological confirmation in all cases. Interobserver variability was not evaluated, and follow-up imaging was absent. These factors may limit generalizability, introduce bias, and affect the accuracy of HRCT-based diagnosis and assessment of disease progression.

CONCLUSION

High-Resolution Computed Tomography (HRCT) plays a pivotal role in the diagnosis and classification of diffuse interstitial lung diseases (DILDs). This study demonstrates that HRCT, when systematically interpreted, offers critical insights into disease patterns such as UIP and NSIP, enabling accurate, non-invasive diagnosis. Key imaging features like honeycombing, septal thickening, and ground-glass opacities showed strong correlation with final diagnoses, reinforcing HRCT's diagnostic reliability. When combined with clinical and serological findings in a multidisciplinary setting, HRCT not only reduces the need for invasive procedures but also facilitates early therapeutic decision-making and prognostic assessment, ultimately contributing to improved patient care and outcomes.

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