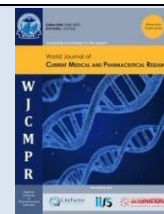




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CONCORDANCE OF HIGH-RESOLUTION CT PATTERN CLASSIFICATION WITH MULTIDISCIPLINARY DIAGNOSIS IN SUSPECTED INTERSTITIAL LUNG DISEASE: A RETROSPECTIVE STUDY

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ARTICLE HISTORY	ABSTRACT
Received on: 19-08-2026 Revised on: 06-09-2026 Accepted on: 14-10-2026 Keywords: High-resolution computed tomography; interstitial lung disease; usual interstitial pneumonia; idiopathic pulmonary fibrosis; multidisciplinary discussion; concordance. Corresponding Author Dr. Shravil	Background: Interstitial lung diseases (ILDs) are a heterogeneous group of diffuse parenchymal lung disorders with variable inflammatory and fibrotic components. Overlapping clinical and radiological features make diagnosis challenging, and high-resolution computed tomography (HRCT) is central to the imaging assessment of suspected ILD. Objective: To describe the distribution of HRCT patterns in patients with suspected ILD and to assess their concordance with the final multidisciplinary discussion (MDD) diagnosis. Methods: This retrospective single-centre study included 52 patients with suspected ILD who underwent HRCT between January 2023 and June 2023. Two thoracic radiologists independently classified HRCT patterns using the 2018 ATS/ERS/JRS/ALAT framework. Concordance with the final MDD diagnosis was calculated as a proportion with 95% confidence intervals (CIs), and interobserver agreement was assessed with Cohen's kappa. Results: The mean age was 61.8 ± 12.3 years, and 30 patients (57.7%) were male. Definite usual interstitial pneumonia (UIP) was the most frequent HRCT pattern (20 patients, 38.5%), followed by nonspecific interstitial pneumonia (NSIP; 12, 23.1%), hypersensitivity pneumonitis (HP; 6, 11.5%), organizing pneumonia (OP; 6, 11.5%), sarcoidosis (5, 9.6%), and other patterns (3, 5.8%). Overall HRCT–MDD concordance was 82.7% (43/52; 95% CI 70.3–90.6%), including 95.0% (19/20; 95% CI 76.4–99.1%) for definite UIP and 75.0% (24/32; 95% CI 57.9–86.7%) for non-UIP patterns. Interobserver agreement was $\kappa = 0.79$ (95% CI 0.68–0.90). Nine cases (17.3%) were discordant. Conclusion: HRCT pattern classification showed 82.7% concordance with the final MDD diagnosis, with higher concordance for definite UIP than for non-UIP patterns. Because MDD incorporates imaging, these results describe agreement rather than independent diagnostic accuracy. HRCT should be interpreted within an integrated clinical and multidisciplinary assessment.

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INTRODUCTION

Interstitial lung disease (ILD) comprises a heterogeneous group of parenchymal lung disorders with diverse causes, prognoses, and management implications. Clinical, radiological, and pathological findings often overlap, making an integrated diagnostic approach important [1]. These disorders involve varying combinations of inflammation and fibrosis, with effects on gas exchange and respiratory function [2]. Accurate classification matters because prognosis and treatment differ between subtypes: idiopathic pulmonary fibrosis (IPF) carries a poor prognosis [3], and

antifibrotic therapy slows the decline in forced vital capacity [4,5]. High-resolution computed tomography (HRCT) is a principal imaging modality for the initial assessment and characterization of suspected ILD [6]. Thin-section acquisition and high-spatial-frequency reconstruction allow detailed assessment of the lung parenchyma. The clinical value of HRCT extends beyond detecting abnormalities to classifying imaging patterns. The 2018 ATS/ERS/JRS/ALAT guideline states that, in an appropriate clinical context, a definite UIP pattern on HRCT can support a diagnosis of IPF without surgical lung biopsy [7]. This is supported by CT–pathology correlation studies [8] and is clinically

relevant because surgical lung biopsy carries procedural risk, including mortality [9].

Nevertheless, HRCT appearances of different ILD subtypes overlap, and interpretation requires specialist expertise. Clinical history, serology, pulmonary function, and histopathology when available may alter the diagnostic assessment, and multidisciplinary discussion (MDD) is therefore an important component of ILD diagnosis [10]. Agreement between MDD teams and the diagnostic ability of MDD vary between settings [11,12]. This study describes the distribution of HRCT patterns in a cohort of patients with suspected ILD evaluated over a six-month period and assesses their concordance with the final MDD diagnosis.

MATERIALS AND METHODS

Study design and setting

This retrospective analytical study was conducted at a tertiary-care academic medical centre with a specialized ILD programme. Patients referred for evaluation of suspected ILD between January 2023 and June 2023 were considered. The institutional review board approved the protocol and waived individual informed consent because of the retrospective design.

Participants

Patients were eligible if they were aged 18 years or older; had clinical suspicion of ILD based on respiratory symptoms, abnormal pulmonary function, or incidental imaging findings; had undergone HRCT using the protocol described below; and had completed MDD evaluation. Patients with incomplete imaging data, prior lung transplantation, or predominantly airway-centred disease were excluded. A total of 52 patients met these criteria.

HRCT acquisition

All examinations were performed on multi-detector CT scanners (128 slices or more) at 120 kVp with automatic tube-current modulation (reference 100–200 mAs), slice thickness of 1.0–1.25 mm, reconstruction interval of 0.5–0.625 mm, and a high-spatial-frequency reconstruction algorithm. Images were acquired supine at full inspiration; prone and expiratory acquisitions were added when clinically indicated to distinguish dependent atelectasis and to evaluate air trapping, respectively.

HRCT PATTERN CLASSIFICATION

Two board-certified thoracic radiologists, each with at least ten years of ILD imaging experience, independently reviewed all examinations using the 2018 ATS/ERS/JRS/ALAT criteria [7]. Each patient was assigned to one of the study categories: UIP, NSIP, OP, HP, sarcoidosis, or other patterns. The 2018 guideline distinguishes UIP, probable UIP, indeterminate for UIP, and findings suggesting an alternative diagnosis. [AUTHOR INPUT REQUIRED: verify the terminology used in the original dataset; explain how probable UIP and indeterminate cases were handled; state whether readers were blinded to clinical data and MDD outcome, whether either reader participated in MDD, how disagreements were resolved, and which reader/classification was used for concordance analysis.]

MULTIDISCIPLINARY DISCUSSION

The MDD panel comprised ILD pulmonologists, thoracic radiologists, and lung pathologists. Cases were reviewed with clinical history, serological results, pulmonary function tests, HRCT findings, and histopathology when available.

The consensus MDD diagnosis was used as the reference diagnosis. The diagnostic pathway is summarized in Figure

Outcome Measures

The primary outcome was concordance between the HRCT-assigned pattern and the final MDD diagnosis. [AUTHOR INPUT REQUIRED: specify the prespecified matching rule for each HRCT category and the MDD diagnosis; clarify how the “other” category was handled.] Concordance was reported for the overall cohort and for definite UIP and non-UIP subgroups. The secondary outcome was interobserver agreement between the two radiologists.

Statistical analysis

Analyses were performed using SPSS version 26.0 (IBM Corporation, Armonk, NY). Continuous variables are presented as mean $\pm$ standard deviation and categorical variables as frequencies and percentages. Concordance proportions are presented with 95% confidence intervals (CIs) calculated using the Wilson score method. Interobserver agreement was assessed using Cohen's kappa for categorical classification. [AUTHOR INPUT REQUIRED: provide the HRCT–MDD cross-tabulation and calculate HRCT–MDD kappa with its 95% CI from the underlying data, if this analysis is retained.] The study was prepared with reference to STARD [20] and GRRAS [21] reporting guidance; ensure that the final checklist matches the study design and claims.

RESULTS

Patient Characteristics

The cohort comprised 52 patients with a mean age of 61.8 ± 12.3 years (range 29–84); 30 (57.7%) were male and 22 (42.3%) were female. Exertional dyspnoea was present in 45 patients (86.5%) and chronic cough in 38 (73.1%). A total of 23 patients (44.2%) were ever-smokers and 11 (21.2%) had a connective tissue disease. The mean symptom duration before HRCT was 13.8 ± 10.2 months. Mean forced vital capacity was $67.8 \pm 17.6\%$ predicted and mean diffusing capacity for carbon monoxide was $55.2 \pm 15.9\%$ predicted.

Table 01: Baseline characteristics of the study cohort (n = 52).

Characteristic	Value
Age, years (mean $\pm$ SD)	61.8 $\pm$ 12.3
Age range, years	29–84
Male sex, n (%)	30 (57.7)
Female sex, n (%)	22 (42.3)
Exertional dyspnoea, n (%)	45 (86.5)
Chronic cough, n (%)	38 (73.1)
Ever-smokers, n (%)	23 (44.2)
Connective tissue disease, n (%)	11 (21.2)
Symptom duration, months (mean $\pm$ SD)	13.8 $\pm$ 10.2
FVC % predicted (mean $\pm$ SD)	67.8 $\pm$ 17.6
DLCO % predicted (mean $\pm$ SD)	55.2 $\pm$ 15.9

Distribution of HRCT patterns

Definite UIP was the most frequent pattern (20 patients, 38.5%), followed by NSIP (12, 23.1%), HP (6, 11.5%), OP (6, 11.5%), sarcoidosis (5, 9.6%), and other patterns (3, 5.8%).

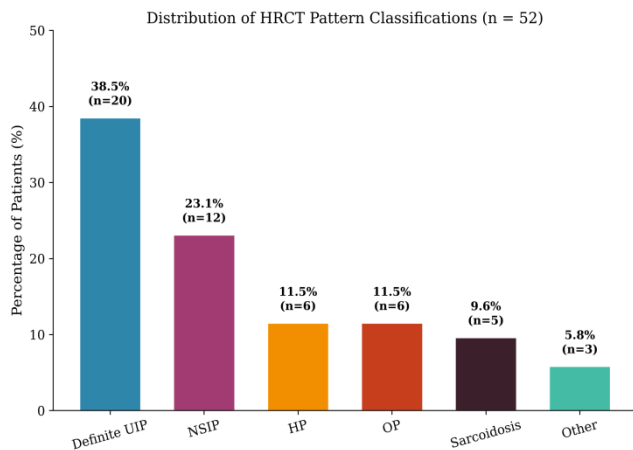


Figure 02: Distribution of HRCT pattern classifications among 52 patients with suspected ILD.

Table 02: Distribution of HRCT pattern classifications (n = 52).

HRCT Pattern	n	% (95% CI)
Definite UIP	20	38.5 (26.5–52.0)
NSIP	12	23.1 (13.7–36.1)
HP	6	11.5 (5.4–23.0)
OP	6	11.5 (5.4–23.0)
Sarcoidosis	5	9.6 (4.2–20.6)
Other patterns	3	5.8 (2.0–15.6)
Total	52	100

Interobserver agreement

Agreement between the two radiologists was $\kappa = 0.79$ (95% CI 0.68–0.90), indicating substantial agreement [19].

Concordance with multidisciplinary diagnosis

Overall, the HRCT pattern was concordant with the final MDD diagnosis in 43 of 52 patients (82.7%; 95% CI 70.3–90.6%). Concordance was 95.0% (19/20; 95% CI 76.4–99.1%) for definite UIP and 75.0% (24/32; 95% CI 57.9–86.7%) for non-UIP patterns. Within the non-UIP group, concordance was 75.0% (9/12) for NSIP, 66.7% (4/6) for HP, 83.3% (5/6) for OP, 80.0% (4/5) for sarcoidosis, and 66.7% (2/3) for other patterns. Nine patients (17.3%) were discordant: one had a definite UIP pattern and eight had non-UIP patterns.

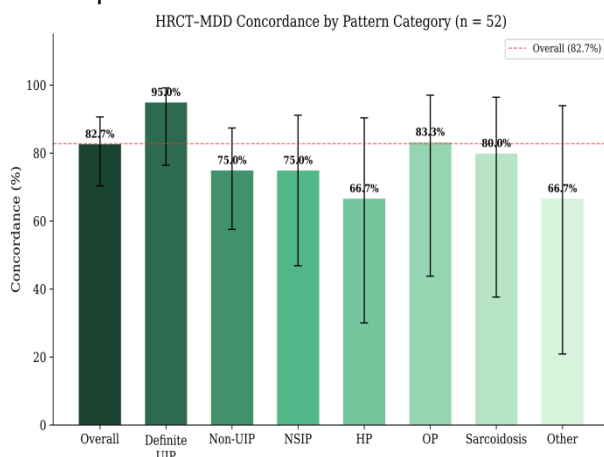


Figure 03: HRCT-MDD concordance rates by pattern category.

Table 03: Concordance between HRCT pattern and MDD diagnosis.

Category	Total	Concordant	% (95% CI)	Discordant
Overall	52	43	82.7 (70.3–90.6)	9
Definite UIP	20	19	95.0 (76.4–99.1)	1
Non-UIP	32	24	75.0 (57.9–86.7)	8
NSIP	12	9	75.0 (46.8–91.1)	3
HP	6	4	66.7 (30.0–90.3)	2
OP	6	5	83.3 (43.6–97.0)	1
Sarcoidosis	5	4	80.0 (37.6–96.4)	1
Other	3	2	66.7 (20.8–93.9)	1

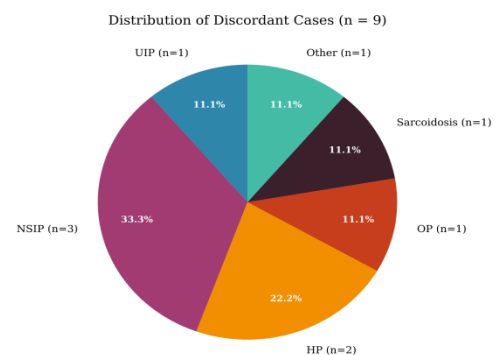


Figure 04: Distribution of discordant cases by HRCT pattern category (n = 9).

DISCUSSION

In this retrospective cohort evaluated over a six-month period, HRCT pattern classification was concordant with the final MDD diagnosis in 82.7% of patients, and interobserver agreement between two experienced thoracic radiologists was substantial. Concordance was highest for the definite UIP pattern (95.0%) and lower for non-UIP patterns (75.0%). These findings should be interpreted in light of the retrospective, single-centre design, the relatively small sample size inherent to a six-month study window, and the use of MDD as the reference diagnosis; comparison with other cohorts must account for differences in patient selection, diagnostic criteria, reader expertise, and MDD composition.

The high concordance for definite UIP is consistent with guideline recommendations that this pattern, in an appropriate clinical context, is informative for IPF [7,8]. However, a UIP pattern and a diagnosis of IPF are not synonymous. UIP-type fibrosis can occur in other conditions, including fibrotic hypersensitivity pneumonitis [18] and connective tissue disease-associated ILD. Alternative causes should therefore be assessed through clinical and serological evaluation.

Concordance was lower for non-UIP patterns and lowest for the heterogeneous "other" category, although the small size of that group ($n = 3$) yields a wide confidence interval. This is plausible given the recognized overlap in imaging appearances among NSIP, OP, and HP [13,14] and the diagnostic uncertainty that remains in a proportion of cases even after MDD [11,12]. Fibrotic phenotypes with a progressive course may also share imaging features across diagnoses [15]. The 17.3% discordance rate supports regarding HRCT as one component of an integrated diagnostic pathway rather than a stand-alone diagnostic test.

The reproducibility of pattern classification ($\kappa = 0.79$) was substantial, and was obtained from readers with subspecialty experience in a dedicated ILD programme; agreement may be lower in centres without such expertise. Quantitative CT and artificial intelligence-based approaches [16] are potential avenues for improving consistency but were not evaluated here.

Limitations

This study has several limitations. First, its retrospective, single-centre design may introduce selection bias because only patients who completed the diagnostic pathway, including MDD, were included. Second, the six-month study period yielded a relatively small sample ($n = 52$), limiting the precision of subgroup estimates, particularly for less common HRCT patterns. Third, MDD incorporated imaging into its assessment, so the reference diagnosis was not independent of the index test; the results describe concordance and should not be interpreted as diagnostic accuracy estimates such as sensitivity, specificity, or predictive values. Fourth, histopathological confirmation was not available for every patient, and MDD diagnoses may retain residual uncertainty. Fifth, the "other" category was small ($n = 3$), producing imprecise estimates. Sixth, the study combined a UIP-spectrum imaging category with diagnosis-oriented labels such as NSIP, OP, HP, and sarcoidosis; probable UIP and indeterminate-for-UIP categories were not analysed separately, limiting comparability with studies using guideline categories alone. Finally, the short study period limits assessment of temporal trends. Outcomes such as avoided biopsies, time to treatment, and patient outcomes were not measured.

CONCLUSION

HRCT pattern classification by experienced thoracic radiologists showed 82.7% concordance with the final MDD diagnosis in patients with suspected ILD evaluated over six months. Concordance was higher for definite UIP than for non-UIP patterns, and interobserver agreement was substantial. The small sample warrants confirmation in larger studies. HRCT findings should be integrated with clinical history, serological testing, pulmonary function, and histopathology where indicated; a UIP pattern should not be equated with IPF in every patient. Future multicentre studies using predefined reference standards independent of the index test and larger samples are needed to estimate diagnostic accuracy across ILD subtypes.

DECLERATIONS

The study followed the principles of the Declaration of Helsinki. It was approved by the institutional review board (protocol number 2023-ILD-0089, which waived the

requirement for individual written informed consent because the data were retrospective and de-identified.

ACKNOWLEDGEMENT

Not Declared

CONFLICT OF INTREST

Nil

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