Idiopathic Interstitial Pneumonia

What Is the Effect of a Multidisciplinary Approach to Diagnosis?

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Current guidelines recommend that the clinician, radiologist, and pathologist work together to establish a diagnosis of idiopathic interstitial pneumonia. Three clinicians, two radiologists, and two pathologists reviewed 58 consecutive cases of suspected idiopathic interstitial pneumonia. Each participant was provided information in a sequential manner and was asked to record their diagnostic impression and level of confidence at each step. Interobserver agreement improved from the beginning to the end of the review. After the presentation of histopathologic information, radiologists changed their diagnostic impression more often than did clinicians. In general, as more information was provided the confidence level for a given diagnosis improved, and the diagnoses rendered with a high level of confidence were more likely congruent with the final pathologic consensus diagnosis. The final consensus pathologist diagnosis was idiopathic pulmonary fibrosis in 30 cases. Clinicians identified 75% and radiologists identified 48% of these cases before presentation of the histopathologic information. Histopathologic information has the greatest impact on the final diagnosis, especially when the initial clinical/radiographic diagnosis is not idiopathic pulmonary fibrosis. We conclude that dynamic interactions between clinicians, radiologists, and pathologists improve interobserver agreement and diagnostic confidence.

Keywords: diagnosis; nonspecific interstitial pneumonia; usual interstitial pneumonia

Histopathologic subsets of idiopathic interstitial pneumonia exhibit different prognoses (1–8). Therefore, an accurate diagnosis is critical to the management of patients with idiopathic interstitial pneumonia. Clinical features, high-resolution computed tomography (HRCT) (9–12), and surgical lung biopsy (13) all play a role in establishing a diagnosis. An American Thoracic Society/European Respiratory Society (ATS/ERS) committee emphasized the need for a dynamic diagnostic integrated process in which clinicians, radiologists, and pathologists exchange information in the determination of a diagnosis in individual patients with suspected idiopathic interstitial pneumonia (14). Using histology alone as the "gold standard" for diagnosis can be complicated by difficulties with interrater agreement (15) and the potential for sampling error (2). The combination of HRCT and histologic features also better predicts prognosis compared with either modality alone (16). In the current study, we hypothesized that an interactive process would improve the interobserver agreement between expert clinicians, radiologists, and pathologists in consecutive patients with suspected idiopathic interstitial pneumonia compared with each group working in diagnostic isolation. This study illustrates that a consensus diagnosis, reached after a careful exchange of clinical, radiographic, and histopathologic information, often differs from the initial diagnosis reached by the individual clinician, radiologist, or pathologist working in isolation. Some of these results have been previously reported in the form of an abstract (17, 18).

METHODS

Patient Selection

Patients in this study represented consecutive patients referred to the University of Michigan Specialized Center of Research (SCOR) in the Pathobiology of Fibrotic Lung Disease for potential participation in research protocols between January 2002 and August 2002. Patients with suspected idiopathic interstitial pneumonia were referred to the study center by participants in the University of Michigan Fibrotic Lung Disease Network (*see* ACKNOWLEDGMENT). Through the course of evaluation all patients underwent a history, physical examination, complete pulmonary function testing, HRCT, and surgical lung biopsy. Patients without an HRCT scan or a surgical lung biopsy were excluded. Patients with known collagen vascular disease at the time of presentation were excluded. Patients without collagen vascular disease at initial presentation, but that developed a discrete collagen vascular disease during the course of follow-up, were included.

Data Collection

A standard form was used to collect clinical information including symptoms, environmental exposures, comorbid illnesses, medication use, smoking history, family history, physical examination findings, and serologic data. Pulmonary function data (spirometry, lung volumes, and diffusion capacity for carbon monoxide) and HRCT within 6 months of surgical lung biopsy were reviewed.

Pathology Interpretation

Two expert pulmonary pathologists (T.C. and W.T.) individually reviewed each patient's surgical lung biopsy without clinical or HRCT information. The slides from each patient's surgical lung biopsy were independently reviewed by the two pathologists before the study meeting. At the study meeting, during Steps 1–3 (*see below*) the pathologists were physically separated from the clinicians and radiologists and resolved individual differences in histopathologic opinion through joint review and a consensus histopathologic diagnosis was reached.

Study Organizational Scheme

The overall study format was designed to evaluate whether the addition of specific clinical, radiographic, and pathologic information impacted the diagnostic impression of each participant. Participants met at the University of Michigan and were given information in a stepwise fashion as outlined below and in Figure 1. Participants could change diagnostic impression and/or level of confidence at each step of the review process.

(*Received in original form February 3, 2004; accepted in final form July 11, 2004*)

Supported in part by National Institutes of Health NHLBI grant P50HL46487, NIH/NCRR 3 MO1 RR00042-33S3, NIH/NIA P60 AG08808-06, NHLBI, 1 K24 HL04212, and 1 K23 HL68713.

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Am J Respir Crit Care Med Vol 170. pp 904–910, 2004
Originally Published in Press as DOI: 10.1164/rccm.200402-147OC on July 15, 2004
Internet address: www.atsjournals.org

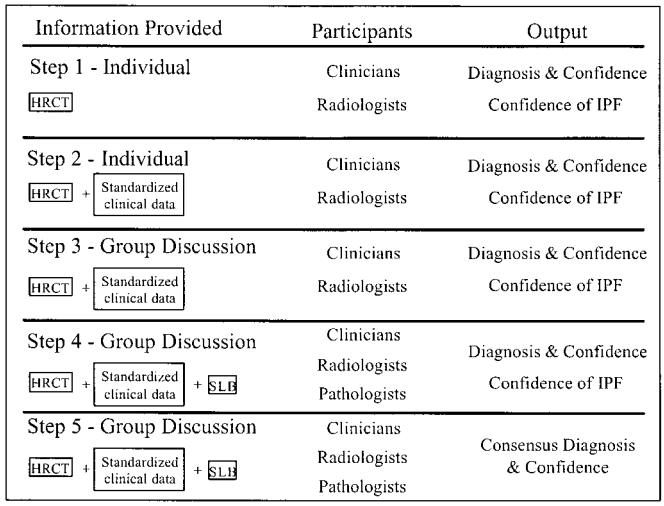

Figure 1. Schematic representation of the information presented to each of the participants at each step of the study. HRCT = high-resolution computed tomography; IPF = idiopathic pulmonary fibrosis; SLB = surgical lung biopsy. Individuals made their diagnostic decisions without conferring in Steps 1 and 2 and individually after conferring in Steps 3–5.

Step 1: Expert clinicians (J.L., T.K., and G.R.) and radiologists (E.K. and B.G.) independently reviewed HRCTs without clinical or pathologic information. Each participant was asked independently to provide their opinion as to the most likely diagnosis and a confidence level for that diagnosis (1 = definite, 2 = probable, 3 = possible, 4 = definitely not). Acknowledging the prognostic importance of usual interstitial pneumonia (UIP), participants were asked to record their confidence that the case could represent UIP.

Step 2: Clinicians and radiologists reviewed HRCTs with a standardized presentation of clinical information and recorded their diagnostic impression and confidence as in Step 1; no discussion occurred between the participants.

Step 3: Clinicians and radiologists discussed diagnostic impressions and again recorded their individual diagnosis and confidence level.

Step 4: Pathologists (T.C. and W.T.) entered the study arena. The standardized clinical information and HRCT were again reviewed. The pathologists then discussed their interpretation of the surgical lung biopsy. The clinicians, radiologists, and pathologists discussed each case and again recorded their individual final clinical, radiologic, and pathologic diagnosis and confidence level. For this part of the study the two pathologists functioned as a single observer, that is, they did not each record their individual interpretation.

TABLE 1. DIAGNOSIS OF EACH PARTICIPANT THROUGH EACH STEP OF THE STUDY

	Clinician			Radiologist		Consensus
	A	B	C	A	B	Pathologist
Step 1						
IPF	28	17	24	15	15	NA
NSIP	20	32	19	27	27	NA
RBILD/DIP	7	1	2	1	2	NA
Hypersensitivity pneumonitis	3	4	6	11	13	NA
Bronchiolar disease	0	1	0	0	0	NA
Other	0	3	7	4	1	NA
Step 2						
IPF	28	19	24	15	15	NA
NSIP	21	26	19	25	25	NA
RBILD/DIP	4	3	5	2	3	NA
Hypersensitivity pneumonitis	4	4	5	13	12	NA
Bronchiolar disease	1	1	1	0	0	NA
Other	0	5	4	3	3	NA
Step 3						
IPF	24	23	24	15	16	NA
NSIP	24	21	21	24	24	NA
RBILD/DIP	4	4	3	3	3	NA
Hypersensitivity pneumonitis	5	4	5	13	12	NA
Bronchiolar disease	1	1	1	1	0	NA
Other	0	5	4	2	3	NA
Step 4						
IPF	32	29	29	32	30	30
NSIP	15	16	12	12	15	15
RBILD/DIP	3	5	3	1	2	1
Hypersensitivity pneumonitis	3	3	4	3	3	1
Bronchiolar disease	1	1	3	4	4	6
Other	4	4	7	6	4	5
Step 5						
IPF	31	29	30	30	30	30
NSIP	15	19	14	14	15	15
RBILD/DIP	4	4	2	1	2	3
Hypersensitivity pneumonitis	3	3	4	3	3	1
Bronchiolar disease	1	0	3	5	4	4
Other	4	3	5	5	4	5

Definition of abbreviations: IPF = idiopathic pulmonary fibrosis; NA = not applicable; NSIP = nonspecific interstitial pneumonia; RBILD/DIP = respiratory bronchiolitis interstitial lung disease/desquamative interstitial pneumonia.

TABLE 2. DIAGNOSIS BY PATHOLOGIST WITHOUT CLINICAL OR RADIOGRAPHIC INFORMATION

Diagnosis	Pathologist A	Pathologist B	Consensus
IPF	27	28	30
NSIP	11	14	15
RBILD/DIP	1	1	3
Hypersensitivity pneumonitis	2	1	1
Bronchiolar disease	7	4	4
Other	10	10	5*

Definition of abbreviations: IPF = idiopathic interstitial pneumonia, NSIP = nonspecific interstitial pneumonia, RBILD/DIP = respiratory bronchiolitis interstitial lung disease/desquamative interstitial pneumonia.

* Other diagnoses were as follows: diffuse alveolar damage (n = 2), cellular interstitial pneumonia with granulomas and possible atypical mycobacterial disease, poor biopsy specimen, and pulmonary veno-occlusive disease.

Step 5: Participants discussed their own interpretation of each case. When disagreement was present an attempt was made to reach a consensus diagnosis. A consensus clinical, radiologic, and pathologic diagnosis could not be reached in all cases and therefore all participants again recorded their individual diagnoses and confidence levels.

Statistical Analysis

Each observer's diagnosis was coded into one of six categories—idiopathic pulmonary fibrosis (IPF), nonspecific interstitial pneumonia (NSIP), respiratory bronchiolitis interstitial lung disease/desquamative interstitial pneumonia (RBILD/DIP), hypersensitivity pneumonitis, bronchiolar disease, and other. McNemar tests were subsequently used to test whether two probabilities of agreement conducted during different steps or by different raters were equal. A κ statistic allowing for multiple raters was also used to assess agreement in diagnosis. κ Scores are rated as almost perfect agreement (above 0.8), substantial agreement (scores between 0.6 and 0.8), moderate agreement (scores between 0.4 and 0.6), fair agreement (scores between 0.2 and 0.4), slight agreement (scores between 0.0 and 0.2), and poor agreement (scores below 0.0) (19). An estimating equation approach to the analysis of correlated κ statistics was used in comparisons of κ statistics estimated throughout the study and in producing confidence intervals for the κ statistics (20). A χ^2 or Fisher exact test was used to examine the relationship between the confidence of each participant for their diagnosis and the final pathologist consensus diagnosis. A recorded confidence level of 1 was considered high in confidence and a confidence level of 2, 3, or 4 was considered low in confidence.

RESULTS

Fifty-eight patients were evaluated. The κ for the two pathologists without clinical or radiologic information (pathology review before Step 1) was 0.72 (95% confidence interval, 0.57 to 0.86) with a probability of agreement of 0.81 (95% confidence interval, 0.71 to 0.91). IPF and NSIP were the most common diagnoses (Tables 1 and 2). In general, agreement among clinicians and between clinicians and radiologists improved when more data (clinical, radiographic, and pathologic) were provided (Table 3). Importantly, when pathology results were provided to the group, the radiologists were more likely to alter their interpretation than were the clinicians, as enumerated by the decrease in intraobserver κ coefficient between Steps 3 and 4 (Table 4).

The agreement level of clinicians and radiologists with the pathologist consensus diagnosis tended to increase as additional information was provided (Table 5). Importantly, a diagnosis of IPF by each clinician or each radiologist following the review of clinical and radiographic data (before pathologic data) coincided with the pathologic diagnosis in all but two cases. For one case two clinicians and both radiologists changed their diagnosis to NSIP; in a separate case one clinician changed to a diagnosis of desquamative interstitial pneumonia. Furthermore, clinicians correctly diagnosed more cases of IPF that were subsequently pathologically confirmed as IPF compared with radiologists at this step (Step 3) of the study. After pathologic impressions were provided to the group, the radiologists changed their interpretations to a greater extent. This is suggested by the marked improvement in interobserver agreement between radiologists and pathologists (Table 5) and the lower radiologist intraobserver agreement level (Table 4). The radiologists most often changed their diagnosis of NSIP to IPF and changed diagnoses of hypersensitivity pneumonitis and RBILD/DIP to NSIP (data not shown). The pathologists changed their initial consensus impressions (n = 11) less often than the clinicians (n = 27, 17, 15) or radiologists (n = 34, 28). These data reflect the change in diagnosis for the pathologists between their initial consensus review before obtaining clinical and radiographic information; for clinicians and radiologists the change reflects a change from each individual's diagnosis after a clinical and radiologic discussion (Step 3) but before histopathologic discussion (Step 5). When the pathologists changed their initial consensus impressions, their final diagnoses are listed in Table 6. It is notable that in three cases a histologic diagnosis of UIP was thought not to represent IPF after review of clinical and HRCT data. We were not able to identify unique clinical or radiographic features that could reliably predict non-IPF idiopathic interstitial pneumonia diagnoses without a surgical lung biopsy.

Clinicians tended to be more confident than radiologists in the early steps of the evaluation process, although the number of confident diagnoses increased for all observers as more information was provided (Table 7). A statistically significant relationship between confidence in diagnosis and final diagnosis was more often seen with clinicians compared with radiologists, particularly in the early compared with late stages of the evaluation process. An increase in confidence was noted with the addition of pathologic data for both clinicians and radiologists.

Total agreement (3 clinicians, 2 radiologists, and 2 pathologists) on a final diagnosis was reached in 47 (81%) of the cases (IPF, n = 28; NSIP, n = 13; RBILD, n = 1; hypersensitivity pneumonitis, n = 1; other, n = 4). In 6 (10%) cases all but one rater was in agreement (IPF, n = 2; NSIP, n = 2; hypersensitivity pneumonitis, n = 2). In four cases all but two raters were in

TABLE 3. INTEROBSERVER AGREEMENT AT EACH DIAGNOSTIC STEP

Step	Clinicians [κ (*95% CI*)]	Radiologists [κ (*95% CI*)]	Clinicians–Radiologists [κ (*95% CI*)]	All Observers [κ (*95% CI*)]
1	0.41 (0.29, 0.52)	0.72 (0.57, 0.86)	0.39 (0.29, 0.49)	NA
2	0.51 (0.37, 0.64)	0.80 (0.67, 0.93)	0.44 (0.34, 0.54)	NA
3	0.67 (0.54, 0.79)	0.78 (0.65, 0.91)	0.55 (0.44, 0.66)	NA
4	0.75 (0.64, 0.86)	0.84 (0.72, 0.96)	0.78 (0.70, 0.86)	0.79 (0.71, 0.86)
5	0.86 (0.76, 0.95)	0.90 (0.80, 0.99)	0.88 (0.81, 0.96)	0.88 (0.81, 0.94)

Definition of abbreviations: CI = confidence interval for corresponding statistic; NA = not applicable.

TABLE 4. INTRAOBSERVER AGREEMENT FOR CLINICIANS AND RADIOLOGISTS AT EACH STEP

	Clinicians			Radiologists	
Steps	A [κ (*95% CI*)]	B [κ (*95% CI*)]	C [κ (*95% CI*)]	A [κ (*95% CI*)]	B [κ (*95% CI*)]
1 and 2	0.75 (0.61, 0.90)	0.73 (0.59, 0.88)	0.80 (0.68, 0.92)	0.92 (0.84, 1.00)	0.90 (0.80, 0.99)
2 and 3	0.86 (0.75, 0.98)	0.75 (0.61, 0.89)	0.92 (0.84, 1.00)	0.95 (0.88, 1.00)	0.98 (0.92, 1.00)
3 and 4	0.60 (0.45, 0.76)	0.55 (0.39, 0.71)	0.50 (0.35, 0.66)	0.20 (0.06, 0.34)	0.32 (0.16, 0.48)
4 and 5	0.92 (0.83, 1.00)	0.89 (0.79, 0.99)	0.79 (0.66, 0.92)	0.84 (0.72, 0.96)	0.94 (0.88, 1.00)

agreement (RBILD, n = 1; bronchiolar, n = 3). In one case the raters were equally divided between RBILD versus a bronchiolar disorder.

DISCUSSION

Assigning a diagnosis to a patient with interstitial lung disease is difficult and at times imprecise. In clinical practice, pulmonary physicians, radiologists, and pathologists are separated by time, geographic location, and different schedules. This challenges the pulmonary physician confronted with the actual patient in the clinic to individually integrate and analyze the gathered clinical, radiographic, and pathologic data and make decisions about a given patient rather than discussing the data with the radiologist and/or pathologist in a collective manner. In an attempt to improve diagnostic accuracy the ATS/ERS consensus statement recommended a dynamic integrated approach to the diagnosis of interstitial lung diseases that involves an interaction between clinicians, radiologists, and pathologists to achieve a final clinical, radiologic, and pathologic diagnosis (14). In this study we examined whether such a dynamic interactive process impacted the perceived diagnosis, and confidence level for that diagnosis, for a group of consecutive patients with suspected idiopathic interstitial pneumonia. We demonstrate that:

1. The level of agreement between observers and diagnostic confidence improves as more data (clinical, radiographic, and pathologic) are provided.
2. Patients may not require surgical lung biopsy when the clinical and radiographic (HRCT) impression is consistent with a confident diagnosis of IPF.
3. For non-IPF idiopathic interstitial pneumonias, a surgical lung biopsy may be required as a final consensus diagnosis is most influenced by the histopathologic pattern in this setting.

This study quantifies how a dynamic exchange of clinical, radiographic, and pathologic information changes the diagnostic impression of expert physicians when assigning a diagnosis of idiopathic interstitial pneumonia. Exchanges of information lead to both changes in diagnosis and improved confidence with the assigned diagnosis. The effect of interaction between physicians seems most critical for non-IPF idiopathic interstitial pneumonia cases. After review of the clinical, radiographic, and pathologic information the pathologists thought that IPF was the diagnosis in 30 cases. Of these 30 cases, the two radiologists and three clinicians each identified 14, 15, 22, 23, and 23 (respectively) after the review of clinical/radiographic information before obtaining histopathologic information. Importantly, in almost half of the overall cases the histopathologic findings were critical in determining the final diagnosis from each participant. The discussion and exchange of clinical, radiographic, and histopathologic information also tended to improve each participant's confidence in their diagnosis. This is important as diagnoses at any stage rendered with a high level of confidence tended to correspond with the final consensus diagnosis. This suggests that when a physician expresses uncertainty about an idiopathic interstitial pneumonia diagnosis, extra effort should be made to seek additional information and/or opinions with the hope of achieving greater confidence in their diagnostic impression. Furthermore, these data strongly support the role of surgical lung biopsy in patients with a non-IPF HRCT and clinical scenario (1, 14).

A unique feature of this study is the lack of the arbitrary assignment of a gold standard for the final diagnosis. By allowing all participants the opportunity to change their initial diagnostic interpretations we monitored how diagnoses changed with more information and the level of agreement at each stage in the evaluation process. Our data demonstrate that a change in the final clinical–radiographic–pathologic diagnosis is particularly likely to occur in patients with a clinical and radiographic scenario suggestive of non-IPF idiopathic interstitial pneumonia. Importantly, providing the clinical and radiographic information to pathologists led to an alternative or clarified pathologic opinion in 19% of the cases. These findings extend previous work that evaluated agreement between clinicians, radiologists, and pathologists (5, 10, 16, 21–24).

TABLE 5. AGREEMENT OF CLINICIANS AND RADIOLOGISTS WITH PATHOLOGIST IMPRESSION

	Clinicians			Radiologists	
Step	A [κ (*95% CI*)]	B [κ (*95% CI*)]	C [κ (*95% CI*)]	A [κ (*95% CI*)]	B [κ (*95% CI*)]
1	0.22 (0.07, 0.36)	0.22 (0.09, 0.36)	0.38 (0.23, 0.54)	0.09 (0.0, 0.21)	0.14 (0.02, 0.27)
2	0.34 (0.20, 0.48)	0.20 (0.05, 0.34)	0.39 (0.24, 0.55)	0.12 (0.0, 0.26)	0.17 (0.04, 0.30)
3	0.34 (0.20, 0.48)	0.32 (0.17, 0.47)	0.39 (0.23, 0.54)	0.13 (0.0, 0.26)	0.19 (0.05, 0.32)
4	0.76 (0.63, 0.88)	0.79 (0.67, 0.91)	0.74 (0.61, 0.88)	0.81 (0.69, 0.94)	0.92 (0.84, 1.00)
5	0.89 (0.80, 0.99)	0.78 (0.65, 0.91)	0.89 (0.79, 0.99)	0.87 (0.76, 0.97)	0.92 (0.84, 1.00)

The consensus diagnosis of the pathologists without clinical or radiographic information (Table 2) was used for Steps 1–3. The consensus diagnosis of the pathologists after hearing the clinical/radiographic information and after a final group discussion (Table 1) was used for Steps 4 and 5, respectively.

TABLE 6. CASES IN WHICH INITIAL AND FINAL PATHOLOGIC INTERPRETATION CHANGED

Initial Diagnosis	Final Diagnosis
Hypersensitivity pneumonitis	NSIP*
Organizing pneumonia	NSIP
UIP	ILD associated with CVID
Bronchiolar disease	Pulmonary veno-occlusive disease
End-stage lung	IPF
End-stage lung	IPF
End-stage lung	IPF
UIP	NSIP*
UIP	NSIP
Bronchiolar disease	RBILD
Bronchiolar disease	RBILD

Definition of abbreviations: CVID = common variable immunodeficiency; ILD = interstitial lung disease; IPF = idiopathic pulmonary fibrosis; NSIP = nonspecific interstitial pneumonia; RBILD = respiratory bronchiolitis interstitial lung disease; UIP = usual interstitial pneumonia.

* These cases were associated with rheumatoid arthritis.

The level of agreement between participants was good at onset and improved with discussion of additional clinical and histopathologic information. The highest initial agreement was between radiologists. Radiologists were also less likely than clinicians to believe that the clinical scenario was characteristic of IPF and were more likely, compared with clinicians, to change their diagnosis on the basis of histopathologic findings. Previous work demonstrated the limited sensitivity (16, 24, 25) yet high positive predictive value (10, 12, 16, 26) of HRCT for detecting IPF. Our data highlight the value of clinicians reviewing the actual HRCT with a radiologist versus relying on reported findings. The greatest improvement for the clinician's interobserver agreement occurred after the discussion of clinical and radiographic features with radiologists.

The ATS/ERS consensus panel on idiopathic pulmonary fibrosis states that in the absence of a surgical lung biopsy, the diagnosis of IPF/UIP remains uncertain. However, the panel proposed diagnostic criteria that could be used by clinicians to increase the likelihood of a correct clinical diagnosis of IPF (Table 8). In the immunocompetent adult, the presence of all of the major diagnostic criteria along with at least three of the four minor criteria was recommended. These criteria were not prospectively tested. However, the clinicians involved in the present study were coauthors of the Statement and followed these principles in defining cases of idiopathic interstitial pneumonia. This may account for some of the differences seen between the clinicians and radiologists involved in this study.

A limitation of our study is the use of participants with significant expertise in the field of interstitial lung disease. Some investigators have suggested that expert radiologists exhibit improved interobserver agreement compared with radiologists with lesser expertise (27–30). No similar data have examined this topic in the evaluation of suspected idiopathic interstitial pneumonia by less experienced clinicians. Additional data are required to assess the role of a dynamic, interactive diagnostic process in the hands of less experienced clinicians, radiologists, and pathologists. These data also do not address how individual personalities may have impacted the degree of agreement (or disagreement) at various steps throughout the experiment. The participants in this study are recognized, senior experts and are accustomed to rendering an "expert opinion." As such, other physicians may render diagnostic opinions that are more (or less) malleable compared with this study group.

In summary, our data quantify the essence of a dynamic clinical, radiographic, and pathologic approach to the diagnosis of patients

TABLE 7. RELATIONSHIP BETWEEN CLINICIAN AND RADIOLOGIST LEVEL OF CONFIDENCE FOR DIAGNOSIS AND AGREEMENT WITH FINAL PATHOLOGIST CONSENSUS DIAGNOSIS

	Self-reported Confidence Level†									
	Clinician A		Clinician B		Clinician C		Radiologist A		Radiologist B	
Diagnosis Matched Final Pathologist Consensus	High	Low	High	Low	High	Low	High	Low	High	Low
Step 1										
Yes	15	18	21	10	12	25	7	14	9	16
No	3	22	8	19	0	20	5	32	8	25
p Value*	0.009		0.008		0.005		0.097		0.39	
Step 2										
Yes	17	22	20	9	12	27	6	17	10	16
No	4	15	12	17	2	16	4	31	9	23
p –Value*	0.14		0.064		0.18		0.17		0.57	
Step 3										
Yes	16	22	24	12	12	28	7	16	13	14
No	3	17	12	10	2	15	4	31	10	21
p –Value*	0.044		0.41		0.19		0.093		0.28	
Step 4										
Yes	38	13	35	17	36	13	31	18	32	22
No	0	7	5	1	0	8	2	7	2	1
p Value*	< 0.001		0.665		< 0.001		0.031		1	
Step 5										
Yes	43	11	43	6	38	14	38	15	37	17
No	0	4	5	3	0	3	2	3	2	1
p Value*	0.003		0.10		0.026		0.17		1	

* Fisher's exact test.

† Raters were asked to grade their level of confidence in diagnosis as 1 = high, 2 = probable, 3 = possible, and 4 = definitely not. A confidence level of 1 was considered high, and levels of 2–4 were considered low. Comparisons in which the 2×2 subtable entries do not sum to 58 patients indicate one or more missing confidence level values.

TABLE 8. CONFIDENT DIAGNOSIS OF USUAL INTERSTITIAL PNEUMONIA IN AN IMMUNOCOMPETENT ADULT IN THE ABSENCE OF SURGICAL BIOPSY

Major criteria (*all* must be present)
1. Exclusion of other known causes of ILD, such as certain drug toxicities, environmental exposures, and connective tissue diseases
2. Abnormal pulmonary function studies that include evidence of restriction (reduced VC, often with an increased FEV_1/FVC ratio) and impaired gas exchange [increased $(A–a)P_{O_2}$ with rest or exercise or decreased $D_{L_{CO}}$]
3. Bibasilar reticular abnormalities with minimal ground glass opacities on HRCT scans
4. Transbronchial lung biopsy or bronchoalveolar lavage showing no features to support an alternative diagnosis

Minor criteria (three of four must be present)
1. Age, 50 yr
2. Insidious onset of otherwise unexplained dyspnea on exertion
3. Duration of illness greater than 3 mo
4. Bibasilar, inspiratory crackles (dry or "Velcro" type in quality)

Definition of abbreviations: $(A–a)P_{O_2}$ = alveolar–arterial pressure difference for oxygen; $D_{L_{CO}}$ = diffusing capacity of the lung for carbon monoxide; HRCT = high-resolution computed tomography; ILD = interstitial lung disease; VC = vital capacity.

From Reference 31.

with suspected idiopathic interstitial pneumonia. We believe that at a minimum the evaluation of patients with idiopathic interstitial pneumonia should include an interaction between the clinician and thoracic radiologist. If this initial step results in a confident diagnosis of IPF a surgical lung biopsy is not required. In all other cases a surgical lung biopsy is likely to impact the final diagnosis and should be performed if possible. If a surgical lung biopsy is available, the pathologist should be involved in the diagnostic analytic discussion. It appears the current gold standard for the diagnosis of idiopathic interstitial pneumonia is a dynamic integrated process that requires direct interaction between clinicians and radiologists as well as pathologists when a surgical lung biopsy is available. Further research to clarify this process, examine its effect in the hands of less experienced physicians, and evaluate the implications in terms of response to therapy and prognosis is required.

Conflict of Interest Statement: K.R.F. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript; T.E.K. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript; G.R. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript; J.P.L. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript; T.V.C. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript; W.D.T. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript; B.H.G. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript; E.A.K. received $3,000 in 2003 from General Electric (GE) for speaking at a conference and received grant support from GE Medical Systems, August 1, 2002–November 1, 2002 ($37,733) and February 20, 2003–February 16, 2005 ($44,000) and serves on the General Electric Radiology Research Academic Fellowship (GERRAF) Board of Directors and has received $3,000 annually since 2002 and no compensation from the GE Medical Advisory Board; G.B.T. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript; Q.L. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript; S.M. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript; V.N.L. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript; S.E.G. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript; F.J.M. does not have a financial relationship with a commercial entity that has an interest in the subject of this manuscript.

Acknowledgment: The University of Michigan Fibrotic Lung Disease Network includes: *University of Michigan, Division of Pulmonary and Critical Care, Ann Arbor, MI*—D. Arenberg, W. Bria, D. Dahlgren, C. Grum, V. Lama, T. Ojo, M. Peters-Golden, R. Simon, T. Sisson, T. Standiford, V. Thannickal, E. White; *Internal Medicine Clinic, Alpena, MI*—P. Bachwich, C. Easton, J. Mazur; *The Lung Center, Battle Creek, MI*—S. Chaparala, G. Harrington, N. Potempa; *Bay City, MI*—S. Manawar, J. Summer; *Clawson, MI*—P. Hukku, J. Sung; *Clinton Township, MI*—R. Babcock; *Pulmonary and Critical Care Medicine Consultants, Commerce, MI*—J. Belen, M. Dunn, D. Maxwell, R. Reagle, R. Sherman, S. Simecek; *Oakwood Hospital, Dearborn, MI*—L. Victor; *Henry Ford Hospital, Detroit, MI*—B. DiGiovine, M. Eichenhorn, R. Hyzy, J. Popovich, Jr., D. Spizarny; *Botsford General Hospital, Farmington Hills, MI*—B. Rabinowitz; *Pulmonary and Critical Care Specialists, Farmington Hills, MI*—G. Ferguson, P. Kaplan, S. Sklar, W. VanderRoest; *Pulmonary Associates, PC, Flint, MI*—O. Filos, V. Rao, M. V. Thomas, J. Varghese, J. Vyskocil, F. Wadenstorer; *Grand Valley Internal Medicine, Grand Rapids, MI*—J. Cantor, W. Katz, R. Johnson, Jr., D. Listello, J. Wilt; *Michigan Medical Professional Company, Grand Rapids, MI*—C. Acharya, W. Couwenhoven, T. Daum, M. Harrison, M. Koets, G. Sandman, G. VanOtteren; *Michigan Medical, PC, Holland, MI*—S. Kraker; *Huntington Woods, MI*—M. Greenberger, A. O'Neill, D. Wu; *Pulmonary Clinics of Southern Michigan, Jackson, MI*—R. C. Albertson, III, J. Chauncey, T. Murray, G. Patten; *Associated Pulmonary and Critical Care Specialists, PC, Kalamazoo, MI*—T. Abraham, J. Dirks, B. Dykstra, G. Grambau, J. Schoell; *Pulmonary and Critical Care Associates, PC, Kalamazoo, MI*—R. Brush, S. Jefferson, J. Miller, S. Schuldheisz, M. Warlick; *Pulmonary and Critical Care Consultants, Lansing, MI*—J. Armstrong, A. Atkinson, T. Kantra, L. Rawsthorne, D. Young; *Pulmonary Services, Lansing, MI*—A. Abbasi, C. M. Gera, G. Kashyap, J. Morlock; *Respiratory Medicine, Marquette, MI*—S. Danek, A. Saari; *Midland, MI*—S. Yadam; *Central Michigan Healthcare System, Mt. Pleasant, MI*—E. Obeid; *Muskegon Pulmonary Associates, Muskegon, MI*—D. Hoch, A. Kleaveland; *Owosso Medical Group, Owosso, MI*—A. Allam, M. A. Gad, Jr.; *Lung Associates, Pontiac, MI*—A. Desai, U. Dhanjal, A. Sethi; *St. Joseph's Hospital, Pontiac, MI*—F. Ahmad, L. Kaiser, L. Rosenthal, D. Sak; *Physician HealthCare Network, Port Huron, MI*—R. Ailani, M. Basha, A. Hadar, S. Holstine; *Pulmonary, Critical Care, and Sleep, PC, Rochester Hills, MI*—M. W. Al-Ameri, R. Go, M. Kashlan; *Rochester, MI*—K. Aggarwal; *Roseville, MI*—W. Hanna, R. Marchese; *William Beaumont Hospital, Royal Oak, MI*—R. Begle, D. Erb, K. P. Ravikrishnan, J. Seidman, S. Sherman; *Saginaw,* MI—R. Agarwal, F. Ansari, T. Damuth, C. Indira; *Spring Lake, MI*—M. Ivey; *Lakeside Healthcare Specialists, St. Joseph, MI*—S. Deskins, A. Palmer, S. Shastri; *Pulmonary and Critical Care Associates, St. Clair Shores, MI and Troy, MI*—R. DiLisio, S. Galens, K. Grady, D. Harrington, R. Herbert, C. Hughes, J. Lee, A. Starrico, K. Stevens, M. Trunsky, W. Ventimiglia; *Taylor, MI*—D. Mahajan. *Pulmonary Medicine Associates, Warren, MI*—H. Kaplan, L. Tankanow; *Henry Ford Wyandotte Hospital, Wyandotte, MI*—M. Pensler; *Toledo Pulmonary and Sleep Specialists, Toledo, OH*—F. O. Horton, III, A. Nathanson, R. Wainz.

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