ORIGINAL ARTICLE

PREVALENCE AND CLINICAL CHARACTERISTICS OF LUNG CANCER IN ELDERY PATIENTS WITH IDIOPATHIC PULMONARY FIBROSIS

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Abstract

Introduction: Idiopathic pulmonary fibrosis (IPF) is a progressive, fatal lung disease of unknown cause, typically affecting older men, and limited to the lungs. During its clinical course, IPF is frequently associated with several comorbidities, among which lung cancer is one of the most significant. This study aimed to determine the frequency, epidemiological characteristics, prognostic implications, and management strategies of IPF– lung cancer (LC) in geriatrc patients within our clinical population.

Materials and Method: The coexistence of lung cancer in patients diagnosed with IPF (Group 1) and non-IPF (Group 2) between September 2023 and June 2025 was retrospectively evaluated. In addition to demographic data, comorbidities, echocardiographic findings, histopathological cancer diagnosis, and administered treatments were recorded.

Results: Lung cancer was detected in 13.2% of patients with idiopathic pulmonary fibrosis and 3.8% of those with non- idiopathic pulmonary fibrosis (p = 0.098), with an overall prevalence of 7.7% among all patients. LC was only diagnosed in male patients with both groups. The most frequent histological subtype was squamous cell carcinoma, predominantly located in the left upper and right lower lobes. Only 29% of IPF patients with lung cancer had received antifibrotic therapy.

Conclusion: In eldery patients, the coexistence of IPF and LC constitutes a high-risk phenotype associated with poor prognosis and increased management complexity. Given the complexity of management in this vulnerable population, systematic screening, early diagnosis, and individualized treatment strategies are of critical importance.

Keywords: Idiopathic Pulmonary Fibrosis; Lung Neoplasms; Aged; Lung Disease, Interstitial.

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INTRODUCTION

Idiopathic pulmonary fibrosis (IPF) is a chronic, progressive lung disease characterized by parenchymal fibrosis, leading to dyspnea, respiratory failure and death. The precise etiology remains unknown; however, IPF predominantly affects men in their eldery ages (sixth or seventh decade of life), often with a history of cigarette smoking and variable exposure to agricultural, wood, or metal dusts. Additionally, concomitant disease and comorbid conditions such as atherosclerosis, cardiovascular disease, and malignancy in eldery ages, it can adversely affect quality of life, complicate diagnosis, treatment, and increase mortality (1). Several clinical and epidemiological parameters, including rapid forced vital capacity (FVC) decline, male sex, advanced age, combined pulmonary fibrosis and emphysema (CPFE), and current smoking, have been independently associated with a higher incidence of lung cancer in IPF patients. Studies have demonstrated that patients with IPF have approximately a fivefold higher risk of developing lung cancer compared to the general population (2).

According to epidemiological data, the median prevalence of lung cancer among IPF patients is 11.6% in European cohorts and 15.3% in Asian cohorts. However, autopsy studies have reported rates as high as 48%, suggesting that a considerable proportion of lung cancer (LC) cases may remain clinically undetected (3). The frequent coexistence of IPF and LC is increasingly recognized and is believed to result from shared molecular and cellular pathogenic mechanisms. Both diseases are thought to originate from repetitive alveolar epithelial injury followed by aberrant tissue repair processes, culminating in fibrotic remodeling in IPF and malignant transformation in lung cancer. These overlapping mechanisms include genetic mutations, epigenetic alterations, dysregulated microRNA expression, and activation of both profibrotic and pro-oncogenic signaling pathways, ultimately contributing to disease progression and poor clinical outcomes (4). In patients exhibiting a usual interstitial pneumonia (UIP) pattern, LC lesions are most commonly localized to the subpleural regions of the lower lobes (75.5%), which aligns with the characteristic distribution pattern of UIP-associated fibrosis.

The management of lung cancer in patients with pulmonary fibrosis remains particularly challenging, as standard therapeutic modalities—including surgery, chemotherapy, and radiotherapy—may precipitate acute exacerbations of fibrosis and are associated with increased morbidity and mortality (5). Given that eldery conditions and LC is more prevalent among patients with IPF aged over 65 years compared with the general population, and considering the relative paucity of studies examining the relationship between LC and IPF in advanced age, further investigation is warranted.

Accordingly, the present study aims to evaluate the incidence of LC in eldery patients with and without IPF, and to identify potential predisposing factors contributing to malignancy development in the context of fibrotic pattern.

MATERIALS AND METHOD

Patients who demonstrated a UIP or non-UIP fibrotic pattern on thoracic computed tomography (TCT) between November 2022 and June 2025 were retrospectively reviewed at our institution. Radiological findings, along with relevant clinical and laboratory data, were retrieved from the hospital's electronic medical and imaging record systems. Inclusion criteria comprised patients who had a radiologically confirmed UIP pattern on TCT and complete clinical and radiological data available. Exclusion criteria included incomplete data, non-fibrotic interstitial lung diseases other than UIP, and individuals with a pre-existing diagnosis of lung cancer.

Patients with IPF were categorized as Group 1, whereas those with non-IPF fibrotic interstitial

lung diseases were assigned to Group 2. For each patient, demographic characteristics (age, sex), comorbidities, smoking history and intensity (pack-years), history of COVID-19 infection, duration of follow-up, connective tissue disease subtype (if applicable), antifibrotic treatment status and duration, and use of long-term oxygen therapy were recorded.

In addition, the presence of pulmonary malignancy, histopathological subtype of lung cancer (if applicable), tumor localization, and any history of chemotherapy and/or radiotherapy were documented. Laboratory parameters included complete blood count, serum albumin, C-reactive protein (CRP), and pro–B-type natriuretic peptide (proBNP) levels. Echocardiographic measurements such as ejection fraction (EF) and pulmonary artery pressure (PAP), along with pulmonary function test (PFT) parameters-forced expiratory volume in one second (FEV_1), forced vital capacity (FVC), FEV_1/FVC ratio, diffusing capacity for carbon monoxide (DLCO), and DLCO/alveolar volume (DLCO/VA)-were assessed. The six-minute walk test (6MWT) results were also compared between groups. Survival and mortality data were verified through the national death registry system.

The study was approved by our institutional ethics committee (approval number: AEŞH-BADEK2-2025-373) and conducted in accordance with the ethical standards of the Declaration of Helsinki and its subsequent revisions.

Statistical Analysis

Data were analyzed using the IBM SPSS Statistics software package, version 24.0. Caregorical data were presented as frequency (n) and percentage (%). Categorical variables were compared using the Pearson Chi-square or Fisher's exact test. Continuous variables were also presented as mean ± standard deviation (x ± SD) or median (IQR) values according to distribution. The normality of continuous variables was assessed using the Kolmogorov–Smirnov and Shapiro–Wilk tests. Comparisons between two groups for continuous variables were performed using the Independent Samples t-test for normally distributed data, and the Mann–Whitney U test for non-normally distributed data. A p-value < 0.05 was considered statistically significant.

RESULTS

A total of 69 patients were included in the study. Group 1 comprised 32 patients with IPF, with a mean age of 70.16 ± 1.39 years, whereas Group 2 included 37 patients with non-IPF fibrotic ILA, with a mean age of 65.85 ± 1.33 years. The prevalence of lung cancer was 13.2% in Group 1 and 3.8% in Group 2 ($p = 0.098$). Squamous cell carcinoma (SCC) and adenocarcinoma were the most common histologic subtypes, and lesions were predominantly located in the lower lobes. The rates of adjuvant chemotherapy and radiotherapy were comparable between the groups ($p > 0.05$) (Table 1).

Neutrophil counts and CRP levels were significantly higher in Group 1 (median neutrophils: 5800 vs. 4660 cells/μL, $p = 0.048$; median CRP: 8.5 mg/L vs. 5 mg/L, $p = 0.035$). Among pulmonary function test (PFT) parameters, FVC (% predicted), DLCO, and DLCO/VA values were significantly lower in patients with IPF compared with non-IPF fibrotic ILD (FVC: 71.86 ± 2.56 vs. 84.21 ± 2.75, $p = 0.002$; DLCO: 42.94 ± 2.10 vs. 57.32 ± 18.65, $p < 0.001$; DLCO/VA: 63.69 ± 3.39 vs. 76.33 ± 2.69, $p = 0.004$). All patients diagnosed with lung cancer in both groups were male. There was no significant association between comorbidities and the development of lung cancer ($p > 0.05$). No cases of lung cancer were detected among never-smokers in Group 1. Of the five IPF patients with lung cancer, two were current smokers and three were ex-smokers. In Group 2, both patients with lung cancer were ex-smokers and had underlying rheumatoid arthritis (RA). Only two of the seven patients with



Table 1. Comparison of demographic data, pulmonary function, and biochemical parameters between IPF (Group 1) and non-IPF fibrotic lung diseases (Group 2)

Variable	Group 1 N (%)	Group 2 N (%)	p
Gender, Male, N(%)	32 (84.2)	37 (69.8)	0.114
Age, year	70.16±1.39	65.85±1.33	0.031
Smoking status, N(%)			
Current smoker	7 (18.4)	10 (19.2)	0.396
Ex-smoker	19 (50.0)	19 (36.5)	
Never smoker	12 (31.6)	23 (44.2)	
Pack-years	36.28±4.51	42.72±0.90	0.276
Comorbidity, N(%)			
Yes	26 (68.4)	45 (84.9)	0.061
No	12 (31.6)	8 (15.1)	
Comorbid conditions, N (%)			
RF	9 (23.7)	6 (11.3)	0.117
COPD	0	12 (22.6)	0.002
DM	10 (26.3)	8 (15.1)	0.185
HT	15 (39.5)	23 (43.4)	0.708
AF	1 (2.6)	2 (3.8)	0.763
HL	5 (13.2)	4 (7.5)	0.377
CAD	13 (34.2)	19 (35.8)	0.872
HF	3 (7.9)	4 (7.5)	0.951
CVD	0	2 (3.8)	0.226
Renal Failure	4 (10.5)	3 (5.7)	0.390
Pulmonary Function Tests			
FEV1 (%), Median (IQR)	74(22)	87(31)	0.094
FEV1 (ml), Median (IQR)	2095(993)	2260(1145)	0.312
FVC (%)	71.86±2.56	84.21±2.75	0.002
FVC (ml)	2606.5±150.83	2678.58±130.43	0.721
FEV1/FVC, Median (IQR)	78(12)	76(11)	0.078
DLCO	42.94±2.1	57.32±18.65	<0.001
DLCO/VA	63.69±3.39	76.33±2.69	0.004
6MWT (m)	380.93±38.90	424±26.70	0.354
EF (%)	57.70±1.18	59.46±0.74	0.192
sPAP (mmHg), Median (IQR)	25.50(12)	30(17)	0.123
ProBNP, Median (IQR)	459.5(1318)	269(1240)	0.552
WBC	9515.53±432.76	8117.74±314.06	0.009
Neutrophils, Median (IQR)	5800(3375)	4660(2620)	0.048
Lymphocytes, Median (IQR)	2250(1150)	1960(905)	0.245
NLR, Median (IQR)	2.68(2.39)	2.40(1.81)	0.477
Platelets	247.20±15.29	244.62±9.81	0.882
Eosinophils, Median (IQR)	160(203)	160(220)	0.910
Hemoglobin (mg/dl), Median (IQR)	13.35(3)	14(2)	0.155
MPV, Median (IQR)	10(1)	10(1)	0.947
Albumin, Median (IQR)	41(5)	43(4)	0.191
GFR, Median (IQR)	79(33)	89(25)	0.104
CRP, Median (IQR)	8.5(22)	5(12)	0.035

*All values are presented as mean ± SD, otherwise indicated in the column as median (IQR), or N (%).
Abbreviations: IPF, idiopathic pulmonary fibrosis; RF, respiratory failure; COPD, chronic obstructive pulmonary disease; DM, diabetes mellitus; HT, hypertension; AF, atrial fibrillation; HL, hyperlipidemia; CAD, coronary artery disease; HF, heart failure; CVD, cerebrovascular disease; FEV1, Forced expiratory volume in the first second; FVC, Forced Vital Capacity; DLCO, diffusing capacity of the lung for carbon monoxide; VA, alveolar ventilation; 6MWT, six-minute walk test; EF, ejection fraction; sPAP, systolic pulmonary artery pressure; WBC, white blood cell; NLR, neutrophil-to-lymphocyte ratio; MPV, mean platelet volume; GFR, glomerular filtration rate; CRP, C-reactive protein

lung cancer had received antifibrotic therapy, both in Group 1 (p = 0.021). When PFT results were evaluated within Group 1, patients diagnosed with lung cancer exhibited lower overall parameter values. Notably, FEV_1 (% predicted) and DLCO/VA were significantly reduced in patients with cancer compared with those without cancer (FEV_1: 63.5 [30.0] vs. 76.0 [22.0], p = 0.016; DLCO/VA: 39.0 [33.0] vs. 63.5 [24.0], p = 0.020) (Table 2).

In both groups, SCC was the most frequent histopathological subtype. In Group 1, tumor localization was in the right lower lobe in two patients, the left upper lobe in two, and the middle lobe in one. In Group 2, both tumors were located

Table 2. Comparison of demographic characteristics and connective tissue disease subtypes according to lung cancer presence within each group

Variable	Group 1		p	Group 2		p
	Lung Cancer (+)	Lung Cancer (–)		Lung Cancer (+)	Lung Cancer (–)	
Gender						
Male	5	27	0.401	2	35	0.483
Female	0	6		0	16	
Smoking status, N (%)						
Current smoker	2 (5.3)	5 (13.2)	0.184	0	10 (19.2)	0.164
Ex-smoker	3 (7.9)	16 (42.1)		2 (3.8)	17 (32.7)	
Never smoker	0	12 (31.6)		0	23 (44.2)	
Antifibrotic treatment						
Present	2	30	0.021	0	17	
Abscent	3	3		2	34	0.457
Connective tissue disease subtype, N (%)						
RA	0	0		2 (100.0)	13 (54.2)	0.811
SLE	0	0		0	0	
Sjögren	0	0		0	5 (20.8)	
Scleroderma	0	0		0	4 (16.7)	
Other	0	0		0	2 (8.4)	
Pulmonary Function Test						
FEV1, ml	1890(1073)	2115.00(1153)	0.657			
FEV1, %	63.50(30.00)	76.00(22.00)	0.016			
FVC, ml	2540.00(1800.00)	2620.00(1373.00)	0.965			
FVC, %	71.50(25.00)	74.00 (20.00)	0.262			
FEV1/FVC	78.50(9.00)	78.00 (12.00)	0.243			
DLCO,	35.50(25.00)	41.50 (22.00)	0.224			
DLCO/VA	39.00(33.00)	63.50 (24.00)	0.020			

*All values are presented as mean ± SD, otherwise indicated in the column as median (IQR), or N (%).

Abbreviations: RA, rheumatoid arthritis; SLE, systemic lupus erythematosus; FEV1, Forced expiratory volume in the first second; FVC, Forced Vital Capacity; DLCO, diffusing capacity of the lung for carbon monoxide; VA, alveolar ventilation; 6MWT, six-minute walk test



Table 3. Distribution of lung cancer cell types, localization, and treatments between groups of IPF (Group 1) and Non-IPF Fibrotic (Group 2) Patients

Parameter	Group 1 N (%)	Group 2 N (%)	p
Lung cancer	5 (13.2)	2 (3.8)	0.098
Histopathological diagnosis			
SCC	2 (40)	1 (50.0)	0.733
Adenocarcinoma	1 (20)	1 (50.0)	
SCLC	1 (20)	0	
High-grade neuroendocrine tumor	1 (20.0)	0	
Localization			
Right lower lobe	2 (40.0)	2 (100)	0.350
Left upper lobe	2 (40.0)	0	
Middle lobe	1 (20.0)	0	
Chemotherapy			
Adjuvant CT	3 (60.0)	1 (50.0)	0.809
None	2 (40.0)	1 (50.0)	
Radiotherapy			
Adjuvant RT	3 (60.0)	1 (50.0)	0.809
None	2 (40.0)	1 (50.0)	

*All values are presented as mean ± SD, otherwise indicated in the column as median (IQR), or N (%).

Abbreviations: SCC, squamous cell carcinoma; SCLC, small cell lung cancer; IPF, idiopathic pulmonary fibrosis; CT, chemotherapy; RT, radiotherapy.

in the left upper lobe. Among the diagnosed cases, three Group 1 patients received adjuvant chemotherapy and three underwent radiotherapy, whereas one Group 2 patient received combined chemoradiotherapy (Table 3).

DISCUSSION

The incidence of LC among patients with IPF was 7.7%, occurring more frequently in male eldery patients and in those with lower FEV_1 (%) and DLCO/VA values. Squamous cell carcinoma was the predominant histological subtype, most commonly located in the right lower and left upper lobes. Only a small proportion of patients diagnosed with cancer were receiving antifibrotic therapy. All cases of lung cancer observed in the non-IPF fibrotic group were in patients with rheumatoid arthritis. Idiopathic pulmonary fibrosis is predominantly a disease of older adults, with a median age at diagnosis between 66 and 70 years, and a markedly increasing incidence after the age of 65 (6). It has been demonstrated that comorbidity burden and mortality rates are higher among elderly patients with IPF (7).

At the molecular level, IPF lungs exhibit hallmark features of biological aging, including telomere shortening, cellular senescence, stem cell exhaustion, and mitochondrial dysfunction (8). These aging-related alterations may create a permissive microenvironment for malignant transformation. Epidemiological data suggest that the incidence of lung cancer among individuals with IPF is substantially higher than in the general population, with a relative risk estimated to

be 7-14 times greater (9). In another study, the incidence density of lung cancer development was reported as 25.2 cases per 1000 person-years (10). In a large population-based study including 54,453 patients aged ≥65 years with non–small cell lung cancer, patients with concomitant IPF were older (median age 76 vs. 74 years) and more frequently male (11). Moreover, emerging evidence indicates that, in addition to smoking, male sex constitutes a significant independent risk factor for the development of lung cancer in this patient population. A recent multicenter retrospective study from Türkiye compared 251 patients diagnosed with IPF and non-IPF progressive fibrosis (PF), reporting a male predominance among those with lung cancer, a mean age of 69 ± 7.9 years, and a smoking history in 85.7% of the patients (12). Although both groups were in eldery ages, patients in the IPF group were significantly older than those in the non-IPF fibrotic group in our study. Similarly, a male predominance was observed, and both former and current smokers were more numerous compared to non-smokers. Given the strong correlation between male sex and smoking history, it is plausible that the observed effect of male sex in the present study may, at least in part, be attributable to smoking-related exposure.

In non-IPF patients, the majority of SCC (60-80%) arise in the proximal portions of the tracheobronchial tree. In contrast, several studies have demonstrated that in patients with IPF, lung carcinomas predominantly localize to the peripheral regions of the lungs, particularly in the lower lobes and areas with established honeycombing (13). It has been observed that the transitional zones between fibrotic (honeycomb) and non-fibrotic parenchyma -where epithelial metaplasia frequently occurs- represent regions with a higher likelihood of malignant transformation (9). In a retrospective analysis involving 632 patients with IPF, SCC was reported as the most prevalent histological subtype (30%), with the majority of tumors located peripherally (82.9%) and adjacent to fibrotic regions consistent with the UIP pattern (75.7%) (9). Similarly, in a large European cohort of 3,178 IPF patients followed over a 10-year period, SCC was also identified as the most common histologic variant, with a predominant localization in the lower lobes, while adenocarcinoma was found less frequently (14). Among NSCLC patients aged ≥65 years, those with IPF had a higher proportion of squamous cell histology compared to those without IPF (46% vs. 35%), and tumors were more frequently located in the lower lobes (11). These findings support the hypothesis that the anatomical and structural remodeling in IPF, particularly in subpleural and fibrotic areas, may provide a pro-tumorigenic microenvironment favoring carcinogenesis (12). In line with previous reports, our study also identified non-small cell lung cancer (NSCLC) as the predominant histologic type, with SCC being the most frequent subtype. Most lesions were located in the right lower lobe and, interestingly, also in the left upper lobe. This distribution pattern supports the hypothesis that chronic alveolar injury and fibrotic remodeling in IPF not only predispose to malignancy but may also influence tumor localization and histologic subtype. The predilection for peripheral and lower lobe regions is consistent with the typical anatomic distribution of fibrotic changes in IPF and highlights the importance of careful radiological surveillance of these areas during follow-up. The presence of lesions in the left upper lobe, however, may suggest heterogeneous fibrotic involvement or localized mechanical stress and inflammation that could promote carcinogenesis even outside the predominantly fibrotic zones (15). In our study, lung cancer was also detected in patients with fibrotic interstitial lung disease (fILD) unrelated to IPF, particularly among those with rheumatoid arthritis-associated interstitial lung disease (RA-ILD). Several mechanisms may contribute to this association. Chronic inflammation, driven by persistent immune activation and cytokine release (such as TNF-α, IL-6, and IL-17), creates a



pro-tumorigenic microenvironment, shared risk factors, such as cigarette smoking, that promotes DNA damage, impaired apoptosis, and epithelial–mesenchymal transition. Moreover, fibrotic remodeling and repeated epithelial injury in RA-ILD mirror the pathophysiological processes observed in IPF, suggesting that fibrosis itself represents a precancerous milieu (16). Collectively, these findings underscore the need for careful oncologic screening and longitudinal monitoring of RA-ILD patients, given their dual risk arising from both chronic autoimmune inflammation and fibrotic lung remodeling.

Most patients diagnosed with NSCLC were found to have locally advanced disease, and although those with small cell lung cancer (SCLC) were in the limited stage, survival times remained notably short (17). These findings indicate that LC represents an additional risk factor that markedly worsens the prognosis in patients already suffering from IPF, a disease with inherently poor outcomes. Therefore, early detection and vigilant follow-up strategies for lung cancer are of critical importance in the management of patients with IPF. In our study, patients with IPF who developed lung cancer exhibited significantly lower FVC% and DLCO values compared to those without lung cancer. These findings align with previous studies suggesting that reduced lung volumes and impaired diffusing capacity are associated with worse clinical outcomes and increased mortality risk in IPF patients.

The development of lung cancer in patients with IPF has been associated with several risk factors, such as extensive smoking history, coexisting emphysema, male gender, ongoing smoking at diagnosis, and a pronounced annual decline in FVC exceeding 10%. From a functional standpoint, numerous studies have demonstrated that reductions in FVC and DLCO reflect restricted lung ventilation and impaired gas exchange, both of which are markers of disease progression and poor prognosis in IPF (9). Therefore, the markedly lower FVC% and DLCO values observed in our eldery study population may indicate more advanced fibrotic remodeling and a higher vulnerability to malignant transformation within the fibrotic lung microenvironment. Furthermore, inflammatory biomarkers including WBC, neutrophil count, and CRP were significantly elevated in the IPF cohort suggesting a stronger systemic inflammatory component.

Growing evidence over the past decade suggests that antifibrotic agents may exert a protective effect against lung cancer development in IPF. Several retrospective and prospective studies have demonstrated that patients treated with nintedanib or pirfenidone exhibit a significantly lower incidence of lung cancer compared with untreated IPF cohorts (18). Importantly, subgroup and real-world analyses indicate that antifibrotic therapy remains effective and generally well tolerated in eldery patients, and advanced age alone should not preclude treatment (19,20).

The potential mechanisms underlying the protective effects of antifibrotic therapy may involve inhibition of fibroblast proliferation, suppression of vascular endothelial growth factor (VEGF) and platelet-derived growth factor (PDGF) signaling pathways, and attenuation of chronic epithelial injury and aberrant remodeling-processes considered fundamental to both fibrogenesis and carcinogenesis (21). Importantly, discontinuation of antifibrotic therapy following a cancer diagnosis may accelerate fibrosis progression, resulting in reduced pulmonary reserve and impaired treatment tolerance (22). Collectively, these findings highlight that continuation of antifibrotic therapy -particularly nintedanib- should be carefully considered even after the diagnosis of lung cancer, provided no contraindications exist, as it may confer both antifibrotic and potential antitumor benefits. In our study, only a limited proportion of patients with concomitant IPF and LC had received antifibrotic therapy. Given the small sample size, no meaningful

conclusions can be drawn regarding the efficacy of antifibrotic treatment in this population.

This study has several limitations. First, its retrospective design may have introduced selection and information biases inherent to this type of analysis. Second, the relatively small sample size and single-center nature of the study may limit the generalizability of our results. Third, the relatively short observation period might have restricted the evaluation of variability in disease progression and treatment response among patients. Despite these limitations, our institution is one of the major city hospitals, and the study was conducted in a large tertiary referral center. Therefore, the data are derived from real-world clinical practice, which we believe enhances the external validity and clinical applicability of our findings.

CONCLUSION

A growing body of evidence indicates that eldery patients with IPF have a significantly increased risk of developing lung cancer compared with the general population. In the context of global population aging and extended life expectancy, early detection of lung cancer in older patients with IPF is critical for optimizing individualized, age-appropriate management strategies.

Shared pathogenetic mechanisms between IPF and LC likely underlie their frequent coexistence in clinical practice and contribute to substantial challenges in both diagnosis and management. In eldery patients with fibrotic lung disease, the presence of multiple comorbidities further complicates diagnostic and therapeutic decision-making. Accordingly, routine clinical management in this population necessitates a comprehensive and individualized assessment of overall health status.

The coexistence of IPF and LC associated with a poorer prognosis. Therefore, close surveillance—encompassing not only clinical and functional evaluation but also regular imaging and, when indicated, additional diagnostic investigations—may play a pivotal role in early detection. Timely identification of lung cancer arising within fibrotic lung parenchyma could facilitate the implementation of personalized therapeutic approaches and potentially mitigate associated morbidity and mortality.

Nonetheless, rigorously designed, adequately powered, large-scale prospective randomized controlled trials are required to more definitively elucidate the complex pathobiological mechanisms linking these two conditions and to refine and individualize evidence-based management strategies in the eldery population, in whom comorbidities and treatment-related risks frequently complicate clinical decision-making. Furthermore, the inclusion of a dedicated section on future directions would provide a structured framework to identify unresolved knowledge gaps, prioritize clinically relevant research questions, and guide the development of targeted therapeutic and management approaches in subsequent investigations.

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REFERENCES

1. Abu Qubo A, Numan J, Snijder J, et al. Idiopathic pulmonary fibrosis and lung cancer: future directions and challenges. Breathe (Sheff). 2022 Dec;18(4):220147. doi: 10.1183/20734735.0147-2022.
2. Sun X, Lei S, Zhao H, Guo L, Wang Y. Mortality-related risk factors of idiopathic pulmonary fibrosis: a systematic review and meta-analysis. J Thorac Dis. 2024 Dec 31;16(12):8338-8349. doi: 10.21037/jtd-23-1908.



3. Alfaro TM, Robalo Cordeiro C. Comorbidity in idiopathic pulmonary fibrosis - what can biomarkers tell us? Ther Adv Respir Dis. 2020 Jan-Dec;14:1753466620910092. doi: 10.1177/1753466620910092.

4. Vancheri C. Common pathways in idiopathic pulmonary fibrosis and cancer. Eur Respir Rev. 2013 Sep 1;22(129):265-72. doi: 10.1183/09059180.00003613.

5. Karampitsakos T, Spagnolo P, Mogulkoc N, et al. Lung cancer in patients with idiopathic pulmonary fibrosis: A retrospective multicentre study in Europe. Respirology. 2023 Jan;28(1):56-65. doi: 10.1111/resp.14363.

6. Raghu G, Remy-Jardin M, Myers JL, et al. Diagnosis of Idiopathic Pulmonary Fibrosis. An Official ATS/ERS/JRS/ALAT Clinical Practice Guideline. Am J Respir Crit Care Med. 2018 Sep 1;198(5):e44-e68. doi: 10.1164/rccm.201807-1255ST.

7. Leuschner G, Klotsche J, Kreuter M, Prasse A, et al. Idiopathic Pulmonary Fibrosis in Eldery Patients: Analysis of the INSIGHTS-IPF Observational Study. Front Med (Lausanne). 2020 Nov;16(7):601279. doi: 10.3389/fmed.2020.601279.

8. Mora AL, Rojas M, Pardo A, Selman M. Emerging therapies for idiopathic pulmonary fibrosis, a progressive age-related disease. Nat Rev Drug Discov. 2017 Nov;16(11):755-772. doi: 10.1038/nrd.2017.170.

9. Kirkil G, Mogulkoc N, Jovanovic D. Risk factors and management of lung cancer in idiopathic pulmonary fibrosis: A comprehensive review. Sarcoidosis Vasc Diffuse Lung Dis. 2025 Mar 18;42(1):15604. doi: 10.36141/svdld.v42i1.15604.

10. Kato E, Takayanagi N, Takaku Y, et al. Incidence and predictive factors of lung cancer in patients with idiopathic pulmonary fibrosis. ERJ Open Res. 2018 Feb 2;4(1):00111-2016. doi: 10.1183/23120541.00111-2016.

11. Whittaker Brown SA, Padilla M, Mhango G, et al. Outcomes of Older Patients with Pulmonary Fibrosis and Non-Small Cell Lung Cancer. Ann Am Thorac Soc. 2019 Aug;16(8):1034-1040. doi: 10.1513/AnnalsATS.201808-510OC.

12. Kara S, Mogulkoc N, Kirkil G, et al. Lung cancer in patients with pulmonary fibrosis: characteristics features and prognosis. Sarcoidosis Vasc Diffuse Lung Dis. 2024 Dec 10;41(4):e2024050. doi: 10.36141/svdld.v41i4.15675.

13. Kishi K, Homma S, Kurosaki A, Motoi N, Yoshimura K. High-resolution computed tomography findings of lung cancer associated with idiopathic pulmonary fibrosis. J Comput Assist Tomogr. 2006 Jan-Feb;30(1):95-9. doi: 10.1097/01.rct.0000188650.66527.d2.

14. Karampitsakos T, Tzilas V, Tringidou R, et al. Lung cancer in patients with idiopathic pulmonary fibrosis. Pulm Pharmacol Ther. 2017 Aug;45:1-10. doi: 10.1016/j.pupt.2017.03.016.

15. Kinoshita T, Goto T. Molecular Mechanisms of Pulmonary Fibrogenesis and Its Progression to Lung Cancer: A Review. Int J Mol Sci. 2019 Mar 22;20(6):1461. doi: 10.3390/ijms20061461.

16. Wilton KM, Matteson EL. Malignancy Incidence, Management, and Prevention in Patients with Rheumatoid Arthritis. Rheumatol Ther. 2017 Dec;4(2):333-347. doi: 10.1007/s40744-017-0064-4.

17. Kewalramani N, Machahua C, Poletti V, Cadranel J, Wells AU, Funke-Chambour M. Lung cancer in patients with fibrosing interstitial lung diseases: an overview of current knowledge and challenges. ERJ Open Res. 2022 Jun 20;8(2):00115-2022. doi: 10.1183/23120541.00115-2022.

18. Kumar P, Goldstraw P, Yamada K, et al. Pulmonary fibrosis and lung cancer: risk and benefit analysis of pulmonary resection. J Thorac Cardiovasc Surg. 2003 Jun;125(6):1321-7. doi: 10.1016/s0022-5223(03)00028-x.

19. Cameli P, Refini R.M, Bergantini L, et al. Long-Term Follow-Up of Patients With Idiopathic Pulmonary Fibrosis Treated With Pirfenidone or Nintedanib: A Real-Life Comparison Study. Front Mol Biosci. 2020 Sep 4;7:581828. doi: 10.3389/fmolb.2020.581828.

20. Honda K, Saraya T, Ishii H. A Real-World Prognosis in Idiopathic Pulmonary Fibrosis: A Special Reference to the Role of Antifibrotic Agents for the Eldery. J Clin Med. 2023 May 19;12(10):3564. doi: 10.3390/jcm12103564.

21. Bertuccio F.R, Baio N, Perrotta F, et al. The Role of Antifibrotic Therapy in Pulmonary Fibrosis and Lung Cancer: A Multicenter Retrospective Analysis. Biomedicines. 2025 Sep 21;13(9):2310. doi: 10.3390/biomedicines13092310.

22. Naoi H, Suzuki Y, Mori K, et al. Impact of antifibrotic therapy on lung cancer development in idiopathic pulmonary fibrosis. Thorax. 2022 Jul;77(7):727-730. doi: 10.1136/thoraxjnl-2021-218281.