

# Radiologic-pathologic correlation in 2-year follow-up patients after COVID-19 infection



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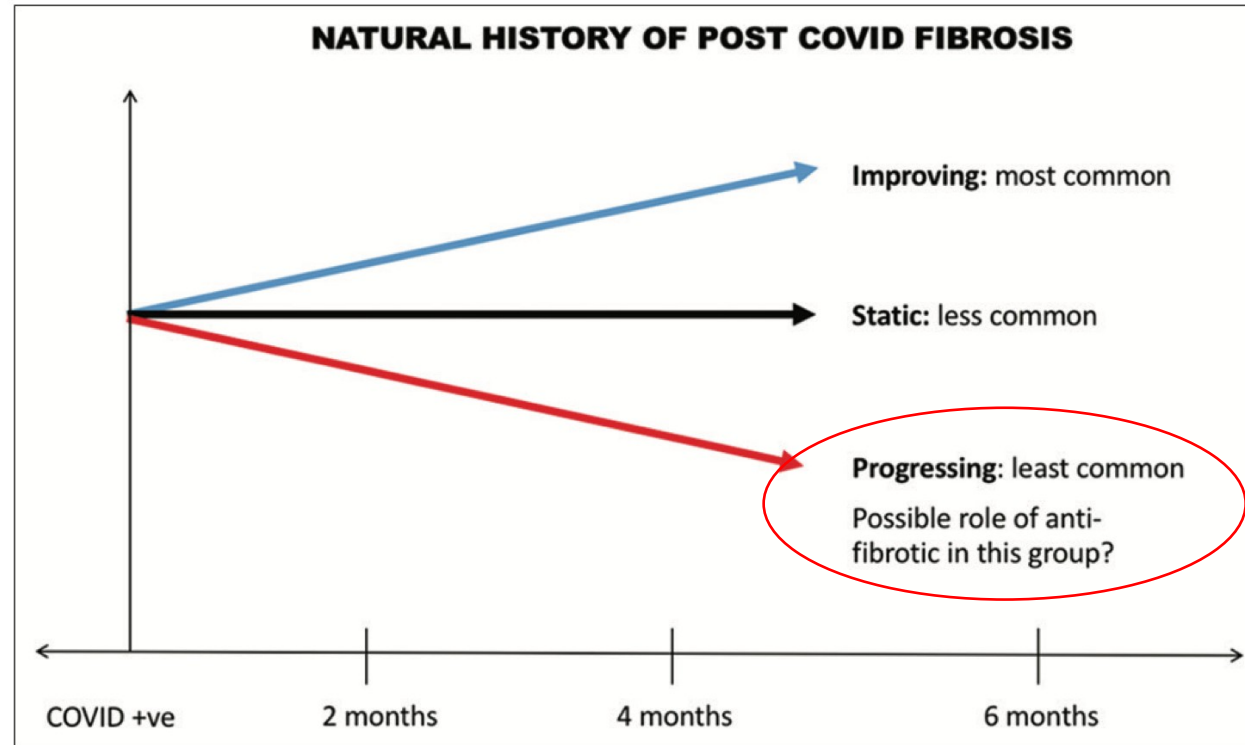
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# Background & Purpose



## Post-COVID ILD – OPEN QUESTIONS



*Richeldi et al. Lung India 2021*

## Purpose

The aim of this study is to evaluate the characteristics of post-COVID-19 interstitial lung changes, with the unique opportunity to evaluate radiologic-pathologic correlations using HRCT and transbronchial lung cryobiopsy specimens.

# Our experience: Materials and Methods



## PATIENTS POPULATION AND STUDY DESIGN

- Single-center analysis of a larger prospective-multicenter-national trial (6 Italian referral centers for ILDs)
- September 2020 – December 2022 at Careggi University Hospital, Florence (IT)
- Data collection: at BASELINE, after 6 (+/-1) and 12 (+/-1) months after hospital discharge
- HRCT changes at 6 months involving more than 5% of the total lung volume were considered significant
- Patients with significant HRCT changes will undergo BAL and/or cryobiopsy and a subsequent follow-up with HRCT and lung function evaluation at 18(+/-1) and 24 (+/-1) months

*The presence of significant lung involvement was defined according to current “interstitial-lung-abnormalities” definition as non-dependent abnormalities affecting more than 5% of any lung zone<sup>1</sup>.*

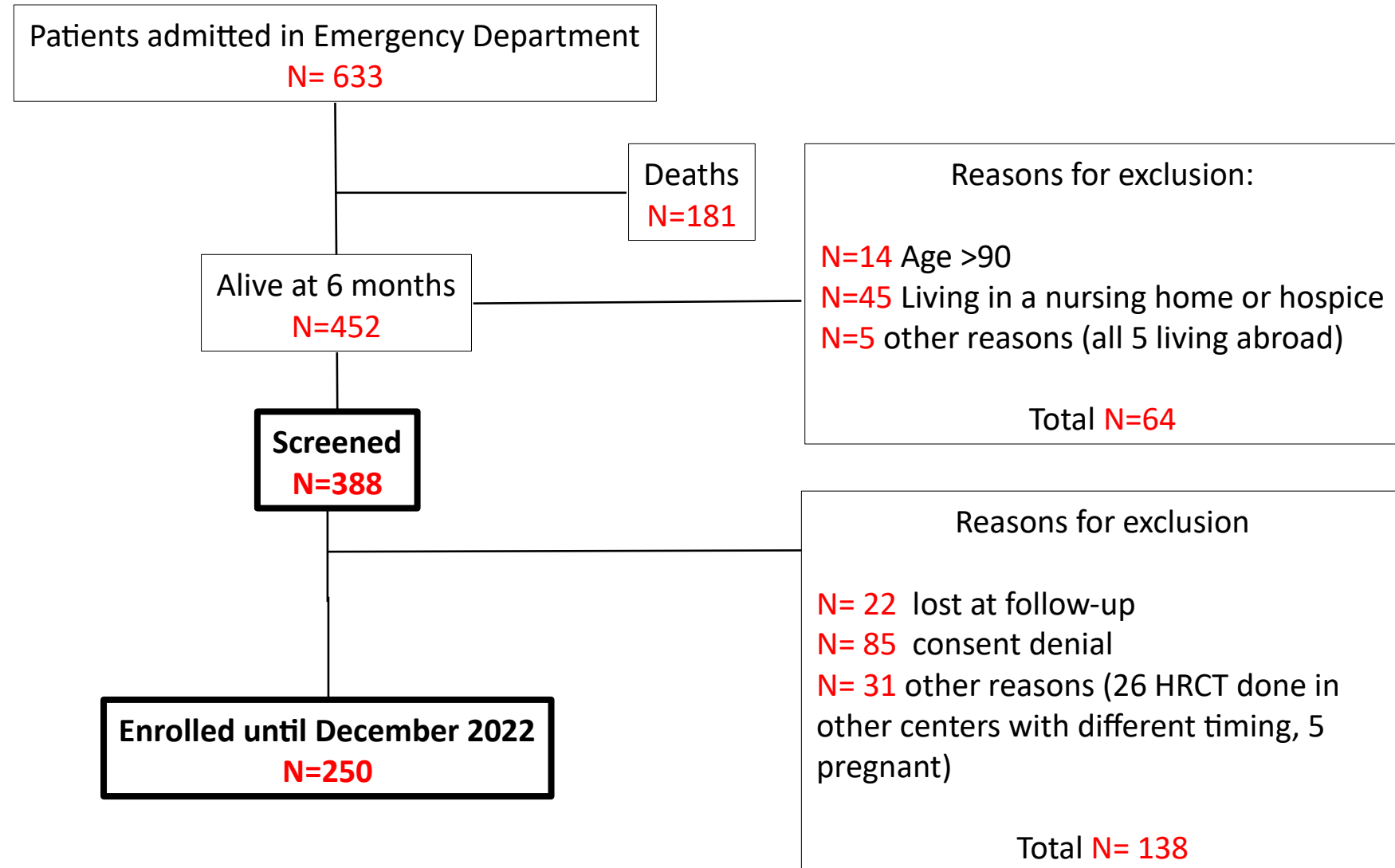
<sup>1</sup>Hatabu H et al. Interstitial lung abnormalities detected incidentally on CT: a Position Paper from the Fleischner Society (2020) Lancet Respir Med 8;726-737



# Our experience: Results

## DESCRIPTIVE ANALYSIS

**250 HRCT** were evaluated  
60.8 % males  
median age 67 y.o. (18-87)



Screened: selected for possible participation in the study  
Enrolled: signed consent and performed HRCT at 6 months





# Our experience: Results

## DESCRIPTIVE ANALYSIS

**250 HRCT** were evaluated until December 2022

60.8 % males

median age 67 y.o. (18-87)

### Results at 2-year follow up

**195/250 (78%)** complete remission from lung involvement or minimal changes (<5%)

**55/250 (22%)** still have HRCT significant changes (>5%)

**Cryobiopsies were performed in 25 patients → some discordance with radiological appearance**

#### **Fibrotic-like changes 47/250 (18.8%):**

- NSIP/OP pattern 25 (10%)
- Indeterminate 12 (4.8%)
- UIP probable 7 (2.8%)
- Sarcoid-like 1 (0.4%)
- Fibrotic HP 1 (0.4%)
- PPFE-like 1 (0.4%)

#### **Non - Fibrotic changes 8/250 (3.2%):**

- Pure GGO 8 (3.2%)

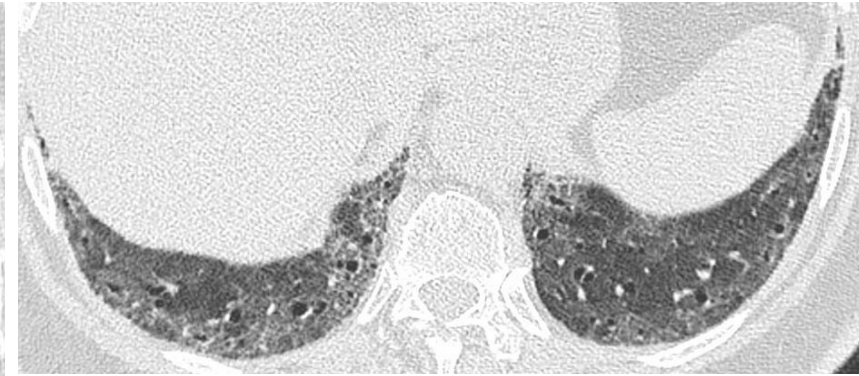


# Our experience: Results

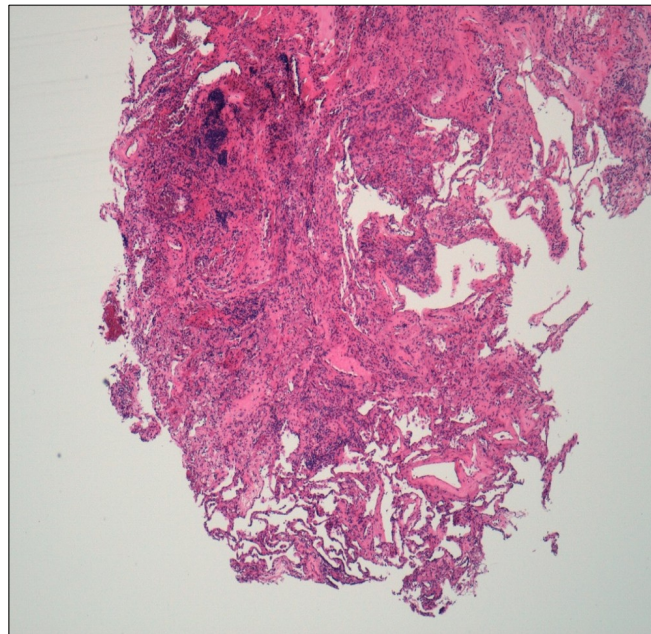
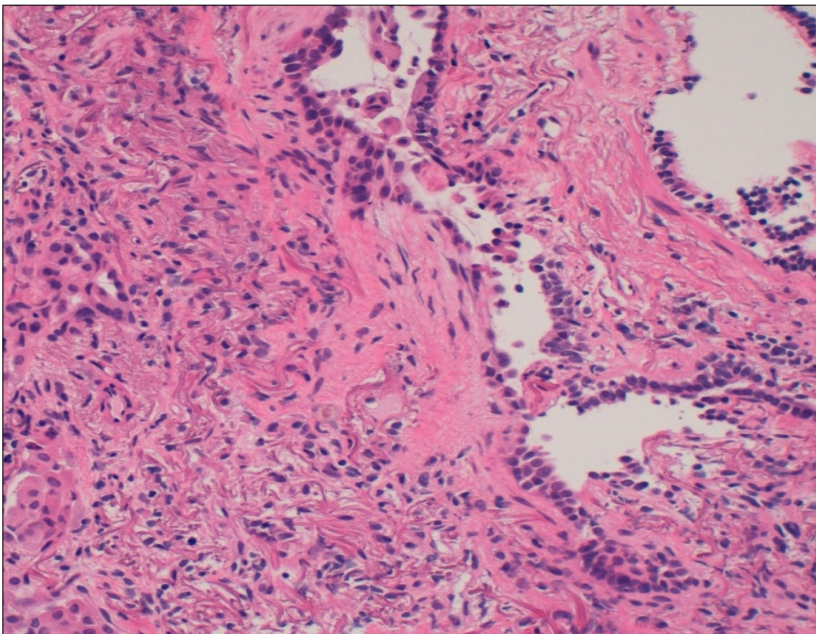
Cryobiopsies	HRCT pattern	MDD	Cryobiopsies	HRCT pattern	MDD
1	OP	Post COVID-19 ILD	15	UIP probable-like	IPF
2	OP	Post COVID-19 ILD	16	UIP probable-like	IPF
3	OP	Post COVID-19 ILD	17	UIP probable-like	IPF
4	NSIP	Post COVID-19 ILD	18	UIP probable-like	IPF
5	NSIP	Post COVID-19 ILD	19	UIP probable-like	IPF
6	NSIP	Post COVID-19 ILD	20	UIP probable-like	IPF
7	NSIP/OP	Post COVID-19 ILD	21	UIP probable-like	Post COVID-19 ILD
8	NSIP/OP	Post-ventilation fibrosis	22	UIP indeterminate	Post COVID-19 ILD
9	NSIP/OP	Post COVID-19 ILD	23	UIP indeterminate	Smoking-related ILD
10	Lobar GGO	Chronic inhalation	24	UIP indeterminate	Smoking-related ILD
11	Diffuse GGO	GL-ILD	25	UIP indeterminate	IPF
12	Sarcoid-like	Sarcoidosis			
13	PPFE-like	IPF + PPFE			
14	Fibrotic-HP	IPF			

*MDD: multidisciplinary decision*

# Our experience: Results



Female 65y, former smoker  
HRCT 12 months f-up:  
Fibrosing NSIP-like pattern

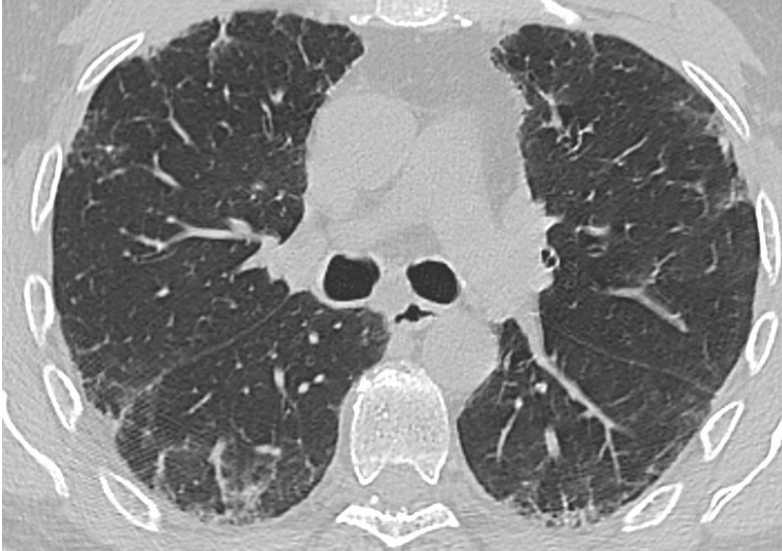


Pathological findings: initial patchy fibrosis  
with occasional fibroblastic foci and  
smooth muscle fibre hyperplasia.

**Multidisciplinary decision:  
IPF, antifibrotic therapy**

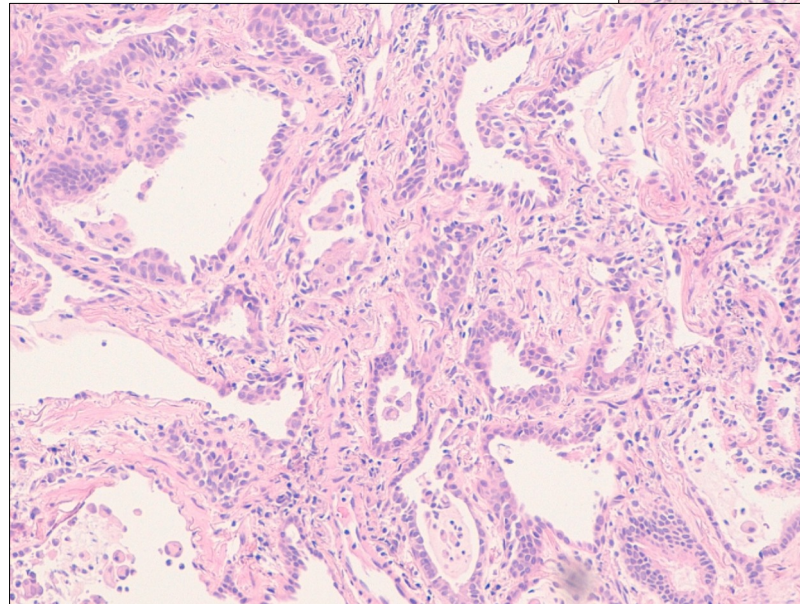
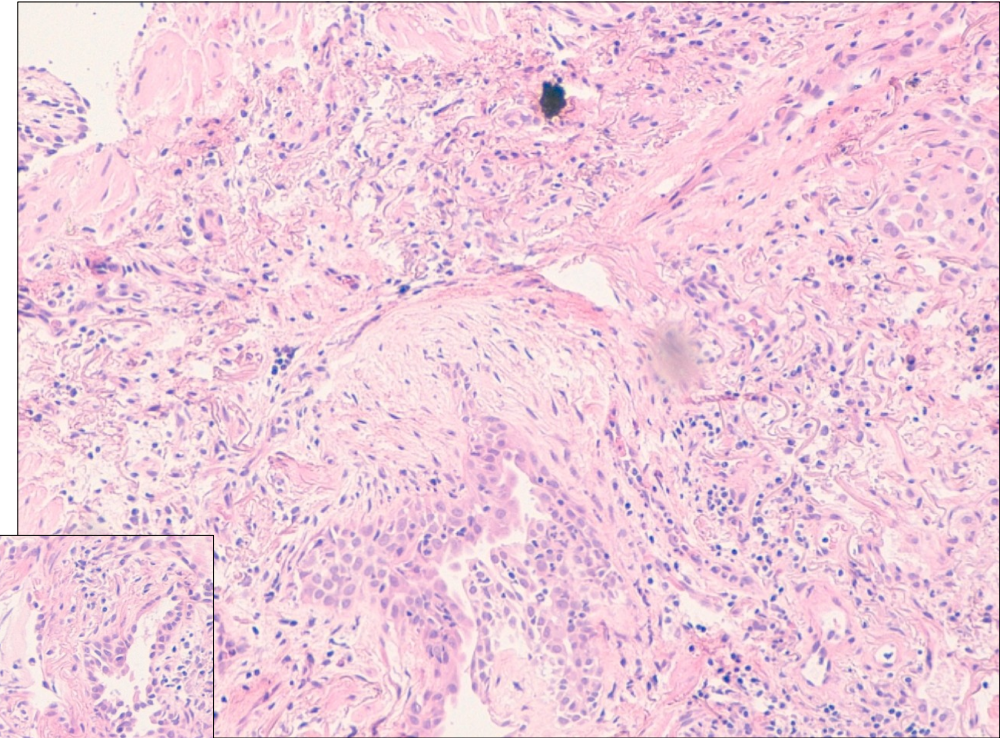


# Our experience: Results



Male 65 y, smoker

HRCT 12 months f-up:  
Probable-UIP pattern



Cryobiopsy: UIP pattern

Dense patchy fibrosis with microscopic honeycombing and a fibroblastic foci; squamous metaplasia on the left

**Multidisciplinary decision:  
IPF, antifibrotic therapy**



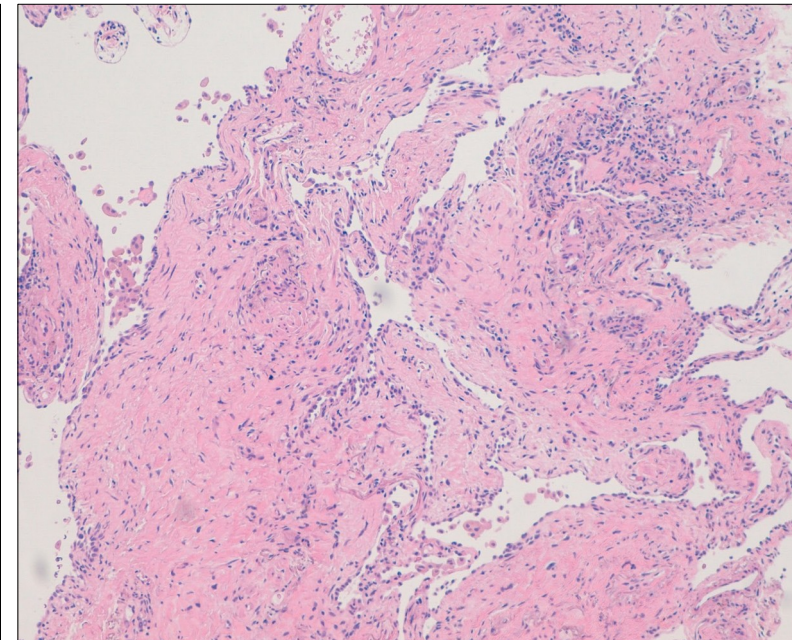
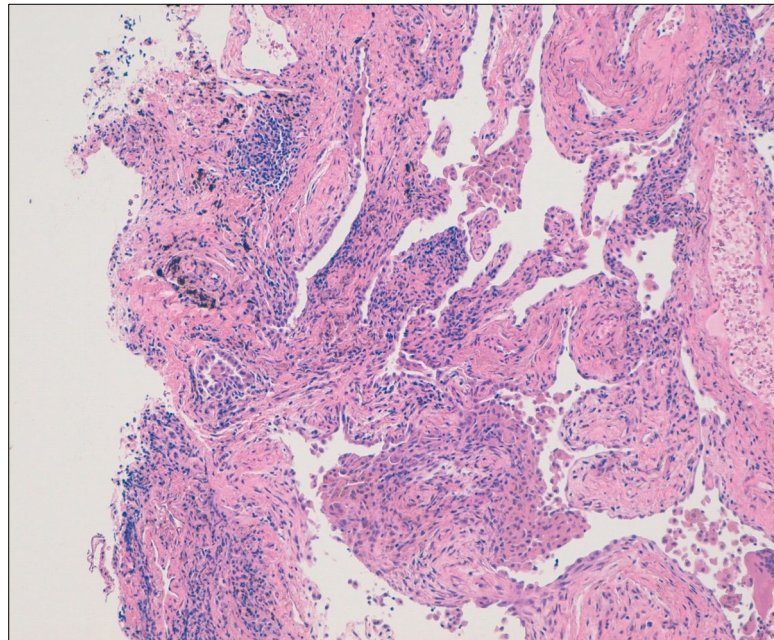
# Our experience: Results



Male 70y, heavy smoker  
HRCT 18 months f-up: Probable-UIP pattern  
+ lung nodule

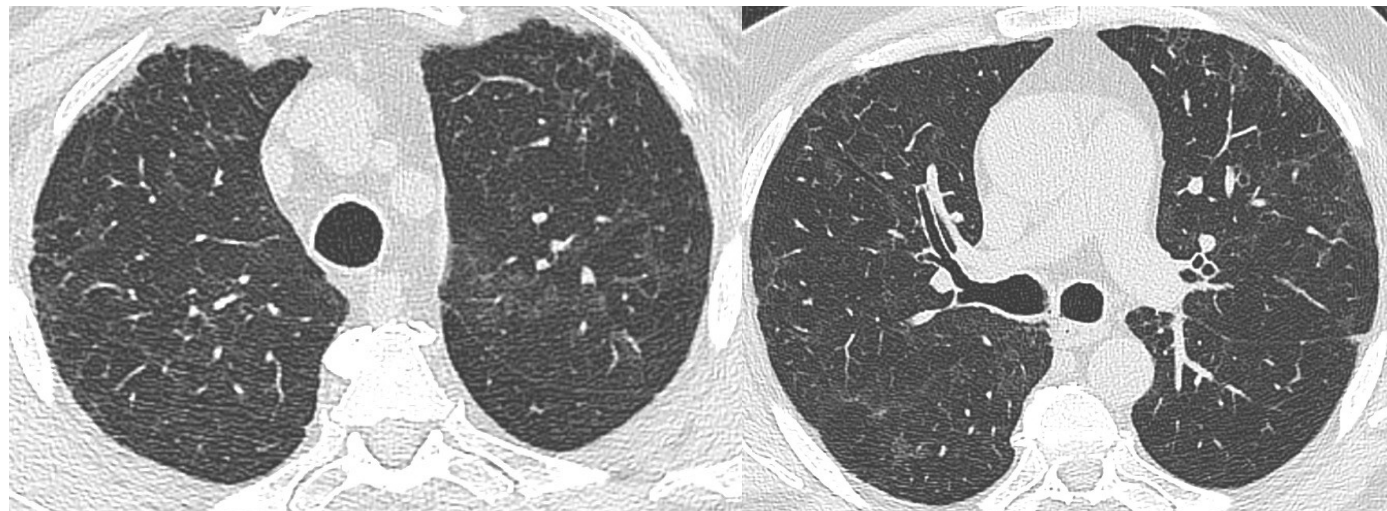
Cryobiopsy: septal thickening, foci of  
interstitial fibrosis and Masson's  
body (OP-like), anthracosis

**Multidisciplinary decision:  
Smoking-related ILD, lung cancer**

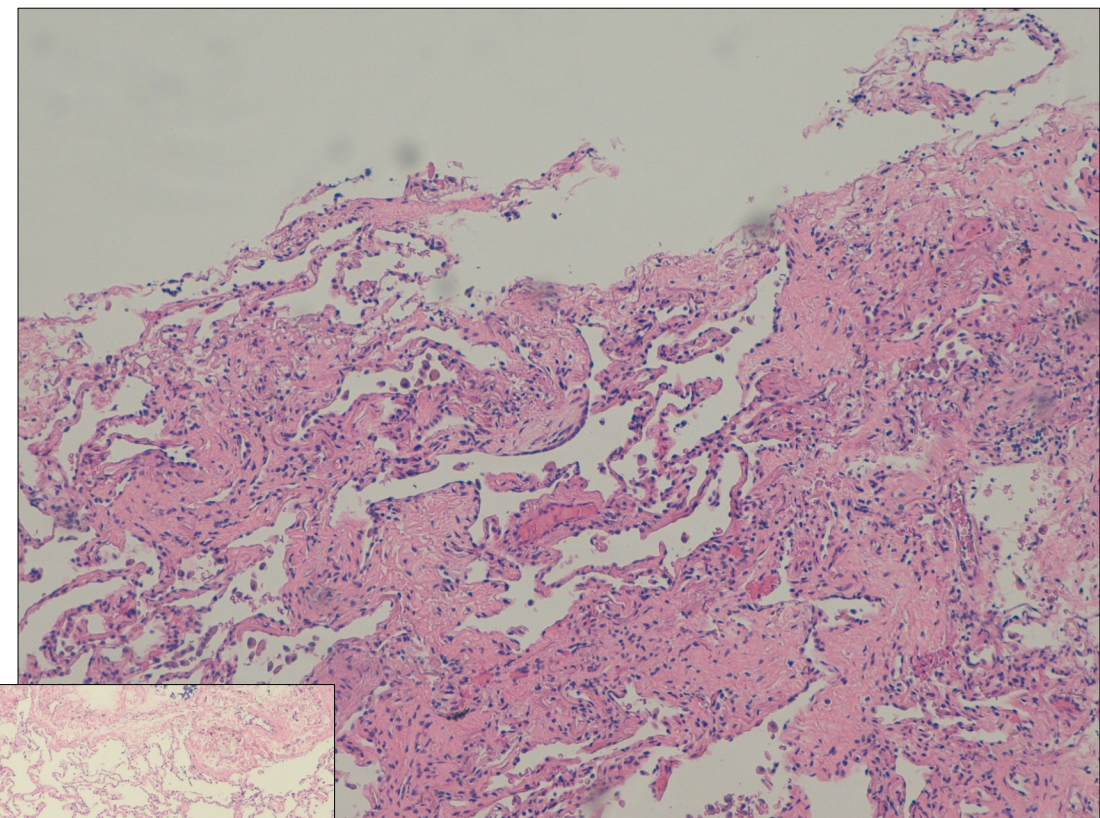




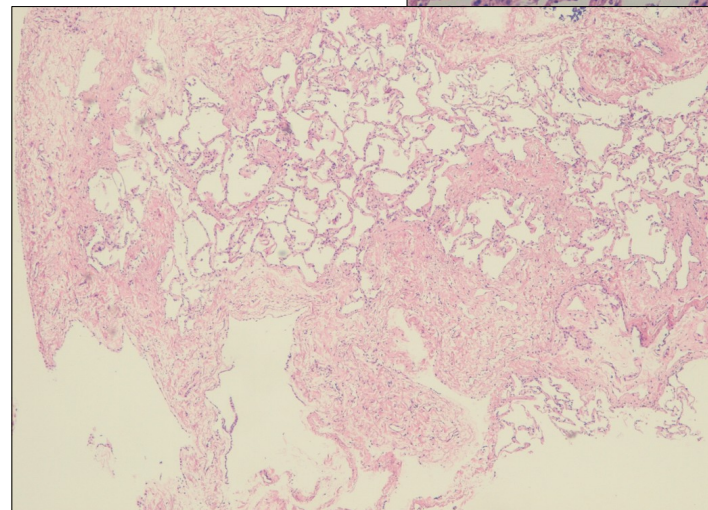
# Our experience: Results



Male 52 y  
Non smoker



Patchy (subpleural) fibrosis with a  
fibroblastic foci:  
NSIP/OP (2° choice early-UIP)

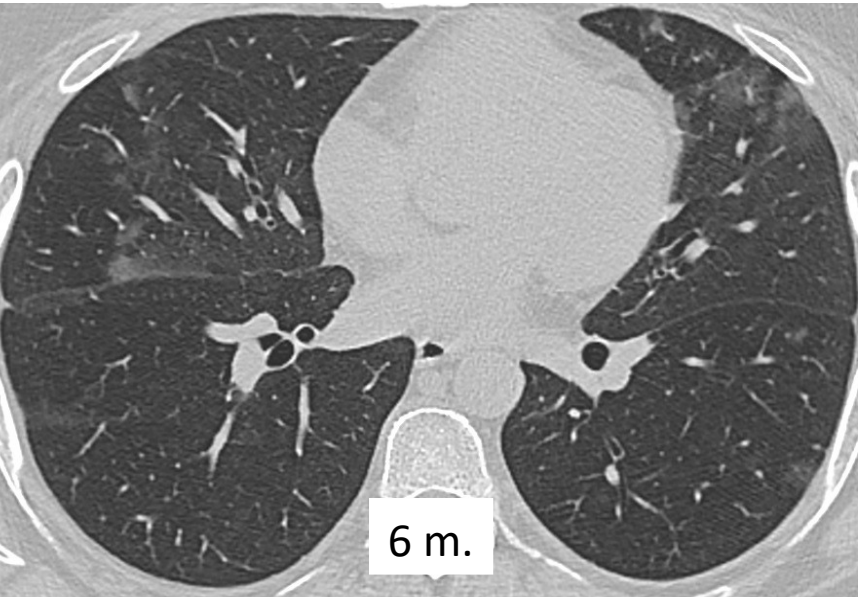


**Multidisciplinary decision:**  
**Unclassifiable - follow up**  
**Post-COVID-19 related fibrosis**

HRCT 18 months f-up: non-fibrotic perilobular GGO



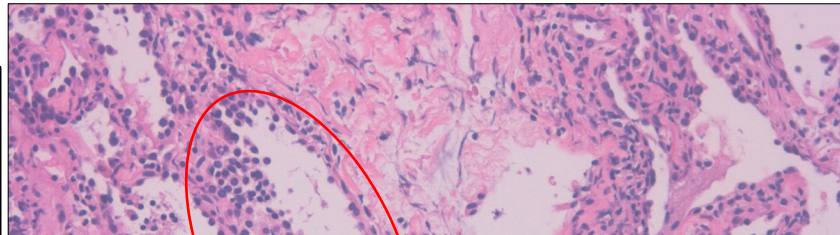
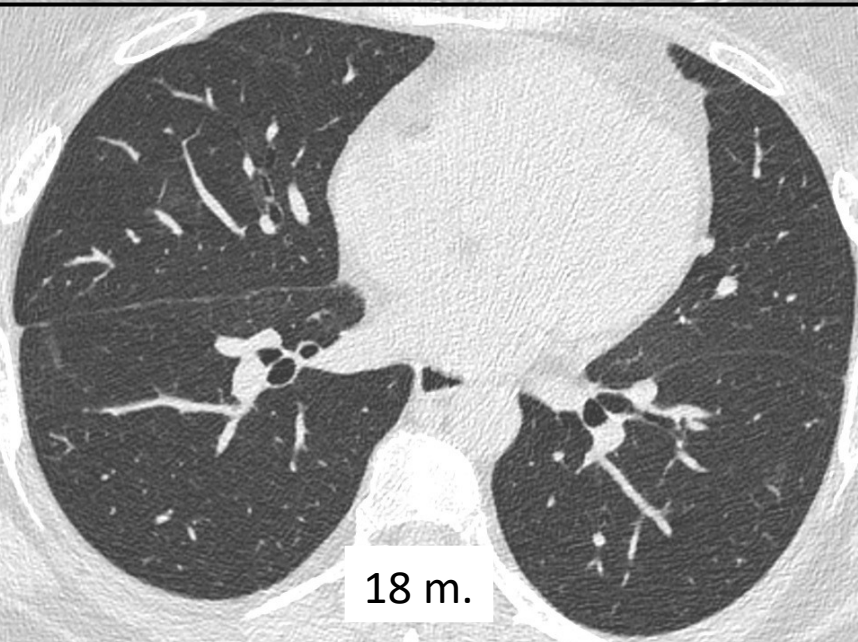
# Our experience: Results



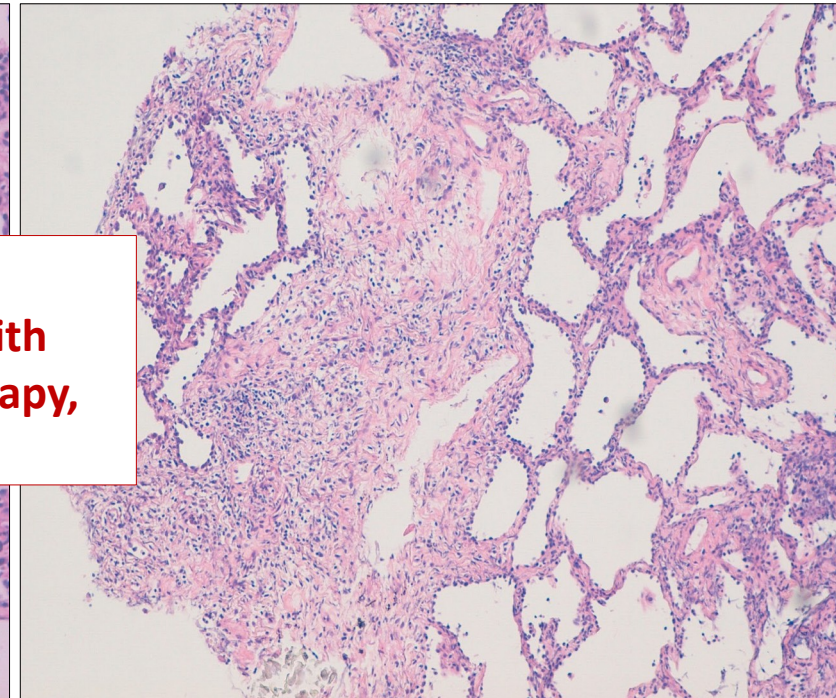
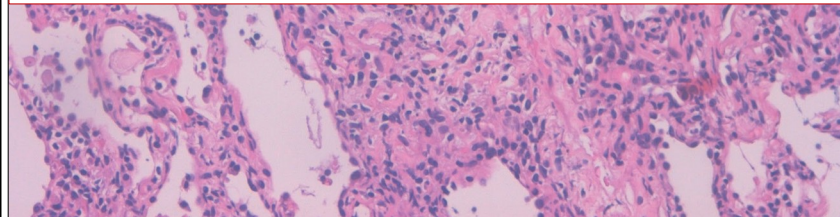
Male 44y, non-smoker      HRCT 6 months f-up: Perilobular non fibrosing GGO

HRCT parenchymal progression in 12-months follow up → BAL: persistent COVID-19 infection after 12 months

Cryobiopsy: diffuse septal thickening, type 2 pneumocyte hyperplasia, Cellular NSIP pattern



**Multidisciplinary decision:**  
**Persistent subacute COVID damage with**  
**cellular NSIP pattern → antibodies therapy,**  
**18m.follow-up clear improvement**



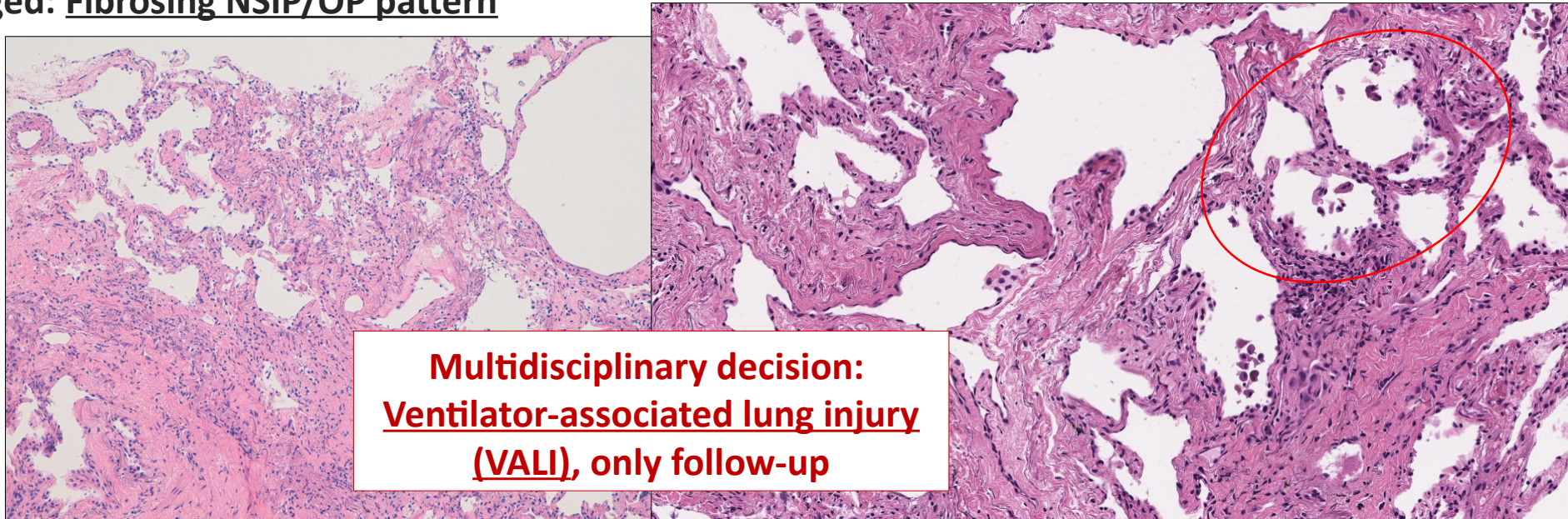


# Our experience: Results



Male 69y, former smoker (20 days of invasive ventilation, tracheostomy)  
HRCT 6-12 months f-up unchanged: Fibrosing NSIP/OP pattern

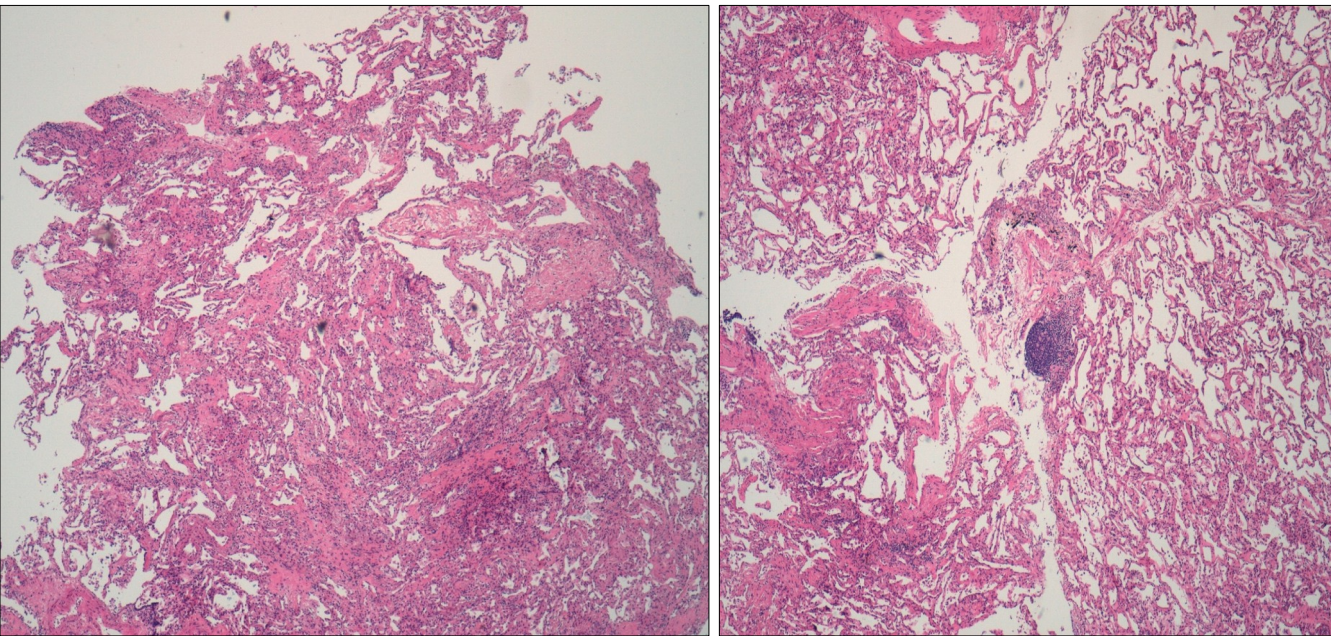
**Cryobiopsy:**  
Dense and diffuse fibrosis, mild  
interstitial inflammation, with  
prominent bronchiolar damage  
(epithelial damage including  
epithelial detachment and  
alveolar denudation)



**Multidisciplinary decision:**  
Ventilator-associated lung injury  
(VALI), only follow-up



# Our experience: Results



Female 52y, non-smoker

HRCT 12 months f-up: Fibrosis indeterminate pattern

Cryobiopsy: homogeneous septal thickening with initial fibrosis and dilatation of the interstitial capillaries. Initial inflammatory infiltrate in the peribronchiolar area – Indeterminate fibrosis

**Multidisciplinary decision:**

**Post COVID-19 fibrosis**

**Steroid treatment based on lymphoid infiltrate and symptoms (dyspnea and diffuse articular pain)**

# Our experience: Conclusions and clinical relevance



- The post-COVID-19 pneumonia changes are likely to **disappear within 1 year** in the majority of patients
- Post-COVID-19 ILD manifests mainly with HRCT NSIP/OP pattern.
- A small minority (2.8%) presents with a UIP-like pattern observed in IPF: this might be an expression of a pre-existing **un-recognized UIP/IPF**.
- Sars-CoV-2 infection could be a **trigger** for a possible underlying latent interstitial disease, in predisposed subjects.
- **Multidisciplinary approach**



**Thank you for the attention**

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