COVID-19 LONG HAULERS

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OBJECTIVES

1.Outline range of pulmonary complications after recovery from COVID- 19

2.Analyse available data on pulmonary, functional and radiologic outcomes after COVID-19

3.Provide information on treatment of COVID-19 associated long term pulmonary complications

A BRIEF REVIEW..

SARS CoV-2, a novel coronavirus, emerged in late 2019 in Wuhan, China

Infection with SARS CoV-2 -> variable clinical course

Current mortality from SARS CoV-2 is over 1.4million

A BRIEF REVIEW..

Spectrum: Mild symptoms to ARDS

Huge advances in acute management of COVID-19

Intermediate to long term outcomes: Unknown and management unclear

PULMONARY SEQUELAE POST COVID-19

Post COVID-19 ILD has emerged as a significant problem

Can cause both functional and radiological abnormalities

Optimal treatment guidelines for treatment of this condition are unavailable

However various emerging studies have shed light on incidence, radiological abnormalities and treatment approaches in Post COVID-19 ILD

PULMONARY SEQUELAE POST COVID-19

- Acute infection :
- Radiological Pattern: Ground glass opacities +/- consolidation
- Histological Pattern: Organizing Pneumonia, Diffuse alveolar damage etc
- Persistent CT imaging abnormalities can be seen up to 5 weeks
- Lack of definitive data on natural history of inflammatory infiltrates

Ref:
1.Zhao W, et al . Relation between chest CT findings and clinical conditions of coronavirus disease (COVID-19) pneumonia: a multicenter study. *AJR Am J Roentgenol* 2020;214:1072–107.
2.Pan F, *et al*. Time course of lung changes at chest CT during recovery from coronavirus disease 2019 (COVID-19). *Radiology* 2020;295:715–721

Pulmonary function and radiological features 4 months after COVID-19: first results from the national prospective observational Swiss COVID-19 lung study

Cite this article as: Guler SA, Ebner L, Aubry-Beigelman C, *et al*. Pulmonary function and radiological features 4 months after COVID-19: first results from the national prospective observational Swiss COVID-19 lung study. *Eur Respir J* 2021; 57: 2003690 [https://doi.org/10.1183/13993003.03690-2020].

STUDY DESIGN

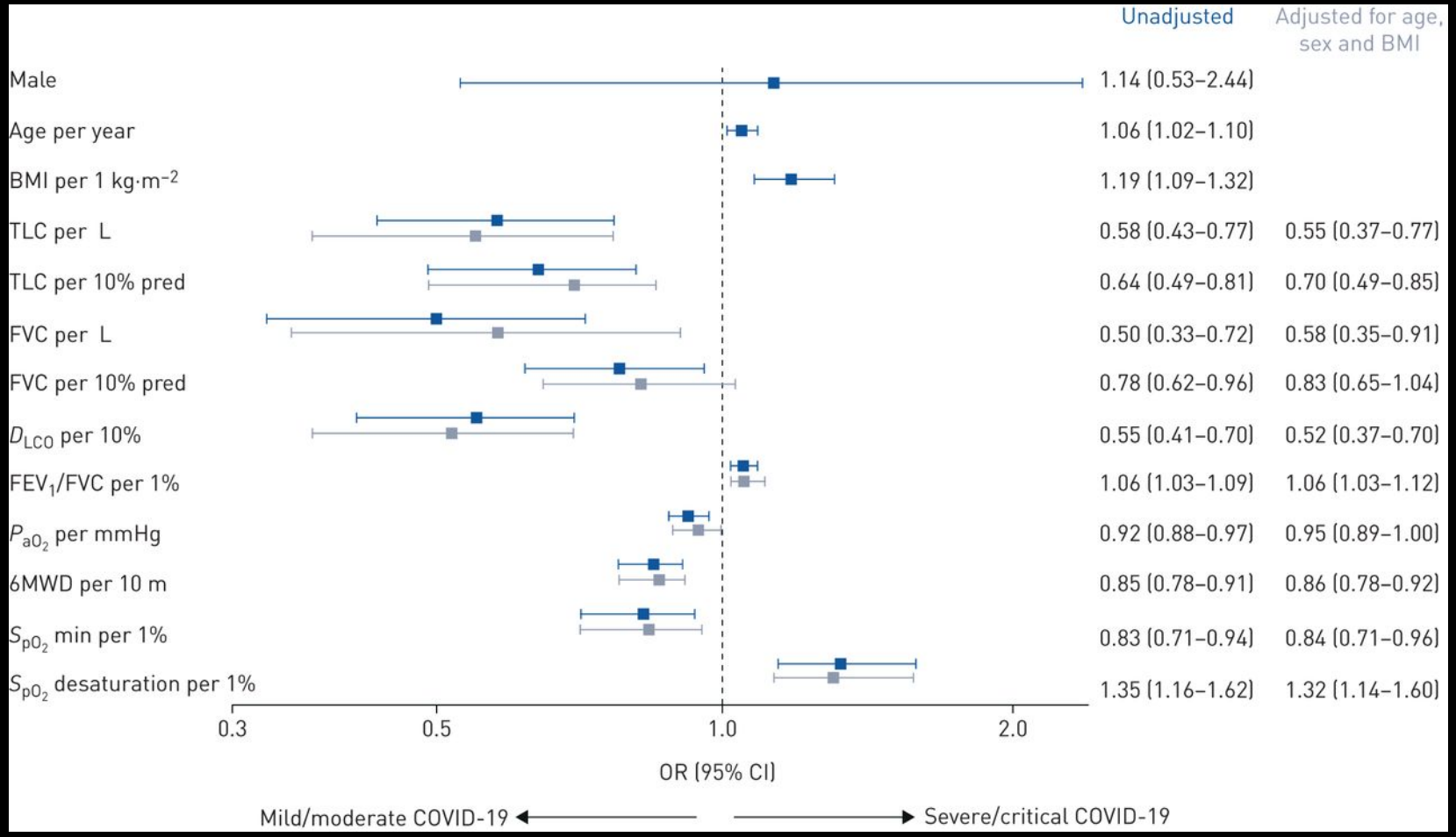
Multicenter prospective cohort study evaluating pulmonary sequelae after COVID-19

113 COVID-19 patients following hospital admission

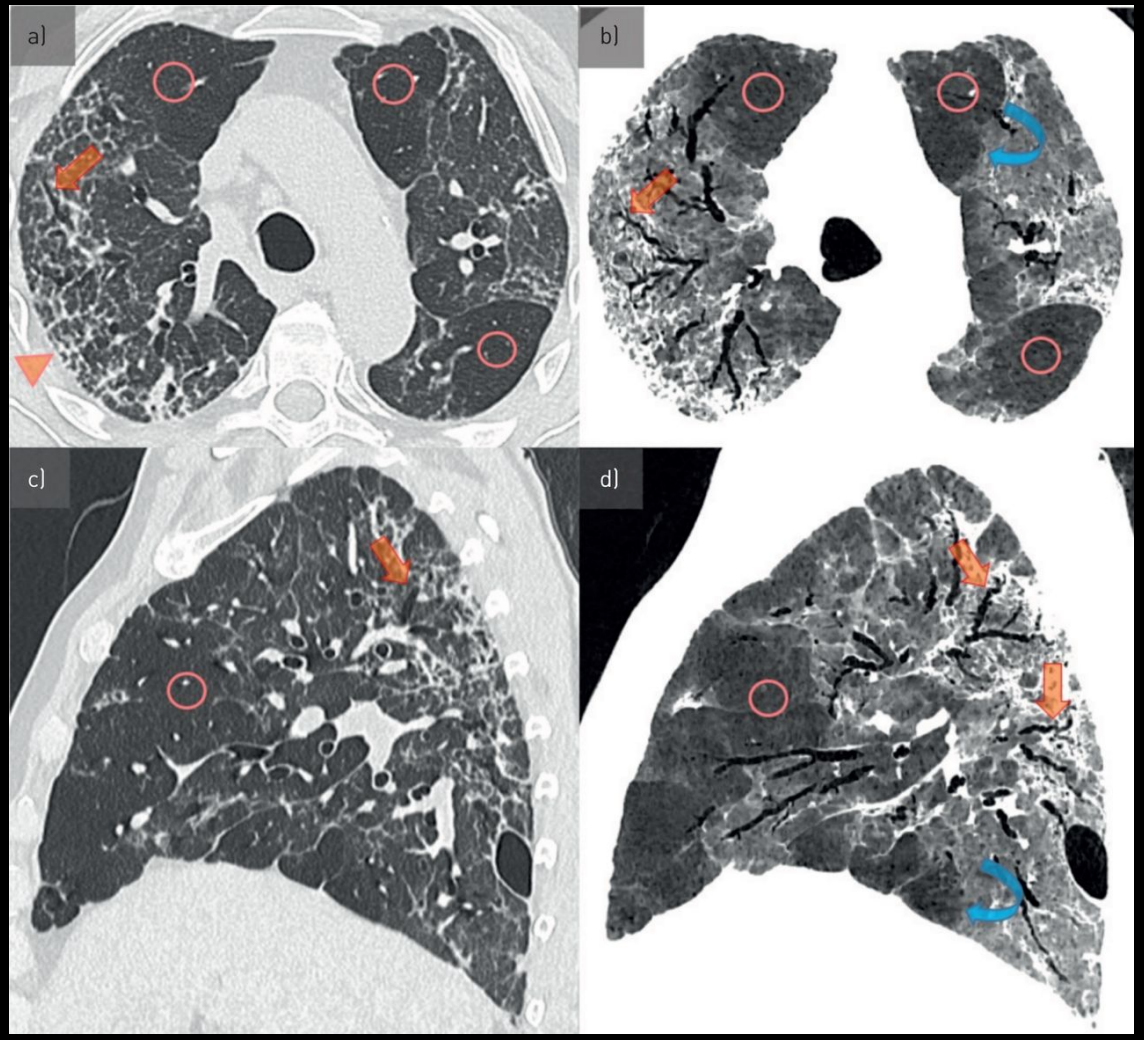
Divided into 2 groups :Mild/moderate disease - 47, Severe disease-66

METHODS/RESULTS

- Patients underwent evaluation 4 months after COVID-19 hospitalization
- All underwent PFT,6MWT,MIP/MEP, and chest imaging was done as indicated.
- Patient who had severe disease were older with higher BMI
- Patients in both groups had persistent exertional dyspnea
- Patients with more severe disease had lower lung volumes and diffusion capacity


Unadjusted
Adjusted for age, sex and BMI
Male
1.14 (0.53–2.44)
Age per year
1.06 (1.02–1.10)
BMI per 1 kg·m^{-2}
1.19 (1.09–1.32)
TLC per L
0.58 (0.43–0.77)
0.55 (0.37–0.77)
TLC per 10% pred
0.64 (0.49–0.81)
0.70 (0.49–0.85)
FVC per L
0.50 (0.33–0.72)
0.58 (0.35–0.91)
FVC per 10% pred
0.78 (0.62–0.96)
0.83 (0.65–1.04)
D_{LCO} per 10%
0.55 (0.41–0.70)
0.52 (0.37–0.70)
FEV_1/FVC per 1%
1.06 (1.03–1.09)
1.06 (1.03–1.12)
P_{aO_2} per mmHg
0.92 (0.88–0.97)
0.95 (0.89–1.00)
6MWD per 10 m
0.85 (0.78–0.91)
0.86 (0.78–0.92)
S_{pO_2} min per 1%
0.83 (0.71–0.94)
0.84 (0.71–0.96)
S_{pO_2} desaturation per 1%
1.35 (1.16–1.62)
1.32 (1.14–1.60)
0.3
0.5
1.0
2.0
OR (95% CI)
Mild/moderate COVID-19
Severe/critical COVID-19

Characteristic radiological changes of a patient with severe sequelae 3 months after coronavirus disease 2019 (COVID-19) pneumonia.



Ref: Sabina A. Guler et al. Eur Respir J 2021;57:2003690

RESULTS

Radiological abnormalities found were:

- Traction bronchiectasis
- Uni/Multi-lobular hypo attenuated areas
- Ground glass opacities
- Honeycombing

Radiological abnormalities were more prevalent after severe disease.

CONCLUSIONS

Impaired lung function can persist in COVID-19 survivors

Impaired lung function correlates with impaired physical performance

Limited data of Chest CT imaging reveals a pattern of parenchymal abnormalities

Patients with more severe disease appear to be at higher risk of residual impairment

IS THERE DATA ON POTENTIAL EVALUATION/THERAPY OFCOVID-19 ILD ?

ORIGINAL RESEARCH

Persistent Post–COVID-19 Interstitial Lung Disease

An Observational Study of Corticosteroid Treatment

Katherine Jane Myall[1], Bhashkar Mukherjee[1], Ana Margarida Castanheira[1], Jodie L. Lam[1], Giulia Benedetti[2], Sze Mun Mak[2], Rebecca Preston[2], Muhunthan Thillai[3], Amy Dewar[1], Philip L. Molyneaux[4,5], and Alex G. West[1]

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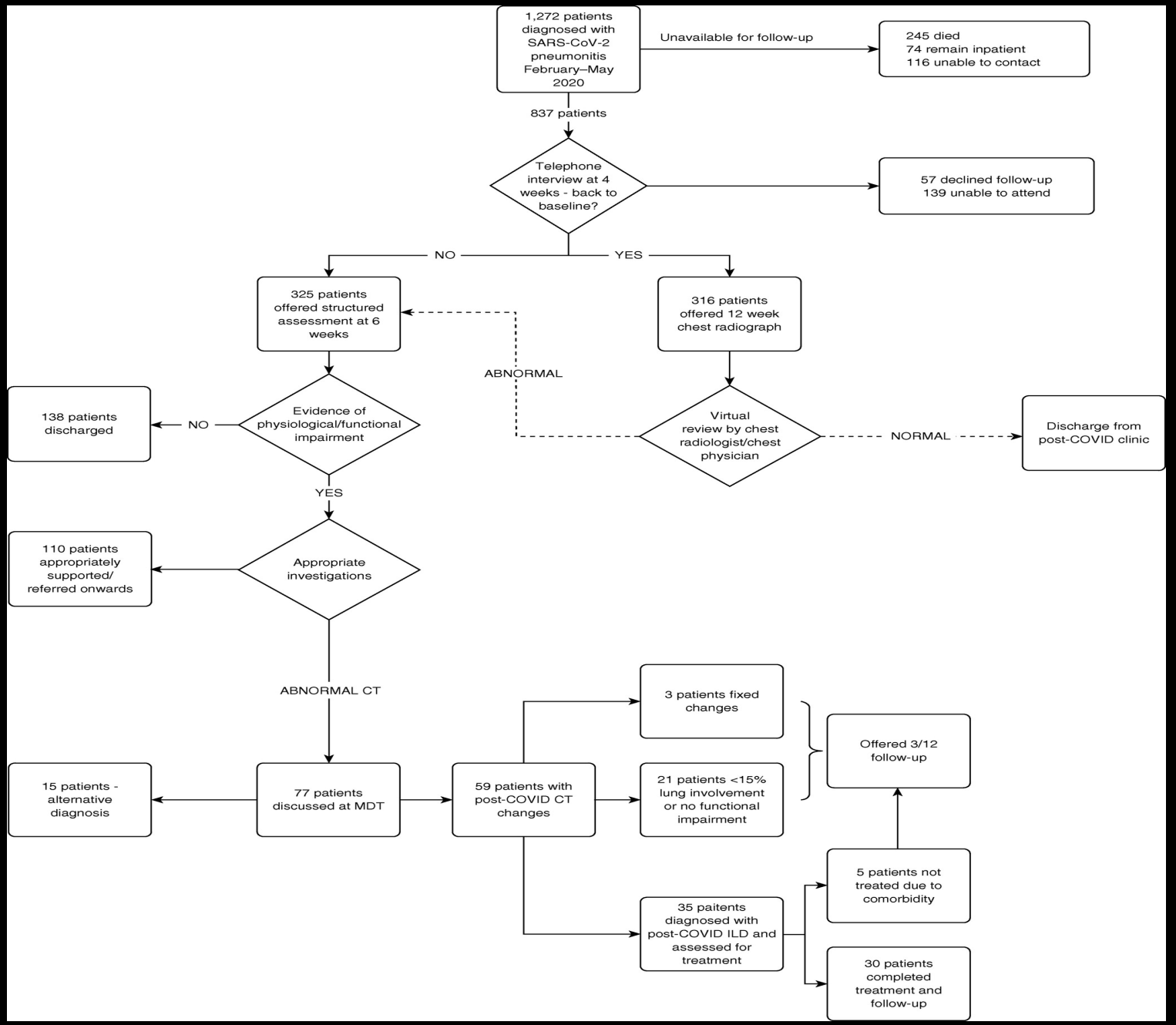
PULMONARY SEQUELAE POST COVID-19

- Single center prospective observational study of SARS Co-V-2 pneumonitis
- Screened 6 weeks after hospital discharge
- Patients with ongoing symptoms underwent further assessment
- Patients with Interstitial lung disease evaluated by multidisciplinary team
- Clinically appropriate patients were offered steroid therapy
- Weekly follow-up and repeat assessment at 3 weeks

PULMONARY SEQUELAE POST COVID-19

Initial evaluation:

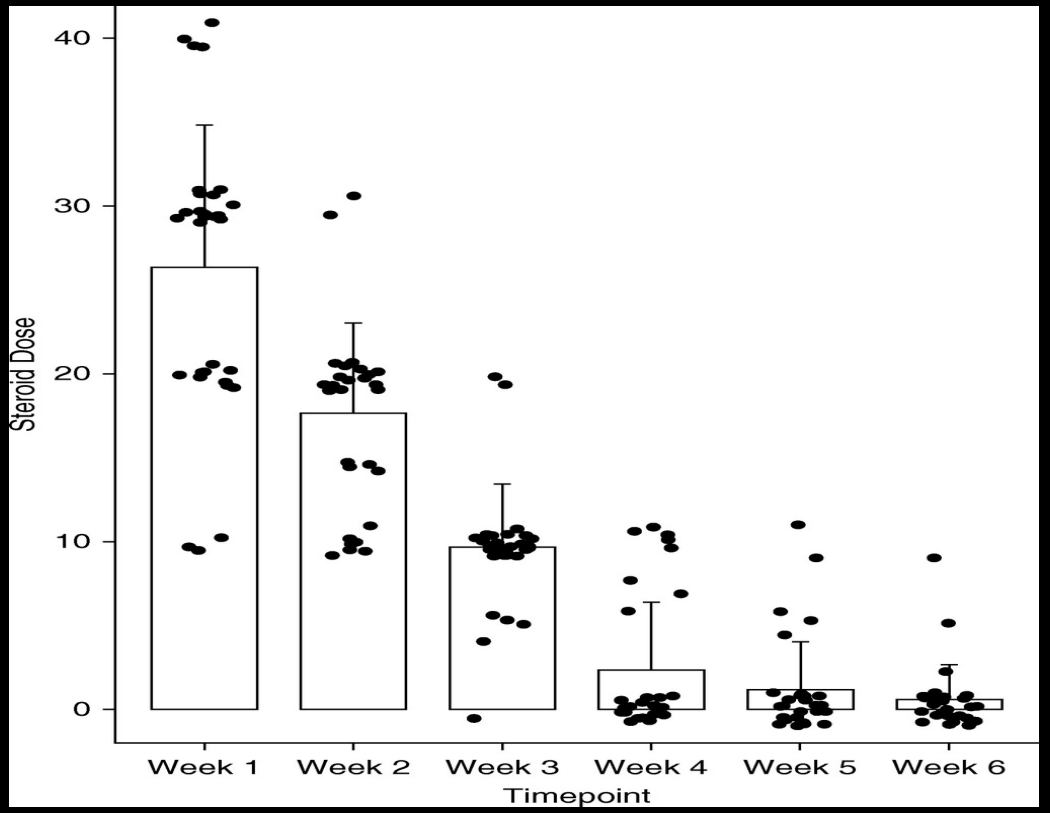
- Chest radiograph
- PFT
- Dyspnea score
- Standard blood test
- Echocardiogram, ECG as clinically indicated


1,272 patients diagnosed with SARS-CoV-2 pneumonitis February–May 2020
Unavailable for follow-up
245 died
74 remain inpatient
116 unable to contact
837 patients
Telephone interview at 4 weeks - back to baseline?
57 declined follow-up
139 unable to attend
NO
YES
325 patients offered structured assessment at 6 weeks
316 patients offered 12 week chest radiograph
ABNORMAL
138 patients discharged
NO
Evidence of physiological/functional impairment
Virtual review by chest radiologist/chest physician
NORMAL
Discharge from post-COVID clinic
YES
110 patients appropriately supported/ referred onwards
Appropriate investigations
ABNORMAL CT
3 patients fixed changes
Offered 3/12 follow-up
15 patients - alternative diagnosis
77 patients discussed at MDT
59 patients with post-COVID CT changes
21 patients <15% lung involvement or no functional impairment
5 patients not treated due to comorbidity
35 paitents diagnosed with post-COVID ILD and assessed for treatment
30 patients completed treatment and follow-up

RESULTS

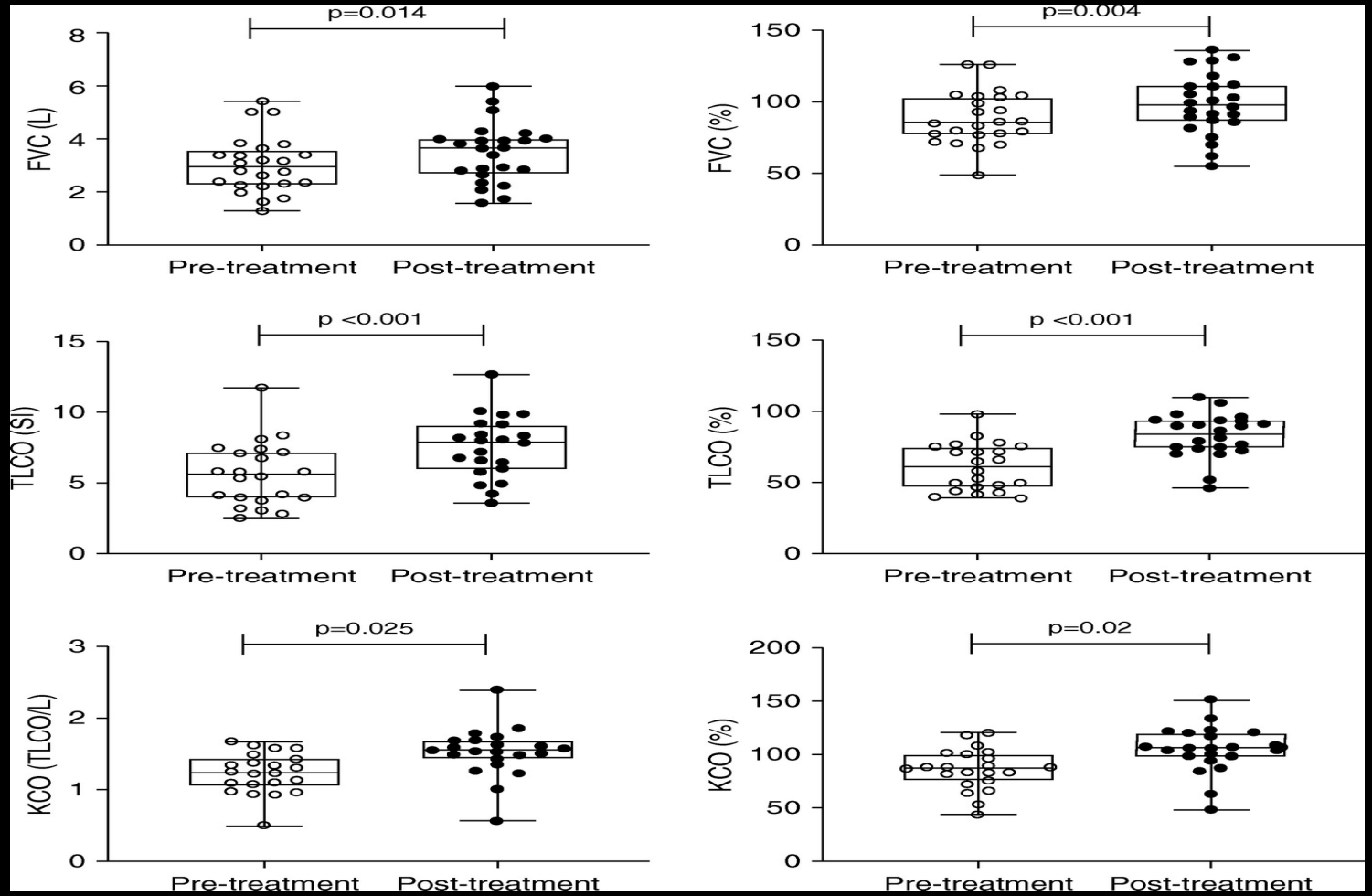
- 325 patients were symptomatic
- 138 (42.9%) had no physiological impairment
- 110(33.8%) had physiological impairment due to extrapulmonary causes
- 77(24%) referred for post COVID-19 ILD evaluation
- 59 patients found to meet ILD criteria
- 35 patients met criteria for treatment with steroids

STEROID DOSING BY WEEK.



Published in: Katherine Jane Myall et al; *Annals ATS* 18799-806.
DOI: 10.1513/AnnalsATS.202008-1002OC

CHANGE IN LUNG FUNCTION WITH RX



STUDY TAKEAWAYS

- Symptomatic Impairment after COVID-19 is very common
- Systematic evaluation should be performed to evaluate primary cause of impairment
- Steroid therapy can be considered in selected patients with ILD
- Selected Patients with ILD with therapy showed radiological, functional and physiologic improvement

IS THERE A ROLE OF ANTIFIBROTIC THERAPY IN PATIENTS WITH COVID-19 ILD?

ANTIFIBROTICS AND COVID-19 ILD

Antifibrotic medications :In IPF and fibrotic lung disease secondary to inflammatory conditions

Demonstrated efficacy in reducing lung function decline

Currently available antifibrotic drugs include: Nintedanib and Pirfenidone

RATIONALE FOR ANTIFIBROTICS

- Similar risk factor profile for patients at risk of COVID-19 ILD and IPF
- Rationale for antifibrotic use in IPF exacerbations due to viral infections
- Current antifibrotics have broad antifibrotic activity
- No published studies currently available to confirm efficacy.