

A Descriptive Study of Pulmonary Function Testing and Chest Computed Tomography in Survivors of Veno-Venous Extracorporeal Membrane Oxygenation

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A Descriptive Study of Pulmonary Function Testing and Chest Computed Tomography in Survivors of Veno-Venous Extracorporeal Membrane Oxygenation

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Purpose

- Veno-Venous Extracorporeal Membrane Oxygenation (VV ECMO) is a therapy for refractory hypoxemia due to Acute Respiratory Distress Syndrome (ARDS).
- Previous studies of ARDS patients not treated with VV ECMO described radiographic changes post ARDS which showed chronic reticular CT changes.¹
- A longitudinal study of patients five years post ARDS showed near normal pulmonary function tests (PFTs).²
- Little is known about the radiographic and functional pulmonary recovery of the most severe subgroup of ARDS patients who required ECMO.

Methods

This is a single center descriptive study to evaluate radiographic changes and PFTs in post ARDS patients treated with VV ECMO. Two female and two male adults with ARDS, averaging 46.4 +/- 7 years were included. Etiologies of ARDS included Influenza A H1N1, community acquired pneumonia, Influenza A H1N1 with community acquired pneumonia and unknown etiology. All presented with severe, persistent hypoxia with a PF ratio <100 requiring VV ECMO.

	Time from ECMO to PFT (Days)	FVC (L)	FEV1 (L)	FEV1/FVC %	TLC (L)	RV (L)	DLCO %
A	177	1.96 (60%)	1.87 (72%)	95%	3.14 (64%)	1.17 (63%)	29%
B	328	1.3 (40%)	0.93 (32%)	72%	3.01 (69%)	1.58 (131%)	24%
C	84	2.21 (50%)	1.97 (56%)	89%	3.09 (43%)	0.83 (34%)	29%
D	117	4.99 (92%)	4.19 (99%)	84%	7.13 (98%)	2.13 (92%)	62%

Patient A	3.75
Patient B	3.50
Patient C	3.75
Patient D	3.75

Patient A

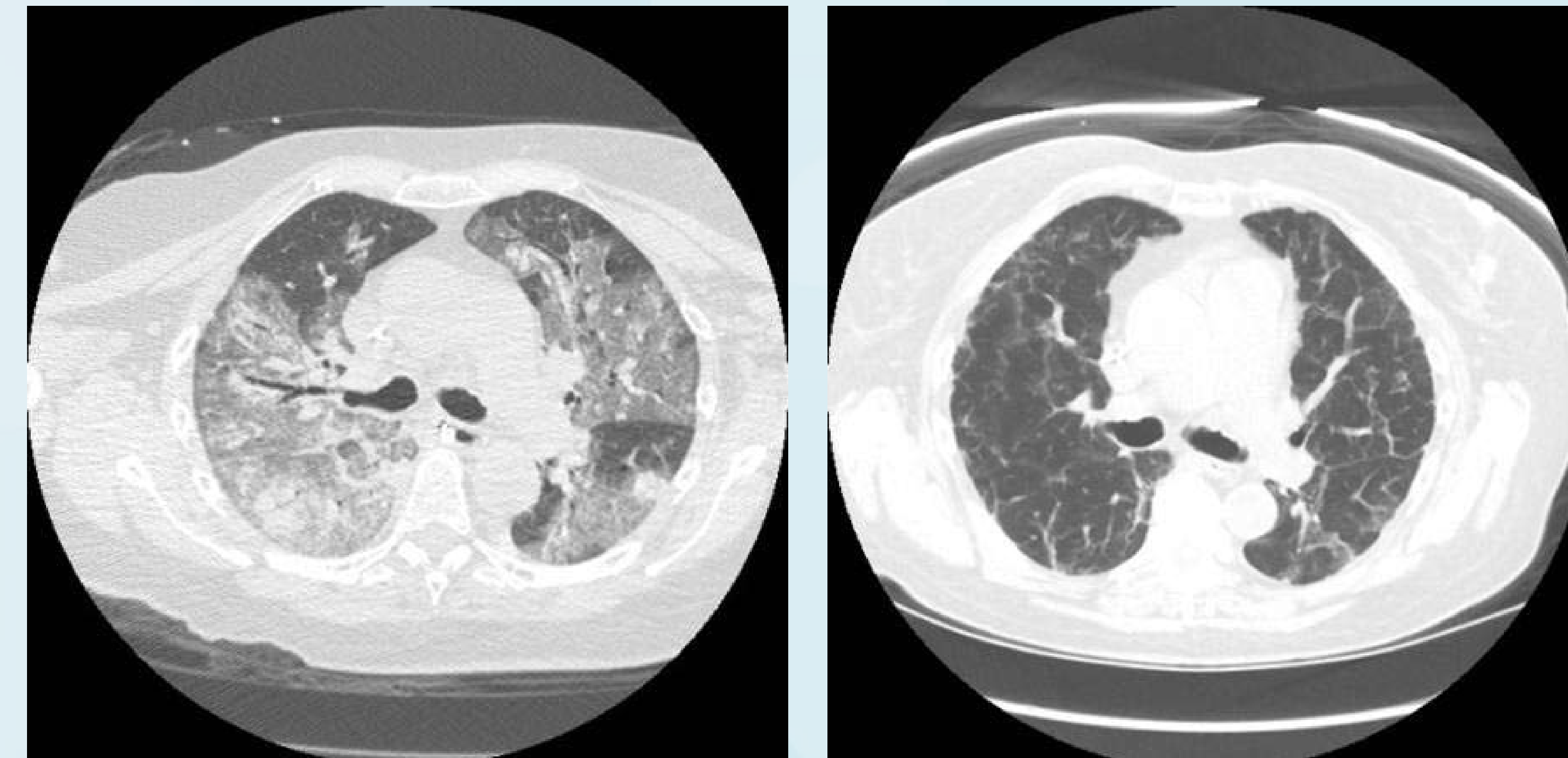


Figure 1. (Patient A) 62 year old female with Influenza A H1N1 and community acquired pneumonia initial CT scan on left side. The follow up chest CT scan 177 days post ECMO is on the right side.

Patient B

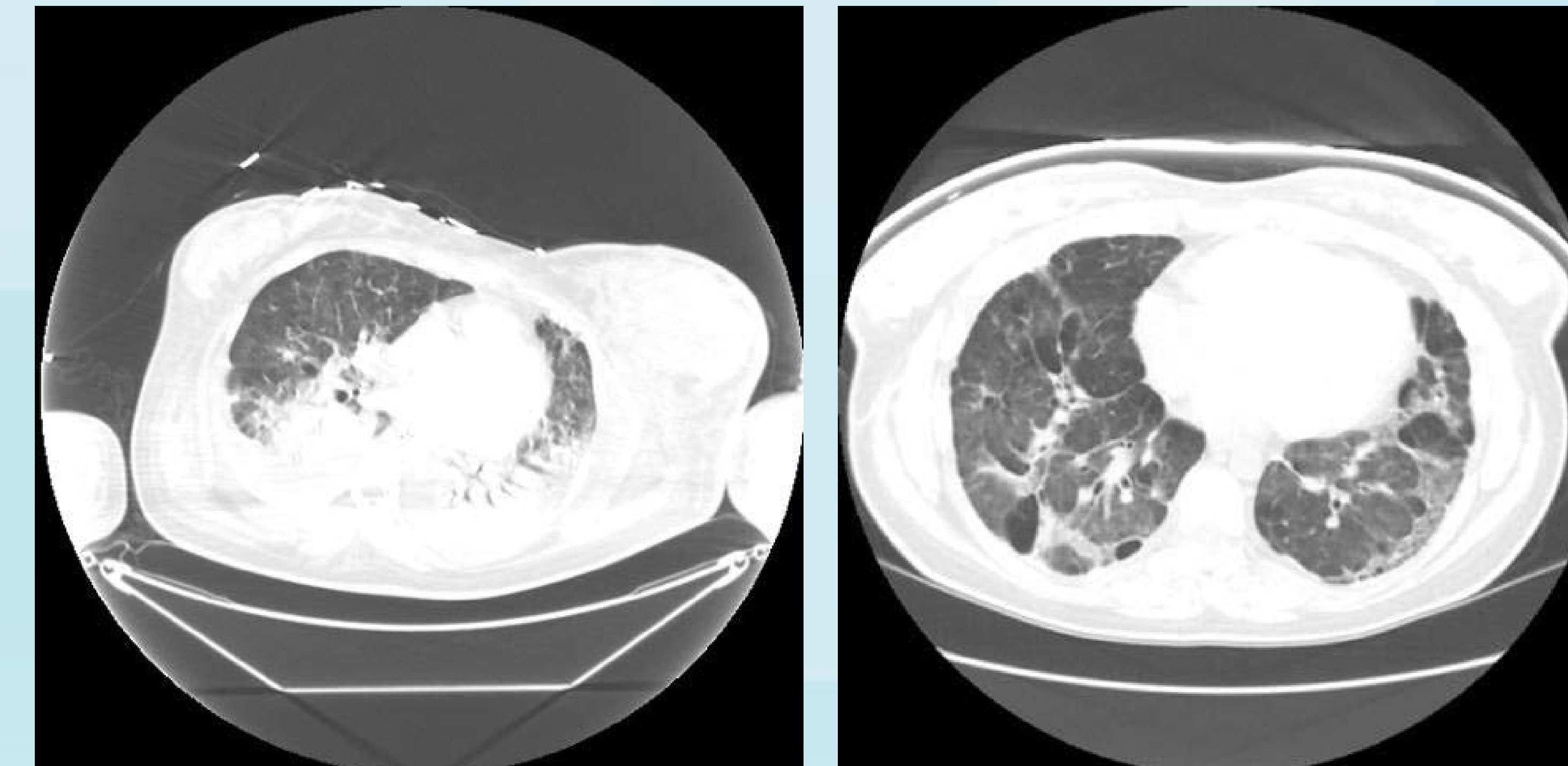


Figure 3. (Patient C) 61 year old male with community acquired pneumonia initial chest CT scan on the left side. The follow up chest CT scan 18 days post ECMO is on the right side.

Patient C

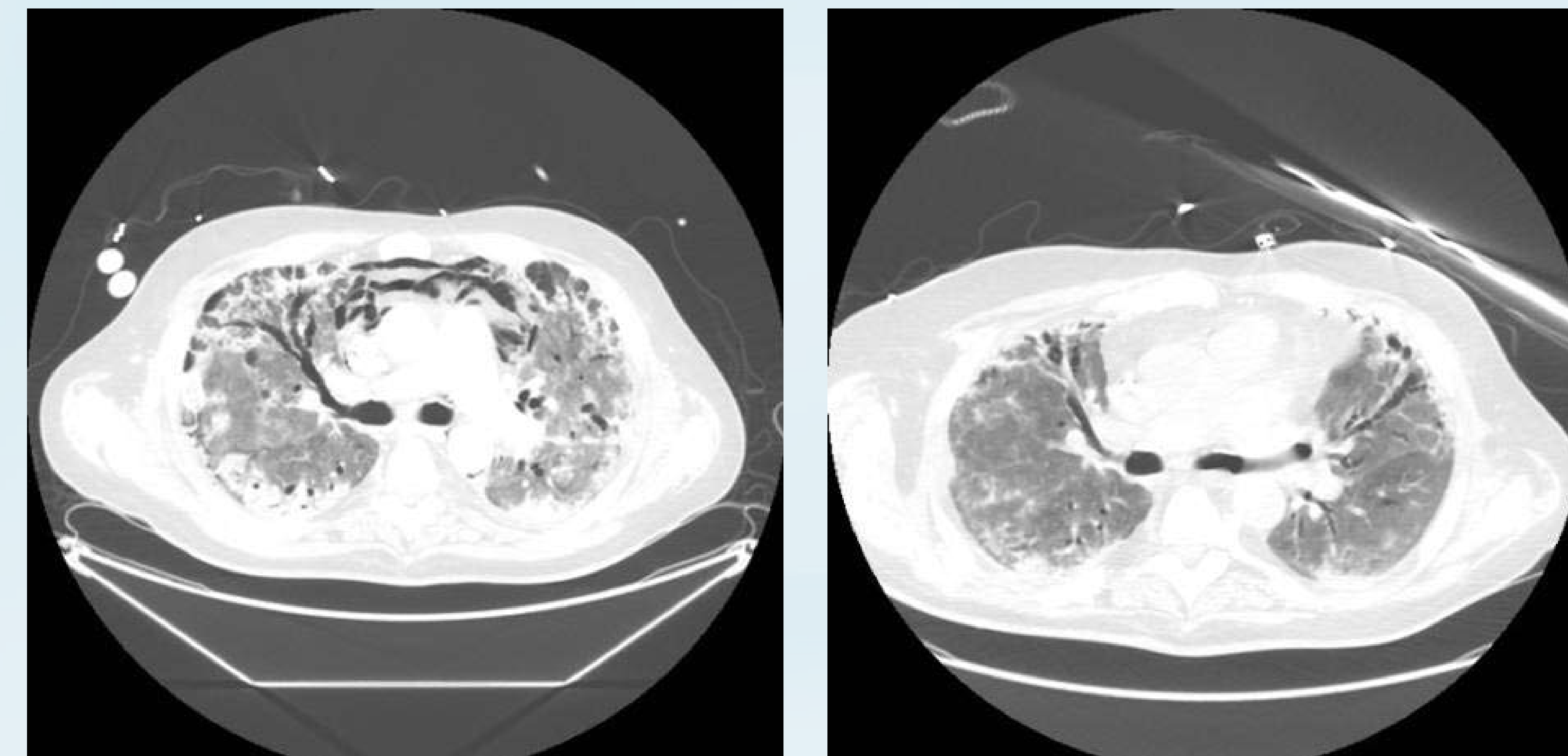


Figure 2. Figure 2: (Patient B) 26 year old female with Influenza A H1N1 initial chest CT scan on left side. The follow up chest CT scan 314 days post ECMO is on the right side.

Patient D

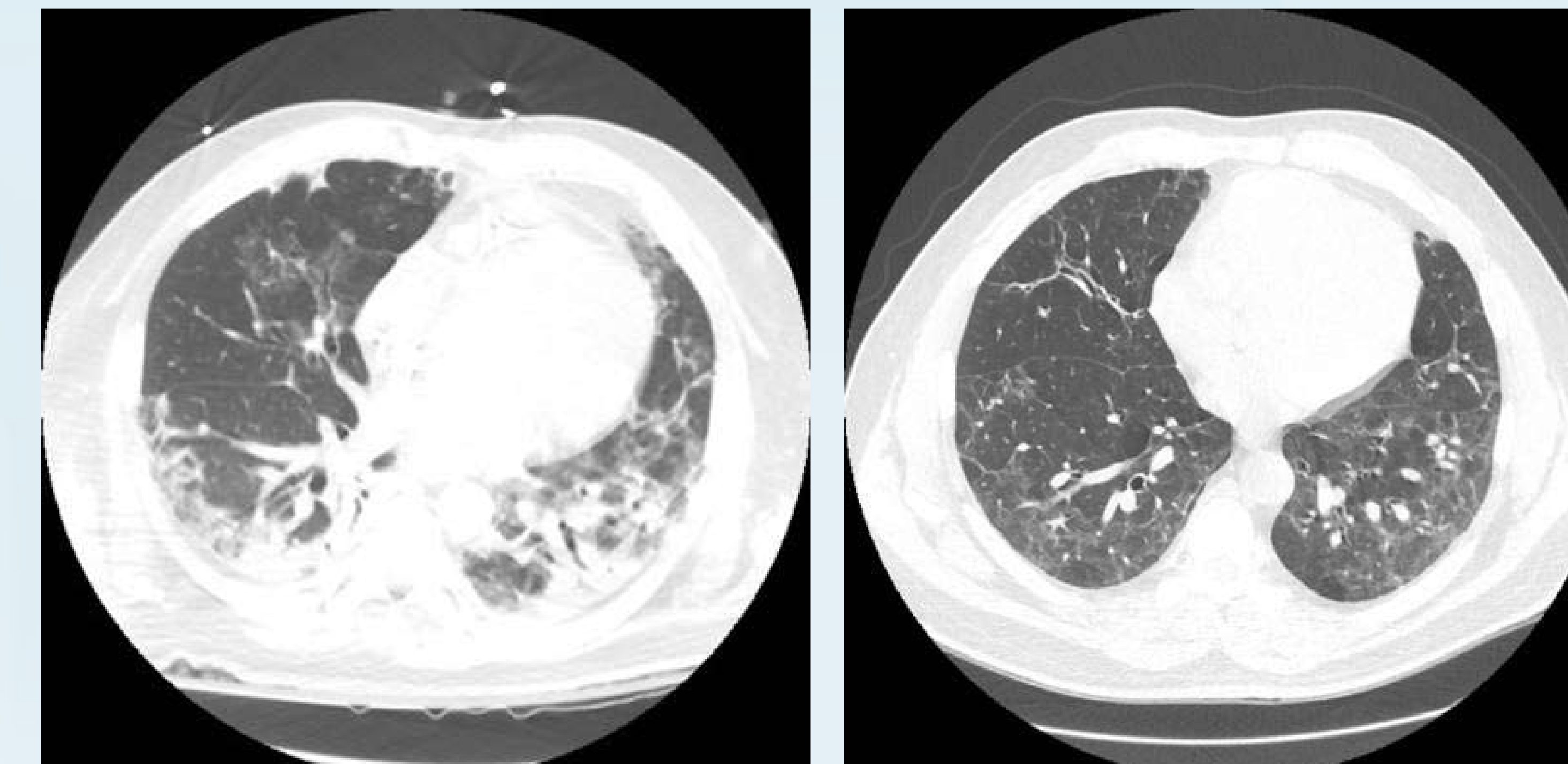


Figure 4. (Patient D) 50 year old male with unknown etiology for ARDS initial chest CT scan on left side. The follow up chest CT scan 225 days post ECMO is on the right side.

Conclusion and Clinical Implications:

- Patients who presented with severe ARDS requiring VV ECMO, had significant residual pulmonary abnormalities on PFT's.
- Post VV ECMO patients also had persistent chest CT abnormalities including interstitial opacities.
- Further research is needed to evaluate long-term recovery in post ARDS VV ECMO patients.

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