

Echocardiographic evaluation of right ventricle subclinical dysfunction in interstitial lung disease patients

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Comorbidity in IPF

Characteristic

Continent

North America	50 (40)
Asia	36 (29)
Europe	36 (29)
South America	2 (2)
Africa	1 (1)
Oceania	1 (1)
Total	126 (100)*

Study type

Retrospective cohort study	85 (67)
Prospective cohort study	25 (20)
Case-control study	10 (8)
Cross-sectional study	5 (4)
Case series	1 (1)
Mean (median, range) number of IPF patients	270 (70, 8–9286)
Mean [#] age of IPF patients years	65.3

Comorbidities¹

Respiratory

Pulmonary hypertension	43 (34)
Chronic obstructive pulmonary disease/emphysema	23 (18)
Lung cancer	15 (12)
Obstructive sleep apnoea	7 (6)
Pulmonary embolism	3 (2)

Nonrespiratory

Cardiovascular	34 (27)
Metabolic	30 (24)
Gastro-oesophageal reflux disease	23 (18)

Data are presented as n (%), unless otherwise stated. IPF: idiopathic pulmonary fibrosis. [#]: value is mean of the mean age reported in the studies (n=92 studies); ¹: papers could have reported more than one comorbidity; *: may not total 100% due to rounding.

Raghu, et al. Comorbidities in idiopathic pulmonary fibrosis patients: a systematic literature review, Eur Respir J. 46 (2015)

Outcomes of pulmonary arterial hypertension in IPF

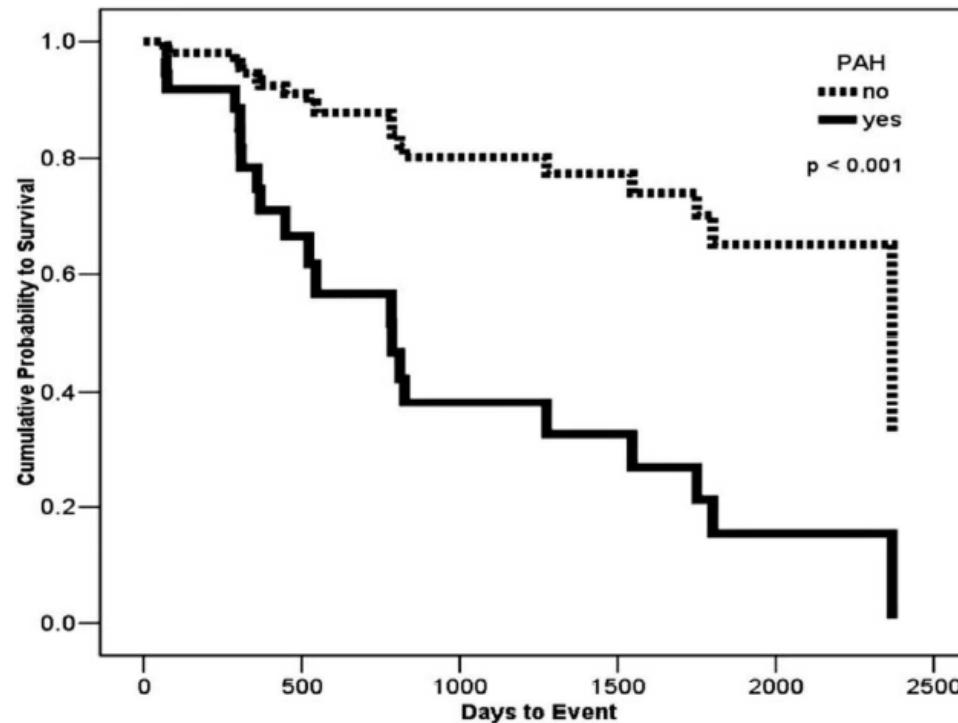


FIGURE 2. PAH as a predictor of survival in patients with IPF.

Conclusions: PAH is common in advanced cases of IPF and significantly impacts survival. A reduced DLCO, supplemental oxygen requirement, or poor 6-min walk performance should raise suspicion of the presence of underlying PAH. Identifying PAH might be an important adjunct in monitoring disease progression, triaging for transplantation, and guiding therapy.

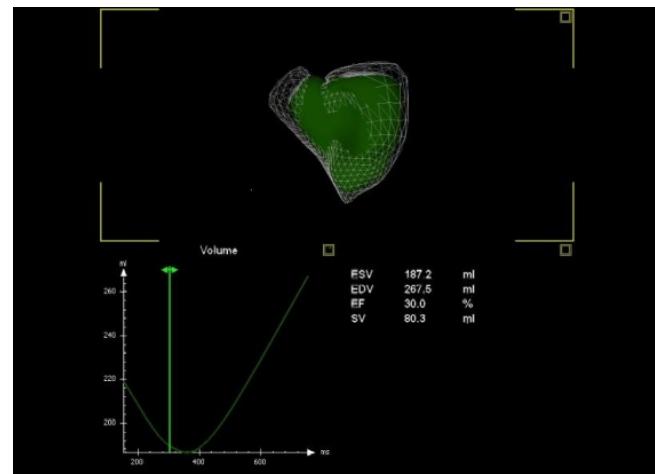
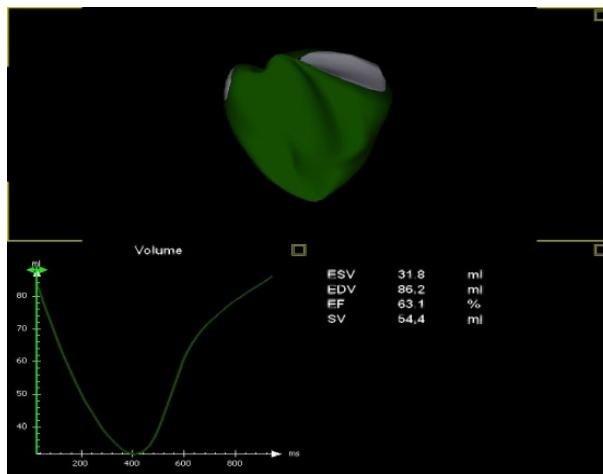
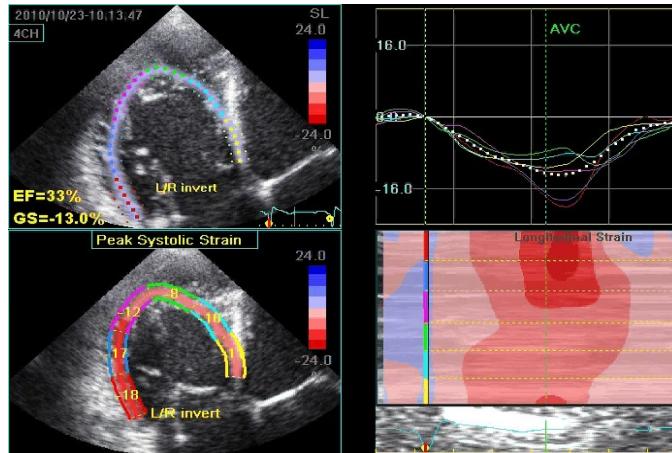
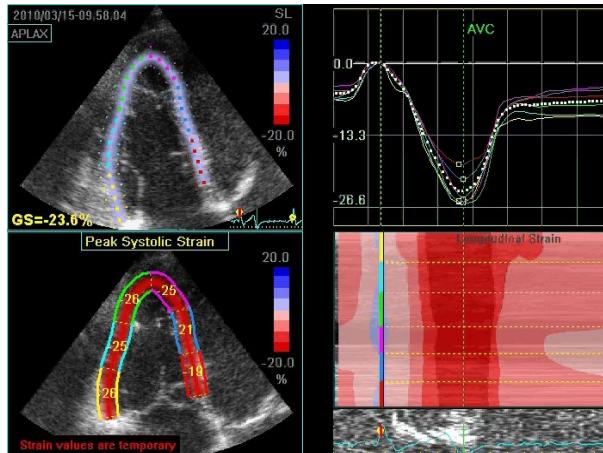
(CHEST 2006; 129:746–752)

Lettieri CJ et al. Prevalence and outcomes of pulmonary arterial hypertension in advanced idiopathic pulmonary fibrosis. Chest 2006;129:746–52.

Aim

- ▶ Detect early signs of right ventricular dysfunction in patients with Intertitial Lung Disease (ILD) by combining standard echocardiography with 2D Speckle Tracking and real-time 3 D echocardiography

Speckle Tracking and Real Time 3D Echocardiography



Variable	Controls (n=30)	ILDs (n=45)	p value
Age (years)	$67,76 \pm 6,078$	$69,20 \pm 8,662$	NS
Sex (M/F)	19 M 11 F	32 M 13 F	NS
Smokers/ex smok/no smok	8/12/10	11/19/15	NS
Pack/yr	$35,7 \pm 25,4$	$36,2 \pm 26,2$	
<i>Co-morbidities</i>			
Arterial Hypertension	-	25	
Gastro-oesophageal reflux	-	15	
Diabetes Mellitus type II	-	7	
Thyroid Disease	-	2	
Chronic Cerebrovascular disease	-	1	
Body Mass Index (Kg/m ²)	$24,9916 \pm 2,78987$	$29,2387 \pm 4,13802$	0,0001
Systolic BP (mmHg)	$126,9412 \pm 13,00226$	$138,3111 \pm 17,20045$	0,01
Diastolic BP (mmHg)	$77,6471 \pm 10,17313$	$78 \pm 10,89203$	NS
Heart Rate (bpm)	$66,6471 \pm 11,56472$	$76,1778 \pm 12,52686$	NS

Results

	Total	Control	ILD	p value (adjusting for sPAP)	p value
sPAP	34.5(±15)	24.4(±4.4)	37.8(±15.8)	<0.001	/
RV_GLS	-22.5(±4)	-24.2(±4.1)	-21.6(±3.6)	0.009	0.091 ←
RV_LLS	-25.5(±5.2)	-27(±5.5)	-24.2(±4.8)	0.034	0.138
RV_SLS	-19.9(±4.5)	-22.1(±3.8)	-18.9(±4.4)	0.006	0.099
voldiastRV3d	88(±37.9)	104.9(±50)	83.5(±33.3)	0.096	0.079
volsistRV3d	41.2(±18.7)	46(±25.4)	39.9(±13.1)	0.344	0.225
FERV3d	52.1(±8.5)	57.4(±4.9)	50.6(±8.8)	0.018	0.049 ←

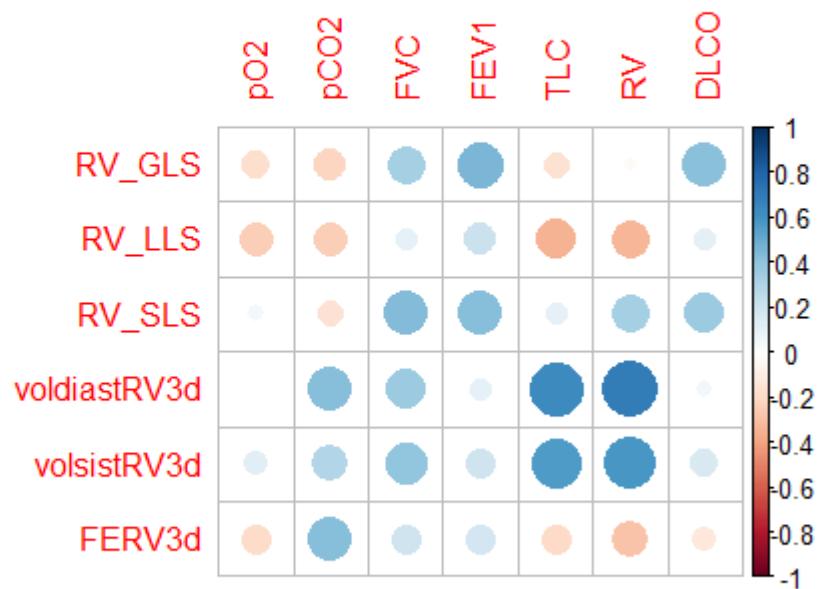
Results

	Total	IPF	No IPF	p value	p value (adjusting for sPAP)
sPAP	37.8(±15.8)	39.6(±19.8)	35.8(±9.3)	0.348	/
RV_GLS	-21.6(±3.6)	-20.2(±3.1)	-23(±3.7)	0.006	0.009
RV_LLS	-24.2(±4.8)	-22.7(±4.5)	-25.9(±4.7)	0.021	0.022
RV_SLS	-18.9(±4.4)	-17.4(±3.6)	-20.5(±4.8)	0.016	0.023
voldiastRV3d	83.5(±32.2)	87.3(±31.8)	80(±35)	0.489	0.416
volsistRV3d	39.9(±16.7)	41.3(±16)	38.7(±17.6)	0.622	0.613
FERV3d	50.6(±8.8)	50.8(±10.2)	50.5(±7.5)	0.931	0.636

	Control	IPF	p value	p value (adjusting for sPAP)
sPAP	24.4(±4.4)	39.6(±19.8)	<0.001	/
RV_GLS	-24.2(±4.1)	-20.2(±3.1)	<0.001	0.005
RV_LLS	-27(±5.5)	-22.7(±4.5)	0.005	0.017
RV_SLS	-22.1(±3.8)	-17.4(±3.6)	<0.001	0.003
voldiastRV3d	104.9(±50)	87.3(±31.8)	0.237	0.231
volsistRV3d	46(±25.4)	41.3(±16)	0.527	0.415
FERV3d	57.4(±4.9)	50.8(±10.2)	0.052	0.099

	Control	No IPF	p value	p value (adjusting for sPAP)
sPAP	24.4(±4.4)	35.8(±9.3)	0.001	/
RV_GLS	-24.2(±4.1)	-23(±3.7)	0.313	0.856
RV_LLS	-27(±5.5)	-25.9(±4.7)	0.445	0.862
RV_SLS	-22.1(±3.8)	-20.5(±4.8)	0.232	0.775
voldiastRV3d	104.9(±50)	80(±35)	0.109	0.164
volsistRV3d	46(±25.4)	38.7(±17.6)	0.343	0.327
FERV3d	57.4(±4.9)	50.5(±7.5)	0.010	0.101

No IPF



Conclusion

ILD patients had:

Impairment of right ventricle LONGITUDINAL STRAIN (*RV GLS, RV LLS, RV SLS*) and of **EJECTION FRACTION**

Subclinical signs or RV involvement is more evident in IPF patients



Speckle tracking and Real Time 3D echocardiography
Could be considered to detect early signs of right ventricle dysfunction