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Contributing factors to exercise induced desaturation in pulmonary arterial hypertension

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Objective

To evaluate the prevalence of exercise induced desaturation (EID) and elucidating the contributing factors in pulmonary arterial hypertension (PAH) patients.

Methods

Analyze 20 pulmonary arterial hypertension patients' data (EID group = 10) from April 2016 to May 2018. Comparisons of background characteristics, comorbidity, trans-thoracic echocardiography (TTE), cardiac catheterization, pulmonary function test (PFT), 6MWT with gas analysis, body composition test and muscle power test between EID and non-EID patients were conducted.

Results

Epidemiological characteristics, TTE data and cardiac catheterization data did not differ between 2 groups. Forced expiratory volume in the first second (FEV1), 6MWD and peak oxygen consumption (VO2peak) were significantly low in EID group(Table 1). We suggest a "predictive scale for exercise induced desaturation in pulmonary arterial hypertension (PSEID)" (table 2). As PSEID is 4 or more, it showed 80% of sensitivity and 90% of specificity.

Conclusion

The EID was found in the half of PAH patients and FEV1, 6MWD and VO2peak were most relevant factors. Result of TTE and cardiac catheterization was not correlated with EID.
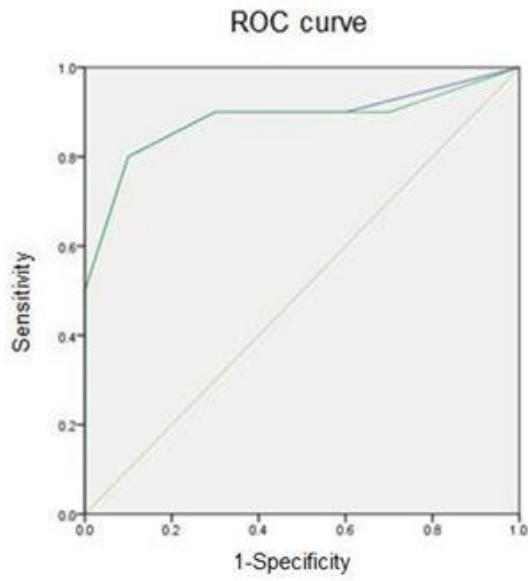
Table1. Pulmonary function and 2-minute walk test data

	Non-EID group (n = 10)	EID group (n = 10)	p-value*
FVC_%	89.00 [81.00, 90.00]	74.50 [65.00, 84.00]	0.078
FEV1_%	83.00 [81.00, 84.00]	70.00 [69.00, 80.00]	0.037*
DLCO_%	73.00 [58.00, 86.00]	55.00 [32.00, 70.00]	0.086
6_MWD(m)	503.00 [450.00, 520.00]	331.00 [252.00, 467.00]	0.021*
6_MWD_%	71.00 [65.10, 77.10]	48.65 [45.20, 64.30]	0.011*
VO2peak	15.73 [13.56, 20.12]	11.41 [10.48, 16.22]	0.021*
VO2peak_%	57.50 [52.00, 63.30]	48.00 [32.00, 57.20]	0.064
VE/VCO2_slope	37.85 [29.60, 39.10]	41.10 [32.80, 60.20]	0.241
peak HR_%	63.36 [57.40, 77.27]	63.96 [59.78, 72.20]	0.910

Table2. Predictive scale for exercise induced desaturation in pulmonary arterial hypertension (PSEID)

	Score
6 minute walk distance (m)	
≥ 450	1
450 > and ≥ 300m	2
< 300	3
Forced expiratory volume in the first second (% of predicted)	
≥ 80 of predicted value	0
80 > and ≥ 50	1
50 > and ≥ 30	2
< 30	3
Peak oxygen consumption (ml/min/kg)	
≥ 14	1
14 > and ≥ 10	2
>10	3
Diffusion capacity for carbon monoxide (% of predicted)	
≥50	0
< 50	1
Interstial lung disease	
Present	0
Absent	1
Sarcopenia	
Present	0
Absent	1

Table3. Sensitivity and specificity of PSEID

ROC curve

Score	Sensitivity	1-Specificity
0	1.000	1.000
1.5	.900	.600
2.5	.900	.300
3.5	.800	.100
4.5	.500	.000
5.5	.400	.000
6.5	.200	.000
8	.000	.000