

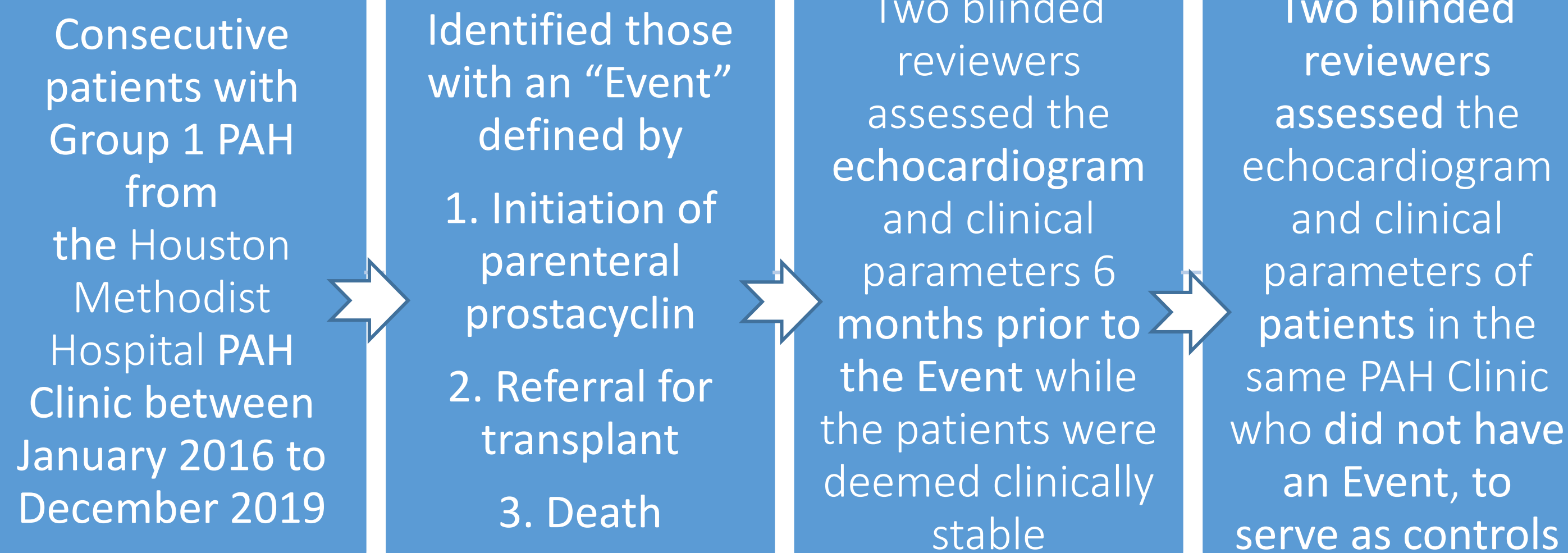
Background

Echocardiography is routinely used for the screening and longitudinal monitoring of patients with pulmonary arterial hypertension (PAH). Whether using physician gestalt or objective assessment with the REVEAL or European scores, echocardiographic parameters play an important role in the management of patients with PAH.

Purpose

We sought to determine if echocardiographic parameters can predict early decline in PAH patients who are clinically stable.

Methods



Results

Table 1: Patient characteristics

	Total (N=41)	No Event (N=29)	Event (N=12)	p-value
Event type				NA
Death	--	--	3 (25.0)	
Transplant referral	--	--	3 (25.0)	
IV Prostacyclin initiation	--	--	6 (50.0)	
Age (years)	51.0	52.0	45.5	0.50
Gender				1.00
Male	4 (10.0)	3 (10.7)	1 (8.3)	
Female	36 (90.0)	25 (89.3)	11 (91.7)	
B-type natriuretic peptide	59.0	41.5	142.0	0.01
Six-minute walk distance (m)	400.0	420.0	393.0	0.46
WHO classification				0.73
I	3 (7.5)	3 (10.7)	0 (0.0)	
II	19 (47.5)	13 (46.4)	6 (50.0)	
III	16 (40.0)	11 (39.3)	5 (41.7)	
IV	2 (5.0)	1 (3.6)	1 (8.3)	

Tables 1 & 2. All parameters in the Event group were obtained approximately 6 months prior to the Event. Differences between groups were determined by Fisher's exact tests for categorical variables and Wilcoxon rank-sum test for continuous variables. LV: Left ventricle; RV: Right ventricle; RA: Right atrium; TAPSE: Tricuspid annular plane systolic excursion; PASP: Pulmonary artery systolic pressure; FAC: Fractional area change; ES: End systolic; ED: End diastolic.

*Data collected from first 41 consecutive patients from the Houston Methodist PAH Clinic. Data collection is ongoing.

Table 2: Echocardiographic Parameters

	Total (N=41)	No Event (N=29)	Event (N=12)	p-value
LVEF biplane (%)	62.0	63.5	60.5	0.49
RV function				0.002
Normal	12 (29.3)	10 (34.5)	2 (16.7)	
Mildly depressed	12 (29.3)	12 (41.4)	0 (0.0)	
Moderately depressed	11 (26.8)	5 (17.2)	6 (50.0)	
Severely depressed	6 (14.6)	2 (6.9)	4 (33.3)	
RV size				0.13
Normal	10 (24.4)	9 (31.0)	1 (8.3)	
Mildly enlarged	9 (22.0)	8 (27.6)	1 (8.3)	
Moderately enlarged	11 (26.8)	6 (20.7)	5 (41.7)	
Severely enlarged	11 (26.8)	6 (20.7)	5 (41.7)	
RA volume index (mL/m2)	36.0	29.0	54.0	0.01
LV stroke volume (ml)	67.0	69.0	50.5	0.045
ED Eccentricity Index	1.1	1.0	1.3	0.001
ES Eccentricity Index	1.2	1.1	1.5	<0.001
RV s', (cm/s)	10.3	10.5	9.6	0.32
TAPSE (cm)	1.9	2.0	1.6	0.06
Estimated RA pressure(mmHg)	10.0	5.0	10.0	0.03
Estimated PASP (mmHg)	61.8	52.3	74.0	0.02
RV FAC (%)	29.0	31.0	27.0	0.14
W sign by RVOT PW				0.47
No	28 (68.3)	21 (72.4)	7 (58.3)	
Yes	13 (31.7)	8 (27.6)	5 (41.7)	
RV basal dimension (cm)	4.4	4.3	5.0	0.049
Pericardial effusion				0.73
No	26 (63.4)	19 (65.5)	7 (58.3)	
Yes	15 (36.6)	10 (34.5)	5 (41.7)	

Figure 1

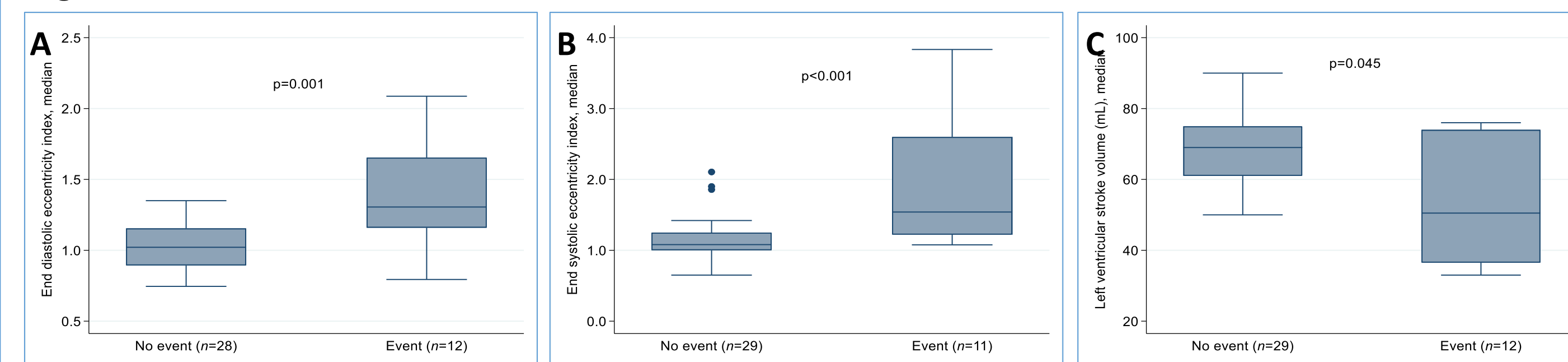


Figure 1. Comparison of end diastolic eccentricity index (A), end systolic eccentricity index (B), and left ventricular stroke volume (C) between those patients with and without an Event.

Discussion

We evaluated 41 patients, 12 with an Event and 29 without an Event. Six-minute walk distance and WHO class were not significantly different between the groups, suggesting that the patients were clinically similar at the time of the echocardiogram.

In those patients who had an Event approximately 6 months later (Event group), RA volume index, end diastolic LV eccentricity index, end systolic LV eccentricity index, estimated PA systolic pressure, and RV basal dimension were significantly higher and LV stroke volume and RV systolic function were significantly lower, when compared to the control group who did not have an Event.

Of note, the presence of a pericardial effusion, which is considered a poor prognostic marker, did not predict early decline between the two groups in our analysis.

Conclusions

Echocardiography can predict early decline in Group 1 PAH even when patients are clinically stable, based on their functional class and six-minute walk test, six months prior to an event.