

Introduction: The 6-minute walk test is heavily ingrained in the management of pulmonary arterial hypertension (PAH). The current monitoring solution does not allow for real-time measurements of cardiac status therefore we developed an experimental setup to help patients conduct a self-administered 6-minute walk test at home using wearable technology.

Method: We analyzed data from 50 individuals including 13 health subjects (H), 37 PAH including 18 stable (S), 7 with treatment intensification (TI), and 12 with treatment initiation (TN). During the walk, they wore Biostamp (MC10, Cambridge, MA) collecting single-lead ECG and accelerometry signals. We report HR at baseline (HRb), maximum HR (HRm), HR acceleration during exercise (HRa), HR at 1-minute recovery (HRr), SDNN during recovery, and number of laps. Patients performed two tests at different times across groups (H:8 ±8, S:19 ± 19, TI:51 ± 19, TN:58 ± 31 days). We reported absolute value (val), within subject standard deviation (Sw), and repeatability coefficient (RC) across the patient cohorts.

Results: We collected ECG and accelerometry signals during 6-min walk tests using a single patch. We extracted measurements before, during, and after the test in 4 distinctive groups. We demonstrated good repeatability in healthy subjects at a week interval, and we reported clinically valid measures in PAH patients (see table).

Conclusion: We have devised a range of measurements derived from signals recorded by a patch during a 6-minute test in PAH patients. Our novel monitoring setup provides an instantaneous assessment of cardiac status that can be performed remotely.

[val,Sw,RC]	N	HRb	HRm	HRa	HRr	SDNN	Laps
H	13	[75, 8, 22]	[136,14,39]	[96,70,194]	[28,9,25]	[9,3,7]	[22.7,2.1]
S	18	[83, 6,17]	[153,9,25]	[119,45,124]	[21,7,20]	[7,2,6]	[16,1,3]
TN	12	[87, 8, 23]	[126,7,19]	[127,23,64]	[16,6,17]	[5,2,4]	[15,1,3]
TI	7	[84, 7, 19]	[115,8,21]	[100,25,69]	[18,9,24]	[5,2,6]	[13,2,5]