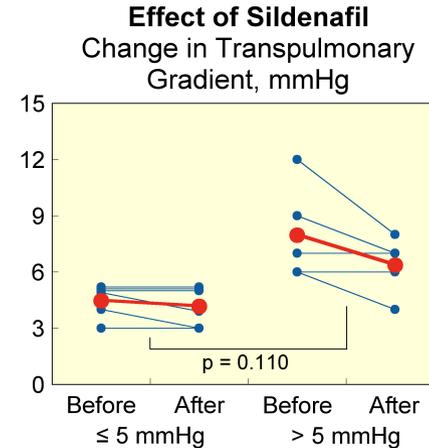
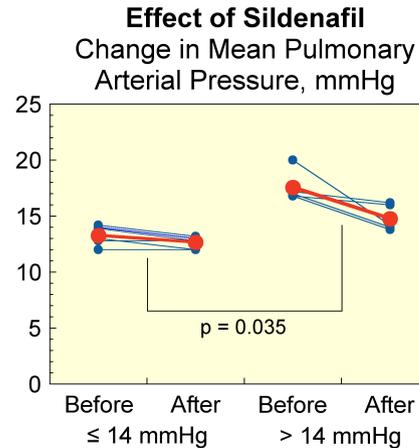


## Background and Purpose

Pulmonary vasodilators improve the functional capacity of some patients with pulmonary arterial hypertension. However, pulmonary vasodilators frequently fail to improve meaningful endpoints of efficacy in patients with lower pulmonary arterial pressures who have been palliated with a Fontan procedure. Hemodynamic measurements were reviewed to determine whether baseline pulmonary arterial pressure and the acute response to sildenafil might identify candidates for precision care with phosphodiesterase V inhibitors following Fontan palliation.

## Methods

Heart catheterization was performed in a subset of patients following Fontan palliation to measure mean pulmonary arterial pressure (MPAP), atrial or pulmonary arterial wedge pressure (PAWP) and transpulmonary gradient (TPG). Estimates of cardiac index (CI), pulmonary vascular resistance index (Rp) and systemic vascular resistance index (Rs) were calculated using estimates of oxygen consumption and the Fick principle. Hemodynamic measurements before and after treatment with intravenous sildenafil (mean 0.14, range 0.05-0.20 mg/kg) Results (mean ± SD) were compared by paired and unpaired t-tests to identify statistically significant changes.



Effect of similar doses of sildenafil on MPAP and TPG: comparison of changes in patients with pressures ≤ median values and changes in patients with pressures > median values (MPAP 14 mmHg and TPG 5 mmHg, red = mean)

	Before Sildenafil	After Sildenafil	P
MPAP, mmHg	15.3 ± 2.5	13.6 ± 1.4	<b>0.011</b>
MPAP > 14 mmHg, n = 5	17.6 ± 1.3	14.8 ± 1.1	<b>0.038</b>
MPAP ≤ 14 mmHg, n = 6	13.3 ± 0.8	12.7 ± 0.5	<b>0.025</b>
PAWP, mmHg	9.1 ± 1.9	8.5 ± 1.9	0.088
MPAP > 14 mmHg	9.8 ± 1.8	8.6 ± 2.3	0.145
MPAP ≤ 14 mmHg	8.5 ± 1.9	8.3 ± 1.6	0.363
TPG, mmHg	6.1 ± 2.5	5.2 ± 1.7	<b>0.043</b>
CI, L/min-m <sup>2</sup>	2.69 ± 0.55	2.93 ± 0.67	<b>0.036</b>
MPAP > 14 mmHg	2.62 ± 0.57	2.76 ± 0.54	0.142
MPAP ≤ 14 mmHg	2.74 ± 0.58	3.07 ± 0.78	0.120
Rp, units-m <sup>2</sup>	2.48 ± 1.16	1.89 ± 0.60	<b>0.017</b>
MPAP > 14 mmHg	3.23 ± 1.24	2.33 ± 0.48	0.083
MPAP ≤ 14 mmHg	1.85 ± 0.65	1.51 ± 0.39	0.107
Rs, units-m <sup>2</sup>	17.1 ± 4.0	14.1 ± 3.9	<b>0.015</b>
MPAP > 14 mmHg	18.3 ± 3.7	15.7 ± 3.4	0.142
MPAP ≤ 14 mmHg	16.0 ± 3.9	12.8 ± 4.2	0.088

## Results

Eleven patients were evaluated with intravenous sildenafil during heart catheterization. Sildenafil was acutely associated with changes in MPAP, TPG, CI, Rp and Rs.. Changes in MPAP were greater for patients with MPAP > 14 mmHg versus patients with a MPAP ≤ 14 mmHg. Changes in TPG, PAWP, CI, Rp and Rs were not significantly different for patients with a MPAP > 14 mmHg. Changes in TPG were significantly greater for patients with a TPG > 5 mmHg and a MPAP > 14 mmHg (P = 0.026).

## Conclusion

- Sildenafil acutely decreases MPAP and TPG, and tends to cause greater changes in patients with higher MPAP and TPG.

## Speculation

- It is possible that patients with relatively high MPAP and TPG who have a favorable acute response to intravenous sildenafil will also have a favorable long-term response to treatment with a phosphodiesterase V inhibitor.

- Studies focused on precision care (treating the right patient with the right agent) are needed to determine whether a subset of patients will experience meaningful improvement from pulmonary vasodilators following Fontan palliation.