

SUPPLEMENTAL DIGITAL CONTENT

Patient	A	B	C	D	E	F
Diagnosis	PA/IVS	MS, AS	MS, AS	TA, PA left PAS	MA, AA	MA, AA
Stage 1 surgery	3.5mm mBTS	Norwood 3.5mm mBTS	Norwood 3.5mm mBTS	4mm mBTS with LPAplasty	Norwood 3.5mm mBTS	Norwood 3.5mm mBTS
Age* (months)	6	3	4	3	4	5
BSA (m ²)	0.34	0.30	0.27	0.26	0.28	0.34
CI (L/min/m ²)	4.31	4.08	6.87	6.23	5.79	5.47
Qpl (L/min/m ²)	1.32	1.94	3.69	2.77	2.57	3.53
mP _{atr} (mmHg)	5	6	6	7	5	4
mP _{PA} (mmHg)	13(R), 12(L)	12(R/L)	11(L)	17(R), 14(L)	13 (L)	13.5(L)
mP _{Ao} (mmHg)	43 [#]	52	51	53	53	72
Calculated VO ₂ (ml-O ₂ /min)	52.2	45.9	43.6	41.8	44.6	51.7

Table S1: Demographics, clinical measurements, and calculated O₂ consumption of the patient cohort considered in this study

*Age at data acquisition

[#]Estimated from left upper limb sphygmomanometer

BSA: body surface area; PA/IVS: pulmonary atresia/intact ventricular septum; mBTS: modified Blalock-Taussig shunt; MS: mitral stenosis; AS: aortic stenosis; TA: tricuspid atresia, PAS: pulmonary artery stenosis; MA: mitral atresia; AA: aortic atresia; CI: cardiac index; Qpl pulmonary flow index; mP_{atr} : mean systemic atrial pressure; mP_{PA}: mean pulmonary artery pressure; R/L: right/left; mP_{Ao}: mean invasive ascending aortic pressure;

Patient A

CI (L/min/m ²)	5.50	6.53	7.50
Qp (L/min)	0.54	0.60	0.66
Qs (L/min)	1.34	1.61	1.89
Qp/Qs	0.40	0.37	0.35

Patient B

CI (L/min/m ²)	4.70	5.50	6.33	7.13	7.97
Qp (L/min)	0.66	0.74	0.81	0.88	0.95
Qs (L/min)	0.75	0.91	1.08	1.26	1.45
Qp/Qs	0.89	0.81	0.75	0.70	0.66

Patient C

CI (L/min/m ²)	6.11	7.15	8.30	9.44	10.63	11.81	13.00
Qp (L/min)	0.89	1.00	1.11	1.21	1.31	1.41	1.51
Qs (L/min)	0.76	0.94	1.13	1.34	1.56	1.78	2.01
Qp/Qs	1.17	1.07	0.98	0.91	0.85	0.79	0.75

Patient D

CI (L/min/m ²)	5.38	6.38	7.46	8.58	9.69	10.81
Qp (L/min)	0.65	0.73	0.81	0.89	0.96	1.03
Qs (L/min)	0.76	0.93	1.13	1.34	1.56	1.77
Qp/Qs	0.85	0.78	0.71	0.66	0.62	0.58

Patient E

CI (L/min/m ²)	5.25	6.21	7.25	8.32	9.43	10.46
Qp (L/min)	0.68	0.76	0.85	0.93	1.01	1.08
Qs (L/min)	0.80	0.98	1.18	1.40	1.63	1.85
Qp/Qs	0.85	0.78	0.72	0.67	0.62	0.59

Patient F

CI (L/min/m ²)	5.35	6.03	6.74	7.44	8.21	9.03	9.74
Qp (L/min)	1.20	1.32	1.43	1.55	1.67	1.79	1.89
Qs (L/min)	0.62	0.73	0.85	0.98	1.13	1.28	1.42
Qp/Qs	1.94	1.80	1.68	1.58	1.48	1.39	1.33

Table S2: Simulation results of flow related quantities at different titration levels of VAD support for the six patient cases

CI: cardiac index; Qp: pulmonary blood flow; Qs: systemic blood flow; Qp/Qs: pulmonary-to-systemic blood flow ratio;

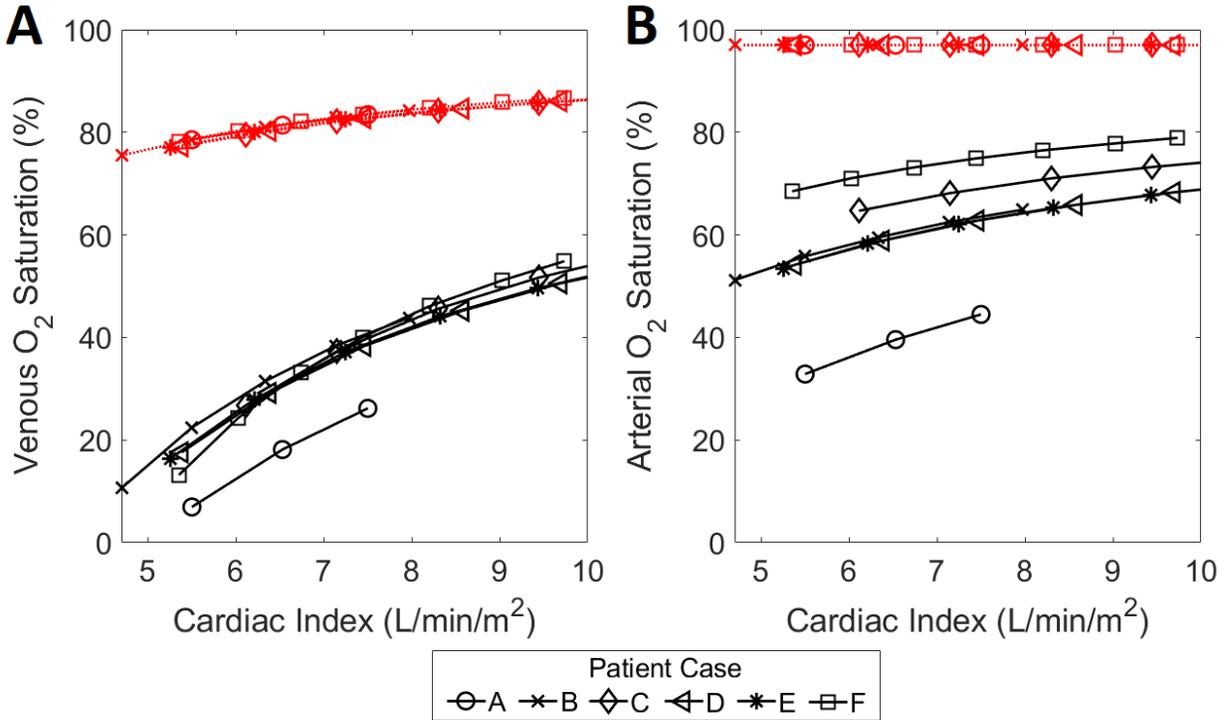


Fig S1. **A)** Venous and **B)** arterial O₂ saturation versus cardiac index for six patient-specific simulated cases. Solid (also black) and dotted (also red) lines represent the systemic-to-pulmonary shunted, and non-shunted (normal), scenario, respectively.