Table 4.16 Selected Doppler Methods for Estimation of Pulmonary Vascular Resistance

Measurements Required	Formula for PVR (WU)	r	Pt. No.	Ref.
Functional pre-ejection period [PEP] (ms): time interval between the onset of TR and pulmonary systolic flow # **Acceleration time [AcT] (ms):** time interval between the onset of ejection to the time of peak RVOT velocity **Total systolic time [TT] (ms):** summation of PEP and ejection time (ET) where ET is the time interval between the onset and end of the systolic RVOT/PV flow	PVR = 0.156 + 1.154 x ([PEP ÷ AcT] ÷ TT)	0.96	63	1
RVOT VTI (cm): traced from the PW Doppler signal **TRv (m/s):** highest TR velocity via CW Doppler	PVR ≈ TRv ÷ $RVOT_{VTI}$ § When ratio >0.175 & <0.275: • PVR = (TRv ÷ $RVOT_{VTI}$) x 10 When ratio > 0.275: • PVR = (TRv^2 ÷ $RVOT_{VTI}$) x 5	0.76	150	2
Velocity propagation [Vp] (cm/s): colour M-mode flow propagation in the main pulmonary artery during systole	PVR ≈ Vp **Regression equation:** PVR = -1.71 x Vp + 26	0.90	11	3
mPAP (mm Hg): derived from the PAEDP (estimated from the PR velocity) and PASP (estimated from the TR velocity + RAP) **Pulmonary capillary wedge pressure [PCWP] (mm Hg):** assumed to be 9 mmHg **Cardiac output [CO] (L/min):** derived from the LVOT diameter (cm^2) and LVOT VTI (cm)	PVR = (mPAP - PCWP) ÷ CO	0.92 * 0.93**	52 * 15**	4
RVOT VTI (cm): traced from the PW Doppler signal **PASP (mm Hg):** estimated from TR velocity + RAP	PVRI ≈ (PASP ÷ [HR x $RVOT_{VTI}$]) ψ	0.86	51	5
RVOT VTI (cm): traced from the PW Doppler signal **RVSP (mm Hg):** estimated from TR velocity + RAP **E/e':** mitral E velocity divided by the medial DTI e' velocity	PVR = (RVSP - E/e') ÷ $RVOT_{VTI}$	0.81^ 0.88^^	42	6

\# Functional PEP estimated as interval between the onset of TR and the onset of pulmonary systolic flow rather than the total duration of TR. Total duration of TR may overestimate PEP in the presence of elevated PASP and PVR, as TR may continue after the premature closure of the pulmonary valve (i.e., the premature completion of the ejection period).

§ Ratio > 0.175 PVR likely > 2 WU; ratio > 0.275 PVR likely > 6 WU

* Comparison between catheter haemodynamic assessment and non-simultaneous Doppler echo data;

** Comparison between catheter haemodynamic assessment and simultaneous Doppler echo data.

ψ PVRI (WU/m^2) = PVR indexed where cardiac output indexed to body surface area; threshold >0.076 PVRI likely > 15 WU/m^2

^ When PCWP ≤ 15 mm Hg; ^^ when PCWP > 15 mm Hg

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