

Poster presentation

Differences in cardiac chamber volumes during prone versus supine imaging

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Introduction

Prone imaging may be an attractive strategy for improved visualization of right ventricular structure and function using CMR and is used extensively in SPECT myocardial perfusion imaging. Limited data are available on the effects of prone position on cardiac chamber sizes and function.

Purpose

We sought to determine the effects of prone positioning on right and left ventricular volumes and function using CMR.

Methods

11 subjects (27% females), age 54.9±17.3, 10 without clinical heart disease and 1 with coronary artery disease and normal ventricular function were imaged in supine and prone position using retrospectively gated SSFP cine imaging in contiguous short axis planes covering both right (RV) and left (LV) ventricles. Left and right ventricular end diastolic (EDV) and end systolic volumes (ESV), stroke volume (SV), cardiac output (CO) and ejection fraction (EF) were derived for both positions by a single highly experienced image analyst using Medis QMass MR software version 6.2.3 and compared using paired t tests. Heart rate (HR) and blood pressure (BP) were also compared.

Results

(Table 1) Both LV and RV EDV and SV were reduced in prone versus supine position with a small increase in heart rate and no change in EF or BP. Thus CO was also significantly reduced. LV ESV did not change significantly but RV ESV was reduced in prone position.

Conclusion

In subjects with normal cardiac function, prone position appears to reduce biventricular preload with a resultant fall in stroke volumes and cardiac output. The mechanism of this effect and the response in subjects with cardiac dysfunction remains to be determined. Prone imaging may improve visualization of right ventricular free wall morphology but should not be used to evaluate right ventricular size.

Table 1: Prone and supine variables

		Prone	Supine	p-value
Left Ventricle	EDV(ml)	160.4+38.6	171.5+39.2	0.008
	ESV(ml)	72.1+20.3	75.7+20	0.17
	EF (%)	55.3 + 6	56.1 + 4.3	0.42
	SV(ml)	88.4+22.1	95.7+ 21.2	0.003
	CO(L/min)	5.9+1.3	6.3+ 1.4	0.016
Right Ventricle	EDV(ml)	139.3+40.2	160.2+ 40.2	0.002
	ESV(ml)	61.6 + 22.4	69.1 + 19.6	0.006
	EF (%)	56.7 + 7.5	57.1 + 4.4	0.77
	SV(ml)	77.7 + 21.9	91.1 + 22.8	0.011
	CO(L/min)	5.2 + 1.3	6.0 + 1.5	0.012
Heart Rate		69 + 10	65 + 9	0.02
Systolic Blood pressure(mmHg)		124.5 + 11.7	125.4 + 13.9	0.74
Diastolic Blood pressure(mmHg)		77 + 8.5	75 + 9.6	0.42

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