

Left Ventricular Systolic and Diastolic Function and Structure using Transthoracic Echocardiography in Women with Untreated Preeclampsia

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Study purpose: Preeclampsia is a major cause of maternal morbidity and mortality worldwide.¹ Studies of the underlying cardiac function in women with untreated preeclampsia have produced conflicting results however an understanding of cardiac function is needed to optimally treat these critically unwell women. The aim of this study was to determine left ventricular (LV) systolic function, diastolic function and LV mass using transthoracic echocardiography (TTE) in women with untreated preeclampsia.

Method: Our previous study² determined the sample size and after institutional ethics approval and informed consent, forty women with untreated preeclampsia and forty gestationally matched healthy women were enrolled. After resting for a minimum of five minutes, heart rate (HR) and blood pressure (BP) were obtained and each woman underwent a standardised TTE examination.² Statistical analysis used the General Linear Model and t-test comparisons between groups.

Results:

	Healthy pregnant women (control) n = 40	Women with untreated preeclampsia n = 40
Age (yr)	32 ± 0.6	31 ± 0.8
Gestation (wks)	36 ± 0.7	36 ± 0.7
BMI (kg/m ²)	28 ± 0.7	32 ± 1.0*
MAP (mmHg)	81 ± 1.3	111 ± 0.8*
Cardiac output (ml/min)	4109 ± 94	4789 ± 224*
HR (BPM)	78 ± 2	81 ± 2
SV (ml)	53 ± 1.3	59 ± 2.0*
Mitral valve E/A	1.5 ± 0.1	1.3 ± 0.1*
Septal e' (cm/s)	11.5 ± 0.4	8.7 ± 0.4*
Septal a' (cm/s)	7.2 ± 0.2	8.4 ± 0.3*
Mitral valve E/ septal e'	6.7 ± 0.2	10.4 ± 0.4*
LVEDD (cm)	4.6 ± 0.1	4.5 ± 0.1
LV mass (g)	131 ± 3.3	189 ± 6.3*
Pericardial effusion	9 (23%)	36 (90%)*

Mean ± SEM or count (%) * variables significantly different (p<0.02) MAP = mean arterial pressure LVEDD = LV end diastolic diameter

Conclusions: Women with untreated preeclampsia demonstrate increased cardiac output due to an increase in stroke volume, and diastolic changes, increased LV mass and pericardial effusions. These findings support a hypothesis that preeclampsia impairs diastolic function and may concurrently increase systolic function with a resultant increase in overall cardiac work.

References:

1. Lewis, G. CEMACH 2003-2005. London; 2007.
2. Dennis A et al IJOA 2009 doi:10.1016/j.ijoa.2009.06.007 in press