

2D echo changes in hypertensive disorder of pregnancy in third trimester

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Conflicts of Interest: Nil

Abstract

Introduction: Hypertensive disorders of pregnancy account for approximately a quarter of all antenatal admissions and continue to be one of the largest causes of maternal and foetal mortality and morbidity and affects 3% to 10% of all pregnancies worldwide. Echocardiography is a safe, non-invasive technique to assess cardiac structure and function in pregnancy.

Objectives of the study: Analyse the Echocardiographic alterations in pregnant women in hypertension and fetomaternal outcome with a normal echocardiography compared to those with impaired echocardiography.

Materials: An observational study was done on 60 pregnant women from January 2021 to June 2022 who with gestational age >28 weeks at RRMCH who met a pre-defined criterion.

Results: The most common age group was 21- 30 years, 66.67%, mean age 22.56 years in the normal-ECHO and

46.67%, mean age 24.59 years in the impaired ECHO-group. neonatal complications was higher in the impaired ECHO-group. (36.67% v/s13.33%) admitted in NICU for observation (53.33% v/s36.67%) The difference was statistically significant with a p value <0.0001. IUGR was seen in 1 case and 2 case in the normal ECHO-group was and in the impaired ECHO. In those who had impaired echo findings both the systolic findings and diastolic echo findings were altered and vice versa.

Conclusion: Early ECHO may help to identify the high-risk groups and in managing.

Keyword: Hypertensive, Echocardiography, Worldwide

Introduction

Hypertensive disorders of pregnancy and their complications rank as one of the major causes of maternal mortality and morbidity in the world. It accounts for approximately a quarter of all antenatal

admissions. In addition, as it is strongly associated with fetal growth restriction and prematurity, it also contributes largely to perinatal mortality and morbidity. Hypertensive disorders of pregnancy continue to be one of the largest causes of maternal and foetal mortality and morbidity and affects 3% to 10% of all pregnancies worldwide. Echocardiography is a safe, non-invasive technique to assess cardiac structure and function in pregnancy. Cardiac mass, output and stroke volume increase with a decrease in peripheral vascular resistance. The anterior and leftward displacement of the heart in pregnancy makes it ideally suited to transthoracic echocardiographic assessment. Echocardiography in pregnancy with hypertension shows an increased left ventricular mass and remodeling causing diastolic dysfunction in some women.

Aims and objectives of the study

Echocardiographic alterations in pregnant women with hypertension. Correlation between echocardiographic abnormalities and outcome of pregnancy in patients of hypertensive disorders of pregnancy, Advantages of early diagnosis and early echocardiography in preventing adverse outcomes. Analyse the fetomaternal outcome in hypertensive women with a normal echocardiographic finding compared to those with impaired echocardiographic findings.

Materials and methods

Duration of Study: 18 MONTHS (January 2021 to May 2022)

Type of Study: Hospital based observational study.

Study Center

Department of OBG in Rajarajeswari Medical College and Hospital, Bangalore, Karnataka.

Selection Criteria

All Antenatal patients who attended the outpatient with gestational age >28 weeks and admitted in department of OBG in Rajarajeswari Medical College And Hospital, Bangalore, Karnataka

Inclusion Criteria

- Pregnant women between 20-40 years
- Gestational age - >28 weeks
- Pregnant women with gestational hypertension, Pre-eclampsia, Eclampsia

Exclusion Criteria

- Gestational age <28 weeks
- Preexisting medical disorders such as hypertension, diabetes mellitus, heart disease, and renal disease, and connective tissue disorders.

Results and observation

- In our study, no case in the normal echocardiographic findings group had urine microalbumin and all cases in the impaired echocardiographic findings group had urine microalbumin.

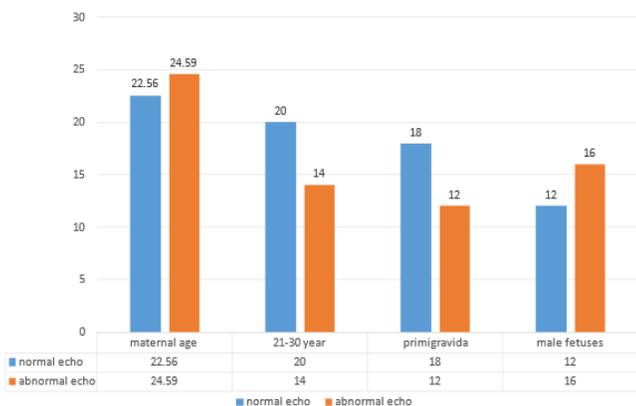
The difference was statistically significant with a p value <0.0001.

- In the present study the mean systolic blood pressure in the normal echocardiographic findings group was 126.5+SD 3.5 mmHg and in the impaired echocardiographic findings group was 166.5+SD 39.5mmHg. The difference was statistically significant with a p value <0.0001.

- In the present study the mean diastolic blood pressure in the normal echocardiographic findings group was 74.5+SD 9.5 mmHg and in the impaired echocardiographic findings group was 105.5+SD 18.5 mmHg.

The difference was statistically significant with a p value <0.0001.

Graph 1: Distribution of patients with normal and abnormal echo findings



The most common age group was 21- 30 years, 66.67%, mean age 22.56 years in the normal-ECHO and 46.67%, mean age 24.59 years in the impaired ECHO-group.

Graph 2: distribution of systolic echo findings

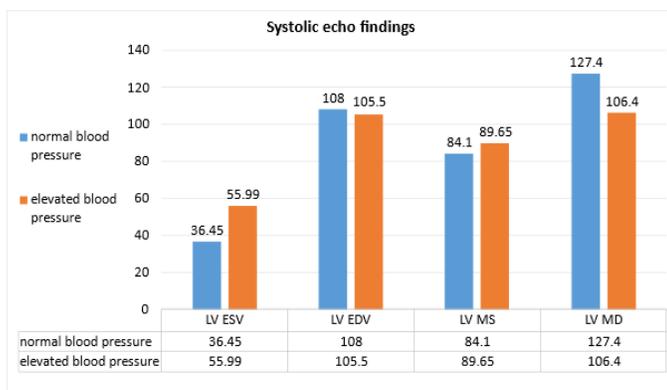
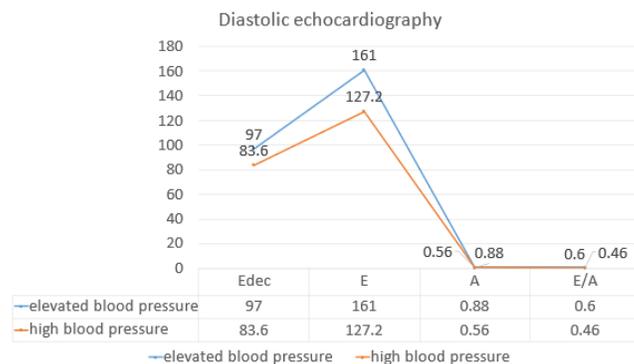


Table 1: 2d echo changes between normal and elevated blood pressure

CO	LV ESV	LV EDV	LV MS	LV MD
normal blood pressure	36.45	108	84.1	127.4
elevated blood pressure	55.99	105.5	89.65	106.4
SD	<0.0001	<0.0001	0.3528	<0.0001

Table 2: distribution of diastolic echo changes in normal and elevated blood pressure

Diastolic echocardiography					
	IVRT	Edec	E	A	E/A
elevated blood pressure	98.45	162.45	0.985	0.705	1.405
normal blood pressure	85.05	128.65	0.665	0.565	1.205
P	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001



Graph 3: distribution of mode of delivery in women having normal and impaired echo findings



Graph 4: distribution of indications for lscs between normal and impaired echo findings women

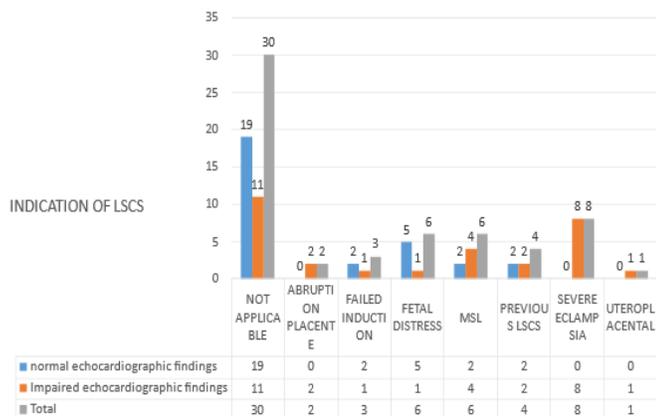


Table3: distribution of birth weight between normal and impaired echo findings group women

PARAMETER	GROUP	MIN	MAX	MEAN	STD. DEV	P VALUE
BIRTH WEIGHT	IMPAIRED ECHOCARDIOGRAPHIC FINDINGS	1.9	4	2.5483	0.52645	<0.001
	NORMAL ECHOCARDIOGRAPHIC FINDINGS	2.1	4.51	3.0517	0.80464	

Table 4 : distribution of maternal complications in women with normal and impaired echo findings group women

MATERNAL COMPLICATIONS	Impaired echocardiographic findings	normal echocardiographic findings	Total	Impaired echocardiographic findings	normal echocardiographic findings	Impaired echocardiographic findings
ABRUPTION	1	0	1	3.33%	0.00%	1.67%
ECLAMPSIA, HELLP	1	0	1	3.33%	0.00%	1.67%
MILD ATONIC PPH	1	0	1	3.33%	0.00%	1.67%
MODERATE ATONIC PPH	1	0	1	3.33%	0.00%	1.67%
nil	26	30	56	86.67%	100.00%	93.33%
Total	30	30	60	100.00%	100.00%	100.00%

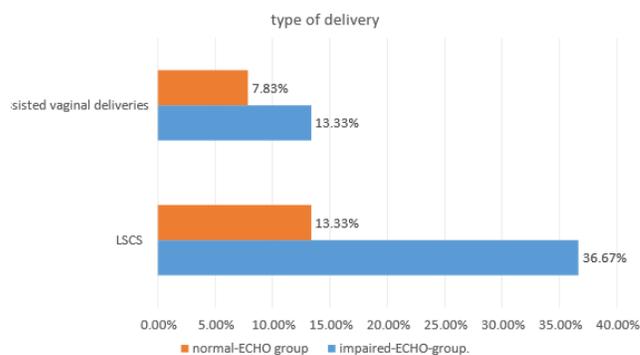
Table 5: showing indications for nicu admission in normal and impaired echo findings group women

INDICATION FOR NICU ADMISSION	Normal echocardiographic findings	Impaired echocardiographic findings	Total	normal echocardiographic findings	Impaired echocardiographic findings	Total
NIL	19	14	33	63.33%	46.67%	55.00%
IUGR	1	2	3	3.33%	6.67%	5.00%
MECONIUM ASPIRATION	1	4	5	3.33%	13.33%	8.33%
OBSERVATION	7	5	12	23.33%	16.67%	20.00%
CONGENITAL ANOMALY	0	1	1	0.00%	3.33%	1.67%
RESPIRATORY DISTRESS	2	4	6	6.67%	13.33%	10.00%
TOTAL NICU ADMISSION	11	16	27	36.67%	53.33%	45.00%

Table 6: distribution of gender of the baby with normal and impaired echo findings group women

GENDER OF THE BABY	normal echocardiographic findings	Impaired echocardiographic findings	Total	normal echocardiographic findings	Impaired echocardiographic findings	Total
MALE	12	19	31	40.00%	63.33%	51.67%
FEMALE	18	11	29	60.00%	36.67%	48.33%
Total	30	30	60	100.00%	100.00%	100.00%

Graph 5: distribution between assisted vaginal deliveries and lscs between normal and impaired echo findings group women



Discussion

1. Maternal complications was higher in the in impaired-ECHO-group. The need for LSCS (36.67% v/s13.33%), assisted vaginal deliveries (13.33%

v/s7.83%). The difference was statistically significant with a p value < 0.0001,

2. Incidence of PPH was 2 case in impaired ECHO and 0 case in normal-ECHO-group

3. In those who had impaired-echo-findings both the systolic findings and diastolic echo findings were altered and had correlation with the blood pressure control $r=0.068$.

4. Chaitra Shivananjiah et al study was conducted in the Department of Obstetrics and Gynaecology, M. S. Ramaiah Medical College and Teaching Hospital, Bengaluru noted mean LV end-systolic volume (LV ESV) in preeclamptic women was 33.45 ± 2.8 , LV end-diastolic volume (LV EDV) was 106 ± 3.01 , and LV systolic mass (LV Ms) was 87.1 ± 1.65 when compared to normotensive women LV ESV - 27 ± 0.74 , ($P < 0.0001$) LV EDV - 106.2 ± 0.43 , ($P = 0.3528$), and LV Ms - 84 ± 0.56 ($P < 0.0001$)

5. The prolonged Isovolumetric relaxation time in hypertensive patients in comparison to normotensives (98 ± 9.99 , 84.6 ± 0.59) was significant ($P < 0.0001$) as LV pressure takes greater time to fall below the atrial pressure compared with normotensive patients as also shown in study by Valens Ise et al

Conclusion

1. There was an increase in the incidences of maternal and fetal complications in those who had impaired echocardiographic findings

2. The incidence of failed inductions, LSCS deliveries also increased in those who had impaired echocardiographic findings

3. The female gender of the neonate was found as a risk factor for impaired echocardiographic findings

4. Early ECHO may help in identification of the high-risk patients and to manage them early, to prevent complications.

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