



## Research Article

### PREDICTORS OF FETO–MATERNAL MORBIDITY IN PREGNANCY WITH CHRONIC HYPERTENSION

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#### ABSTRACT

Chronic hypertension affects 0.5-5% of pregnant women. Ninety percent is due to essential hypertension and rest due to secondary causes. It is associated with both maternal and fetal complications. This is a prospective observational study carried out in a charitable maternity hospital over one year. In this study any correlation between some physical and blood parameters, and fetomaternal outcomes were studied. The maternal outcomes considered were the mode of delivery and superimposed preeclampsia. The fetal outcomes were birth weight and intrauterine deaths. The study showed poor fetal outcomes and superimposed preeclampsia was related to higher values of serum lactate dehydrogenase and uric acid and lower levels of haemoglobin percentage. However, only correlation of lactate dehydrogenase and fetomaternal morbidity was statistically significant.

**Keywords:** chronic hypertension, fetomaternal outcomes, intrauterine deaths, superimposed preeclampsia

#### INTRODUCTION

Chronic hypertension affects 0.5-5% of pregnant women, depending on which population that is studied and which criteria are used<sup>1</sup>. Hypertension in pregnancy is diagnosed as chronic if present before conception or occurs before the 20<sup>th</sup> week of gestation. It is defined as systolic blood pressure of at least 140 mm Hg and/or diastolic blood pressure of at least 90 mm Hg (WHO- International Society of Hypertension, 2003) measured on two different occasions. Chronic hypertension is of two types- essential (90%) and secondary. The risk for fetal and maternal morbidity and mortality is increased among pregnant women with chronic hypertension<sup>2</sup>. There is increased risk of small for gestational age (SGA)<sup>2</sup> and intrauterine death<sup>3</sup>. The mothers are at increased risk of superimposed preeclampsia, gestational diabetes and placental abruption<sup>4</sup>. Superimposed preeclampsia enhances the risk for offspring of chronically hypertensive mothers to be born small for gestational age<sup>5</sup>.

#### MATERIALS AND METHODS

This is a hospital based prospective observational study carried out in a charitable maternity hospital over duration of one year from 1<sup>st</sup> March 2014 to 28<sup>th</sup> February 2015.

The study population was pregnant women with diagnosed chronic hypertension of gestational age upto 20<sup>th</sup> weeks attending the outpatient department. 55 mothers entered the study after giving informed and written consent. The mothers were followed till delivery with treatment with oral antihypertensive agents such as esamlodipine, alpha methyl dopa and labetalol, single or in combination. Three short acting antihypertensive agents – hydralazine, labetalol, and short acting (sublingual or orally administered) nifedipine – are commonly used to control acute, very high blood pressure in women with severe hypertension in pregnancy<sup>6</sup>. Therefore, these drugs were used to control hypertensive emergency. Five mothers were lost in follow up.

The statistical tests of significance used were Chi square test and Student's t test.

Ethical committee clearance was taken from the hospital authority.

The parameters studied were clinical, biochemical and fetomaternal profile (ultrasound). The association of these parameters with the final fetomaternal outcomes was studied.

The exclusion criteria includes diabetes, connective tissue disorders, HIV infection, renal failure, malignancy, on allopurinol, receiving blood transfusion and known secondary causes like adrenal disorder and ischemic heart disease.

#### RESULTS

The total number of pregnant mothers followed till delivery in the study is fifty.

The range of age of the mothers is 16 to 39 years. The majority, 31 out of 50 (62%), belonged to age group 20-30 years. [Table 1]

The majority 38 out of 50 (76%) are from rural areas while 12 (24%) are from urban areas. [Table 2]

26 out of 50 pregnant women were diagnosed with chronic hypertension for the first time at the outpatient department before twenty weeks of gestation. Seven, twelve and five mothers were having chronic hypertension for duration less than 5 years, 5 to 10 years and more than 10 years respectively. [Figure 1]

Thirty mothers were untreated before booking at the hospital. Among the rest, fifteen mothers were on monotherapy and five on more than one antihypertensive agents. [Figure 2]

The fetal outcome found at delivery showed 17 healthy babies born with normal birth weight (>2.5 kg) and 29 babies born were of low birth weight (<2.5kg). There were 4 intrauterine fetal deaths. [Figure 3]

The modes of delivery were caesarean section (emergency or elective) in 30 women and vaginal delivery (spontaneous or induced) in 20 women. [Table 3]

Superimposed preeclampsia was diagnosed by new appearance of more than 1+ proteinuria (0.3gm/litre) in 8 mothers. Among these 4 cases were in age group more than thirty years. [Table 3]  
There were 4 intrauterine fetal deaths out of which 50% (2 out of 4) were in age group more than thirty years. [Table 3]

The average birth weights in the age groups <20 years, 20-30 years and >30 years were 2.45±0.78 kg, 2.56±0.64 kg and 2.24± 0.54 kg respectively. Hence, elderly mothers with chronic hypertension delivered babies with lower birth weights. [Table 3]

The outcomes studied on basis of duration of the chronic hypertension showed that the occurrence of fetal deaths and superimposed preeclampsia increased with the duration of the disease. [Table 4]

The blood parameters studied were serum lactate dehydrogenase (LDH) , serum uric acid and haemoglobin percentage. Higher values of serum LDH and uric acid are associated with poor fetal outcomes (low birth weight and fetal death) and higher incidence of preeclampsia. Low levels of haemoglobin were found in cases of low birth weight.[Table 5]

Logistic regression analysis was performed with any adverse outcome like intrauterine fetal death, low birth weight or preeclampsia, considered as outcome variable. Only blood LDH showed significant association. Odds ratio=1.23 (p<0.005) that is significant.

**Table 1: Age distribution of patients**

Total number of patients		50
Age (in years)	<20	4(8%)
Range: 16-39 years	20-30	31(62%)
	>30	15(30%)

**Table 2: Distribution of patients according to residence**

Rural	38(76%)
Urban	12(24%)

**Table 3: Distribution of feto-maternal outcomes according to maternal age**

Age (years)	<20 N=4	20-30 N=31	>30 N=15	Total =50	P value
Vaginal Delivery	2	13	5	20	>0.05
Caesarean Section	2	18	10	30	0.023
Superimposed Preeclampsia	3	1	4	8	0.0012
Intrauterine foetal death	1	1	2	4	>0.05
Birth Weight (Kilograms) mean±2SD	2.45±0.78	2.56±0.64	2.24±0.54	-	<0.05

**Table 4: Feto-maternal outcome based on duration of hypertension**

Outcomes	Foetal death	Caesarean section	Preeclampsia	Low birth weight
Duration of Hypertension				
Newly diagnosed	1	10	1	10
<5 years	1	7	3	6
>5 years	2	13	4	9

**Table 5: Relation of blood parameters with feto-maternal outcomes**

Parameters	Serum lactate Dehydrogenase	Serum uric acid	Haemoglobin%
Foetal Weight	<2.5 kg	499.6±252.5	6.03±1.9
	≥2.5 kg	318.5±414.9	4.81±0.89
Foetal outcome	Fetal death	620±31	7.03± 1.22
	Live birth	447±35	5.13±2.01
Superimposed preeclampsia	Yes	543±120	6.9±1.4
	No	555±143	5.8±1.1

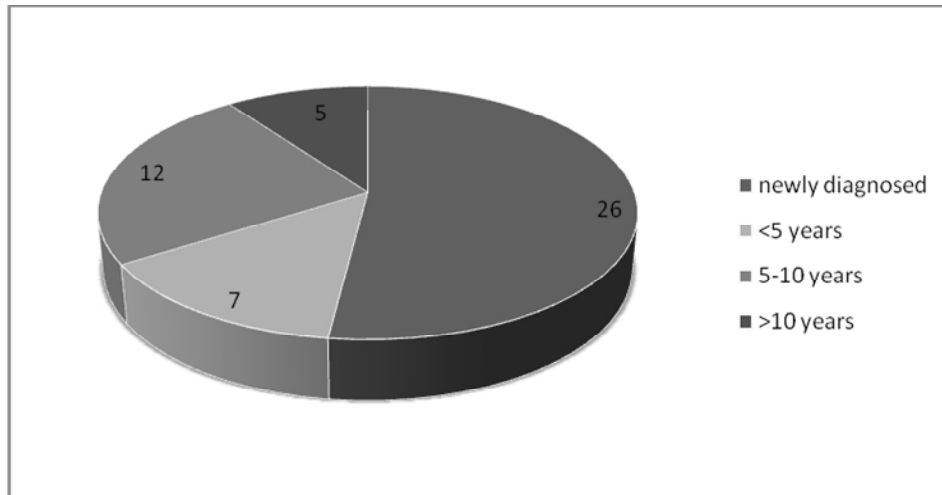


Figure 1: Proportion of duration of chronic hypertension among the patients

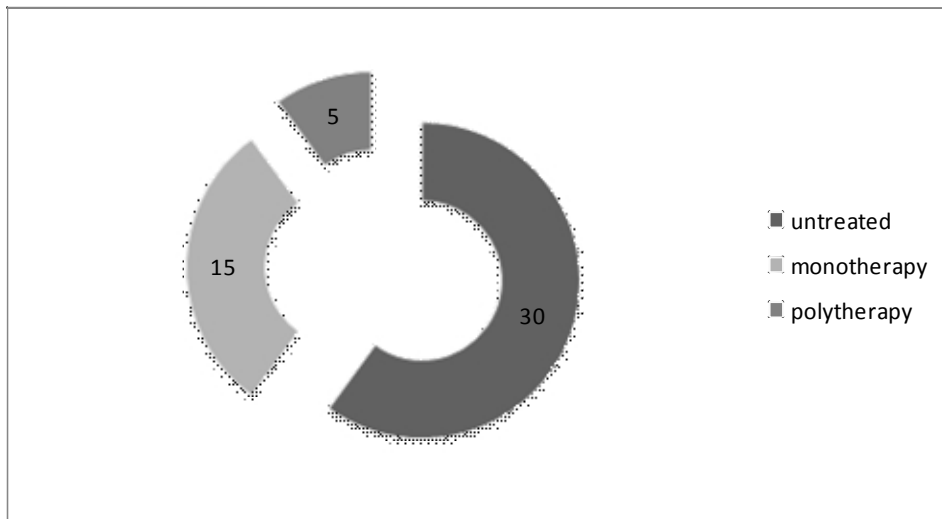


Figure 2: Distribution of patients based on duration of therapy of antihypertensive drugs

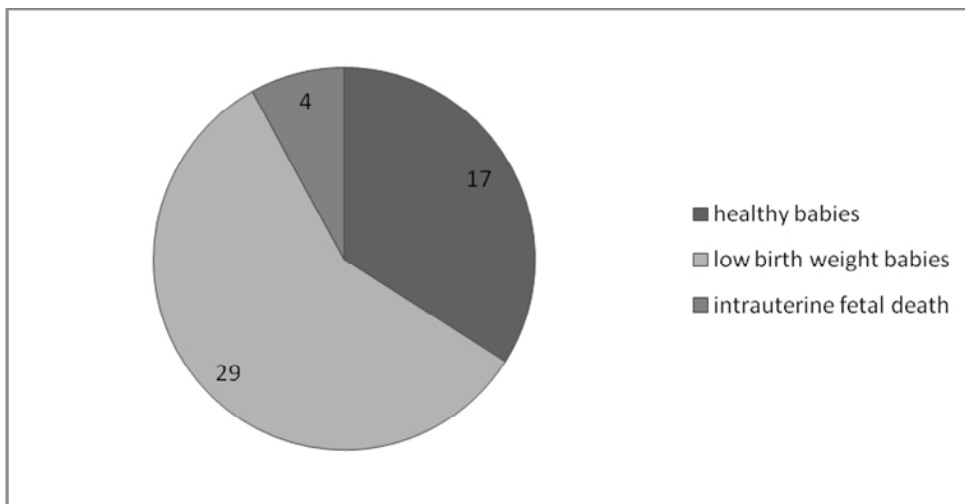


Figure 3: Foetal outcomes at delivery

## DISCUSSIONS

A 1991 study on 60 pregnant women with chronic hypertension by J. Verhaeghe showed serum LDH >400 U/L was associated with liver necrosis and maternal complications<sup>7</sup>.

A study in 2005 by Qublan in Jordan showed that LDH >800IU/L was associated with significant perinatal mortality<sup>8</sup>.

In a study by Sibai and Anderson preeclampsia rate was shown to be 10-25% in mild and upto 50% in severe chronic hypertension<sup>9</sup>. In our study the rate of superimposed preeclampsia was 16% (n=8).

Kee-Hak Lim et al showed in their study in 1998 that serum uric acid is related to the severity of the disease in pregnancy with chronic hypertension and perinatal outcome<sup>10</sup>.

Asma Ul Hosna et al showed that mean serum uric acid is higher in hypertensives than controls<sup>11</sup>. In our study the mean uric acid was 6.08, higher than the mean value of 3.61±0.75 mg/dl in late pregnancy<sup>12</sup>.

The incidence of superimposed preeclampsia on mild chronic hypertension is 10-25% and its 50% in severe chronic hypertension<sup>2</sup>. In our study the incidence of preeclampsia is 16%.

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