

Perinatal Outcome in Hypertensive Mothers: A Prospective Study in a Rural Tertiary Hospital

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Research Article

Abstract: Introduction: Hypertensive disorders of pregnancy are one of the most common medical complications occurring during pregnancy and leading to higher perinatal morbidity and mortality. Hence the study was undertaken to study the perinatal outcomes. **Material and Methods:** A prospective study to evaluate the perinatal outcome in mothers with hypertensive disease during pregnancy in Adichunchanigiri Institute of Medical Sciences, over a period of 16 months. Statistical analysis done using SPSS and results obtained. **Results:** During the study period, 1000 mothers delivered out of which 130 had hypertensive disorders of pregnancy, incidence being 13%. Cases of gestational hypertension (GH) and pre-eclampsia (PE) constituted 59 (45.38%) each and eclampsia (E) and chronic hypertension (CH) constituted 9 (6.92%) and 3 (2.66%) respectively. Primigravida women constituted 74 (56.92%) of which, PE was developed in 31 (41.89%) and Eclampsia in 5 (6.75%). Term deliveries were observed in mothers with GH, PE and CH whereas Preterm deliveries in mothers of Severe PE, Imminent Eclampsia and eclampsia groups with statistical significance ($p=0.004$). Seventy four (56.9%) births needed intervention in the form of Cesarean section, fetal distress being the most common indication and that also associated with oligohydramnios. Sixty eight (52.36%) of the babies were low birth weight. There was a significant association ($p=0.02$) between grades of GH and gestational age. LBW babies were born to women with preeclampsia, constituting 57.35% ($p=0.016$). Overall preterm births were 48 (36.9%) and the babies born to women with pre-eclampsia presented a higher percentage (60%). This shows a significant association between prematurity and severity of gestational hypertension levels ($p=0.004$). Intrauterine growth retarded babies constituted 37 (28.46%). Birth weight and gestational age had statistically significant correlation with $p=0.000$. Intrauterine fetal demise constituted 13 (10%) and 3 (2.3%) delivered still borns, constituting a mortality of 12.30%. **Conclusion:** Incidence of low birth weight, IUGR and prematurity remains significantly high in babies born to mothers with GH, which was more common in primigravidae, with majority developing pre-eclampsia and needing intervention to ensure delivery of the baby at appropriate time, to improve perinatal outcome.

Introduction

Hypertensive disorders of pregnancy have been identified as a major worldwide health problem, associated with increased perinatal morbidity and mortality. Pregnancy induced hypertension (PIH) is one of the most common causes of both maternal and neonatal morbidity. ¹Pre-eclampsia is a multi-system disorder of the mother that

affects the fetus because of utero-placental insufficiency.² Fetal growth retardation and PIH are thought to be initiated with improper remodeling of the uterine spiral arteries caused by inadequate trophoblast invasion in early pregnancy, leading to reduced placental and fetal perfusion and subsequent dysfunction of the maternal vascular endothelium³. Chief complications which may arise are intra-uterine growth retardation (IUGR) and intra-uterine death due to chronic placental insufficiency, prematurity and birth asphyxia. In India alone, 6-8 million low birth weight (LBW) infants are born annually⁴. The primary medical intervention in affected pregnancy is to ensure delivery of the baby at the optimal time, balancing the risks of fetal compromise from uteroplacental dysfunction against those of prematurity.

Material and Methods

A prospective study was conducted to evaluate the perinatal outcome amongst mothers admitted with hypertensive disease during pregnancy at Adichunchanigiri Institute of Medical Sciences, BG Nagar over a period of 16 months (from June 2012 to September 2013). The study sample comprised of 130 babies born to mothers with hypertensive disorders of pregnancy. Maternal details were recorded with respect to age, parity, socioeconomic status, gestational age at delivery and mode of delivery and prevalence of various groups of hypertensive disorders of pregnancy. Relevant maternal investigations were also obtained. Hypertensive disorders of pregnancy were classified as gestational hypertension, preeclampsia, eclampsia and chronic hypertension. Preeclampsia was further sub classified into mild, severe preeclampsia and imminent Eclampsia. Mild PE is characterized by an elevated blood pressure less than 160 mm Hg. Severe PE is defined as a blood pressure greater than 160 mm Hg (systolic) or 110 mm Hg (diastolic) associated with proteinuria greater than or equal to 5 grams per day, furthermore, in the presence of multiorgan involvement including thrombocytopenia (platelet count less than 100,000/uL), pulmonary edema,

or oliguria (less than 500 mL per day). Chronic hypertension was defined as a diastolic blood pressure of ≥ 90 mm Hg at the enrollment visit or at < 20 weeks gestation or the use of current or previous antihypertensive medication. Fetal outcome data were documented with respect to birth weight, sex, gestational age, still birth rate, neonatal death rate and overall perinatal loss. The infants were examined and Birth weights were recorded and centiles calculated by birth weight centile charts, LBW babies were taken below 2.5kgs, small for gestational age (SGA) was defined as being less than the 10th centile. Gestational age was estimated by modified Ballard's scoring.

Statistical Analysis

This Descriptive and explorative study data was analyzed using the statistical Package for Social Sciences (SPSS) Version 16 for windows. P value < 0.05 was taken as significant.

Results

During the study period 1000 mothers delivered out of which 130 had hypertensive disorders of pregnancy, incidence being 13%. Cases of gestational hypertension (GH) and pre-eclampsia (PE) constituted 59 (45.38%) each and eclampsia (E) and chronic hypertension (CH) constituted 9 (6.92%) and 3 (2.66 %) respectively. Mothers between 21-25 years constituted 44.6% and 30.8% in less than < 20 years. Primigravida women constituted 74 (56.92%) of which, GH was developed in 38 (64.4 %), PE in 31 (41.89%) and Eclampsia in 5 (6.75%). Gravida 2 women constituted 25.38 %, with 45.45 % developing pre eclampsia. 41.89% of primi's developed preeclampsia and 55.6 % of eclampsia cases were constituted by primis. Term deliveries were observed in mothers with GH, mild PE and CH whereas Preterm deliveries in mothers having Severe PE, Imminent Eclampsia and eclampsia groups with statistical significance ($p = 0.004$) (Table 1) Seventy four (56.9%) births needed intervention in the form of Cesarean section, fetal distress being the most common indication and more those being associated with oligohydramnios. Sixty eight (52.36%) of the babies were low birth weight. There was a significant association ($p = 0.02$) (Table 2) (Figures) between grades of hypertensive disorders of pregnancy and gestational age. 36.9 % of babies weighed between 1.6-2.5 kgs. LBW babies born to mothers less than 20 years constituted 40% and LBW babies were born more to women with preeclampsia, constituted 57.35% ($p = 0.016$). Out of 59 pre eclamptic mothers 39 (66.10 %) babies and 55.55 % eclamptic mother babies were of low birth weight. 52.7 % primi mothers had LBW babies. With significant correlation being between the obstetric score and birth weight of babies $p = 0.013$. (Table 3) Intrauterine growth

retarded babies constituted 37 (28.46%). Birth weight and gestational age had statistically significant correlation with $p = 0.000$. (Table 4) Overall preterm births were 48 (36.9%) and the babies born to women with pre-eclampsia presented a higher percentage (60%). This shows a significant association between prematurity and severity of gestational hypertension levels ($p = 0.004$). 60.4% of preterms were born to pre eclamptic mothers. Babies born at < 33 weeks were 13.8 % and 16.2 % were born between 34 and 37 weeks. Intrauterine fetal demise constituted 13 (10%) and 4 (3.07%) delivered still born babies constituting a perinatal mortality of 13.07%. 60 % of IUD's and 25 % stillbirth were delivered by PE mothers. 75 % Stillborn weighed between 1.6-2.5 kgs and 40% IUD's weighed between 1-1.5kgs. C-Section was needed for 21.42 % of the IUD's and Stillborns.

Discussion

Hypertensive disorder of pregnancy leads to higher perinatal and neonatal mortality. Hypertensive disorders of pregnancy is a global problem and complicates approximately 10-17%⁵, 5-15%⁶ and 7-10%^{7,8} of pregnancies and was observed in our study to be 13 %. Intra Uterine Growth Retardation (IUGR), reduction in amniotic fluid volume, fetal distress, insufficient placental blood transmission, premature placental detachment, and intrauterine fetal death can be considered as early fetal complications in babies born to mothers with hypertensive disorders of pregnancy^{9,10}. Also Pregnancy related hypertensive disorders in each trimester affect fetal blood pressure and wellbeing. In our study Primigravida women constituted 74 (56.92%) slightly lesser to a Study by Bhattacharya S¹¹ who reported that 65.6% cases were primigravidas. Duckitt *et al.*¹² and Jose Villar *et al.*¹³ also reported that primigravida was a risk factor for preeclampsia and eclampsia. Incidence of PE and E being 45.3% and 6.92 % respectively was much higher compared to Shalini K. *et al.*¹⁴ which had reported the incidence to be 7-10% and 0.5 to 1.8% respectively and 3-10% and 0.8% respectively in various other studies^{7,15,16}. Seventy four (56.9%) births needed intervention in the form of Cesarean section in our study slightly lesser compared to similar studies by Chappell *et al.*¹⁷, Oladokun A *et al.*¹⁸, Miguil M *et al.*¹⁹ and Dissanayake VH *et al.*²⁰ revealed caesarean section rates as 70%, 60%, 71% and 78% respectively, attributable to smaller sample size. Sixty eight (52.36%) of the babies were low birth weight. There was a significant association ($p = 0.02$) between grades of Gestational hypertension and gestational age. LBW babies were born to women with preeclampsia, constituting 57.35% ($p = 0.016$). Audrey *et al.*²¹ and Jiménez *et al.*²² concluded that maternal age less than 20 years was the strongest risk factor for preeclampsia

however in our study 42.5 % and 48.27% of pre eclamptic mothers belonged to less than 20 years and 21-25 years respectively. LBW babies born to mothers less than 20 years constituted 40% and were born more to women with preeclampsia, constituting 57.35% ($p=0.016$). Out of 59 pre eclamptic cases, 66.10 % babies and 55.55 % eclamptic mother babies were of low birth weight. Intra-uterine growth retardation contributes to almost two-thirds of LBW infants born in India²³. Delivery of Intrauterine growth retarded babies comprised nearly 28.46% (quarter) of the women compared to 48.3% (half) with superimposed preeclampsia¹⁷. The risk of SGA also increased with the severity of PIH. The association of low birth weight and SGA was particularly evident with severe and early onset pre-eclampsia as compared with milder PIH.²⁴ Overall preterm births were 36.9% and the babies born to women with pre-eclampsia presented a higher percentage (60%). This shows a significant association between prematurity and severity of gestational hypertension levels ($p=0.004$). Kapoor *et al.*²⁵ concluded that, the incidence of premature babies was 23 percent and prematurity was one of the major risk factors for increasing the perinatal mortality. Prematurity was the most important factor responsible for increased perinatal

morbidity and mortality which is in accordance with earlier reports^{7,26}. Intrauterine fetal demise constituted 10% and 3.07 % delivered still borns, constituting a perinatal mortality of 13.07 % similar to other few studies where the rate of stillbirth was approximately 3 per 1000 live births beyond 28 weeks gestation, but is very less compared to a study by Shaheen *et al.*²⁷, where perinatal mortality was 41.6 percent. 60 % of IUD's and 25 % stillbirth were delivered by Pre-eclampsia mothers similar to Sibai and Barton²⁸ which reported that severe Pre-eclampsia is associated with higher perinatal mortality. 75 % Stillborn weighed between 1.6-2.5 kgs and 40% IUD's weighed between 1-1.5kgs, and C-Section was needed for 21.42 % of their deliveries.

Conclusion

In the present study, hypertensive disorders of pregnancy were very common problem in the rural population. It was common in young primigravidas. The adverse perinatal outcomes mainly were increased low birth weight babies and preterm babies, which can be improved by regular antenatal checkups, screening and appropriate management of hypertensive disorders of pregnancy and timely decision regarding mode of delivery and adequate NICU care.

Table 1: PIH grade and gestational age

			GA		Total
PIHGRADE	G H	Count	47	12	59
		% of PIHGRADE	79.7%	20.3%	100.0%
	P E	Count	18	12	30
		% of PIHGRADE	60.0	40.0	100.0
	Severe P E	Count	9	15	24
		% of PIHGRADE	37.5%	62.5%	100.0%
	I E	Count	3	2	5
		% of PIHGRADE	60.0%	40.0%	100.0%
	E	Count	3	6	9
		% of PIHGRADE	33.3%	66.7%	100.0%
	C H	Count	2	1	3
		% of PIHGRADE	66.7%	33.3%	100.0%
Total		Count	82	48	130
		% of PIHGRADE	63.1%	36.9%	100.0%

Systematic Review

		Value	P value
Nominal by Nominal	Contingency Coefficient	.343	.004
N of Valid Cases		130	

Table 2: Gestational age (weeks) * PIH GRADE

		PIHGRADE						Total
		G H	P E	Sev PE	I E	E	C H	
WKS	28	0	0	1	0	1	0	2
		.0%	.0%	4.2%	.0%	11.1%	.0%	1.5%
	29	0	2	4	0	0	0	6
		.0%	6.7%	16.7%	.0%	.0%	.0%	4.6%
	30	0	0	0	0	1	0	1
		.0%	.0%	.0%	.0%	11.1%	.0%	.8%

	32	1	1	1	0	0	0	3
		1.7%	3.3%	4.2%	.0%	.0%	.0%	2.3%
	33	1	0	3	1	1	0	6
		1.7%	.0%	12.5%	20.0%	11.1%	.0%	4.6%
	34	1	2	0	0	0	0	3
		1.7%	6.7%	.0%	.0%	.0%	.0%	2.3%
	35	0	0	1	1	1	1	4
		.0%	.0%	4.2%	20.0%	11.1%	33.3%	3.1%
	36	3	2	3	0	0	0	8
		5.1%	6.7%	12.5%	.0%	.0%	.0%	6.2%
	37	1	2	2	0	1	0	6
		1.7%	6.7%	8.3%	.0%	11.1%	.0%	4.6%
	38	41	19	9	3	4	2	78
		69.5%	63.3%	37.5%	60.0%	44.4%	66.7%	60.0%
	39	5	0	0	0	0	0	5
		8.5%	.0%	.0%	.0%	.0%	.0%	3.8%
	40	5	2	0	0	0	0	7
		8.5%	6.7%	.0%	.0%	.0%	.0%	5.4%
	41	1	0	0	0	0	0	1
		1.7%	.0%	.0%	.0%	.0%	.0%	.8%
Total		59	30	24	5	9	3	130
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Systematic Review

		Value	P value
Nominal by Nominal	Contingency Coefficient	.628	.020
N of Valid Cases		130	

Table 3: Obstetric Score * Weight

		Weight					Total
		< 1 kg	1-15kg	1.6-2.5	2.6-3	>3	
OBSCORE	Primi	5	4	30	17	18	74
		6.8%	5.4%	40.5%	23.0%	24.3%	100.0%
	G2	0	6	11	10	6	33
		.0%	18.2%	33.3%	30.3%	18.2%	100.0%
	G3	0	3	3	6	3	15
		.0%	20.0%	20.0%	40.0%	20.0%	100.0%
	G4	0	1	3	0	2	6
		.0%	16.7%	50.0%	.0%	33.3%	100.0%
	G5	1	0	0	0	0	1
		100.0%	.0%	.0%	.0%	.0%	100.0%
	G7	0	0	1	0	0	1
		.0%	.0%	100.0%	.0%	.0%	100.0%
	Total	6	14	48	33	29	130
		4.6%	10.8%	36.9%	25.4%	22.3%	100.0%

Systematic Review

		Value	P value
Nominal by Nominal	Contingency Coefficient	.468	.013
N of Valid Cases		130	

Table 4: Weight * Gestational Age

			GA		Total
			Term	Pre	
WEIGHT	< 1 kg	Count	2	4	6
		% of GA	2.4%	8.3%	4.6%
	1-15kg	Count	2	12	14
		% of GA	2.4%	25.0%	10.8%
	1.6-2.5	Count	24	24	48
		% of GA	29.3%	50.0%	36.9%
	2.6-3	Count	30	3	33

	>3	% of GA	36.6%	6.3%	25.4%
		Count	24	5	29
		% of GA	29.3%	10.4%	22.3%
	Total	Count	82	48	130
		% of GA	100.0%	100.0%	100.0%

Systematic Review

		Value	P value
Nominal by Nominal	Contingency Coefficient	.465	.000
N of Valid Cases		130	

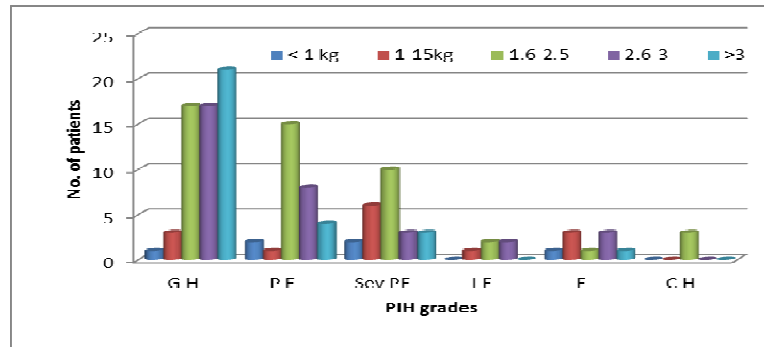
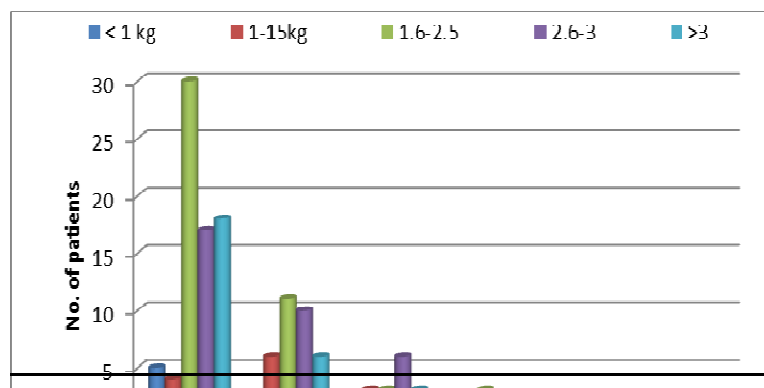


Figure 1: Grades of hypertensive disorders of pregnancy vs Birth weight



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