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An epidemiological study of assessment of fetal outcome in hypertensive disorders of pregnancy

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Abstract

Introduction: The maternal health without any nutritional and systemic disorders is essential to provide an optimal in-utero environment for proper growth and development of fetus. Hypertensive disorders of pregnancy(HDP) are one of those conditions which may jeopardize not only the maternal health but also the fetal outcome.

Aim of the study: Assessment of fetal outcome in mothers with hypertensive disorders of pregnancy.

Results: In the study of 1286 pregnant mothers, 628 mothers having pregnancy induced hypertension (PIH) were taken as cases and 658 mothers without PIH were taken as control group. In the case group, there were 530 live births(LB) (81.9%) out of 647 births, whereas in control group, there were 615 LB (93.2%) out of 660 births. The deadborn(DB) babies in case group were 117(18.1%) whereas in control group, it was only 45 (6.8%). Moreover there were 5 maternal deaths and 3 maternal hysterectomies in case group comparing with no deaths and morbidity in control group. Maximum number of PIH mothers were newly diagnosed 593 (94.4%) and most of the mothers were diagnosed in third trimester only 567(90.3%). PIH was more in primigravida 374(59.6%) when compared to all other gravidas combined. With increasing severity of HDP, DB babies were more in number. Regarding to maturity and gestational age, preterm babies were 171(26.4%) and term small for gestationl age(SGA) were 117(18.1%)- totalling (44.5%) in case group of 647 babies.

Conclusion: Both maternal and fetal morbidity and mortality were higher in HDP. Diagnosis of both new and recurrent cases occurred mostly in third trimester. PIH was more common in primigravida. With increasing severity of HDP, DB babies were more in number. Fetal outcome might not be dependent upon mode of treatment and might be due to severity of the disease. Type of delivery did not have much impact on both positive and negative fetal outcome. Preterm babies and term SGA babies were more in case group which will have greater negative impact in future health of the baby. Early diagnosis and treatment of HDP prevents the negative impact of fetal outcome.

Keywords: Hypertension, Pregnancy, Delivery, Fetal outcome, Maturity and gestational age of the baby.

Introduction

The maternal health without any nutritional and systemic disorders is essential to provide an optimal in-utero environment for proper growth and development of fetus. In general, fetus is well protected and insulated against adverse physical, chemical and zoological insults. HDP are one of those conditions which may jeopardize not only the maternal health but also the fetal outcome. HDP occur in 6-8% of pregnancies and epidemiological studies showed that there was no decline in incidence of eclampsia in developing countries in the last decade inspite of better antenatal care.[1,2] Hence it is decided to study the fetal outcome in mothers with hypertensive disorders complicating pregnancy.

Aim of the study

Assessment of fetal outcome in mothers with hypertensive disorders of pregnancy.

Material and Methods

Study design: Case Control Study

This study was carried out over 1 year period from August 2005 to July 2006 at the Department of Obstetrics and Gynaecology, and Department of Paediatrics, Government Raja Mirasudhar Hospital, Thanjavur, Tamil Nadu, India.

Inclusion criteria

1. Pregnant mothers with HDP for 'case group study'.
2. Pregnant mothers without HDP for 'control group study'.

Exclusion criteria

1. Pregnant mothers who did not turn up for follow up.
2. Pregnant mothers who were not delivered during the study period.

In this study, there were 628 cases and 658 controls totalling 1286 pregnant mothers. They were explained about the study and prior consent was got to proceed with the study and a preformed questionnaire was given. The mothers were questioned regarding parity, prior history of any associated illnesses and prior HDP. They were examined regarding age, height, weight, associated symptoms and signs, and blood pressure recorded. The mode of treatment with antihypertensive drugs and the method of delivery were noted. They were followed till puerperium. Babies born to them were examined and documented including various aspects of fetal mortality and morbidity.

The results were analysed using z test or Normal test and x^2 test.

Results

Details of study group is given below (Table 1).

Table 1: Data of study group

	PIH cases			Control group
Pregnant mothers	628			658
Twin pregnancies	17			2
Triplets	1			-
Births	647			660
LB	530(81.9%)	29(≤7mo GA)	501(>7mo GA)	615(93.2%)
DB	117(18.1%)	33(≤7mo GA)	84(>7mo GA)	45(6.8%)
Newborn deaths	20			17
Mothers expired	5			-
Mothers morbidity	3 hysterectomy			-

(LB-livebirths; DB-deadborn; GA-gestational age)

Various aspects of fetal outcome are given below (Table 2)

Table 2: Fetal outcome

	PIH	Control
DB < 20 weeks	3	20
≥ 20 weeks	114	25
Preterm(SGA, AGA & LGA)	171(26.4%)	18(2.7%)
Term SGA Term AGA	117(18.1%) 524(79.4%)	74 (11.2%) 311(49.3%)
Newborn deaths		
RDS	8	2
Birth asphyxia	9	5
Prematurity	1	1
Sepsis	2	9

(AGA-Appropriate for gestational age; LGA-Large for gestational age; RDS-Respiratory distress syndrome)

Maximum numbers of PIH mothers were newly diagnosed 593(94.4%) and most of the mothers were diagnosed in third trimester only 567(90.3%). Increased severity of disorder occurred in recurrent PIH group- 12 out of 26(46.1%). PIH was more in primigravida 374 (59.6%) when compared to all other gravidas combined 254 (40.4%). (Table 3 & 4)

Table 3: Type and month of diagnosis of study group

Parity/Month	PIH Group(%)						Control(%)
	New(%)	Recur(%)	Chronic(%)	Total(%)			
Primigravida	374(59.6)	-	-	374(59.6)			314(47.7)
Multigravida	219(34.9)	26(4.1)	9(1.4)	254(40.4)			344(52.3)
Primigravida	374(59.6)	-	-	374(59.6)			314(47.7)
Gravida 2	129(20.4)						238(36.2)
Gravida>2	125(19.9)						106(16.1)
≤7mo diagnosis	52	4	5	61 (9.7)	29 LB	33 DB	---
>7mo diagnosis	541	22	4	567 (90.3)	501 LB	84 DB	

(RECUR-recurrent; CHRONIC-chronic HT with superimposed PIH)

Fetal outcome might not be dependent upon mode of treatment and that might be due severity of the disease(Table 4).

Table 4: Fetal outcome in relation to drugs received in case population

	ALDO		ALDO+NIFE		ALDO+NIFE+$MgSO_4$		Others		Total	
	LB	DB	LB	DB	LB	DB	LB	DB	LB	DB
Mild	213	23	108	11	3	0	52	7	376	41
Severe	17	6	81	31	11	6	11	5	120	48
APE	6	1	5	4	13	21	7	0	31	26
IPE	0	0	1	1	0	0	2	1	3	2

(ALDO-alpha methyl dopa; NIFE: nifedipine; MgSO4: magnesium sulphate)

Type of delivery does not have much impact on positive as well as negative fetal outcome(Table 5).

Table 5: Fetal outcome in relation to type of delivery in study population

	LN	LSCS	P value	LN	LSCS	P value
	LB	LB		DB	DB	
PIH	361	169	<0.05	98	19	>0.05
Control	483	132	<0.05	45	-	<0.05

(LN- Labour naturalis; LSCS- Lower segment Cesarian section)

With increasing severity of PIH cases, the dead born babies were more in number(Table 6).

Table 6: Type of diagnosis and fetal outcome in relation to case severity

Type	Mild	Severe	APE	IPE	Total
Primi gravida	239	95	36	4	374
Multi gravida					
New	141	57	21	0	219
Recurrent	14	12	0	0	26
Chronic	7	2	0	0	9
Total	401(63.9%)	166(26.4%)	57(9.1%)	4(0.6%)	628
Fetal outcome					
LB	376((90.2%)	120(71.4%)	31(54.4%)	3(60%)	530
DB	41(9.8%)	48(28.6%)	26(45.6%)	2(40%)	117
Total	417	168	57	5	647

(APE- Antepartal eclampsia; IPE- Intrapartal eclampsia)

There is no much difference in outcome in relation with associated risk factors like anemia, gestational diabetes milletus etc.(Table 7)

Table 7: Fetal outcome in study group in relation with associated risk factors

	Associated with risk factors		Associated without risk factors	
	LB(%)	DB(%)	LB(%)	DB(%)
PIH	132(80.5)	32(19.5)	398(82.4)	85(17.6)
Control	79((94.1)	5(5.9)	536(93.1)	40(6.9)

Regarding to maturity and gestational age of the baby there was greater negative impact in fetal outcome (45.6%) in case group(Table 8).

Table 8: Fetal outcome with maturity in study population

Maturity	Preterm						Term						Post Term						Others	
Gestational Age	SGA		AGA		LGA		SGA		AGA		LGA		SGA		AGA		LGA			
Outcome	LB	DB	LB	DB	LB	DB	LB	DB	LB	DB	LB	DB	LB	DB	LB	DB	LB	DB	LB	DB
PIH Cases	44	42	47	24	13	1	100	17	302	9	21	0	1	5	2	3	0	0	0	16
Control Group	1	2	100	5	0	0	69	5	518	6	17	0	0	0	0	0	0	0	0	27

Discussion

The study was conducted with 628 mothers who had HDP (case group) and compared with 658 mothers who did not have HDP (control group). The fetal outcome was assessed between two groups. In this study, in case group there were 530 LB (81.9%) out of 647 births, whereas in control group there were 615 LB (93.2%) out of 660 births. The percentage of DB in case group was (18.1%) whereas in control group it was only 6.8%. Moreover there were 5 maternal deaths in case group with no deaths in control group. These datas indicate that both maternal and fetal mortality are higher in case group showing the significance of the PIH in maternal and fetal outcome[3] (Table 1).

Out of 631 babies of case group population whose gestational age and maturity were analysed, 171(26.4%) were delivered preterm and 117(18.1%) babies were delivered as term SGA, totalling 288(44.5%). Out of 660 babies of control group 18(2.7%) were delivered preterm and 74(11.2%) babies were delivered as term SGA. This shows the greater negative impact on fetal outcome in case group compared with control group. 524(79.4%) babies were born as term AGA in control group whereas 311(49.3%) babies were born as term AGA in case group. This also shows the negative impact on fetal outcome in case group compared with control group. DB were higher in babies with ≥ 20 weeks GA suggesting the deleterious effect of HDP with prolonged duration of illness. In newborn deaths, birth asphyxia and RDS were common in PIH group whereas sepsis were common in control group (Table 2 & 8).

Occurrence of PIH cases were more in the primigravida mothers 374(59.6%) out of 628 cases whereas there were only 254 cases (40.4%) in all other gravidas totalled. Moreover when both primigravida and second gravida were added there were 503 cases (80.1%) in PIH gravida group. This suggests the increased occurrence of PIH cases in the initial pregnancies but when it is compared with control group, primigravida mother were 314(47.7%) and second gravida were 238(36.1%) totalling 552(83.8%) which is almost equal to PIH case group (80.1%). This suggestion may be noted when assessing the increased risk of PIH cases in nulliparous women. Comparing the month of diagnosis case group, most of the mothers were diagnosed in third trimester only- both in new cases541 (91.2%) out of 593 cases and in recurrent PIH cases 22(84.6%) out of 26 cases. This further confirms the need of awareness of diagnosing PIH cases. There is significant increase in DB- 84 out of 117 deaths in PIH mothers diagnosed after third trimester. This suggests more number of months between diagnosis and delivery leads to greater negative impact on fetal outcome. This may be due to the effect of the hypertensive disorders in producing various deleterious effects on placenta and fetus showing more period of exposure leads to more deleterious effect[4,5](Table 3).

In our study, when mild cases were treated with alpha methyl dopa DB were 23(9.7%) whereas treatment with alpha methyl dopa +nifedipine showed 11(9.2%), showing no difference between treating the mild cases with alpha methyl dopa or alpha methyldopa and nifedipine. When severe cases were treated with alpha methyl dopa DB were 6(26%) while treatment with alpha methyl dopa + nifedipine DB were 31(27.7%), and treatment with aldo+nifedipine+$Mgso_4$ DB were 6(35.2%). This also shows that there is no significant variance between treating the severe cases with alpha methyl dopa only or alpha methyl dopa + nifedipine or alpha methyl dopa+nifedipine +$Mgso_4$. DB rate was relatively higher in APE and IPE while treating with alpha methyl dopa+nifedipine and alpha methyl dopa+nifedipine +$Mgso_4$ as in APE mothers the cases treated with alpha methyl dopa only had one DB (14.2%), treating with alpha methyl dopa+nifedipine DB were 4(44.4%), and treating with alpha methyl dopa+nifedipine +$Mgso_4$ DB were 21(61.7%). In IPE mothers, on treatment with alphamethyldopa +nifedipine DB was 1(50%). These data showed that the fetal outcome may not be dependent upon the mode of treatment. This may be due to severity of the disease[6,7,8,9,10] (Table 4).

LB were 361(68.1%) in cases and 483(78.5%) in control group when delivered via naturalis. When delivered via naturalis, DB were 98(88.3%) in cases group whereas in control group all DB 45(100%) were delivered via naturalis. This data shows that type of delivery does not have much impact on positive as well as negative fetal outcome (Table 5).

Mild PIH cases were more when mothers were newly diagnosed (primigravida-new 239 (63.9%) out of 374 cases in the primigravida group, multigravida – new 141(64.4%) out of 219 multigravida new cases) whereas severe PIH cases were more in recurrent PIH mother 12(46.1%) in relation to mild cases 14(53.9%) suggesting the increased severity of the disorder in recurrent PIH group[11,12] (Table 6).

Comparing the outcome of babies, DB were common in severe preeclampsia 48(28.6%), APE 26(45.6%) and in IPE 2(66.7%) whereas in mild preeclampsia cases DB were 41 (9.8%). This shows that with increasing severity of the PIH cases, DB were more in number(Table 6).

There was little increase in DB when there were other associated risk factors as DB in PIH mothers with associated risk factors were 32(19.5%) whereas PIH without other risk factors they were 85 (17.6%) (Table 7)

Conclusion

- Both maternal and fetal morbidity and mortality were higher in HDP.
- Preterm babies and term SGA were more in case group which will have greater negative impact in the future health of the baby

- Diagnosis of both new and recurrent cases occurred mostly in third trimester.
- Fetal outcome might not be dependent upon mode of treatment and might be due to severity of the disease.
- There was increased severity of the disorder in recurrent PIH.
- With increasing severity of the PIH, DB were more in number.
- The type of delivery did not have much impact both on positive and negative fetal outcome.
- Earlier diagnosis of PIH prevents the negative impact on fetal outcome which stresses the need for identification of cases not only by doctors but other field health functionaries also.
- PIH training unit can be established at every medical college and periodic CME on PIH can be conducted for field health functionaries and doctors working in primary and secondary level institutions. This will go in a long way to improve the fetal outcome.

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