



MATERNAL MORBIDITY AND MORTALITY WITH PERINATAL OUTCOME IN INPATIENTS WITH SEVERE PREGNANCY INDUCED HYPERTENSION UNDERGOING VAGINAL BIRTH OR CAESAREAN SECTION

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ABSTRACT

Background: Hypertensive disease of pregnancy is the leading cause of maternal death worldwide¹.

They can complicate up to 10% of pregnancies and promote significant maternal and perinatal morbidity and mortality worldwide².**Method:** It is a hospital based comparative observational study carried out in a tertiary care hospital on 300 patients with severe pregnancy induced hypertension with either of SBP \geq 160 mm of Hg or DBP \geq 110 mm of Hg or both on admission diagnosed after 34 weeks of gestation with or without proteinuria admitted through Antenatal OPD or Emergency labour room, Gauhati Medical college and hospital over a period of 1 year. Patients who presented with eclampsia at the time of admission were excluded. Patients with previous caesarean section were excluded. Patients with associated other co-morbid condition affecting the maternal outcome such as diabetes mellitus, placenta previa, PROM with sepsis, established organ failure, severe anemia, heart disease, seizure disorder, patients with diagnosed fetal congenital anomaly or intra uterine fetal death, patients with multiple pregnancy, non-cephalic presentation were excluded from the study. All women with severe pregnancy induced hypertension in this study were divided into two groups on the basis of whether delivered vaginally or by caesarean section. The First group consisted of patients who delivered vaginally was called "VD Group". The Second group consisted of patients in whom lower segment cesarean section was carried out due to severe PIH with varied associated indications was called the "CD group". The two groups are compared on the basis of age distribution, parity, booked or unbooked status, religion, indication of induction or caesarean section, ante-partum, intra-partum and postpartum complications, maternal and fetal outcome. Investigation and management were carried out as per protocol. **Result:** Out of the 300 women 46% delivered by caesarean section, 54% delivered vaginally. Highest incidence of severe PIH (50%) in age group of age 20-24 years, un-booked case 69%, booked caes 31%, primigravida 66% as a whole. Incidence of LSCS is high among primigravida (75%). Hypertension in first degree relatives is found in 18% of cases. Premonitory symptoms seen in 50% cases and 5% patients developed eclampsia. Cervix was unfavorable in 91% in CD group and 85% in VD group. LSCS was done for contracted pelvis (6%), cervical dystocia (12%), fetal distress (35%), induction failure (47%) and CPD (1%). Among the patients in VD group, 15.5% patient delivered vaginally spontaneously, 86% patients underwent vaginal delivery following induction. No patient developed any complication or eclampsia who delivered within 6 hours of admission, whereas maximum complication including eclampsia occurred in patients who delivered in between 19 to 24 hours of admission. Sepsis developed in 5% patients in CD group and 11% in VD group. The incidence of pulmonary edema was significantly high in VD group (13%) in comparison to CD group (4%). Maternal complications, ICU admission and maternal death are significantly lower in CD group. Maternal mortality was 0.72% in CD group and 6.21% in the VD group. There was no IUFD in CD group whereas 2 in VD group. Perinatal mortality was significantly high in VD group. There were 2 stillbirth in CD group and 12 in VD group. The mean apgar score at 1 and 5 minute was significantly high in neonates of CD group. Live birth rate was 98.56% in CD and 91.30% in VD group. **Conclusion:** The mainstay of management of patient with severe PIH is timely anticipation of birth and mode of delivery also plays a major role in pregnancy outcome. As seen in the present study, delivery within 6 hours of admission leads to more favourable foeto-maternal outcome. Therefore, from the present study, it can be concluded that in patients with severe PIH; specially in patients of gestational age 34 weeks or more with unfavourable cervix on admission; prompt decision for caesarean section leads to more favourable foetal as well maternal outcome in comparison to vaginal birth following induction.

KEYWORDS :

INTRODUCTION

Pregnancy induced hypertension one of the most frequent complication of pregnancy, and anticipation of birth often necessary. Hypertensive disease of pregnancy is the leading cause of maternal death worldwide¹. They can complicate up to 10% of pregnancies and promote significant maternal and perinatal morbidity and mortality worldwide². The identification of this clinical entity and effective management plays a major role in outcome of pregnancy, both for the mother and also the baby. However, the best way of giving birth in patients of hypertensive disease of pregnancy remains to be established.

Potentially lethal complications include abruption placentae, pulmonary edema, disseminated intravascular coagulation, cerebral hemorrhage, hepatic failure and acute kidney injury; these are the frequently associated with the diagnosis of severe pre-eclampsia (previously severe pregnancy induced

hypertension). Severe pre-eclampsia is diagnosed in presence of one or more of these findings: systolic blood pressure of 160mmHg or more, diastolic BP-110mmHg or higher on two occasions at least six hours apart while on bed rest ; thrombocytopenia (platelet count less than 100,000/microliter); impaired liver function as indicated by abnormally elevated blood concentration of liver enzymes (twice the normal); severe persistence right quadrant pain or epigastric pain unresponsive to medication and not accounted for by alternative diagnosis, or both; progressive renal insufficiency (serum creatinine concentration greater than 1.1mg/dl or a doubling of serum concentration in the absence of any renal disease); pulmonary oedema; new onset cerebral or visual disturbances (ACOG2013).

The routine-use of Magnesium sulphate (MgSo₄) for preventing and treating eclampsia has been shown to have an important effect on maternal mortality. The optimal

management of severe gestational hypertension (preeclampsia and eclampsia) includes both MgSo4 administration and anticipation of birth; which constitutes the only definitive treatment. It is therefore very common that obstetrician face the need to indicate the interruption of pregnancy in cases of pregnancy induced hypertension.

Delivery is recommended in women who are diagnosed with Gestational hypertension or preeclampsia of any severity at 37 weeks gestation or later³.

Patients with pre-eclampsia or gestational hypertension with severe features at 34 weeks gestation or greater should proceed to delivery, whereas expectant management may be considered at less than 34 weeks gestation⁴.

The purpose of this study is to evaluate the prevalence, socio-demographic parameters, maternal and fetal complications of this potentially devastating disorder of pregnancy in this developing region of the globe. Keeping this in view an attempt has been made in the present study to ascertain if caesarean section has any distinct advantage over vaginal delivery in lowering the maternal and perinatal mortality and morbidity in patients of gestational age 34 weeks or more with severe pregnancy induced hypertension.

Methods

This study entitled 'Maternal morbidity and mortality with perinatal outcome in in patients with severe pregnancy induced hypertension undergoing vaginal birth or caesarean section' was conducted in the department of Obstetrics and Gynaecology, Gauhati Medical college and hospital, Assam for a period of 1 year, from 1st June, 2020 to 31st May, 2021.

It is a hospital based comparative observational study.

Selection of cases-

Women admitted in the department of Obstetrics and Gynaecology who fulfilled the specified inclusion and exclusion criteria. Data was recorded in pre-designed proforma. Altogether 300 cases were taken.

All women with severe pregnancy induced hypertension in this study were divided into two groups on the basis of whether delivered vaginally or by caesarean section. The First group consisted of patients who delivered vaginally was called "VD Group". The Second group consisted of patients in whom lower segment cesarean section was carried out due to severe PIH with varied associated indications was called the "CD group".

Inclusion criteria-

300 patients with severe pregnancy induced hypertension with either of SBP \geq 160 mm of Hg or DBP \geq 110 mm of Hg or both on admission diagnosed after 34 weeks of gestation with or without proteinuria admitted through Antenatal OPD or Emergency labour room, Gauhati Medical college and hospital over a period of 1 year were included.

Exclusion Criteria-

Patients who presented with eclampsia at the time of admission were excluded. However, the patients who developed eclampsia after admission were not excluded from the study. Patients with previous caesarean section, with co-morbid condition affecting the fetomaternal outcome such as diabetes mellitus, placenta previa, PROM with sepsis, established organ failure, severe anemia, heart disease, seizure disorder, multiple pregnancy, diagnosed fetal congenital anomaly or intra uterine fetal death, non-cephalic presentation were excluded from the study.

Data Analysis:

Descriptive and inferential statistics were used to analyze the

data. All the data that was derived from the study were analyzed by using Microsoft Excel and IBM SPSS Version 22.0. Chi Square and Fischer's tests were performed to find out significant association between various categorical parameters. Independent t test was used to calculate significant difference between the parameters. P value $<$ 0.05 was considered statistically significant.

Ethical Clearance:

Clearance from Ethical committee of Srimanta Sankaradeva University of Health Sciences has been obtained.

Data Collection :

Data of the patients were taken in a proforma from time to time from admission till discharge. A detailed history and general examination carried out in all patients.

Obstetrics examination was done noting the fundal height, presence or absence of uterine contraction, frequency and duration of uterine contraction, lie, presentation of fetus, relation of the presenting part to the brim and the fetal heart rate and regularity.

Vaginal examination was done and the condition of the cervix-position, consistency, dilatation, effacement and the station of the presenting part i.e., Bishop's score was noted. Presence of bag of membrane and adequacy of the pelvis was also noted. Proteinuria was measured using urinary heat coagulation test⁵. Blood and serum investigations were sent and ECG was done. Prophylactic anticonvulsant ie Pritchard regimen⁶ started and Anti hypertensive were given for control of blood pressure.

Either induction was given with per vaginal Misoprostol or intra-cervical PGE2 gel or taken up for caesarean section directly with for associated indication. Among all patients in the VD group, some delivered vaginally spontaneously while others delivered by instrumental application following successful induction with or without oxytocin augmentation. Caesarean section was also done in those cases wherein induction failed or fetal distress occurred following induction. These patients were also included in the caesarean delivery group.

Both groups were assessed and compared on the basis of Development of eclampsia (Antepartum/ Intrapartum/Postpartum), Sepsis, Development of pulmonary edema, Organ failure, Acute kidney injury, Admission in the ICU, Development of neurological deficit, HELLP Syndrome, Disseminated intravascular coagulation, Placental abruption, Post-partum hemorrhage, aspiration pneumonitis, Associated indication for caesarean section, Induction delivery interval in case of vaginal deliveries/ failed induction, Any intrapartum/intraoperative complication and Maternal death. Fetal parameters were assessed and compared on the basis of live birth/ stillbirth or intra-uterine fetal death, birth weight, meconium staining of amniotic fluid, APGAR score, NICU admission with its indication, Perinatal/Neonatal death. Mother and neonate were followed up at the hospital until discharge at hospital and noted in the proforma.

Results:

All 300 patients with severe pregnancy induced hypertension with gestational age of \geq 34 weeks with live singleton pregnancy with cephalic presentation were studied by dividing them into two groups for comparison.

- The C.D. group consisted of patients in whom caesarean section was performed.
- The V.D. group where patients underwent vaginal delivery.

The incidence of caesarean section was 46% and that of vaginal delivery was 54%.

Mode of delivery	N	%	p-value
LSCS	139	46.33%	0.4751
NVD	161	53.67%	
Grand Total	300	100.00%	

The number of unbooked cases were 207(69%) and booked cases were 93(31%). Incidence of severe PIH was found to be higher (66%) in primigravida. Incidence of LSCS was found to be higher in primigravida (75% of case in CD group were primigravida). Total 16 (5%) of patients with severe pregnancy induced hypertension developed eclampsia even after getting prophylactic Pritchard regimen. Development of antepartum eclampsia and intra partum eclampsia was significantly higher in patients who were planned for vaginal delivery(p value-0.0014).

Type of Eclampsia	LSCS		Vaginal		Total		p-value
	N	%	N	%	N	%	
APE	2	17%	10	83%	12	4%	0.0014
IPE	0	0%	1	100%	1	0%	
PPE	1	33%	2	67%	3	1%	
No Eclampsia	136	48%	148	52%	284	95%	
Total	139	46%	161	54%	300	100%	

Only 38(13%) of patients presented with favourable cervix on admission and out of which 25 patients delivered spontaneously, and 13 patients underwent LSCS for fetal cause. Cervix was unfavorable in 91% of patients in CD group and 85 % of cases in VD group at the time of admission. Only 39 patients were planned for LSCS on admission due to Contracted pelvis in 6%(n=8), cervical dystocia in 12% (n=16) , Fetal distress in 10%(n=13) and CPD in 1%(n=2). Among the patients planned for LSCS on admission, LSCS was done in 38 patients within 6 hours of admission mostly for contracted pelvis, cervical dystocia, fetal distress and CPD. One patient underwent LSCS in 7th hours of admission. Out of remaining 100 patients in the CD group, LSCS was done due to Induction failure in 47%(n=65) and fetal distress in 25%(n=35). Total LSCS done due to fetal distress was 13+35=48(35%). Induction failure(47%) topped the list for indications of caesarean section. Next common indication was fetal distress(35%). Among the 161 patients in VD group, 25 patients with favourable cervix delivered spontaneously (20 within 6 hours and 5 in next 6 hours). Rest 136 patients underwent vaginal delivery following induction, out of which 69 underwent vaginal delivery following application of instruments (36 due to fetal distress in second stage of labour, 11 due to maternal exhaustion and in 28 to cut short the second stage of labour). Rest 67 patients delivered vaginally spontaneously. Forceps were applied mostly in patients with fetal distress in second stage of labor(n=30) and to cut short the second stage of labor(n=28). Ventouse was applied in patients with maternal exhaustion in second stage of labor(n=11). In the present study, 38(28%) patients in CD group and 20(12%) patients in VD group delivered within 6 hours of admission. Total 59 patients delivered between 19 to 24 hours of admission mostly after 2 doses of PGE2 gel induction. LSCS was done in 62 patients between 19 to 24 hours of admission mostly for failed induction and fetal distress during induction. No patient developed any complication or eclampsia in the group of patients delivered within 6 hours of delivery. Whereas maximum complication including eclampsia in patients who delivered in between 19 to 24 hours.

In this study, 5% of patients in CD group developed sepsis and 11% of patients in VD group developed sepsis. Incidence of sepsis was significantly high in VD group(p value-0.0384).

Sepsis	LSCS		Vaginal		Total		p-value
	N	%	N	%	N	%	
No	132	48%	143	52%	275	92%	0.0384

Yes	7	28%	18	72%	25	8%	
Total	139	46%	161	54%	300	100%	

Out of 300 women studied , 7% of patients developed pulmonary edema. The incidence of pulmonary edema was significantly lower (4%) in CD group in comparison to that of VD group(13%) (p value-0.0065).

Pulmonary Edema	LSCS		Vaginal		Total		p-value
	N	%	N	%	N	%	
NO	133	48%	140	87%	279	93%	0.0065
Yes	6	29%	21	13%	21	7%	
Total	139	46%	161	54%	300	100%	

In this study, maternal complications like, neurological deficit, PPH and placental Abruption, aspiration pneumonitis, were significantly lower in patients in CD group (p value-0.0483).

Other Complications	LSCS		Vaginal		Total		p-value
	N	%	N	%	N	%	
DIC	3	60%	2	40%	5	100%	0.0483
PPH/Abruption Placenta	10	29%	24	71%	34	100%	
Neurological deficit	5	21%	19	79%	24	100%	
AKI	5	42%	7	58%	12	100%	
Multi Organ Failure	1	100%	0	0%	1	100%	
HELLP Syndrome	0	0%	2	100%	2	100%	
Aspiration Pneumonitis	1	33%	2	67%	3	100%	
Total	25	31%	56	69%	81	100%	

ICU admission due to maternal complication like AKI, Neurological deficit, PPH, Aspiration pneumonitis , are significantly low in patients in CD group. Out of the patients admitted in ICU, 3 patients got admitted in ICU due to DIC in CD group and 2 patients got admitted in ICU due to DIC in VD group. In the CD group, 1 patient got ICU admission due to MODS. But the overall ICU admission is significantly less in CD group (p value-0.0214).

ICU Admission	LSCS		Vaginal		Total		p-value
	N	%	N	%	N	%	
DIC	3	60%	2	40%	5	2%	0.0214
PPH	1	8%	12	92%	13	4%	
AKI	2	50%	2	50%	4	1%	
Multi Organ Failure	1	100%	0	0%	1	0%	
HELLP Syndrome	0	0%	2	100%	2	1%	
Asphyxia	1	33%	2	67%	3	1%	
Not admitted	131	48%	141	52%	272	91%	
Total	139	46%	161	54%	300	100%	

DIC was developed in 3 cases in CD group and 2 cases in VD group. MODS was developed in only one patient from CD group and that patient died subsequently in ICU. Maternal mortality occurred 1 patient in CD group and 10 in VD group. The patient in CD group died due to multi organ dysfunction. Out of 10 maternal deaths in VD group, 3 deaths were due to PPH, 2 due to DIC, 3 due to CVA and 2 were due to Pulmonary edema.

Maternal mortality was 0.72% in the C.D. group and 6.21% in the V.D group (p value-0.0001).

	LSCS		NVD		Total		
	N	%	N	%	N	%	
Maternal death							
No	138	99.28%	151	93.79%	289	96.33%	0.0001
Yes	1	0.72%	10	6.21%	11	3.67%	
Grand Total	139	100.00%	161	100.00%	300	100.00%	

There was no IUFD in CD group whereas 2 IUFD in VD group. There were 2 still birth in CD group and 12 in VD group. Out of 29 neonatal death, 13 neonatal death occurred in CD group ; whereas 16 neonatal death occurred in VD group . Perinatal mortality was significantly lower in CD group (p value-0.0021).

Live/stillbirth/IUD	LSCS		NVD		Total		
	N	%	N	%	N	%	
IUD		0.00%	2	1.24%	2	0.67%	0.0021
Live	137	98.56%	147	91.30%	284	94.67%	
Still Birth	2	1.44%	12	7.45%	14	4.67%	
Grand Total	139	100.00%	161	100.00%	300	100.00%	

The mean Apgar score at 1 minute and 5 minutes was significantly high in neonates of CD group (p value-0.0026).

Apgar score less than 7 either in 1 min or 5 min	LSCS		NVD		Total		p-value
	N	%	N	N	%	N	
<7	62	44.60%	113	70.19%	175	58.33%	0.0026
>7	77	55.40%	48	29.81%	125	41.67%	
Grand Total	139	100.00%	161	100.00%	300	100.00%	

NICU admission were significantly lower in babies delivered by LSCS than those delivered Vaginally following induction(p value-0.0045).

NICU Admission	LSCS		Vaginal		Total		p-value
	N	%	N	%	N	%	
No	77	58%	55	42%	132	40%	0.0045
Yes	61	40%	92	60%	153	54%	
Total	137	48%	147	52%	284	100%	

DISCUSSION:

The incidence of caesarean section was 46% and that of vaginal delivery was 54%.

In a study by Kamilya G et al⁷ (2005)done on eclampsia, rate of caesarean section was found to be 49.70% which is comparable to this study.

Total 16 (5%) of patients with severe pregnancy induced hypertension developed eclampsia even after getting prophylactic Pritchard regimen. Development of antepartum eclampsia and intra partum eclampsia is significantly high in patients planned for vaginal delivery, may be due to longer admission to delivery time interval.

Aagaard et al (2005)⁸- incidence of eclampsia-0.1%.In his study no of pregnancy was 234out of which eclampsia cases were 26-(11.1% of total cases).

Sepsis developed in 5% of patients in CD group and 11% of patients in VD group.Sepsis was seen significantly more in VD group (p value=0.0384). Murthy et al (2010-2015) found that 11% of cases with eclampsia developed Sepsis.

Overall 9% of patients developed pulmonary edema. It was developed in 4.3% cases in CD group and 13% of cases in VD group (p value-0.0065).Murthy et al (2010-2015) found that 6% of cases with eclampsia developed pulmonary edema.

Development of other maternal complication like AKI, neurological deficit, PPH, aspiration pneumonitis are significantly low in patients in CD group (P value-0.0483 chi square test).DIC developed in 3 cases in CD group and 2 cases in VD group. MODS was developed in 1 patient in CD group and that patient died in ICU.Y Wang, M Hao, S Sampson, J Xia⁴ found that Elective delivery lowered incidence of complications in women with PE or hypertension greater than 34 weeks gestation.

Maternal mortality was 0.72% in the C.D. group and 6.21% in the V.D group (p value-0.0001).Overall maternal death in this study is 4%.

Arup K. Majhi (2001)⁹found maternal mortality from eclampsia was 11.28%.He also found that there was no maternal death among 75 eclampsia patients who were delivered by caesarean section in this series .

There were no IUFD in CD group whereas 2 IUFD in VD group. There were 2 still birth in CD group and 12 in VD group. So, perinatal mortality was significantly low in CD group (p value-0.0021;chi square test). Arup Kumar Majhi⁹ found 39.9%perinatal mortality and 25%still birth in his study of eclampsia patients. It is a notable fact that perinatal mortality was also significantly less (16%) among the babies delivered abdominally.

Conclusion:

The mainstay of management of patient with severe PIH is timely anticipation of birth and mode of delivery also plays a major role in pregnancy outcome. Delivery within 6 hours of admission leads to more favourable fetomaternal outcome in this study. In severe PIH after 34th weeks of gestation, caesarean section should be decided at the optimum time which results better fetomaternal outcome. Therefore, from the present study, it can be concluded that in patients with severe PIH; specially in patients of gestational age 34 weeks or more with unfavourable cervix on admission; prompt decision for caesarean section leads to more favourable fetal as well maternal outcome in comparison to vaginal birth following induction.

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