



## Original Research Article

## Effect of severe and non severe preeclampsia on perinatal outcome– A comparative study

Pooja Singh<sup>1,\*</sup>, Manjari Gupta<sup>1</sup><sup>1</sup>Dept. of Obstetrics and Gynaecology, Heritage Institute of Medical Sciences, Varanasi, Uttar Pradesh, India

## ARTICLE INFO

## Article history:

Received 02-12-2019

Accepted 31-05-2020

Available online 12-09-2020

## Keywords:

Preeclampsia

Eclampsia

Low birth weight

Still birth

## ABSTRACT

**Introduction:** Fetal complications in preeclampsia include increased rates of preterm delivery, intrauterine growth restriction, placental abruption, and perinatal death. The aim of this study is to assess the effect of severe and non severe preeclampsia on perinatal outcome.

**Materials and Methods:** A total of 200 pregnant women attending the antenatal clinic of Heritage Institute of Medical Sciences, Varanasi from august 2018 to august 2019 were included in the study. Patients were categorized into 4 groups of normotensive, mild preeclampsia. Severe preeclampsia and eclampsia respectively. Each group contained 50 patients. All the women included in the study were followed throughout the pregnancy and the perinatal outcome was recorded as following variables. a) mode of delivery; b)intrauterine death; c) IUGR; d)admission to NICU.

**Results:** Out of the 200 patients included in the study, incidence of fetal distress was higher in severe preeclampsia group (20%) and eclampsia (34%) as compared to non severe or mild preeclampsia group.(4%). $\chi^2= 22.3$ ;  $p=.000056$ . There was 72% & 77.1% incidence of low birth weight babies in severe preeclampsia and eclampsia group respectively as compared to 30% in mild preeclampsia group. This association was statistically significant.  $\chi^2= 54.18$ ;  $p \text{ value} < .0001$ . Preterm vaginal deliveries were maximum in the eclampsia group and thereafter in severe preeclampsia group ( $\chi^2=29.3$ ;  $p \text{ value} < .001$ ). Poor Apgar score were recorded in eclampsia group. NICU admissions were maximum in eclampsia group amounting to 56%.

**Conclusion:** Both non severe and severe forms of preeclampsia are associated with poor neonatal outcome. Severe preeclampsia is more commonly associated with intrauterine fetal demise. Low birth weights, preterm vaginal deliveries and operative deliveries.

© 2020 Published by Innovative Publication. This is an open access article under the CC BY-NC license (<https://creativecommons.org/licenses/by-nc/4.0/>)

## 1. Introduction

Hypertension associated with pregnancy is most common medical risk factor for maternal morbidity and mortality. Preeclampsia affects between 10-15% of pregnancies. In developing countries preeclampsia and eclampsia cause 2-30% of maternal death.<sup>1</sup> In developed countries 16% maternal death due to hypertensive disorder. There is no definite cause for preeclampsia though it may be likely related to number of factor-as abnormal placentation, immunological, dietary, environmental factor. Abnormal vascular response to placentation is thought to be the

main underlying mechanism for the development of preeclampsia.<sup>1</sup>

Severe preeclampsia is characterized by end organ damage and all its clinical manifestations can be attributed to glomerular endotheliosis, increased vascular permeability and a systemic inflammatory response.<sup>2</sup>

Poor fetal outcome in preeclampsia are usually associated with gestational age. Increased rates of preterm delivery, intrauterine growth restriction, placental abruption, and perinatal death<sup>3</sup> are some fetal complications that may be associated with preeclampsia. Prematurity is the most common complication associated with pregnancy induced hypertension, although the data on the morbidity

\* Corresponding author.

E-mail address: [dr.poojapriyasha.kgmc@gmail.com](mailto:dr.poojapriyasha.kgmc@gmail.com) (P. Singh).

and outcome for preterm infants of women who have preeclampsia are conflicting.

The aim of this study is to assess the effect of severe and non severe preeclampsia on perinatal outcome.

## 2. Materials and Methods

This is a prospective observational study. A total of 200 pregnant women attending the antenatal clinic of Heritage Institute of Medical Sciences, Varanasi from August 2018 to August 2019 were included in the study.

### 2.1. Inclusion criteria

All pregnant women attending the antenatal clinic willing to participate in the study.

### 2.2. Exclusion criteria

1. Pregnant women with chronic hypertension, chronic renal disease, liver disease, diabetes, collagen vascular disease, severe anemia, antiphospholipid antibody syndrome.
2. Patient not willing to participate in study.

Patients were categorized into 4 groups

Control Group included 50 Pregnant women with normal BP and without proteinuria

Mild preeclampsia Group included 50 patients of mild preeclampsia defined as presence of mild to moderate hypertension (140-159 mm of Hg systolic or 90-109 mm of Hg) with proteinuria of 1+ to 2+ on protein dipstick after 20 weeks of pregnancy.

Severe preeclampsia group included 50 patients of Severe preeclampsia was defined as the presence of one or more of the following criteria in pregnant women after 20 weeks of pregnancy : (a) blood pressure (BP) of 160 mmHg or higher systolic or 110 mmHg or higher diastolic on two occasions at least 6 hours apart while the patient is on bed rest; (b) proteinuria of 3 + or greater on two random urine samples collected at least 4 hours apart; (c) oliguria of less than 500 mL in 24 hours; (d) cerebral or visual disturbances; (e) pulmonary edema or cyanosis; (f) epigastric or right upper quadrant pain; (g) impaired liver function; (h) thrombocytopenia.<sup>4</sup>

Eclampsia Group included 50 patients of eclampsia defined as preeclampsia patient with generalized tonic clonic convulsions.

All the women included in the study were followed throughout the pregnancy and the perinatal outcome was recorded as following variables. a) mode of delivery; b) fetal distress and intrauterine death; c) IUGR; d) admission to NICU.

## 3. Results

Out of the 200 patients included in the study, period of gestation of patients with severe preeclampsia group and eclampsia group was significantly lower as compared to normal and mild preeclampsia group; ( $\chi^2=92.74$  (df=12);  $p<0.001$ ). In eclampsia group 44% patients present before 32 weeks of period of gestation, while in severe preeclampsia 28% patient present between 32 – 37 weeks of period of gestation whereas in normal pregnancy and non severe preeclampsia patients presented at term.

The incidence of fetal distress was higher in severe preeclampsia group (20%) and eclampsia (34%) as compared to non severe or mild preeclampsia group (4%). ( $\chi^2=22.3$ ;  $p=.000056$ ). Maximum intrauterine death were seen in eclampsia group followed by severe preeclampsia group (Table 1)

There was 72% & 77.1% incidence of low birth weight babies in severe preeclampsia and eclampsia group respectively as compared to 30% in mild preeclampsia group. This association was statistically significant. ( $\chi^2=54.18$ ;  $p$  value  $<.0001$ ). (Table 2)

In all groups caesarean section rate was  $>40\%$ , and it was higher than normal delivery. There was higher rate of full term vaginal delivery in mild preeclampsia group as compared to severe preeclampsia and eclampsia group. Preterm vaginal deliveries were maximum in the eclampsia group and thereafter in severe preeclampsia group ( $\chi^2=29.3$ ;  $p$  value  $<.001$ ). (Table 3)

Poor Apgar score were recorded in eclampsia group. NICU admissions were maximum in eclampsia group amounting to 56%. However rates of NICU admissions in mild and severe preeclampsia group were similar.

## 4. Discussion

Women with elevated blood pressure during pregnancy have significant increased maternal and fetal morbidity and mortality. Hypertension affects between 7 to 15% of all pregnancies. It is associated with as much as 22% of all perinatal deaths.

Sibai et al demonstrated that in 31.3% of cases eclampsia is not preventable despite adequate prenatal care and hospital admission.<sup>5</sup>

In our study, maximum intrauterine death were seen in eclampsia group followed by severe preeclampsia group. ( $\chi^2=22.3$ ;  $p=.000056$ ). According to a study conducted by M F MacDorman, beginning at approximately 36 weeks, the risk of intrauterine fetal demise increases substantially with severe preeclampsia representing stillbirth rate of 21 per 1000.<sup>6</sup> According to Barker D J in cases of severe preeclampsia, the risk of intrauterine fetal demise increases with pregnancy prolongation. Whereas in cases of mild preeclampsia, the risk of fetal demise is over 50% less than pregnancies with severe preeclampsia

**Table 1:** Association of fetal distress and intrauterine demise with subtypes of preeclampsia

Low/ NoFHR (<100 bpm)	Normal		Mild PE		Severe PE		Eclampsia	
	No.	%	No.	%	No.	%	No.	%
Yes	1	2.0	4	8.0	10	20.0	17	34.0
No	49	98.0	46	92.0	40	80.0	33	66.0

$$\chi^2=22.3;p=.000056$$

**Table 2:** Association of birth weight with subtypes of preeclampsia

Outcome	Normal		Mild PE		Severe PE		Eclampsia		Statistical significance	
	No.	%	No.	%	No.	%	No.	%	c <sup>2</sup>	P
Birth weight										
<2.5 kg	8	24.0	15	46.0	36	72.0	38	77.6	54.18	<0.001
>2.5 kg	42	76.0	35	54.0	14	28.0	11	22.4		

**Table 3:** Effect of severe and non severe preeclampsia on mode of delivery

Outcome	Normal		Mild PE		Severe PE		Eclampsia		Statistical significance	
	No.	%	No.	%	No.	%	No.	%	c <sup>2</sup>	P
Mode of delivery										
LSCS	25	50.0	27	54.0	28	62.0	28	64.9	29.31	<0.001
FTVD	21	42.0	16	32.0	6	8.0	4	4.3		
PTVD	4	8.0	7	14.0	16	30.0	18	30.8		

(stillbirth rate of 9 per 1000).<sup>7</sup>

In 2015, Harmon et al conducted a study in Norway, preeclampsia was observed in 3.8% (n=21,020) of all pregnancies. Risk of stillbirth was 3.6/1000 in the study population. Risk was 5.2/1000 among pregnancies with preeclampsia.<sup>8</sup> Risk of stillbirth was increased with preeclampsia in early pregnancy. In 26 weeks of pregnancy there were 11.6 stillbirths per 1000 pregnancies with preeclampsia, compared with 0.1 stillbirth per 1000 pregnancies with normal blood pressure. Risk of still birth with preeclampsia declined as pregnancy advanced, but at 34 weeks remained more than sevenfold higher than pregnancies without preeclampsia.

According to a study conducted by Xiong et al in China in 2018, in singleton pregnancies, the risk of a stillbirth in women with a hypertensive disorder in pregnancy was significantly higher than in normotensive women (aRR: 3.1) For patients with severe preeclampsia or eclampsia, it was 4.15; and, for those with gestational hypertension/mild preeclampsia, aRR was 1.21.

In their study, Ødegård et al. observed that patients having severe preeclampsia during pregnancy had infant birth weights 12% lower than expected weight, while pregnancies with mild preeclampsia had no difference in weight gain from expected norms.<sup>9</sup>

In our study in all groups caesarean section rate was >40%, and it was higher than normal delivery. According to Knuist M incidence of eclampsia is less than 1%, but the

rate of caesarean section is increased because of increased rates of induction of labour.

In this study, preterm vaginal deliveries were maximum in the eclampsia group and thereafter in severe preeclampsia group (c<sup>2</sup>=29.3; p value<0.001).

A population-based, longitudinal study was done by Ananth et al births in the province of Nova Scotia, Canada between 1986 and 1992.<sup>10</sup> Mild and severe preeclampsia occurred in 8.7 and 1.7% of pregnancies, respectively. A very strong association was seen between severe preeclampsia and risk of very preterm birth, and moderately preterm birth due to medical intervention. However the risk of very preterm and moderately preterm birth due to medical intervention was apparently low among pregnancies complicated by mild preeclampsia.

Buchbinder et al, in 2002 concluded in their study that women who developed severe gestational hypertension had higher rates of preterm delivery at <37 weeks of gestation (54.2% vs 17.8%, P =.001) and at <35 weeks of gestation (25.0% vs 8.4%, P =.0161), and delivered more small-for-gestational-age infants (20.8% vs 6.5%, P =.024) when compared to women who remained normotensive or those who developed mild gestational hypertension.<sup>11</sup>

In the present study, Poor Apgar score were recorded in eclampsia group. NICU admissions were maximum in eclampsia group amounting to 56%. However rates of NICU admissions in mild and severe preeclampsia group were similar.

The study of Habli et al in 2007 concluded that the rate of neonatal intensive care unit admission (25.6% vs 8.7%;  $P < .001$ ) and duration of neonatal stay (3.9 vs 2.0 days;  $P < .001$ ) were greater in hypertensive pregnancies that delivered at 37 weeks of gestation. These differences were observed largely in women whose condition required labor induction, regardless of the severity of preeclampsia.

## 5. Conclusion

Preeclampsia is a multiorgan, disorder of pregnancy associated with significant maternal and neonatal morbidity and mortality. Both non severe and severe forms of preeclampsia are associated with poor neonatal outcome. Severe preeclampsia is more commonly associated with intrauterine fetal demise low birth weights, preterm vaginal deliveries and operative deliveries.

Early gestation age at presentation of severe preeclampsia affects fetal growth more adversely. Therefore, in pregnancies complicated by preeclampsia, obstetricians must balance the need for achieving in utero fetal maturation with the maternal and fetal risks of continuing pregnancy, including progression to eclampsia, abruptio placentae, and HELLP syndrome, as well as fetal growth restriction and demise.

## 6. Source of Funding

None.

## 7. Conflict of Interest

None.

## References

1. Wagner SJ, Barac S, Garovic VD. Hypertensive Pregnancy Disorders: Current Concepts. *J Clin Hypertens*. 2007;9(7):560–6.
2. Hladunewich M, Karumanchi SA, Lafayette R. Pathophysiology of the Clinical Manifestations of Preeclampsia. 2007;2(3):543–9.
3. Kongwattanakul K, Saksiriwuttho P, Chaiyarach S, Thepsuthammarat K. Incidence, characteristics, maternal complications, and perinatal outcomes associated with preeclampsia with severe features and HELLP syndrome. *Int J Women's Health*. 2018;10:371–7.
4. Tranquilli AL, Brown MA, Zeeman GG, Dekker G, Sibai BM. The definition of severe and early-onset preeclampsia. Statements from the International Society for the Study of Hypertension in Pregnancy (ISSHP): Pregnancy Hypertension. *Int J Women's Cardiovasc Health*. 2013;3:44–7.
5. Sibai B, Dekker G, Kupferminc M. Pre-eclampsia. *Lancet*. 2005;365(9461):785–99.
6. Macdorman MF, Munson ML, Kirmeyer S. Fetal and perinatal mortality. *Natl Vital Statistics Rep*. 2007;56(3):1–19.
7. Barker DJP. In utero programming of chronic disease. *Clin Sci*. 1998;95(2):115–28.
8. Harmon QE, Huang L, Umbach DM, Klungsøyr K, Engel SM, Magnus P, et al. Risk of Fetal Death With Preeclampsia. *Obstet Gynecol*. 2015;125(3):628–35.
9. Odegard RA, Vatten LJ, Nilsen ST, Salvesen KA, Austgulen R. Risk factors and clinical manifestations of pre-eclampsia. *Int J Obstet Gynaecol*. 2000;107(11):1410–6.
10. Ananth C, Savitz D, Luther E, Bowes W. Preeclampsia and Preterm Birth Subtypes in Nova Scotia, 1986 to 1992. *Am J Perinatol*. 1997;14(01):17–23.
11. Buchbinder A, Sibai BM, Caritis S, MacPherson C, Hauth J, Lindheimer MD, et al. Adverse perinatal outcomes are significantly higher in severe gestational hypertension than in mild preeclampsia. *Am J Obstet Gynecol*. 2002;186(1):66–71.

## Author biography

**Pooja Singh** Assistant Professor

**Manjari Gupta** Associate Professor

**Cite this article:** Singh P, Gupta M. Effect of severe and non severe preeclampsia on perinatal outcome– A comparative study. *Indian J Obstet Gynecol Res* 2020;7(3):335-338.