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Original Research Paper

Pediatrics

OUTCOME OF NEWBORN TO ECLAMPTIC AND PREECLAMPTIC MOTHERS

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ABSTRACT

BACKGROUND: Hypertensive disorders are a major cause of maternal morbidity and mortality and includes pre-eclampsia, eclampsia, gestational hypertension and chronic hypertension. Given the potential for hypertensive disorders of pregnancy to disrupt mechanisms regulating fetal growth and development, a better understanding of the clinical profile and complications of neonates may allow us to develop strategies to prevent morbidities from fetal through adult life. We sought to study the various outcomes of newborn babies born to mothers with eclampsia and preeclampsia

METHODS: All babies delivered to mothers with eclampsia or preeclampsia were included in the study and data including gestational age, birth weight, duration of NICU stay, and comorbidities were analysed. Babies with congenital anomalies, syndromic children, and born to mothers with diabetes mellitus and chronic hypertension were excluded.

RESULTS: A total of 50 babies born to eclamptic and preeclamptic mothers were studied out of which 39(78%) were in the preeclamptic group and 11(22%) in the eclamptic group. From the study we found 72% babies were >37 weeks, 22% between 32 to 37 weeks, and the rest of the 8% in between 28 and 32 weeks. Another major finding was that 50% babies were >2.5 kg, 40% between 1.5kg – 2.5 kg, 8% between 1kg-1.5kg and 2% were <1 kg. 62% of the study population was AGA while 38% was SGA. 14% babies required bag and mask ventilation and 8% needed free flow oxygen. 16% babies needed >1 week stay in NICU while 12% required only <1week NICU admission. Majority of indications for NICU admission was for low birthweight.

CONCLUSION: A multidisciplinary approach between fields of maternal- fetal medicine and neonatology is necessary to weigh the maternal and fetal risks of prolonging the pregnancy versus the potential benefits of further fetal maturation across most gestational ages.

KEYWORDS : Pre-eclampsia, Eclampsia, Newborn

BACKGROUND:

Preeclampsia is one of the hypertensive disorders of pregnancy which is a major cause of maternal and perinatal mortality and morbidity. Hypertensive disorders of pregnancy occur in about 10% of all pregnant women around the world. Preeclampsia affects 3-5% pregnancies. Along with preeclampsia, other diseases which are included in the group of hypertensive disorders of pregnancy are eclampsia, gestational hypertension and chronic hypertension.

In Asia and Africa, nearly one tenth of all maternal deaths are associated with hypertensive disorders of pregnancy. In India, the incidence of preeclampsia is reported to be 8-10% among pregnant women.

According to a study, the prevalence of hypertensive disorders of pregnancy was 7.8% with preeclampsia in 5.6% of the study population in India. [1]

The increased incidence of perinatal mortality and morbidity seen in pregnancies complicated by preeclampsia, although complex and multifactorial, is primarily due to need for premature delivery and uteroplacental insufficiency resulting in a compromise of blood flow to the fetus.

In severe preeclampsia neonatal outcome has been reported to be influenced by both the disease and the administration of antihypertensives and anticonvulsant drugs to the mother. [2]

Infants whose mothers had preeclampsia are also at increased risk for problems later in life, even if they were born at full-term. Infants born preterm due to preeclampsia face a higher risk of some long-term health issues, mostly related to being born early, including learning disorders, cerebral palsy, epilepsy, deafness and blindness. Infants born preterm may also have to be hospitalized for a long time after birth and may be smaller than infants born full term. Infants who experienced poor growth in the uterus may later be at higher risk of diabetes, congestive heart failure, and high blood pressure. [3]

Preeclampsia is characterized by de novo development of hypertension and proteinuria after 20 weeks of gestation and affects nearly all organ systems, with the most severe consequences being eclampsia, intrauterine growth restriction and thrombocytopenia. Preeclampsia alters with the intrauterine environment by modulating the pattern of hormonal signals and activating the detrimental cellular signaling that has been transported to the fetus, which has to adapt to this intrauterine environment with detrimental signals. The adaptive signals increase the risk of diseases in later life. The risk factors for diseases that can be transmitted to the offspring will also be discussed in this review. [4]

The paper will review the outcomes of babies born to mothers with eclampsia and preeclampsia, and potential strategies to optimize fetal outcomes in pregnancies complicated by preeclampsia.

Materials And Methods:

Observational study carried out at department of Pediatrics from 1st November 2017 to November 2018.Study population includes all babies born to preeclamptic/eclamptic mothers in AMCH.

Collecting daily data from labour room and NICU

Inclusion Criteria-

All babies delivered to mothers with eclampsia or preeclampsia in AMCH during the study period

Exclusion Criteria-

Babies born with other comorbidities like congenital anomalies and syndromic child and mothers having other comorbidities like diabetes, chronic hypertension.

Results And Observations:

A total of 50 babies born to eclamptic and preeclamptic mothers were studied out of which 39(78%) were in the preeclamptic group and 11(22%) in the eclamptic group.

Table 1. Distribution Of Gestational Age

GA	Preeclamptic mother	Eclamptic mother
>37weeks	29	7
32-37weeks	8	3
28-32 weeks	1	1
<28 weeks	0	0

Table 1 represents the distribution of gestational age and in our study, we found that out of 39 babies born to preeclamptic mothers, 29 (74 %) were >37 weeks, 8 (20 %) were between 32-37 weeks, 1(2.5%) was between 28 to 32 weeks. Out of 11 babies born to eclamptic mothers, 7 (63%) were >37 weeks, 3 (27%) were between 32-37 weeks, 1 (9%) was between 28 to 32 weeks.

Table 2. Distribution Of Birth Weight

Birth weight	Preeclamptic mother	Eclamptic mother
>2.5	20	5
1.5-2.5	15	5
1-1.5	3	1
<1	1	0

Table 2 represents the distribution of birth weight and in our study out of 39 babies born to preeclamptic mothers, 20 (51%) had weight >2.5 kg, 15 (38%) were between 1.5-2.5 kg, 3 (7%) were between 1-1.5 kg, 1(2.5%) was <1 kg. Out of 11 babies born to eclamptic mothers 5(45%) were > 2.5 kg, 5(45%) were between 1.5-2.5 kg and 1(9%) was < 1.5 kg.

Table 3. Distribution Of Weight For Gestational Age

Weight	Preeclamptic mother	Eclamptic mother
AGA	23	8
SGA	16	3

Table 3 represents distribution of weight for gestational age and in our study out of 39 babies born to preeclamptic mothers, 23(58%) were appropriate for gestational age ,16(41%) were small for gestational age. Out of the 11 babies born to eclamptic mothers 8(72%) were AGA, 3(27%) were SGA. Hence majority of the babies born to preeclamptic and eclamptic mothers were of appropriate gestational age.

Table 4. Mode Of Resuscitation Required If Any

Resuscitation	Preeclamptic mother	Eclamptic mother
Routine care	32	7
FF O2	3	1
BMV	4	3
BTV	0	0

Table 4 represents mode of neonatal resuscitation if any were required. Out of 39 babies born to eclamptic mothers, 32(82%) babies required only routine care, 4(10%) required bag and mask ventilation and 3(7%) required FFO2.

Out of 11 babies born to eclamptic mothers, 7(63%) babies required routine care, 3(27%) required BMV and 1(9%) required FFO2. Hence in total 14% babies required bag and mask ventilation and 8% needed Free flow oxygen.

Table 5. Duration Of Nicu Stay For Babies

NICU STAY	Preeclamptic mother	Eclamptic mother
<1 week	4	2
>1 week	5	3

Table 5 represents the duration of NICU stay. Out of 39 babies born to preeclamptic mothers, 5(12%) needed >1 week NICU care, 4(10%) needed <1 week NICU care. Out of 11 babies born to eclamptic mothers, 3(27%) required >1 week NICU care, 2(18%) required < 1 week care. Hence 16% babies needed >1 week stay in NICU while 12% babies required only <1week NICU admission.

Table 6. Clinical Profile Of Babies Born To Mothers With Hypertensive Disorders Of Pregnancy

Clinical profile	Preeclamptic mother	Eclamptic mother
NNJ	4	1
Polycythemia	3	1
Anemia	1	0
AKI	0	0
Hypoglycemia	2	0
Thrombocytopenia	0	0
BPD	0	0
HMD	0	0
IUD	0	0
Sepsis	1	0
Cong. Pneumonia	2	1
Hypocalcemia	2	0

Table 6 represents the clinical profiles of babies born to mothers with hypertensive disorders and in our study out of 39 preeclamptic mothers, 4(10%) babies had neonatal jaundice, 3(7%) had polycythemia, 2(5%) had hypoglycemia, 2(5%) had congenital pneumonia, 2(5%) had hypocalcemia and 1(2%) had anemia. Out of 11 babies born to eclamptic mothers 1(9%) had neonatal jaundice, 1(9%) had polycythemia and 1(9%) had congenital pneumonia.

DISCUSSION:

Lately there have been studies showing around 30% incidence of thrombocytopenia in newborns born to preeclamptic mothers and higher incidence of Hyaline membrane disease even after adjusting the gestational age factor. So, what we understood is the clinical profile of newborns born to preeclamptic and eclamptic mothers in our hospital and the effect on birth weight and gestational age and the need for resuscitation during birth as these babies are already stressed in utero.

Majority of the babies born to preeclamptic and eclamptic mothers were term AGA babies and needed more than a week NICU care.

We studied a total of 50 babies born to eclamptic and preeclamptic mothers, out of which 39 were in the preeclamptic group and 11 in the eclamptic group, 78% and 22% respectively. From the study we found 72% babies were >37 weeks, 22% babies between 32 weeks to 37 weeks, and the rest of the 4 % in between 28 weeks and 32 weeks.

Another major finding was that 50% babies were >2.5 kg, 40% belonged to 1.5kg – 2.5 kg, 8% belonged to 1kg-1.5kg, 2% < 1 kg. 62% of the study population was AGA while 38% was SGA. 14% babies required bag and mask ventilation and 8% needed Free flow oxygen. 16% babies needed >1 week stay in NICU while 12% babies required only <1week NICU admission.

Majority of indications for NICU admission was for low birthweight. Of the admitted cases 8% babies had polycythemia, 6% babies had congenital pneumonia, 5% had neonatal jaundice, 4% babies had hypoglycemia, 4%

hypocalcemia, 2% had sepsis and another 2% had anemia.

In a study conducted by M. L. Wang, D. J. Dorer "Clinical outcomes of near-term infants," in Pediatrics, vol. 114 late-preterm infants have a nine times greater incidence of respiratory distress syndrome than term infants (28.9% versus 4.2%, P < .001). [5]

In a population-based study by W. M. Gilbert, T. S. Nesbitt "The cost of prematurity: quantification by gestational age and birth weight," Obstetrics and Gynaecology, of neonatal morbidity in the United States, the incidence of RDS was 7.4% at 34 weeks, 4.5% at 35 weeks,2.3% at 36 weeks, and 1.2% at 37 weeks. [6]

A more recent study by G. J. Escobar, R. H. Clark, "Short-term outcomes of infants born at 35- and 36-weeks gestation: we need to ask more questions," Seminars in Perinatology, noted infants born at 34 weeks were 18 times more likely to require supplemental oxygen for at least one hour and over 19 times more likely to require assisted ventilation compared to infants born at 38–40 weeks gestation. [7]

Odegård et al. showed pregnancies complicated by severe preeclampsia had infant birth weights 12% lower than expected, while pregnancies with mild preeclampsia showed no difference in weight gain from expected norms. [8]

In addition to the well-described effects of preeclampsia on platelets, neonates delivered to women with preeclampsia have a 50% incidence of neutropenia (defined as absolute neutrophil count less than 500) as studied by A. Mouzinho, C. R. Rosenfeld "Effect of maternal hypertension on neonatal neutropenia and risk of nosocomial infection," Pediatrics. [9]

A recent study by A. R. Hansen, C. M. Barnés, "Maternal preeclampsia predicts the development of bronchopulmonary dysplasia," Journal of Pediatrics, shows that maternal preeclampsia is, in fact, associated with an increased risk for development of BPD, even after adjusting for gestational age, birth weight, and other clinical confounders (OR 2.96, 95% CI 1.17-7.51, P = .01). [10]

CONCLUSION:

Historically there has been a relative lack of consideration to the complications of neonates born to preeclamptic and eclamptic mothers both due to prematurity as well as hypertension. Furthermore, given the potential for hypertensive disorders of pregnancy to disrupt mechanisms regulating fetal growth and development, a better understanding of the clinical profile and complications of neonates may allow us to develop strategies to prevent morbidities from fetal through adult life.

Precaution at grassroot level can be taken by ensuring strict blood pressure monitoring during routine antenatal checkups and early recognition of gestational hypertension, pre-eclampsia and timely referral to tertiary centers.

Because of the high variability of each case, a general recommendation for optimal timing of delivery is not possible.

Based on the data a multidisciplinary, collaborative approach between fields of maternal- fetal medicine and neonatology is necessary to weigh the maternal and fetal risks of prolonging the pregnancy versus the potential benefits of further fetal maturation across most gestational ages.

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