Impact of Pre-eclampsia on Neonatal Outcome at Tertiary Care Center

Syed Kashif Abbas[1], Muhammad Jameel Ashraf[2], Sana Dawood[3]

Abstract

Objective: To determine the impact of pre-eclampsia on neonatal outcome at a tertiary care hospital.
Methods: This was a cross-sectional study conducted in the Neonatal Intensive Care Unit (NICU) and High Dependency Unit (HDU) of Liaquat National Hospital over a period of six months, i.e from June 2015 till December 2015. The inclusion criteria includes all neonates born to pregnant women with systolic blood pressure from 130 to 200 mmHg, Diastolic blood pressure of >110mmHg and proteinuria >1 on dip stick or >300mg/l in 24 hour urinary specimen irrespective of gestational age. The exclusion criteria was all babies born to mother with chronic hypertension, glucose intolerance, renal disease, multiple pregnancy, congenitally abnormal fetus or sepsis.
Results: A total of 80 babies met the inclusion criteria and were included in our study of which only 39 babies were admitted in NICU. Majority of babies were discharged home. Approximately 48.71 % babies managed to stay for 72 hours. Moreover, the major chunk of babies were delivered moderate to late preterm in the study. A total of 23 out of 39 babies presented with IUGR (Intrauterine Growth Restriction) which constitute about 58.97% of total. Regarding the impact of eclampsia on neonatal hematological profile, 25 (64.10%) developed thrombocytopenia, 8 (20.51%) developed anaemia while 6 (15.38%) were found showing no fluctuation in their haematological profiles.
Conclusion: Babies born to pre-eclamptic mothers were found to have higher rates of NICU admissions and longer period of stay compare to those who born to non-eclamptic mothers. Moreover, premature birth and Respiratory Distress Syndrome (RDS) also impose significant risk to newborn babies. Early identification and collaborative approach regarding pre-eclampsia could help us mitigate the poor outcome of neonates born to eclamptic mothers.

Keywords: Pre-eclampsia, neonatal outcome, fetal growth retardation and prematurity.
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Introduction

There are nearly 130 million infants born worldwide every year[1]. Of which 4 million die in the first 28 days of life. Seventy five percent of neonatal deaths occur in first week, and more than one-quarter occur in the first 24 hours[2]. Neonatal death accounts for 40% of death under the age of 5 years worldwide[3]. Globally two-third of the neonatal deaths occur in just 10 countries, mostly in Asia. Pakistan is number three among these countries[4] and accounts for 7% of the global neonatal death. Worldwide, the incidence of pre-eclampsia ranges between 2 and 10% of pregnancies. The incidence of pre-eclampsia varies greatly all over the world[5].

Pre-eclampsia (PE) remains a foremost obstetric problem because it is typically an unpredictable maternal disease with fetal involvement. It is an important cause of maternal and fetal morbidity and mortality. It is obvious that pre-eclampsia, may re-

[1-3] Department of Paediatric Medicine,
Liaquat National Hospital

Correspondence: Dr. Muhammad Jameel Ashraf
Department of Paediatric Medicine,
Liaquat National Hospital
Email: sj_ashraf@hotmail.com
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sult in maternal and neonatal morbidity and mortality as evident in the study conducted at a tertiary care hospital of Karachi, Pakistan[6]. According to WHO report, pre-eclampsia is estimated to be seven times higher in developing countries (2.8% of live births) than in developed countries (0.4%)[7].

Pre-eclampsia is a leading cause of maternal and fetal/neonatal morbidity and mortality[8]. Pre-eclampsia is defined as hypertension BP ~140/90 on two occasion 4-6 hours apart or single reading of diastolic blood pressure (DBP)>110mm Hg and proteinuria developing after 20th week of pregnancy up to 6 weeks postpartum in a previously normotensive, non proteinuric women[9]. It occurs in 5-10% of pregnancies and result in substantial maternal and neonatal morbidity and mortality[10]. Moreover, the incidence of pre-eclampsia worldwide has been estimated 8,37,000 per year in developing countries[11]. Precise aetiology of pre eclampsia is still unknown. Factors that appear to have a role include the abnormal placentation, maternal immune response, genetic predisposition, and maternal vascular disease[12]. The increase incidence of perinatal morbidity and mortality seen in pregnancy complicated by pre-eclamspia, although complex and multifactorial, is primarily due to need for pre mature delivery and uteroplacental insufficiency resulting in compromised blood flow to fetus[8].

PE is typically an unpredictable maternal disease with fetal involvement and is an important cause of maternal and fetal morbidity and mortality. Early severe PE and IUGR deserve special attention from obstetricians and neonatologists[13]. The complication of pre-eclampsia may be considered as immediate (eclampsia, pre-termlabour, accidental haemorrhage and remote (residual HTN and recurrent PE). Other than that, pre-eclampsia has great implication on adverse neonatal outcome. The various implications are low APGAR, IUGR, Low Birth Weight (LBW), Intra Uterine Death (IUD), neonatal respiratory distress, and an increase need of neonatal intensive care unit admission[9].

Babies born to pre-eclamptic mother are mostly low birth weight and preterm due to early deliveries[14]. LBW is defined as a birth weight of a live born infant of less than, 2,500gm regardless of gestational age.

Preterm is defined as babies born alive before 37 weeks of pregnancy are completed. There are sub-categories of preterm birth, based on gestational age[14]. Extremely preterm (<28 weeks), very preterm (28 to <32 weeks and moderate to late preterm (32 to <37 weeks)[15].

Patients and Methods

This was a cross-sectional study conducted in the Neonatal Intensive Care Unit (NICU) and High Dependency Unit (HDU) of Liaquat National Hospital over a period of six months, i.e from June 2015 till December 2015.The inclusion criteria was all neonates born to pregnant women with systolic blood pressure ranges from 130 to 200 mmHg, diastolic blood pressure of >110mmHg and proteinuria >1 on dip stick or >300mg/l in 24 hour urinary specimen irrespective of gestational age. However, all babies born to mother with chronic hypertension, glucose intolerance, renal disease, multiple pregnancies, congenitally abnormal fetus or sepsis were excluded from the study.

Permission from ethical review committee of the Liaquat National Hospital was taken before conducting the study. A total of 80 babies who met our inclusion criteria were included. Performa were filled for patient Identification number (ID), sex and age of all babies enrolled in the study. Written Informed consent was obtained from the parents of study participants. The sample technique that used was non-probability consecutive sampling. Results were analyzed by senior resident, which again was checked by consultant before putting the data onto Performa. Later on after completing the data of the required sample, a database was developed on SPSS for windows version 22.0 for data analysis procedure.

Table 1. Outcome of babies born to mothers with pre-eclamptic toxaemia*.

		Outcome			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Discharged	27	69.2	69.2	69.2
	Expired	9	23.1	23.1	92.3
	LAMA	3	7.7	7.7	100.0
	Total	39	100.0	100.0	

* Pre eclamptic toxemia (systolic blood pressure from 130 to 200 mmHg, diastolic blood pressure of >110mmHg and proteinuria >1 on dip stick or >300mg/l in 24 hour urinary specimen irrespective of gestational age).

Table 2. Length of stay in hours of the babies (born to mothers with pre-eclamptic toxaemia at the neonatal intensive care unit at a tertiary care hospital of Karachi.

		Length of Stay			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-48 hours	4	10.3	10.3	10.3
	48-72 hours	19	48.7	48.7	59.0
	>72 hours	16	41.0	41.0	100.0
	Total	39	100.0	100.0	

Table 3. Frequncy of preterm babies born to mothers with pre-eclamptic toxaemia.

		Preterm Classification			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Moderate to Late	13	33.3	33.3	33.3
	Preterm	18	46.2	46.2	79.5
	Extremely	8	20.5	20.5	100.0
	Total	39	100.0	100.0	

Table 4. Haematological profile of babies born to mothers with pre-eclamptic toxaemia.

		Haematological Profile			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Thrombocytopenia	25	64.1	64.1	64.1
	Anemia	8	20.5	20.5	84.6
	Normal	6	15.4	15.4	100.0
	Total	39	100.0	100.0	

Results

In this study, those who met the inclusion criteria were 80 babies, out of which 41 babies had been moved to mother side, remaining 39 were admitted in NICU. Those who were admitted, 27 got discharged home, 9 were expired and 3 of them got LAMA (leaving against medical advice).

Moreover, with respect to length of stay in NICU, 10.25 % babies were admitted by the age of 48 hours since birth, 48.71 % admitted from 48-72 hours of life and about 41.02 % stayed for more than 72 hours respectively (Table 2). Since pre-eclamptic mothers are more likely deliver pretermbabies; in our study, most babies fall in the

category of moderate to late preterm (32-37 weeks) of age which contributes 24 babies total followed by very preterm (28-32 weeks) and extremely preterm (<28 weeks) which accounts for 18 and 8 babies respectively.

A total of 19 out of 39 (48.7%) babies presented with IUGR (Intrauterine Growth Restriction) 16 (41%) babies presented with RDS (Respiratory Distress Syndrome), 3 (7.7%) with BPD (Bronchopulmonary Dysplasia) and 1 baby developed NEC (Necrotizing Enterocolitis) (2.6%). Of 39 babies admitted in NICU, 25 (64.10%) developed thrombocytopenia, 8 (20.51%) developed anaemia while 6 (15.38%) were found normal haematological profiles.

Discussion

The study suggests that majority of the babies of mothers with pre-eclamptic toxaemia, 27 out of 39 were discharged home, 9 expired and 3 of them left against medical advice (LAMA). This suggests that infants born to pre eclamptic mother have a high risk of mortality as proposed by our study.

Moreover, one of the leading outcomes of pre ecplamsia is prematurity. Our study indicates that most babies were delivered moderate to late preterm followed by very preterm and extremely preterm respectively. On the contrary, study conducted by Sibai BM et al in 2006 advocate that moderate to late preterm baby's ratio is less as compared to very preterm and extremely preterm babies[16]. The phenomenon is the poor blood supply in the placenta, which maydecrease the amount of food and oxygen reaching the growing baby. Usually, babies born to mothers with pre-eclampsia tend to be smaller. There is also an increased risk of premature birth and of stillbirth. Moreover, babies are also more likely to develop breathing problems after they are born.

Furthermore, baby's length of stay in nursery is also an important contributing factor in assessing the outcome of newborn health. Our study suggests that out of 39 babies, 19 babies managed to stay for 48-72 hours followed by 16 babies for greater than 72 hours and only 4 babies were stayed for 48 hours since birth. Similar study was conducted by Narges Afrasiabi et al in 2014 which also show that babies born to pre-eclamptic mothers are more likely to stay longer in nursery[17]. This could be due to the early delivery of the baby. Since late preterms are physiologically and metabolically immature. They are at higher risk than term infants to develop medical complications and are more likely than term infants to be admitted to NICU.

IUGR was the leading cause of admission in our study which is same as results shown by Angie C et al in 2010[14]. This could be due to decreased uteroplacental blood flow and ischaemia, which is a significant risk factor in the development of IUGR and represents the most common cause of IUGR in these infants. Other causes such as RDS, BPD and NEC were found to the important factors associated with pre-eclampsia in our study.

Our study suggest that infant of pre-eclamptic mothers are more likely to develop thrombocytopenia as compared to study conducted by Ligia Maria et al in 2012 who propose that neutropenia can occur in up to 50% of infants born to mothers who have preeclampsia while thrombocytopenia is a transitory alteration, more commonly found in the first 72 hours after birth. The pathogenesis of thrombocytopenia among infants born to mothers with pre-eclampsia is not clear. One potential mechanism is that preeclampsia, and the resultant fetal hypoxia, has a direct depressant effect on megakaryocyte proliferation. This is supported by studies showing that growth-restricted neonates have significant megakaryocytopoeitic defects without evidence of increased platelet destruction.

The limitation of our study is the duration and small sample size. Though the results of our study show that babies born to pre-eclamptic mothers had a poor neonatal outcome, however, a larger sample size and duration of the study would have represented better outcome and strength of association between two variables.

Our recommendation includes that hypertension in pregnancy is a serious concern which needs to be addressed at initial stage in order to mitigate the lethal consequences of neonatal outcome.

Conclusion

Babies born to pre-eclamptic mothers were found to have higher rates of NICU admissions and longer period of stay. Moreover, premature birth and RDS also impose significant risk to newborn babies. Early identification and collaborative approach regarding pre-eclampsia could help us mitigate the poor outcome of neonates born to eclamptic mothers.

Conflict of Interest

Authors have no conflict of interests and no grant/ funding from any organization for this study.

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