

## PRETERM PREECLAMPSIA: NEONATAL OUTCOMES

### Original Article

## PRETERM PREEKLAMPSİ: NEONATAL SONUÇLAR

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### ABSTRACT

**Objective:** The perinatal outcome of pregnancies with preeclampsia varies in comparison to pregnancies without preeclampsia. In addition, the perinatal outcomes are also altered in preterm birth. This study evaluates the neonatal outcomes of pregnancies with preterm preeclampsia compared to preterm birth related with other etiologies.

**Methods:** This study included the evaluation of 160 premature neonates delivered before 37 weeks gestation. Neonatal outcomes of 35 infants delivered prematurely due to preeclampsia were compared with 125 premature infants delivered due to other etiologies. Neonatal outcomes included: APGAR scores, length of stay in the neonatal intensive care unit (NICU), intubation rates, respiratory distress syndrome (RDS) and neonatal death (NND).

**Results:** There was no difference in the APGAR scores between the two groups ( $p>0.05$ ). The rate of intubation, RDS, NND and stay in NICU were found similar among the groups ( $p>0.05$ ). Early preterm delivery ( $<34$  week) rate was found to be higher in preeclampsia (80% vs. 60.8%,  $p=0.045$ ). The rate of infants with very low birth weight ( $<1500$ gr) was found to be higher in preeclampsia compared to the other group (37.1% vs. 18.4%,  $p=0.034$ ).

**Conclusion:** The neonatal outcomes of infants delivered prematurely due to preeclampsia appeared to be worse than the premature infants delivered due to other etiologies. These results can be explained with the pathophysiology of preeclampsia and its effect on the fetus during the intrauterine period.

**Key words:** Preterm; preeclampsia; neonatal outcomes.

**ÖZET**

**Giriş:** Preeklampsi ile komplike gebeliklerde perinatal sonuçlar preeklampsi olmayan gebeliklerden farklıdır. Buna ek olarak perinatal sonuçlar preterm doğumlarda da farklı olmaktadır. Bu çalışmada preeklampsi ve diğer etyolojiler nedeniyle erken doğumla sonuçlanan gebeliklerin neonatal sonuçlarının karşılaştırılmıştır.

**Metod:** Çalışmaya 37. gebelik haftasından önce doğan 160 prematür yenidoğan dahil edildi. Preeklampsi nedeniyle erken doğum yaptırılan 35 gebe ile diğer etyolojiler nedeniyle gebeliği erken doğumla sonuçlanan 125 gebenin neonatal sonuçları karşılaştırıldı. Neonatal sonuçlar olarak, APGAR skorları, yenidoğan yoğun bakımda yatış süresi, entübasyon oranları, respiratuar distress gelişimi ve neonatal mortalite oranları karşılaştırıldı.

**Bulgular:** APGAR skorları açısından iki grup arasında fark saptanmadı ( $p>0.05$ ). entübasyon, RDS gelişimi, yenidoğan mortalite oranları ve yoğun bakımda yatış süreleri açısından fark tespit edilmedi ( $p>0.05$ ). erken preterm doğum ( $<34$  hafta) oranı preeklampsi grubunda daha fazla bulundu (%80 vs. %60.8,  $p=0.045$ ). çok düşük doğum ağırlıklı ( $>1500$ gr) bebek oranları da preeklampsi grubunda daha fazla bulundu (%37.1 vs. %18.4,  $p=0.034$ ).

**Sonuç:** Preeklampsi nedeniyle erken doğum ile sonuçlanan gebeliklerde neonatal sonuçlar daha kötü görünmektedir. Bunun olası nedeni preeklampsi patofizyolojisinin intrauterine dönemde fetus üzerine olası etkileri ile açıklanabilir.

**Anahtar kelimeler:** *Preterm; preeklampsi; neonatal sonuçlar.*

**OBJECTIVE:**

Preterm birth is defined as childbirth occurring between 20 and 37 completed weeks of gestation (1). Preterm labor occurs in approximately 7-12% of all pregnancies (1,2). It is generally known that preterm births are more common in women with a disease during pregnancy, such as urinary tract infections, maternal infectious diseases involving fever, multiple pregnancy, congenital uterine defects, congenital defect or damage to the cervix and recurrent preterm births (3,4). On the other hand, preterm labor is occurred by medical personnel due to some high-risk situations such as preeclampsia, hypertension, chronic kidney disease and diabetes (4).

Preeclampsia is an important cause of maternal and perinatal morbidity / mortality characterized with hypertension, proteinuria and edema during pregnancy (5,6). The neonatal outcomes of infants born from mothers with preeclampsia may differ from those born to non-preeclamptic women (7). In addition, the perinatal outcomes are also altered in preterm birth. This study evaluates the neonatal outcomes of pregnancies with preterm preeclampsia compared to preterm birth because of other etiologies.

**METHODS**

This study was carried out at the Obstetrics & Gynecology and Neonatology Clinics of a University Hospital. Between January 2012 and March 2013, the data of 160 pregnancies with preterm labor before 37 weeks of gestation were evaluated retrospectively. The preterm labors were divided into two groups by the causes of birth, the first group (group-I) related with preeclampsia and the second one (group-II) due to other etiologies. Presence of hypertension (two blood pressure measurements  $\geq 140/90$ mmHg, more than 4h apart), edema and proteinuria ( $>300$  mg/24h) was considered as diagnosis of preeclampsia.

Maternal and antenatal features and neonatal outcomes of 35 infants delivered prematurely due to preeclampsia were compared with 125 premature infants delivered due to other etiologies. Maternal and antenatal features were included: maternal age, number of pregnancy, maternal systemic disease, and gestational week, presence of placenta previa, placenta abruption and oligohydramnios. Neonatal outcomes included: APGAR scores, length of stay in the neonatal intensive care unit (NICU), intubation rates, respiratory distress syndrome (RDS), neonatal death (NND), intraventricular hemorrhage (IVH), necrotizing enterocolitis (NEC), patent ductus arteriosus (PDA), retinopathy and sepsis.

All data were analyzed using Statistical Package for the Social Sciences Version 18.0 (SPSS, Chicago, IL, USA). Differences between the two groups of women were assessed using Chi-squared test, Fisher's Exact test and Mann-Whitney U-test for categorized variables, and Student's t-test for continuous variables.  $P < 0.05$  was considered as significant.

## RESULTS

The maternal and antenatal features were similar in both groups except the rate of delivery age before 34 week (**Table-1**).

Features	Group-I (n=35)	Group-II (n=125)	p value
Age	29.9±6.7	27.7±6.3	0.069
Number of pregnancy	2.7±1.3	2.4±1.4	0.256
Number of delivery	1.3±1.0	1.0±1.1	0.091
Maternal systemic disease	9 (25.7)	32 (25.6)	NS
Diabetes	0	7 (5.6)	0.349
Hypertension	6 (17.1)	19 (15.2)	0.987
Thyroid dysfunction	3 (8.6)	5 (4.0)	0.374
Heart disease	0	2 (1.6)	0.451
Gestational week	31.7±3.3	32.8±2.8	0.073
Delivery <34 week	28 (80)	76 (60.8)	0.045
Delivery <37 week	7 (20)	49 (39.2)	
Placenta previa	1 (2.9)	3 (2.4)	0.942
Placenta abruption	1 (2.9)	5 (4.0)	0.942
Oligohydramnios	11 (31.4)	31 (24.8)	0.568
Steroid before delivery	12 (34.3)	35 (28.0)	0.609

The numbers in parantheses are expressed as %

**Table-1:** Maternal and antenatal features of subjects.

Early preterm delivery (<34 week) rate was found to be higher in preeclampsia group than the other group (80% vs. 60.8%,  $p=0.045$ ).

There was no difference in the APGAR scores between two groups ( $p > 0.05$ ). Similarly, the rate of intubation, RDS and NND was not found different between two groups ( $p > 0.05$ ). The rate of infants with very low birth weight (<1500gr) was found higher in preeclampsia compared to the other group (37.1% vs. 18.4%,

$p=0.034$ ). The birth weight was  $1736\pm567$ gr in preeclampsia group while it was  $1969\pm444$ gr in the other one ( $p=0.046$ ). On the other hand, the rates of infants with IVH, NEC, PDA, retinopathy and sepsis were detected similar in both groups ( $p>0.05$ ) (**Table-2**).

Features	Group-I (n=35)	Group-II (n=125)	p value
APGAR at 1st min.	6.4 $\pm$ 2.0	6.9 $\pm$ 1.7	0.192
APGAR at 5th min.	7.4 $\pm$ 1.6	8.0 $\pm$ 1.3	0.072
Birth weight (BW)	1736 $\pm$ 567	1969 $\pm$ 444	0.046
Very low BW (<1500 gr)	13 (37.1)	23 (18.4)	0.034
NICU	22 (62.9)	86 (68.8)	0.646
Intubation rates	13 (37.1)	30 (24.0)	0.182
Surfactant suppl.	13 (37.1)	26 (20.8)	0.077
RDS	13 (37.1)	26 (20.8)	0.077
IVH	0	2 (1.6)	NS
NEC	0	1 (1.8)	NS
PDA	1 (2.9)	10 (8.0)	0.458
Sepsis	1 (2.9)	5 (4.0)	0.609
Retinopathy	0	1 (0.8)	NS
Mortality	7 (20.0)	13 (10.4)	0.150

NICU: neonatal intensive care unit, RDS: respiratory distress syndrome, NND: neonatal death, IVH: intraventricular hemorrhage, NEC: necrotizing enterocolitis, PDA: patent ductus arteriosus

The numbers in parentheses are expressed as %

**Table-2:** Neonatal outcomes.

## DISCUSSION

Our study demonstrates that the rate of infants with very low birth weight (<1500gr) is higher in preeclampsia compared to the other group. Placental insufficiency due to preeclampsia likely inhibits fetal growth leading to small for gestational age (SGA) and/or intrauterine growth restriction (IUGR) (8). The rate of SGA in the infants delivered from mothers with preeclampsia is found higher

compared with other infants (17.8% vs. 5.6%, respectively) (9). However, the low birth weight without SGA and/or IUGR is related with gestational week. Preterm delivery due to preeclampsia is iatrogenic. Currently, expectant management can perform to prolong the gestational age but the treatment of preeclampsia is delivery. In this study, the rate of early preterm delivery (<34 week) is detected higher in preeclampsia group.

It is believed that infants delivered under preeclamptic conditions exhibited a stress response, expediting lung development, and decreasing the rate of RDS (10). Additionally, a decreased rate of NND was observed in pregnancies complicated by preeclampsia, 11% vs. 18% compared with the control group for early preterm infants (11). In contrast, according to a prospective randomized study by Amorim et al. (12) the rates of RDS, IVH and NND were found decreased by administration of steroid in cases with preterm severe preeclampsia. Pearlman et al. (13) reported that RDS is found with higher ratio in preterm preeclampsia but IVH is lower compared with preterms who did not suffer preeclampsia. In our study, the rate of RDS and NND was higher in the preeclampsia group, but this was not statistically significant. Compared with neonates delivered prematurely because of other etiologies, neonates born to preeclamptic mothers were more likely to be SGA and have RDS, but had a decrease in mortality (14). Fernandez et al. (15) reported that the rate of SGA, delivery with cesarean, low APGAR scores and polycythemia were found higher in pregnancies with preeclampsia compared to normotensive subjects.

The neonatal outcomes of infants delivered prematurely because of preeclampsia appeared to be worse than the premature infants delivered with other etiologies. These results can be explained with the pathophysiology of preeclampsia and its effect on the fetus during the intrauterine period. On the other hand, early preterm delivery because of

preeclampsia related with severe illness or fetal distress can elucidate these results. Because of worse neonatal outcomes of preterm born due to preeclampsia compared with non-preeclamptic ones, it will be appropriate that these cases should be evaluated by more sophisticated hospitals which have qualified NICU conditions.

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