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The evaluation of pregnancies complicated by eclampsia: retrospective analysis of 37 cases in our clinic

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Abstract

Objective: We aimed to evaluate the clinical characteristics and maternal and perinatal outcomes of pregnancies complicated by eclampsia.

Methods: A total of 37 patients were identified who were diagnosed and treated in Zekai Tahir Burak Maternal Health Training and Research Hospital between January 2009 and December 2013. These patients found in and reviewed by their hospital records were evaluated retrospectively in terms of their clinical characteristics, laboratory parameters, and maternal and perinatal outcomes.

Results: It was found that a total of 89,908 deliveries were performed in our hospital during the study. Eclampsia incidence was calculated as 0.4/1000 deliveries. Mean age of the cases in our study was 27.2±6.6 years and mean gestational age was 33.2±4.5 weeks. The rate of the cases who were nullipara was 78.4%. It was understood that the most of the eclamptic seizures occurred during the antenatal period (59.6%) after 28 weeks of gestation (89.2%). Neonatal morbidity rate was 61.1% and perinatal mortality rate was 12.5%. While major morbidity rate was 43.2%, the leading cause of the morbidity was HELLP syndrome (37.8%). It was found that a thirty-year-old woman who was multipara (G2P1) died on the postpartum 10th day due to intracranial hemorrhage.

Conclusion: Eclampsia is one of the most significant reasons of maternal and perinatal morbidity and mortality. Even though it is not always possible to prevent it, the best approach can be provided by ensuring patients with highest risk for eclampsia to have regular antenatal care, preventing convulsions through hospitalization in tertiary healthcare centers with proper conditions, bringing blood pressure under control and carrying out delivery at the most convenient time.

Keywords: Eclampsia, clinical characteristics, maternal and perinatal outcomes.

Özet: Eklampsi ile komplike olan gebeliklerin değerlendirilmesi: Kliniğimizdeki 37 olgunun retrospektif analizi

Amaç: Eklampsi ile komplike olan gebeliklerin klinik özelliklerinin ve maternal ve perinatal sonuçlarının değerlendirilmesi.

Yöntem: Zekai Tahir Burak Kadın Sağlığı Eğitim ve Araştırma Hastanesinde Ocak 2009 ve Aralık 2013 tarihleri arasında eklampsi tanısı konulan ve tedavi edilen toplam 37 hasta tanımlandı. Hastane kayıtlarından saptanan ve dosyaları incelenen bu hastalar klinik özellikleri, laboratuvar parametreleri ve maternal ve perinatal sonuçlarına göre retrospektif olarak değerlendirildi.

Bulgular: Çalışma süresince hastanemizde toplam 89.908 doğumun gerçekleştiği saptandı. Eklampsi insidansı 0.4/1000 doğum olarak hesaplandı. Çalışmamızda yer alan olguların yaş ortalaması 27.2±6.6 yıl ve ortalama gebelik yaşı 33.2±4.5 haftaydı. Olguların %78.4'ü nullipar idi. Eklamptik nöbetlerin çoğunluğunun antenatal dönemde (%59.6) ve 28. gebelik haftasından sonra (%89.2) gerçekleştiği anlaşıldı. Neonatal morbidite oranı %61.1 ve perinatal mortalite oranı %12.5 olarak bulundu. Majör morbidite oranı %43.2 ve morbiditeye neden olan önde gelen sebep HELLP sendromuydu (%37.8). Otuz yaşında multipar (G2P1) bir kadının, doğumdan sonra 10. günde intrakranial kanama nedeniyle kaybedildiği saptandı.

Sonuç: Eklampsi, maternal ve perinatal morbidite ve mortalitenin en önemli nedenlerinden biridir. Her zaman önlenemese de, eklampsi gelişme riski yüksek olan hastaların düzenli antenatal bakım almalarının sağlanması, uygun koşullara sahip üçüncü basamak merkezlerde hospitalize edilerek, konvülziyonların önlenmesi, kan basıncının kontrol altına alınması ve uygun zamanda doğumun gerçekleştirilmesi ile en iyi yaklaşım sağlanabilir.

Anahtar sözcükler: Eklampsi, klinik özellikler, maternal ve perinatal sonuçlar.

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Introduction

Hypertensive disorders are the most frequent medical complication of pregnancy, and it has been reported that they affect 5-10% of pregnancies in the USA.[1] Despite its higher incidence and wider incidence range in developing countries, its incidence rate (0.16–1/1000 delivery) is stable in developed countries.[2] Eclampsia is a specific neurological complication of pregnancy, it is characterized by hypertension and tonic clonic convulsions, and its pathophysiology is still unclear. It has been found that the cerebral anomalies developing in eclampsia are similar to the changes in hypertensive encephalopathy.[3] Early marriage, nulliparity, insufficient prenatal care, low socio-economical condition and malnutrition are the risk factors for eclampsia as in preeclampsia. While eclamptic seizure may develop after severe preeclampsia, it also may develop unexpectedly without hypertension and proteinuria.[4] A mild hypertension can be seen only in 30-60% of the women developing eclampsia.[3] Headache, blurring of vision, photophobia and mental changes may be early diagnoses of an approaching eclampsia; however, the eclampsia may develop even without these findings.

Eclampsia is a life-threatening complication of pregnancy. Its most frequently reported reason is HELLP syndrome.[3] Maternal mortality rate of eclampsia was reported was as high as 15%.[5] Intracranial hemorrhage, pulmonary edema, renal, hepatic and respiratory failures are the leading mortality reasons. Increased perinatal mortality is a result of eclampsia, and perinatal mortality rate was reported as 10% in a multicentric study carried out in Brazil.[6] Chronic placental insufficiency, preterm labor and ablatio placentae are among perinatal mortality reasons.[7] It is easy to establish eclampsia diagnosis; however, it should be remembered that conditions such as epilepsy, encephalitis, meningitis, brain tumors, cysticercosis and ruptured brain aneurysm may trigger eclampsia during advanced weeks of gestation and puerperium. All pregnants having convulsion should be considered as eclamptic until all other reasons are ruled out.[8] Eclampsia requires immediate treatment in order to minimize maternal and fetal morbidity and mortality. In this study, we aimed to analyze eclampsia cases in our hospital which is a tertiary healthcare center in Central Anatolia.

Methods

Thirty-seven cases who were established eclampsia diagnosis and treated in high-risk pregnancy and delivery room departments of Zekai Tahir Burak Maternal Health Training and Research Hospital between January 2009 and December 2013 were evaluated retrospectively. Patient data were obtained from patient files. Demographic characteristics, laboratory findings and obstetric outcomes were recorded. For each women, age, gravida, parity, abortion, gestational body mass index (BMI), blood pressure measurements, week of gestation at diagnosis, additional disease, smoking habit, initial symptoms, educational level, the phase that delivery occurs, laboratory findings, hospitalization period, magnesium application, delivery type, birth weight, Apgar score, and finally maternal - fetal morbidity and mortality were investigated. It was seen that the weeks of gestation were calculated according to last menstrual periods, and that the gestational age was noted according to ultrasound screenings carried out on the first trimester in those who did not know their last menstrual period. Full urinalysis, full blood counts, liver and kidney function tests and LDH values of all cases were recorded. It was found that fetal biometry and Doppler examination by ultrasonography and continuous external fetal monitorization by cardiotocography were carried out for each patient. With 12-hour dosing interval, 12 mg betamethasone was administered to all pregnant women at or below 34 weeks of gestation for fetal lung maturation.

Eclampsia was identified according to the presence of following criteria: the presence of at least two among hypertension, proteinuria, thrombocytopenia, and increased serum AST level within 24 hours after convulsions developed during pregnancy or within 10 days during following delivery. The diagnosis of HELLP syndrome was established according to hemolysis (LDH >600 U/L), thrombocytopenia (<100×103/μL) and increased liver enzyme (AST>70U/L). It was found that 10-minute intravenous loading dose of 4.5 g magnesium sulphate ($MgSO_4$) was administered to all women having eclamptic seizure and then convulsion prophylaxis was initiated so as to progress as 2 g/h intravenous infusion, and nifedipine and alpha-methyldopa were used in the anti-hypertensive treatment in order to keep diastolic blood pressure between 90 and 100 mmHg and severe hypertension under control.

Statistical Package for the Social Sciences (SPSS) version 15.0 (SPSS Inc., Chicago, IL, USA) was used for statistical analysis. Definitive data and frequencies were calculated by the computer. Conformity of the data to normal distribution was evaluated by Kolmogorov-Smirnov test. The data with constant and normal distribution were provided as mean±standard deviation, and the data without constant and normal distribution were provided as median (minimum-maximum). Categorical variables were given as figure (percentage).

Results

During the 5-year period of the study, a total of 89,908 deliveries occurred in our hospital. It was found that 37 of these pregnancies were complicated with eclampsia. Eclampsia incidence was calculated as 0.4/1000 deliveries. Eclampsia was more common in nullipara cases (78.4% vs. 21.6%). Mean age and weeks of gestation of the patients were 27.2±6.6 (range: 16 to 42) years and 33.2±4.5 (range: 25 to 39) weeks, respectively. While mean systolic blood pressure value was 155.7±26.9 mmHg, it was 101.6±17.5 mmHg for diastolic blood pressure. The clinical and laboratory findings of the patients are shown in the **Table 1**. Eclamptic seizure occurred during antepartum period in 22 patients, during postpartum period in 10 patients and during intrapartum period in 5 patients. Eclamptic seizure developed without hypertension in 5 patients, and headache was the most frequent initial symptom (**Table 2**). The rates of cesarean and vaginal delivery were 89.2% and 10.8%, respectively. Two out of 4 patients who had vaginal delivery developed postpartum eclampsia, one patient had intrauterine fetal death and one multipara patient developed intrapartum eclampsia on the second phase of the delivery. The educational level of more than half of the patients was primary school or below. One patient had gestational diabetes while one patient had smoking history. Multiple pregnancy was found in two patients (one twin, and one triplet). It was seen in two patients that eclampsia developed without proteinuria. While maternal morbidity developed in 16 patients, the diagnosis of HELLP syndrome was established in 14 of them, disseminated intravascular coagulation (DIC) in one patient, sudden temporary loss of vision in one patient and renal failure following detachment in one patient. It was found that one patient was referred to the Intense Care Unit of Anesthesiology and Reanimation Department of Ankara Training and Research Hospital due to intracranial hemorrhage, but died on the way. Maternal mortality was found as 2.7% due to this case. Prematurity and intrauterine growth retardation (IUGR) were the most frequent reasons for perinatal morbidity (**Table 3**). Perinatal mortality rate was found as 12.5% (5/40).

Table 1. Clinical and laboratory characteristics of cases.

Variable	Result
Age (year)*	27.2±6.6
Nullipara†	29 (78.4)
Gravida‡	2 (1–6)
Parity‡	0 (0–3)
Abortion‡	1 (0–6)
BMI (kg/m^2)*	29.8±4.8
Smoking†	1 (2.7)
Educational level†	
Illiterate	2 (5.4)
Primary school	17 (45.9)
Secondary school	8 (21.6)
High school	10 (27)
SBP (mmHg)*	155.7±26.9
DBP (mmHg)*	101.6±17.5
Hospitalization period (day)*	8.6±3.3
AST (U/L)*	236.2±458.9
ALT (U/L)*	176.8±305.1
Creatinine (mg/dL)*	0.7±0.2
Platelet (x10^3/µL)*	179.4±108.6
LDH (U/L)*	1008.4±705.9
Proteinuria in spot urine (mg/dL)†	
0	2 (5.4)
0< and ≤30	3 (8.1)
>30 and ≤300	22 (59.5)
>300	10 (27)

BMI: Body mass index; DBP: Diastolic blood pressure; SBP: Systolic blood pressure. Data *: ⅞±SD; †: n(%); ‡: median (minimum–maximum).

Table 2. Initial symptom.

Symptom	n (%)
Headache	10 (27)
Blurring of vision	8 (21.6)
Epigastric pain	2 (5.4)
Recurring seizure	5 (13.5)

Discussion

Eclampsia is a life-threatening gestational complication developing acutely. It has a high risk of morbidity and mortality for mother and fetus. When eclampsia usually occurs following severe preeclampsia, it may appear without any preeclamptic symptoms. Munro[9] reported that 38% of eclamptic seizures occurred without any symptom and finding previously. Its incidence reported in developed countries is 1/2000–1/3000; however, this rate is much more in developing countries.[4] The eclampsia rates reported in Turkey vary. In their study, Yıldırım et al.[10] investigated 113 eclampsia cases and found eclampsia rate as 1.2/1000 delivery, which was reported as 1.7/1000 in another study carried in the western region of Turkey.[11] The study performed in Southeastern Anatolia found the incidence rate as 19/1000[12] while it was reported as 1.2/1000 in Northeastern Anatolia.[13] In our study, we found a lower rate which was 0.4/1000 (1/2430). The reason may be that especially the eclampsia cases developing during the postpartum period referred to other multidisciplinary hospitals in the region.

Liu et al.[14] found that eclampsia incidence gradually decreased and nulliparity, anemia and the presence of cardiac disease in singleton deliveries increased the risk of eclampsia for 2.3–4.8 times. In another study, it was argued that being younger than 20-year-old and older than 35-year-old, long intervals between deliveries, low socio-economic level, gestational diabetes, gestational obesity and gaining weight during pregnancy less or more than recommended were found to be the risk factors associated with eclampsia, and that multiparity and smoking decreased the eclampsia.[15] Yıldırım et al. showed in their studies that 63.7% of eclamptic seizures developed in nullipara cases.[10] Similarly, we found in our study that nulliparity was more common among eclamptic cases (78.4%).

Lopez-Llera[16] categorized eclampsia according to the onset time of the seizure and defined as antepartum if it develops before delivery, as intrapartum if it occurs during delivery and as postpartum if it develops within 7 days after delivery. It was reported that 38–53% of the eclamptic seizures developed during antepartum period while 11–44% of them developed during postpartum period.[3] However, it can be difficult to distinguish them since antepartum and intrapartum periods intertwine. Also, in higher than 90% of the eclamptic cases, it develops after 28 weeks of gestation.[4] In line with the literature, we observed eclamptic seizure in most of our cases during antepartum period (59.4%) and after 28 weeks of gestation (89.2%).

Table 3. Obstetric and maternal-perinatal outcomes.

Variable	Result
Week of gestation*	33.2±4.5
≤28 week of gestation†	4 (10.8)
Birth weight*	1988.9±973.6
Apgar score‡	6 (0–9)
Multiple pregnancy†	
Twin	1 (2.7)
Triple	1 (2.7)
Perinatal morbidity†	
Prematurity	22 (61.1)
IUGR	12 (32.4)
Perinatal mortality†	5 (12.5)
Maternal complication†	16 (43.2)
HELLP	14 (37.5)
Maternal mortality†	1 (2.7)
Delivery type†	
Vaginal delivery	4 (10.8)
Cesarean section	33 (89.2)
Period that seizure occurred†	
Antepartum	22 (59.5)
Postpartum	10 (27)
Intrapartum	5 (13.5)

IUGR: Intrauterine growth retardation. Data *: $\bar{x}$±SD; ‡: n(%); ‡: median (minimum–maximum).

The first step of eclampsia management is to prevent maternal injuries and to provide cardiopulmonary support. Afterwards, it is to prevent the recurrence of convulsions and to decrease blood pressure to the safe levels. There are strong evidences for using routine magnesium sulphate ($MgSO_4$) for the prophylaxis of seizures in the literature, and a full consensus has been reached.[17,18] The recommendation for patient with eclamptic seizure is to administer 1–2 g/h maintenance dose for at least 24 hours after 4–6 g intravenous loading dose.[1] However, in 9.4% of the cases, it was reported that eclamptic seizures may recur despite $MgSO_4$ prophylaxis.[17] We initiate $MgSO_4$ prophylaxis for all our severe preeclamptic and eclamptic patients. We monitor our patients by their urination, respiratory rate, patellar reflex and intermittent serum magnesium levels. In our study, similar to the literature, the seizure recurred under $MgSO_4$ pro-

phylaxis in 5 (13.5%) patients, and we kept the seizure under control in all these patients by single dose diazepam (10 mg).

In women developing eclampsia, detachment, DIC, HELLP, cerebral hemorrhage and maternal mortality risk increased.[4] The risk of HELLP syndrome is reported about 10–15% in eclamptic cases.[3] However, in recent publications in our country, the rate of eclamptic patients developing HELLP syndrome reached up to 40% and the eclampsia was grouped in two categories as developing HELLP and not developing HELLP.[10,11,19] In line with the literature, HELLP syndrome was the most common complication in our patients while one patient had DIC, one patient had renal failure following detachment and one patient had sudden temporary loss of vision. Also, our patient developing HELLP died after intracranial hemorrhage on postpartum 10th day in the intense care unit of a multidisciplinary hospital.

In the study investigating maternal death of 174 cases, Akar et al. found maternal mortality rate as 40/100,000 and preeclampsia- and eclampsia-induced complications as the most common direct maternal death.[20] It is reported in the world that eclampsia-induced maternal mortality rates has increased up to 15%.[5] Eclamptic cases are more common in developing countries and it is explained by the multiple numbers of convulsions occurring out of hospital and non-presence of antenatal follow-ups of these cases. In our country, maternal mortality rate in eclamptic cases is reported between 0 and 14.6%.[21] In our study, we found eclampsia-induced maternal mortality rate as 2.7% (1 case).

Perinatal morbidity and mortality rates are high in the babies of eclamptic mothers. Preeclampsia and eclampsia are responsible for 2.7% of perinatal mortality independent from prematurity and IUGR, preeclampsia rate is 12% in newborns with IUGR and 19% in preterm newborns.[22] In a multinational study supported by WHO and involved 29 countries, perinatal mortality rates were found as 2.6%, 9.2% and 22.6% in non-preeclamptic/non-eclamptic, preeclamptic and eclamptic pregnant women, respectively.[23] These complications are most likely prematurity-induced RDS, apnea, jaundice, kernicterus, malnutrition, hypoglycemia, seizure, periventricular leukomalacia and prolonged hospitalization periods.[24,25] While most of our cases (61.1%) were born as premature, 12 (32.4%) cases had IUGR. One case died during perinatal period and 4 cases during neonatal period. We found perinatal mortality rate as 12.5%.

Conclusion

In conclusion, severe preeclampsia and eclampsia are significant reasons for maternal and perinatal morbidity and mortality in the world. Understanding the pathophysiology better, close antenatal follow-ups and appropriate treatment by hospitalizing risky cases in tertiary healthcare centers with proper conditions may decrease eclampsia incidence and associated secondary maternal and perinatal morbidity and mortality rates.

Conflicts of Interest: No conflicts declared.

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