Factors that influence morbidity and mortality in severe preeclampsia, eclampsia and hemolysis, elevated liver enzymes, and low platelet count syndrome

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ABSTRACT

Objective: To evaluate the prognostic factors affecting morbidity and mortality in severe preeclampsia, eclampsia and hemolysis, elevated liver enzymes, and low platelet count (HELLP) syndrome cases.

Methods: We retrospectively evaluated, 2245 cases who delivered in the Department of Obstetrics and Gynecology, Faculty of Medicine, Cukurova University, Turkey between January and December 2002. Ninety-three cases had severe preeclampsia, 26 cases eclampsia, 19 cases HELLP syndrome, and 6 cases with eclampsia and HELLP syndrome were included in this study. The pregnancy induced hypertension cases were evaluated retrospectively for socioeconomic status, obstetrical history, biochemical parameters, and maternal complications.

Results: The incidence of preeclampsia was 20.1% (453/2245), the incidence of severe preeclampsia, eclampsia, and HELLP syndrome was 6.4% (144/2245). These ratios are higher than that reported in the English literature. The complication rate was 38% in severe preeclampsia cases. Among the severe preeclampsia cases, 32 had eclampsia (22.1%), and 25 had HELLP syndrome (17.3%).

Conclusion: The most important biochemical marker for maternal mortality is bilirubin levels. Maternal mortality was statistically higher in cases with jaundice. Also, there was a statistically significant relation between maternal complications and liver function tests, lactate dehydrogenase levels, and low platelet levels.

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The development of hypertension with proteinuria or edema, or both, induced by pregnancy after the 20th week of gestation is described as preeclampsia.[1] If convulsion or coma is added it is named as eclampsia. Preeclampsia is defined as severe preeclampsia if any of the following criteria exists: systolic blood pressure is higher than 160 mm Hg, and diastolic higher than 110 mm Hg in at least 2 measurements 6 hours apart; proteinuria higher than 5 gr/day, oliguria (less than 400 ml/24 hours); cerebral and visual problems; epigastric pain, nausea and vomiting; pulmonary edema and cyanosis, thrombocytopenia; hemolytic anemia and fetal growth retardation.[1]

In severe preeclampsia cases, hemolysis, increased liver proteins, and low platelet count is defined as HELLP syndrome. The incidence of preeclampsia and HELLP syndrome differs from one country to another. In a study in Canada, the incidence of preeclampsia is

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reported to be 5.6%, and the incidence in primigravida patients was 7.9%.[2] In another study, it was reported that eclampsia occur in 1:2000 pregnancies in developed countries, but the ratio is between 1:100 to 1:1700 pregnancies in underdeveloped countries.[3] Although the pathophysiology of preeclampsia is not clear yet, there are some risk factors which are; parity: 2/3 of the cases are nullipara. Family history: in a study the incidence of preeclampsia is 5.6% in a society, but it is found to be 20.2% in the sisters of preeclamptic women.[2] Medical problems: diabetes mellitus, renal and vascular diseases increases the risk. Maternal age: in both adolescent pregnancies and also in elder pregnant women the risk increases. Obstetrical problems: multifetal pregnancies, hydatiform mole and hydrops fetalis increases the risk. Another risk factor is lower socioeconomical status.

Preeclampsia is one of the major causes of maternal mortality. In the United States of America, 17% of maternal mortalities are secondary to pregnancy induced hypertension.[4] There are many complications leading to maternal and fetal morbidity and mortality. Maternal complications are intracerebral hemorrhage, acute tubular or cortical necrosis, retina decolman, subcapsular hematoma or rupture of liver, pulmonary edema, heart failure, and disseminated intravascular coagulopathy (DIC). Among these, intracerebral hemorrhage is the main mortality cause.[5,6] In Turkey, eclampsia is the leading cause of maternal mortality, so it is also a public health problem. In this study, we retrospectively evaluated the risk of mortality and morbidity of severe preeclampsia, eclampsia and HELLP syndrome cases.

Methods. This study was carried out in Cukurova University, Faculty of Medicine, Department of Obstetrics and Gynecology, Turkey between January and December 2002 on 2245 cases retrospectively. Among 2245 cases who attended our clinic, 453 had a diagnosis of preeclampsia (20.1%). Our study covers 144 patients (6.4%) who had severe preeclampsia. Patients with insufficient information on their files were excluded in the study.

In the study, the educational status of the cases, obstetrical histories, existence of chronic hypertension or systemic diseases, the blood levels of serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT), lactate dehydrogenase (LDH), bilirubin, blood urea nitrogen (BUN) creatinine and platelet levels, which were obtained in the initial visit were reported and these factors were assessed for the complications. Patients were divided into 2 groups; patients with complications and patients without complications. The complication group included patients with; eclampsia, HELLP syndrome, eclampsia + HELLP syndrome, acute tubular necrosis, maternal mortality, DIC, postoperative hematoma, intracranial hemorrhage, hypertensive retinopathy, and abruptio placenta.

Statistical analysis was carried out with SPSS 11.0 program and Mann-Whitney U test, which is a nonparametric variance analyze method is used. The levels of $p<0.01$ were accepted as statistically significant results.

Results. The age of the study cases ranged between 17-45 years. The mean age was 28.42 years. There are 2 peaks for age; one in their 20's and second is at 35 years for severe preeclampsia cases. When the cases were evaluated for educational status, 73.7% of the cases were either uneducated or only finished primary school of 5 years. Only 4 of the severe preeclampsia cases (2.8%) finished university. The severe preeclampsia cases were less educated comparing to our overall pregnant population. In the study group 66 of the cases (45.8%) were primigravida.

Fifteen of the cases had chronic hypertension prior to the pregnancy, 10 cases had a history of preeclampsia in the previous pregnancy. Seven of the cases were postpartum eclampsia. Intrauterine fetal death was diagnosed in 19 (13.2%) cases. Thirteen of the perinatal mortalities were in abruptio placenta cases. The complications of the cases are summarized in **Table 1**. There was no statistically significant difference between the complicated severe preeclampsia cases with the uncomplicated cases regarding age, gestational age, educational status, eclampsia history in previous pregnancies, chronic hypertension, postpartum eclampsia, BUN, creatinine, and bilirubin levels. In the complicated cases liver enzymes (SGOT and SGPT) and LDH levels were significantly higher than the uncomplicated group. Platelet levels were significantly lower in the complicated cases. Comparison of biochemical values of complicated and uncomplicated cases is shown in **Table 2**.

There were 4 women who died in the complicated severe preeclampsia group. One was with intracranial hemorrhage, one was with DIC and 2 with eclampsia + HELLP syndrome. The bilirubin levels of the cases who died were statistically significantly higher than the ones who survived. All 4 of the maternal mortality was in icteric patients. When the intrauterine fetal mortality were assessed 11 cases were found to be related with abruptio placenta .

Discussion. The prevalence of preeclampsia was found to be 20.1% in our series, whereas in the

Table 1 - Complications of the severe preeclampsia cases.

Complications	Number of cases (%)
Eclampsia	26 (18)
HELLP syndrome	19 (13.2)
Eclampsia + HELLP syndrome	6 (4.1)
Acute tubular necrosis	5 (3.5)
Maternal mortality	4 (2.8)
Disseminated intravascular coagulopathy	1 (0.7)
Postoperative hematoma	2 (1.4)
Intracranial hemorrhage	1 (0.7)
Hypertensive retinopathy	1 (0.7)
Abruptio placenta	13 (9)
Uncomplicated cases	89 (61.8)

There were more than one complication in some cases

Table 2 - Biochemical values of the cases with and without complication.

Parameters	Mean		*P*-value
	Uncomplicated cases N=89	Complicated cases N=55	
SGOT	42.89	240.53	0.000
SGPT	41.29	247.85	0.000
LDH	447.52	1883.43	0.000
I. bilirubin	.9049	1.2775	0.113
BUN	22.25	24.17	0.411
Creatinine	.97	1.03	0.446
Platelet count	241.197	146.603	0.000

SGOT - serum glutamic oxaloacetic transaminase, SGPT - serum glutamic pyruvic transaminase, LDH - lactate dehydrogenase, I. bilirubin - indirect bilirubin, BUN - blood urea nitrogen, *p*-value was obtained using the Mann-Whitney U Test.

literature, the average incidence was between 6-7% and the highest literature reported 20%.[1,7] The incidence of severe preeclampsia was less than 1% in England, and it was 6.4% in our series, eclampsia incidence was 1.4% in our series regarding all patients, but it was less than 0.1% in the same study.[3] The higher incidences of preeclampsia and eclampsia in our series maybe explained as follows: our cases had lower educational status, lower economical status and also our hospital is the only tertiary care hospital, which has a maternal fetal medicine and perinatology unit in the East Mediterranean part of Turkey. Our region has a subtropic climate and the nutritional traditions may have a role in this higher incidence. Another major problem is that none of the cases with complications had their antenatal follow-ups in our out-patient clinic, but they all were referred to our clinic for delivery, most of whom had no proper pregnancy follow-up. The most common complication was eclampsia, 22.1% of the severe eclampsia cases had eclampsia and 17.3% had HELLP syndrome. In the literature, the incidence of HELLP syndrome among severe preeclampsia cases is found to be 12%.[8] In our study, among the eclampsia cases,22% were postpartum, whereas in the literature the ratio was 33%.[9] When we compared the postpartum eclampsia cases with pre-partum eclampsia cases there was no statistically significant difference for the complications ($p>0.05$). The complication ratio of the severe preeclampsia was 38% in our series, in the literature this was reported to be 29%.[10] In the same study it was reported that 41.3% of the cases had systematic follow-up during pregnancy whereas it was only 18% in our study, and none of the cases with complication were followed-up in our clinic.[10] As a result, that higher complication rates are related to insufficient follow up during the antenatal period. In our series, 9% of the cases had abruptio placenta, and 13.5% had intrauterine fetal demise, in the other studies the ratio was similar at 16%.[11]

In the evaluation of biochemical parameters, cases with complications had significantly higher liver enzymes and lower platelet levels, but other biochemical parameters were not significantly different. In our study, we found that higher levels of bilirubin were found to be related with maternal mortality. The higher levels of bilirubin is secondary to hemolysis in HELLP syndrome. Therefore, bilirubin levels may be accepted as a prognostic factor for maternal mortality. The SGOT, SGPT, LDH and platelet levels maybe accepted as prognostic factors for maternal morbidity in severe preeclampsia.

As a result, we must emphasize that severe preeclampsia is a problem with higher morbidity and mortality. In our series the most important mortality cause was eclampsia with HELLP syndrome. Unfortunately none of these cases were followed antenatally in our clinic. In order to decrease the maternal and perinatal mortality and morbidity we must increase the ratio of pregnant women who have systematic follow up and increase the socio-economical status of the people.

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