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ORIGINAL ARTICLE

Maternal Complications Associated with Severe Preeclampsia

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Abstract
Objective Hypertension disorders are associated with higher rates of maternal, fetal, and infant mortality, and severe morbidity, especially in cases of severe preeclampsia, eclampsia, and HELLP syndrome. The aim of the study was to determine maternal outcomes in pregnant women with severe preeclampsia.
Data Source The data source consisted of 349 cases with severe preeclampsia.
Design A cross-sectional study was undertaken on 349 cases of severe preeclampsia in pregnancy.
Setting/Period The patients selected for this study were from those who presented at Kermanshah University of Medical Sciences, Department of Obstetrics and Gynecology during 2007–2009.
Materials and Methods Statistical analysis was performed using SPSS 16 software and conducting Chi square and independent sample t tests. Demographic data involving age, parity, gestational age, clinical, and laboratory findings were recorded from the medical files. In addition, delivery route, indications of cesarean delivery, and maternal complications were determined.
Results Of the 349 severely preeclampsia cases, among the 22 cases (6.3 %) who had suffered from eclamptic seizers, 17 cases (77.3 %) were in the age group of 18–35 years ($P = 0.351$) and 13 cases (59.1 %) in the gestational age group of 28–37 weeks ($P = 0.112$). One case (0.3 %) was demonstrated to have HELLP syndrome. Placental abruption was obstetric complication in 7.7 % (27 cases). Delivery route was vaginal in 120 cases (34.4 %), while 229 cases (65.6 %) underwent cesarean delivery. The most frequent maternal complication (37 cases) reported was coagulopathy (10.6 %).
Conclusions We concluded that severe preeclampsia and eclampsia are associated with higher rates of maternal severe morbidity and that these two factors still remain the major contributors to maternal morbidity in Iran.

Keywords Severe preeclampsia · Eclampsia · Maternal complications · HELLP syndrome

Introduction

The four major hypertensive disorders related to pregnancy are preeclampsia, chronic hypertension, preeclampsia superimposed upon chronic hypertension, and gestational hypertension. The development of hypertension and proteinuria in pregnancy is usually due to preeclampsia, particularly in a primigravida. These findings have typically been apparent in the latter part of the third trimester and progress

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until delivery, but some women develop symptoms in the latter half of the second trimester, or intrapartum, or the early postpartum period. Preeclampsia is characterized as mild or severe. Severe hypertension, coagulopathy, thrombocytopenia, liver function abnormalities, and fetal growth restriction are features of severe disease. Laboratory evaluation should assess hemoglobin/hematocrit and platelet count, and hepatic function, as well as assessment of fetal well-being and growth [1].

Preeclampsia complications do arise in about 3 % of pregnancies, and all hypertensive disorders affect about 5–10 % of pregnancies. Hypertensive disorders are associated with higher rates of maternal, fetal, and infant mortality, and severe morbidity, especially in cases of severe preeclampsia, eclampsia, and hemolysis, elevated liver enzymes, and low platelets syndrome [2].

Features of severe preeclampsia include severe proteinuria hypertension and symptoms of central nervous system dysfunction, hepatocellular injury thrombocytopenia, oliguria, pulmonary edema, cerebrovascular accident, and severe intrauterine growth restriction. Women with severe preeclampsia must be hospitalized to confirm the diagnosis, to assess the severity of the disease, to monitor the progression of the disease, and to try to stabilize the disease [3].

Preeclampsia is a pregnancy-specific hypertensive syndrome associated with significant morbidity and mortality in mother and baby. With the increasing understanding of the disease process, the number of complications, as well as the maternal and perinatal deaths, have fallen over the past few decades in the developed countries. In other parts of the world, the rates of mortality and morbidity still remain high [4].

Eclampsia is defined as preeclampsia complicated by generalized tonic–clonic convulsion. Although eclampsia is uncommon in developed countries, it is still a major cause of maternal morbidity and mortality worldwide [5, 6].

One of the rare effects of severe preeclampsia on the eye is sudden loss of vision due to involvement of the occipital cortex or the retina [6].

Subcapsular hepatic hematoma caused mainly by the development of disseminated intravascular coagulation is one of the rare complications experienced with severe preeclampsia and eclampsia [7].

Globally, preeclampsia and eclampsia account for 10–15 % of maternal deaths. A majority of deaths in developing countries result from eclampsia, while in developed countries, complications of preeclampsia are more often the cause. Pulmonary edema is a rare, serious problem, resulting in complications in as many as 3 % of cases of severe preeclampsia [8].

The etiology of preeclampsia is unknown: numerous models have attempted to explain its roles in the pathogenesis of immunology, cytokines, and growth factors, including tumor necrosis factor, endothelial damage, platelet dysfunction, and genetics has been implicated in the pathogenesis of preeclampsia [8, 9].

The goals of therapy must always be the safety of the mother first and then consideration for optimum perinatal outcomes. The only cure for severe preeclampsia is delivery [9].

The present retrospective, descriptive study was undertaken to determine maternal outcomes in severe preeclamptic women in Imam Reza hospital, Kermanshah, Iran.

Materials and Methods

A cross-sectional study was undertaken reviewing the medical records of all gravid women with severe preeclampsia who were managed at Kermanshah University of Medical Sciences (KUMS), School of Medicine, Department of Obstetrics and Gynecology, High Risk Pregnancy Research Center (HRPRC) 2007–2009. Ethics approval was not necessary.

Severe preeclampsia was defined as the presence of one or more of the following criteria: (a) blood pressure (BP) of 160 mmHg or higher systolic or 110 mmHg or higher diastolic on two occasions at least 6 h apart, while the patient is on bed rest; (b) Proteinuria of 2 g or higher in a 24-h urine specimen or 2+ or greater on two random urine samples collected at least 4 h apart; (c) oliguria of less than 500 ml in 24 h; (d) cerebral or visual disturbances; (e) pulmonary edema; (f) epigastric or right upper quadrant pain; (g) fetal growth restriction; (h) symptoms such as persistent severe headache; (i) Medical complications involving acute renal insufficiency, hepatic hematoma, HELLP syndrome (hemolysis, elevated liver enzymes, low platelet count). Generalized seizures in preeclamptic pregnant woman are considered to be due to eclampsia.

Patients were hospitalized in Imam Reza hospital Labor ward. On admission blood pressure measurements were done, blood samples were collected for laboratory evaluation, 24 h urinary albumin excretion was determined. Maternal complications such as eclampsia, HELLP syndrome, acute renal insufficiency, disseminated intravascular coagulation, placental abruption, cerebral and visual disturbance, oliguria, IUGR, pulmonary edema and etc. were recorded.

Ante partum management included bed rest, $MgSO_4$ infusion to prevent eclamptic convulsions (4 g intravenous loading dose followed by 5 g intramuscular every 4 h until 24 h after delivery). Hydralazine was administered intravenous slowly to control high blood pressure values $\geq$160/110 mmHg and Ringer's lactate was given at a rate of 60–120 ml/h for expansion of plasma volume. Betamethasone, two doses of 12 mg, was administered intramuscularly 24 h apart to accelerate the fetal lung maturity in cases with gestational age 28–34 weeks.

Data regarding the demographic parameters, gestational age (determined by known last menstrual period or first trimester ultrasonography), persistent sign and symptoms, blood pressure measurement on admission, laboratory evaluation of blood samples (complete blood count, liver enzymes, creatinine, coagulation profile, platelet count), 24 h urinary albumin excretion were recorded.

The method of delivery dependent on factors such as gestational age, fetal presentation and present or absent of obstetrics indications and fetal distress for cesarean section (C/S) and the findings on cervical examination.

Statistical analysis was performed by SPSS 16 software and using frequency table, crosstab, mean ± SD, Chi square test and independent sample *t* test.

Results

In this survey, 349 pregnant women with severe pre-eclampsia were studied. Maternal characteristics are summarized and most of maternal age group was in 18–35 years group (80.2 %) gestational age in greater or equal 35 week and in nulliparous (59.6 %) (Table 1).

Delivery route was vaginal in 120 cases (34/4 %) and abdominal in 229 cases (65/6 %).

There was no maternal mortality and coma in our study.

Most of the maternal complications associated with severe preeclampsia were coagulopathy (37 cases) and placental abruption (27 cases) (Table 2).

One case was diagnosed as HELLP syndrome that was nulliparus, in age group 18–35 years and 28–37 weeks of gestational age.

From 22 eclamptic cases, 2 cases were more than 35 years old (9.1 %), 3 cases were less than 18 years old (13.6 %) and the others (17 cases) were between 18 and 35 years old ($P = 0.351$). All the eclamptic seizures occurred in ante partum period.

Table 1 Maternal characteristics of the patients

	Number (%)
Maternal age	
≤18	23 (6/6)
18–35	280 (80/2)
≥35	46 (13/2)
Gestational age	
<28	4 (1/1)
28–37	134 (38/4)
≥38	211 (60/5)
Parity	
Nullipar	208 (59/6)
Multipar	141 (40/4)

Table 2 Maternal complication of 349 cases with severe preeclampsia

Complications	Number (%)
Eclampsia	22 (6/3)
Placental abruption	27 (7/7)
Hepatic complications	17 (4/9)
Low PLT count	14 (4)
Coagulopathy	37 (10/6)
Renal insufficiency	8 (2/3)
Visual disturbances	13 (3/7)
Need to transfusion	3 (0/9)
HELLP syndrome	1 (0/3)
Respiratory failure	7 (2)

From the 17 cases with hepatic complications only, 1 case (0/3 %) diagnosed with hematoma.

Of 13 cases with Visual disturbances, 5 cases (1/4 %) involved retinopathy grade II and III and the rest had reduced visual acuity.

Discussion

During the study period 6.3 % (22 cases) of all severe preeclamptic women were complicated by eclamptic seizures. Most of the eclamptic seizures occurred in age groups 18–35 years and 28–37 of gestational age. Previous report by Liu et al. [10], showed 9.34 % (34 cases among 364 severe preeclamptic patients.

In our study rate of cesarean delivery was 65.6 % (229 cases), this mode of delivery was almost similar in different age groups. In <18 group 69.6 % (16 cases), 18–35 (66.4 %) (186 cases) and >35 58.7 % (27 cases). Regarding the gestational age abdominal delivery was the most common mode of delivery in 28–37 weeks gestational age (80.6 %). Similar to our study majority of patients with severe preeclampsia reported by Liu et al. [10] and Murphy and Stirrat [11] underwent C/S (87.3 and 80 % respectively). Yucesoy et al. [12] reported 58.8 % (150 patients) underwent C/S in pregnancies complicated with hypertensive disorders. This high rate of cesarean delivery may be due to the population study that was limited to the early-onset preeclampsia [11].

The present study showed that, in 0.3 % (1 case) cases of severe preeclampsia, there was HELLP syndrome, which was nulliparous, in age group 18–35 years and 27–35 weeks of gestational age.

Yucesoy et al. [12] in their study reported 5 cases of 225 cases of hypertensive disorders in pregnancy were diagnosed as HELLP syndrome, two were severe preeclampsia and three were eclamptic. Also Murphy and Stirrat [11] in their study reported 15 women (21 %) had developed

HELLP syndrome which is higher than present study (21 % vs. 0.3 %).

In the present study 7.7 % (27 cases) presented placental abruption which is less than the reported by Murphy and Stirrat [11] (15 % had abruption).

Although visual disturbances develop in perhaps 25 % of women with severe preeclampsia, complete blindness is rare. [6] The present study showed visual disturbances in 13 women (3.7 %). Of these patients, 5 cases (1.4 %) involved retinopathy grade Π and ΙΙΙ and the others had reduced visual acuity. This type of blindness is reversible following appropriate management of such patients [6]. Current opinion suggest that it is mostly associated with cortical etiology [6] and the under 1 % of visual loss in preeclampsia syndrome is due to exudative retinal detachment [13].

Similar to our study Van Bogaert [14], Alvarez Navascues [4], Jantasing [9] reported no maternal mortality. It might be due to equipped intensive care unit and aggressive rapid interventions applied for severe preeclamptic patients.

Preeclampsia has long been considered of primigravida [15]; however, it is clear that preeclampsia does occur in second or subsequent pregnancies [15]. In our study, 59.6 % of the women were nulliparous, and 40.4 % were parous. Mark A Brown [15] also noted that two-fifths of women with preeclampsia were parous women.

Similar to our study, parous women had a lower incidence of liver disease [15]. We noted incidence of liver disease in 17 cases of our patients of whom 11 cases were nulliparous.

Jantasing [9] in their study noted severe maternal complications including coagulopathy ($n = 5$) and renal failure ($n = 3$) in 239 cases with severe preeclampsia, while the present study showed coagulopathy ($n = 27$) and renal failure ($n = 8$).

Jantasing [9] also reported no rupture hepatic hematoma, but one case of our patients with hepatic complications diagnosed with hematoma. Jantasing [9] founded pulmonary edema in 3.4 cases. The present study showed respiratory failure in 7 cases (2 %).

The need for transfusion was 0.9 % (3 patients), and only 14 cases (4 %) had PLT count less than 100,000.

Placental abruption and coagulopathy were commonest complications of our study; in the study by Agida et al. [5] acute renal failure was the commonest maternal complication.

In summary the presented data were limited by the retrospective study bias but our sample size is too large enough to potentiate the study.

Conclusion

We conclude that severe preeclampsia and eclampsia are associated with higher rates of maternal severe morbidity, and these two still remain major contributors of maternal morbidity in Iran. Early and timely intervention is a very crucial life-saving factor.

Information about danger signs of preeclampsia and eclampsia should be made available to antenatal clients.

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Conflict of interest In this study, the authors declare no conflict of interests.

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