FACTORS INFLUENCING THE POSTPARTUM LENGTH OF HOSPITAL STAY IN ECLAMPTIC WOMEN

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SUMMARY

Objective: To determine which variables are associated with postpartum length of hospital stay in eclamptic patients.

Materials and Methods: The study sample comprised 98 eclamptic patients who were admitted to our perinatology unit during the period between January 1998 and May 2003. The study sample was divided into two postpartum length-of-stay groups: the short-stay group (1–3 days) consisted of 33 patients and the long-stay group (4 days and longer) consisted of 65 patients. The groups were compared with respect to the demographic characteristics, clinical and laboratory variables, and complications.

Results: The mean hospitalization periods for the short-stay and long-stay groups were 2.48 ± 0.79 and 5.60 ± 2.12 days, respectively ($p = 0.010$). The mean prepartum follow-up period after the onset of eclampsia was longer in the long-stay group than in the short-stay group (12.11 ± 27.63 *vs.* 5.08 ± 6.08 hours). The proportion of patients receiving magnesium sulfate therapy longer than 12 hours was higher in the long-stay group ($p = 0.014$). The long-stay group had higher diastolic arterial blood pressure than that of the short-stay group ($p = 0.006$). The total cesarean delivery rate for the short-stay group was 48.5%, compared with 67.7% in the long-stay group ($p = 0.081$).

Conclusion: The duration of magnesium therapy, the timing, and the mode of delivery should be individualized to reduce the length of hospital stay in eclamptic patients. [*Taiwan J Obstet Gynecol* 2007;46(4):410–413]

Key Words: eclampsia, hospital stay

Introduction

Eclampsia is a serious complication of pregnancy that substantially contributes to maternal mortality and morbidity [1]. Eclamptic patients usually require intensive care during the pre- and postpartum period. Additionally, they have a longer hospitalization time than healthy pregnant women.

Factors influencing the length of hospital stay in eclamptic patients have received less attention in the literature. Determining the factors influencing the hospitalization period may help decrease the length of hospital stay, reduce costs, and improve efficiency in perinatology units.

The aim of this study was to determine the variables associated with postpartum length of hospital stay in eclamptic patients.

Materials and Methods

In this retrospective study, the sample consisted of 98 eclamptic patients who were admitted to our perinatology unit between January 1998 and May 2003.

The definition of eclampsia was in accordance with the criteria of Cunningham et al [2]. Age, gravida, parity, and gestational age were the patient characteristics noted. Hematologic and biochemical parameters measured at the time of admission were provided from hospital records.

All patients received magnesium sulfate seizure prophylaxis during the intrapartum period, which consisted

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of a 4.5 g loading dose and a 2.0 g per hour maintenance dose. Vital signs were assessed every hour until the time of hospital discharge.

Data obtained from the patients' obstetric records included delivery route, maternal complications, prepartum follow-up period, and the length of postpartum hospitalization stay.

The study sample was divided into two groups according to the postpartum length of stay: the short-stay group (1–3 days) consisted of 33 patients and the long-stay group (4 days and longer) consisted of 65 patients.

The groups were compared with respect to the demographic characteristics, laboratory and clinical parameters, use of magnesium therapy, and other medical complications.

All data were analyzed using SPSS software (SPSS Inc, Chicago, IL, USA). For statistical analysis, the two-tailed Student's *t* test, Mann–Whitney U test, and Fisher's exact test were used. Statistical significance was considered to be reached at $p < 0.05$.

Results

The mean age of the patients was 23.59 ± 5.67 years in the short-stay group and 24.03 ± 5.57 years in the long-stay group. Sociodemographic characteristics of the patients are presented in Table 1. There were no significant differences between the two groups in terms of age, gravida, parity, and gestational age ($p > 0.05$) (Table 1). One patient (3.03%) in the short-stay group and ten patients (15.38%) in the long-stay group had a history of antihypertensive treatment during antepartum period ($p = 0.049$).

The hematologic and biochemical parameters measured at the time of admittance are presented in Table 2. Both groups were similar in hematologic and biochemical parameters, with the exception of serum fibrinogen, urea, and alanine and aspartate aminotransferase levels ($p > 0.05$). The short-stay group had lower serum fibrinogen and urea levels and higher serum alanine and aspartate aminotransferase levels than the long-stay group ($p < 0.05$) (Table 2).

Table 1. Sociodemographic characteristics of patients*

	Short-stay group ($n = 33$)	Long-stay group ($n = 65$)	*p*
Maternal age (yr)	23.59 ± 5.67	24.03 ± 5.57	0.599
Gravida	2.03 ± 1.51	2.44 ± 4.68	0.516
Parity	0.67 ± 0.85	0.69 ± 1.18	0.903
Nulliparous	18/33 (54.54)	42/65 (64.61)	0.336
Primigravidas	17/33 (51.51)	37/65 (56.92)	0.613
Gestational age (wk)	33.76 ± 4.73	32.89 ± 4.19	0.435
History of antihypertensive treatment	1/33 (3.03)	10/65 (15.38)	0.049†
Chronic hypertension	1/33 (3.0)	4/65 (6.2)	0.507

**Data are presented as mean ± standard deviation or n (%); †statistically significant.*

Table 2. The hematologic and biochemical parameters measured at the time of admittance*

	Short-stay group ($n = 33$)	Long-stay group ($n = 65$)	*p*
Hemoglobin (g/dL)	12.13 ± 1.72	12.09 ± 1.65	0.060
Hematocrit (%)	36.53 ± 5.63	38.39 ± 4.76	0.110
Platelet cell count (per mm^3)	221,655 ± 117,437	193,846 ± 89,076	0.237
Platelets < 100,000	7/33 (21.20)	13/65 (20.0)	0.888
Prothrombin time (sec)	12.93 ± 2.59	17.64 ± 42.40	0.375
Activated partial thromboplastin time (sec)	29.26 ± 5.01	29.25 ± 5.05	0.996
Fibrinogen (mg/dL)	445.12 ± 177.49	472.43 ± 152.49	0.048†
Serum urea (mg/dL)	30.33 ± 16.07	34.49 ± 14.86	0.050†
Serum creatinine (mg/dL)	0.87 ± 0.49	0.93 ± 0.42	0.569
ALT (U/L)	150.54 ± 339.21	73.13 ± 110.85	0.035†
AST (U/L)	226.60 ± 349.20	112.64 ± 192.29	0.040†
Total protein (g/dL)	6.4 ± 1.18	6.03 ± 1.08	0.219
Albumin (g/dL)	3.10 ± 0.49	3.00 ± 0.71	0.572
Proteinuria ≥ 300 mg/dL	20/33 (60.6)	50/65 (76.9)	0.260
Urea/creatinine	36.38 ± 12.71	38.56 ± 12.71	0.426

**Data are presented as mean ± standard deviation or n (%); †statistically significant. ALT = alanine aminotransferase; AST = aspartate aminotransferase.*

The comparison of the clinical parameters between the groups is shown in Table 3. The proportion of patients receiving magnesium sulfate therapy longer than 12 hours was higher in the long-stay group ($p = 0.014$). Likewise, the long-stay group had higher diastolic arterial blood pressure than the short-stay group ($p = 0.006$).

The total cesarean delivery rate for the short-stay group was 48.5%, compared with 67.7% in the long-stay group ($p = 0.081$). The mean length of hospital stay in eclamptic patients was 4.5 ± 2.3 days (range, 1–14 days). The mean hospitalization periods for the short-stay and long-stay groups were 2.48 ± 0.79 and 5.60 ± 2.12 days, respectively. When the groups were compared in terms of the prepartum follow-up period (the interval between onset of eclampsia and delivery), it was longer in the long-stay group than in the short-stay group (12.11 ± 27.63 *vs.* 5.08 ± 6.08 hours) ($p = 0.060$) (Table 3). Maternal complications were similar in both groups ($p = 0.572$).

Discussion

Eclampsia continues to be a poorly understood neurologic complication of pregnancy that substantially contributes to maternal morbidity and mortality. Maternal mortality rates range from 0.5% to 14% [3].

Delivery is the only definitive treatment of eclampsia. The current recommendation is immediate delivery when the convulsions are controlled and the woman's condition is stabilized regardless of gestational age [4]. In our study, the prepartum follow-up period was shorter in the short-stay group than in the long-stay group. Early delivery, the main treatment of eclampsia, may provide prompt clinical recovery that leads to a shorter hospital stay.

Although no randomized clinical trials have evaluated the optimal method of delivery for women with eclampsia, several investigators concluded that the method of delivery in eclamptic patients should depend on factors such as gestational age, fetal presentation, and findings of the cervical examination [1]. The rate of cesarean delivery in eclamptic patients ranges between 11% and 57% [5]. Cunningham and Gant reported that serious maternal morbidity was less common during the puerperium in women with vaginal delivery [6]. In our study, the rate of cesarean delivery was higher in the long-stay group than in the short-stay group, even though it did not reach statistical significance. Higher cesarean section rate leads to a longer hospital stay by delaying clinical recovery in eclampsia and prolonging the need of hospitalization because of surgery-related morbidity.

As morbidity and mortality in eclampsia are related to the number of convulsions, convulsion control is very important in its management. Many trials have been conducted to determine the efficacy of drugs in preventing and controlling eclamptic seizures. The Eclampsia Trial Collaborative Group proved the superiority of magnesium sulfate for reducing recurrence of seizures [7]. However, there is no agreement in the published randomized trials regarding the dose to use, the route of administration, as well as the duration of therapy. Although magnesium sulfate therapy is often arbitrarily given for 12–24 hours after delivery, depending on severity of disease, there are reports suggesting that an individualized clinically based regimen is apparently an alternative option [8–10]. Some investigators believe

Table 3. The comparison of the clinical parameters between the groups*

	Short-stay group ($n = 33$)	Long-stay group ($n = 65$)	p
Systolic blood pressure (mmHg)†	154.24 ± 27.50	159.38 ± 22.83	0.359
Diastolic blood pressure (mmHg)†	97.87 ± 17.09	108.15 ± 17.03	0.006‡
Duration of $MgSO_4$ treatment (hr)	18.68 ± 7.38	23.03 ± 6.81	0.006‡
$MgSO_4$ treatment ≥ 12 hours	22/33 (67.7)	58/65 (89.2)	0.014‡
Prepartum follow up period (hr)	5.08 ± 6.08	12.11 ± 27.63	0.060
Labor induction	12/33 (36.36)	25/65 (38.46)	0.510
Cesarean delivery	16/33 (48.5)	44/65 (67.7)	0.081
Postpartum eclampsia	5/33 (15.1)	4/65 (6.1)	0.147
HELLP syndrome	8/33 (24.2)	25/65 (38.5)	0.153
Hospitalization period (days)	2.48 ± 0.79	5.6 ± 2.12	0.010‡
Maternal complications (pulmonary, renal cardiovascular, neurologic complications)	2/33 (6.06)	5/65 (7.69)	0.572

**Data are presented as mean ± standard deviation or n (%); †value is the average measured on two occasions at least 6 hours apart; ‡statistically significant. HELLP = hemolysis, elevated liver enzymes and low platelet count.*

that higher dose or longer duration is unlikely to confer greater benefit but would almost certainly be associated with more side effects and a greater risk of toxicity [11]. In a recent study, the authors reported that a 12-hour maintenance therapy is as effective as the traditional 24-hour regimen [12]. In our study, the duration of magnesium therapy was significantly shorter in the short-stay group. Higher diastolic pressure in the long-stay group might be responsible for the longer magnesium therapy.

In a study of 446 eclamptic patients, the authors concluded that mortality by eclampsia is directly related to age, diastolic hypertension, seizure, and thrombocytopenia [13]. In our study, as a reflection of severity of disease, patients in the long-stay group had a higher diastolic blood pressure than those in the short-stay group.

Women who develop eclampsia are at increased risk for a number of complications. A syndrome of hemolysis, elevated liver enzymes, and a low platelet count, known as the HELLP syndrome, can complicate up to 10% of eclamptic cases [14,15]. Mortality resulting from the HELLP syndrome ranges from 2% to 24% of cases. In this study, although the level of liver enzymes on admittance was higher in the short-stay group, HELLP syndrome developed more often during the follow-up in the long-stay group. This was probably because of the longer interval between onset of eclampsia and delivery and the higher diastolic blood pressure in the long-stay group.

This study has some limitations. Firstly, the study population was not large enough to draw an accurate conclusion. Secondly, as the study design was retrospective, other parameters such as social and economic factors that might affect the length of hospital stay could not be evaluated. Thirdly, we were unable to obtain a definitive normalization time of liver enzymes after delivery, because the intervals that blood samples were obtained varied between patients. We were also unable to determine the time taken for diastolic pressure to return to normal after delivery, because some of the patients were still hypertensive at the time of discharge. To our knowledge, this is the first report on factors influencing the length of hospital stay in eclamptic patients. In our opinion, further prospective investigations involving large number of cases are needed to confirm these findings.

In conclusion, our findings suggest that the length of hospital stay in eclamptic patients is mainly affected by the diastolic blood pressure, the interval between onset of eclampsia and delivery, mode of delivery, and duration of magnesium therapy. However, prognostic advantages of these subjects have yet to be defined; therefore, management of eclamptic patients should be individualized.

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