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Original Research Article

Critical care management of eclampsia patients - one year study

Bharti C. Parihar*, Babli Yadav, Jaya Patel

Department of Obstetrics and Gynecology, Sultania Zanana Hospital, Gandhi Medical College Bhopal, Madhya Pradesh, India

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***Correspondence:**
Dr. Bharti C. Parihar,
E-mail: drbhartiparihar@gmail.com

ABSTRACT

Background: Critically ill eclampsia patients present a unique challenge to the obstetrician, anesthesiologist and intensivists. In developing countries, maternal mortality is still high due to lack of good maternal antenatal services and obstetric intensive care. This study aims to provide a comprehensive review for the management and outcome of critically ill eclampsia patients admitted in the obstetric intensive care unit (ICU), GMC, Bhopal.
Methods: This study was a hospital based cross sectional study. The study included 145 eclampsia patients who were admitted in obstetric ICU for critical care management. For each eligible patient, sociodemograhic profile, indications of ICU admission, data on ICU interventions and maternal outcome were documented.
Results: During study period, total obstetric admission were 19,815 and 14,731 live births. Out of 348 eclampsia patients, 145 patients were admitted to the obstetric ICU, giving an ICU admission rate of 9.8/1000 live births. 98.03% patients were unbooked referred obstetric emergencies.The average duration of stay in obstetric ICU was 5.4+3.1 days. 72.9% patients had antepartum eclampsia, 17.2% patients had postpartum eclampsia and 10.8% patients had intrapartum eclampsia. 41% patients received mechanical ventilation, 90% patients received oxygen and advanced monitoring, 48.6% patients received vasoactive drugs and 53.7% patients received blood transfusions. There were 26 maternal deaths giving a case fatality rate of 17.93%.
Conclusions: Early referral of eclampsia patients or at risk patients to a tertiary care centre may help to reduce maternal morbidity and mortality. Early diagnosis and prompt treatment through a multidisciplinary team in an ICU setting can prevent complications and reduce morbidity and mortality.

Keywords: Eclampsia, Critical care, Maternal mortality

INTRODUCTION

Hypertensive disorders of pregnancy is one of the major causes of maternal and perinatal mortality and morbidity. It is one of the commonest medical disorder diagnosed by obstetricians in clinical practice.[1] Approximately 1,00,000 women die worldwide per annum because of eclampsia.[2] It is said that pre eclampsia and eclampsia contributes to death of a woman every 3 minutes.[3] Majority of these conditions are preventable. Good antenatal supervision followed by appropriate treatment will definitely help mother and baby for a good outcome.

Due to lack of awareness and absence of regular antenatal care, the critically ill eclampsia patients are referred late and sometimes in moribund conditions with multiple organ damage. In order to provide them specialized care and to reduce maternal mortality, specialized obstetric intensive care unit have been established. Management of the critically ill eclampsia patients is very complex and requires cooperation of obstetricians, anesthetists, physicians and intensivists.

The primary aim of the present study is to provide a comprehensive review of the management and outcome of

critically ill eclampsia patients in the obstetric intensive care unit (ICU) of department of obstetrics and gynaecology, Gandhi medical college, Sultania Zanana Hospital, Bhopal, Madhya Pradesh.

METHODS

The present study was a hospital based cross sectional study done in the department of obstetrics and gynaecology, Gandhi medical college, Sultania Zanana Hospital, Bhopal over a period of one year from 01 April 2019 to 31 March 2020.

Inclusion criteria

All critically ill eclampsia patients admitted in obstetric ICU according to ICU admission criteria.

Exclusion criteria

Other eclampsia patients admitted in eclampsia room of the department of obstetrics and gynaecology with no critical illness/complications.

For each eligible patients for the study, information in socio-demographic characteristics (age, parity, booking/referral status, marital status, educational status and place of delivery), gestational age at the time of identification of complications, indication for ICU admission and timing of admission to ICU (antepartum or postpartum) were collected on a data collection sheet. Data on ICU admission (duration of stay, therapeutic interventions during ICU admission and maternal outcome - mortality or transferred out of the unit) were also documented. Therapeutic interventions of the interest in the ICU included oxygen inhalation, oxymetry, advanced monitoring, mechanical ventilation, use of vasoactive drugs and blood/component transfusion. The outcome of interest were mortality, transfer out of the unit to the ward and transfer to other department of our hospital.

RESULTS

During the study period, there were a total of 19,815 obstetric admission and 14,731 live births. Out of 348 eclampsia patients, 145 patients were admitted to the obstetric ICU, giving an ICU admission rate of 9.8/1000 live births (Table 1).

The mean maternal age of the patients was 25.4+5.8 years (range 18-29 years).

Out of 145 patients, 60 patients (41.3%) were nulliparous and 60.5% were uneducated.

A total 1.97% (3 patients) were booked and 98.03% (142 patients) were unbooked referred emergencies.

The average duration of ICU stay was 5.4+3.1 days.

18.3% (23 patients) gave birth via cesarean section and 81.1% (99 patients) delivered vaginally augmented by oxytocin drip infusion or misoprostol tablets. Over half of the patients were delivered preterm (51.6%).

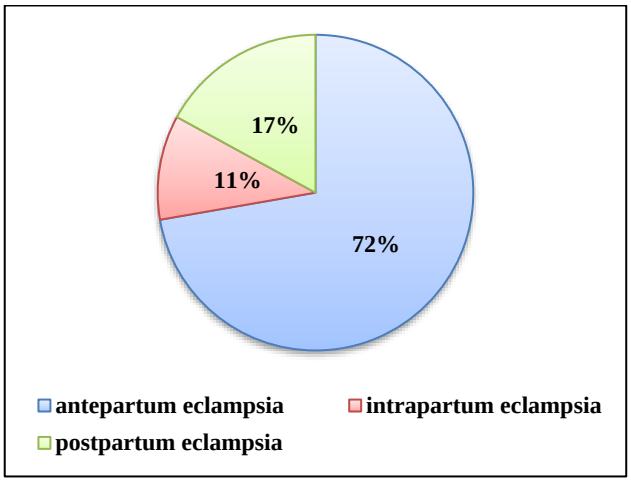

Figure 1: Distribution according to onset of eclampsia.

Table 1: Sociodemographic characteristics and clinical data.

Features	Frequency
Age (years)	25.4±5.3*
Parity (%)	
Nullipara	60 (41.3)
1-3	65 (44.8)
>4	20 (13.7)
Antenatal care	
Booked/unbooked	3/142
Gestational age	
Preterm/term	76/69
Mode of delivery	
Emergency C/S	23
VD	99
Length of ICU stay (days)	5.4±3.1*

*SD-standard deviation, VD-vaginal delivery, C/S-cesarean delivery

Out of 145 critically ill eclampsia patients, 72.9% (105 patients) had antepartum eclampsia, 17.2% (23 patients) had postpartum eclampsia and 10.8% (17 patients) presented with intrapartum eclampsia.

Table 2 shows the major interventions in the ICU to be advanced monitoring, blood/component transfusion, mechanical ventilation, use of vasoactive drugs and renal dialysis.

Most of the patients were admitted for mechanical ventilation (41%) or advanced monitoring (90%).Other interventions included renal dialysis (11.3%), blood/component transfusions (53.7%) and use of vasoactive drugs (48.7%).

Table 2: Interventions in the ICU.

Intervention	Frequency (%)
Mechanical ventilation	60 (41)
Advanced monitoring	131 (90)
Vasoactive drugs	59 (40.6)
Blood/component transfusions	78 (53.7)
Renal dialysis	16 (11.03)

ICU-intensive care unit

Table 3 shows that pulmonary oedema, cerebrovascular accident (CVA), HELLP syndrome, pulmonary embolism, acute kidney injury, aspiration pneumonitis and multiple organ dysfunction syndrome (MODS) were leading complications in women with eclampsia. Of the 145 patients, 119 patients were shifted to ward, 20 patients were transferred to other departments of our hospital and 26 died giving a case fatality rate of 17.93%.

Table 3: Maternal complications in eclampsia.

Complications(n=145)	Frequency (%)
Pulmonary edema	58 (40)
CVA	42 (28.9)
Acute kidney injury	18 (12.4)
HELLP	17 (11.7)
Pulmonary embolism	16 (11.03)
MODS	4 (2.7)
Aspiration pneumonitis	2 (1.3)
Deaths	26 (17.93)

58 women (40%) had pulmonary edema, 42 women (28.9%) had CVA, 17 women (11.7%) had HELLP syndrome, 18 women (12.4%) had renal impairment, 16 women (11.03%) had pulmonary embolism, 4 women (2.7%) had MODS and 2 women (1.4%) had aspiration pneumonitis.

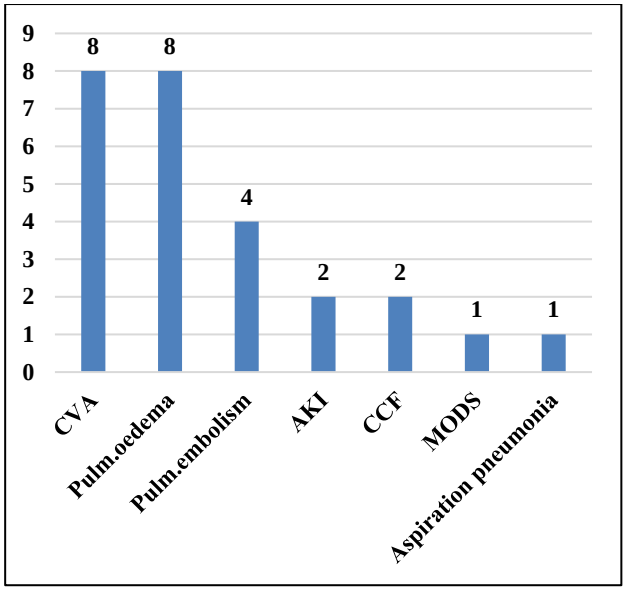

Figure 2: Causes of maternal mortality (n=26).

Most common cause of maternal death was CVA in 8 cases (30%), pulmonary oedema in 8 cases (30 %),pulmonary embolism in 4 cases (15.3%), CCF in 2 cases (1.3%), AKI in 2 cases (1.3%) and 1 death (0.6%) was due to multi organ failure.

DISCUSSION

This study shows that the pulmonary edema and CVA were the leading causes for admission to the ICU in women with eclampsia and mortality is very likely if pulmonary edema complicates eclampsia. There is a plethora of evidence on the outcome of women with eclampsia.[4,5] Most of these studies identified several factors as being responsible for the maternal mortality and morbidity following eclampsia.

Over a third of the women were nulliparous in our study. Pre eclampsia and eclampsia is thought to be a disease of the young and low parity. Several studies in Nigeria and elsewhere indicates that 39-44% of women with eclampsia are nulliparous and similar to our observation.[6,7] The relative preponderance of the disease in nulliparous women implies a higher representation in the associated mortality.

Majority of patients in our study were in age group of 20-25 years (43%), out of these 17.7% were teenage and 13.3% were above 30 years of age. Few authors have reported a linkage between ages with prognosis. Ruiz et al have reported a worse prognosis of subjects age less than 20 years (11%) whereas Waterstone et al found that age more than 34 years was an independent predictor of mortality in eclamptics in ICU.[8,9]

Another socio-demographic characteristic of interest in this study is the lack of antenatal care in a sizable proportion of the women. The non-utilization of antenatal services has been recognized as a critical factor in poor outcome in pregnant women.[10,11] Indeed, a study conducted by Lapinsky et al demonstrated a 10-fold increase in maternal mortality rate in women who did not attend the antenatal clinic in a resource poor setting.[12] The consequences of lack of antenatal care are further compounded when these women receive the emergency obstetric care often resulting in surgical delivery. This formed over half of the patients in this study and similar to the other reports. In fact, Singh et al had demonstrated that the hypertensive disorders were more likely to receive cesarean section than normotensive women.[13]

Critical care management has been advised for pregnancies complicated by eclampsia. This is necessary as eclampsia is a multisystem disorder requiring a multidisciplinary approach to management. Mechanical ventilatory support and advanced monitoring were the major interventions in this study. Specifically, eclamptics with altered sensorium would often require interventions to maintain the adequate oxygenation while minimizing metabolic activities in other organs. It may be necessary to

determine the duration of ventilation for each patient so as to provide insight into the severity of the respiratory impairment. However, a study that had a relatively high incidence of mechanical ventilation observed that the patients had the intervention for a short duration.[14] Furthermore, the delivery of the pregnant woman does not appear to offer the same benefit in respiratory failure as does in preeclampsia/eclampsia. This understanding is important to the ventilatory care of these patients.

Inotropic support was required in 18.54% cases in our study. Author from other parts of the world also observed that hemodynamic and respiratory complications needing inotropic or ventilatory support remain the most common reasons for ICU admission and the need for support may predict poor outcome.[15]

The development of pulmonary edema alone or with any other complication of preeclampsia was a risk factor for poor outcome. The mechanism for the development of pulmonary edema is important to understand the course of the disease. A study showed that 89% of women who developed acute pulmonary edema had preeclampsia.[16] It is therefore, a common complication of preeclampsia and several factors have been implicated. These include endothelial damage and consequent fluid leakage, maternal age, cesarean delivery, increased body mass index and unrecognized cardiomyopathy.[17] Endothelial damage is recognized pathology in eclampsia and a good proportion of patients also had a cesarean delivery; two factors that have been implicated in in the development of pulmonary edema in eclampsia. Preeclampsia/eclampsia presents the patients with hypoproteinemia. It may have been necessary to determine volume and type of fluid used for the peripartum treatment of these women prior to admission to ICU. A study showed that the incidence of pulmonary oedema in pregnant women was higher in women who received crystalloids during treatment.[18] This may have provided further insights into the cause of the pulmonary edema as being pathogenetic or iatrogenic fluid loading. Nonetheless, it is important to restrict fluid administration in cases of eclampsia.

Some have argued for the tradeoff between the restricted use of fluid and risk of development of acute renal failure. It is believed that acute tubular necrosis could be reversed with renal dialysis and the means of overturning pulmonary edema is limited. Our data are inclined towards the avoidance of pulmonary edema as the associated morbidity and consequent mortality in women with eclampsia is high. A study that compared the outcome in two centers with restricted and liberal fluid administration demonstrated that increasing the volume of fluid results in increasing risk of morbidity in women in the postpartum period.[19]

In our study, 42 eclampsia patients (28.9%) had CVA. Among women with stroke during pregnancy, pre eclampsia/eclampsia is an important risk factor for both ischemic and haemorrhagic stroke. In a French case series of 31 women with stroke during pregnancy, about half (n=15) were ischemic, with eclampsia accounting for 6 cases (47%). Of those with haemorrhagic strokes, 7 cases (44%) had eclampsia, in addition to HELLP syndrome or disseminated intravascular coagulation.[20]

In present study, 17 patients (11.7%) had HELLP syndrome. HELLP syndrome is associated with a maternal mortality of 3.5%-24.2%.[21] The maternal mortality associated with HELLP syndrome is mainly due to renal failure, coagulopathy i.e. disseminated intravascular coagulation (DIC), pulmonary edema, cerebral edema, abruptio placentae, hepatic haemorrhage and hypovolemic shock.[22]

There are limitation to the interpretation of our results. In this study, only patients admitted to the ICU were studied. There may have been some patients with eclampsia who did not come to the ICU and were missed out.

CONCLUSION

This study to determine the outcome of women with eclampsia admitted to the obstetric ICU showed that primiparity, unbooked status and cesarean delivery were associated factors for ICU admission. Furthermore, women who developed complications like pulmonary edema, CVA, HELLP syndrome, AKI, Pulmonary embolism etc. in the course of treatment had poor outcome.

When complication arises, early intervention and treatment on a multidisciplinary basis which may involve ICU admission for ventilator support, invasive monitoring and vasoactive drug infusions, can alleviate progression of organ dysfunction and improve prognosis.

Establishment of a dedicated obstetric ICU at tertiary care centre with knowledge familiarity, experience and expertise of an obstetrician and a special team would be best place to monitor and treat the critically ill eclampsia patients which will reduce the maternal morbidity and mortality.

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