

# Critical Care in Preeclampsia – Eclampsia

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## Abstract

Preeclampsia-eclampsia is associated with a high maternal mortality and morbidity. Intensive care is needed antepartum as well as postpartum for successful pregnancy outcome. Primary prevention of complications of PIH and eclampsia is not always possible. It is important to prevent and detect these complications in the budding stage. There were 143 patients with preeclampsia-eclampsia of 1357 deliveries in a year. 70 patients had mild preeclampsia, 52 patients had severe preeclampsia and 21 patients had eclampsia. Of the 52 patients with severe preeclampsia, 22 patients presented with or developed single or multiple complications. There were 3 maternal deaths. Maternal morbidity was reduced considerably not in numbers but in terms of postpartum convalescence, family strain, multiple specialist consultations and financial burden. The maternal morbidity reduction is not in number alone but a decrease in postpartum ailing period which in some patients extends lifelong.

## Introduction

Preeclampsia is a pregnancy specific hypertensive syndrome associated with significant morbidity and mortality in mother and baby.

Preeclampsia-eclampsia needs intensive care antepartum, intrapartum as well as postpartum for successful pregnancy outcome. Preeclampsia leads to multiorgan system involvement if appropriate timing of delivery is delayed. The aim is to avoid multi organ system dysfunction i.e. secondary and tertiary prevention. The maternal morbidity reduction is not in number alone but a decrease in postpartum ailing period. The resultant maternal morbidity may extend lifelong in some patients. Primary prevention of preeclampsia has not yet been possible therefore it is important to prevent and detect the complications occurring secondary to

preeclampsia-eclampsia. This requires an intensive critical care monitoring. Therefore the emphasis should be on the critical care involved and needs to be given in patients with preeclampsia to have a good pregnancy outcome i.e. not just decreasing the perinatal morbidity and mortality or just maternal mortality but in terms of reduced maternal morbidity.

## Material and Methods

The basic aim of this article is to highlight how simple, continuous vigilance even in third world country with limited resources using bedside tests, clinical acumen and advanced technology can achieve a good obstetric outcome in patients of preeclampsia-eclampsia.

All preeclamptics and eclamptics who delivered with us over one year from August 2003 to July 2004 were included in the study. Both registered and unregistered patients were included in the study. There were 143 patients with preeclampsia-eclampsia of 1357 patients delivered with us. Of the 143 patients,

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70 patients presented with mild preeclampsia, 52 presented with severe preeclampsia and 21 patients presented with eclampsia. All of these patients were admitted to the obstetric care unit of the hospital. All patients of preeclampsia including mild preeclampsia were regarded as possible of developing any complication of preeclampsia and risk of progression of disease. Detailed history taken and examination performed on admission to labour ward to assess severity of preeclampsia and risk of eclampsia.

A detailed history included information regarding the obstetric history, presenting complaints, history of symptoms and signs of preeclampsia, impending eclampsia, history suggestive of any organ system involvement, menstrual history, history of investigations performed and treatment taken, any significant past medical and surgical history, history of immunization, history of medication for hypertension, ultrasonography, tests for foetal wellbeing and symptoms of labour.

On examination, a note is made of the general condition of patient and level of consciousness. Check for pulse rate and volume, BP in the left lateral position, pallor, oedema feet, icterus, cyanosis, and patellar reflexes. Look for tongue bite, cyanosis, papillary reflexes, patellar and plantar reflexes, motor tone in patients with eclampsia. Check the respiratory and cardiovascular systems for aspiration and signs of congestive cardiac failure (CCF).

On per abdominal examination look for uterine size-Gestational age (GA), foetal life, presentation and foetal heart rate, uterine activity, w/f signs of abruptio placentae, ascites.

On per speculum examination, check for any evidence of leaking, bleeding per vaginum (PV), local cervico-vaginal infection. On per

vaginal examination, check the Bishop's cervical score; and pelvic adequacy in primigravidas and patients with past history of preterm vaginal delivery or no vaginal delivery.

Two intravenous lines of no. 18 were introduced in peripheral veins. Blood was collected for Haemoglobin, PCV, Complete Blood Count, Bleeding Time (BT), Clotting Time (CT), platelet count, Prothrombin time (PT), clot observation test, DIC profile (where indicated), Blood Urea Nitrogen (BUN), Serum Creatinine, Liver function test and serum electrolytes. Fundoscopy is performed. Blood is sent for grouping and cross match and confirmed. Enquiry regarding availability of FFP platelet concentrates and cryoprecipitate is made. Written informed valid consent taken, explaining both maternal and foetal prognosis. Relatives asked to mobilize more manpower and finances if required, as the general population is of lower socio-economic class and coming from distant places.

Investigations are traced. Intrapartum foetal heart rate monitoring (IPM) done on admission, if non-reassuring pattern, then VAST performed. Maternal and foetal monitoring done every 15 minutes. Obstetric ultrasonography was done in cases where the presentation was doubtful, foetal heart not heard on Doppler transducer and for liquor volume, if required.

Patient maintained on liquid diet except eclamptics, severe preeclampsics with symptoms and signs of impending eclampsia and those patients who are likely to need LSCS delivery and patients on iv oxytocin drip. Patients are given complete bed rest in left lateral position. Uterine activity monitored. Strict Intake/Output chart maintained and sterile pads given. Repeated hourly questionnaire for symptoms and signs

of impending eclampsia enquired with patient and knee jerks assessed so as whether Inj. MgSO<sub>4</sub> therapy required or not. Since continuous FHR monitoring not possible, IPM is repeated 2 hourly in active labour. Per urethral Foley's catheter was introduced in patients on MgSO<sub>4</sub> therapy, eclamptics, and patients with low urine output and abruptio placentae.

Central venous line (Cavafix) was introduced unhesitantly in indicated cases i.e. severe preeclampsics and eclamptics undergoing LSCS, patients with oliguria, Antepartum haemorrhage, and malignant hypertension. Watch is kept on all organ systems to see whether their function is affected by progression of preeclampsia. Clot observation test repeated 4 hourly. Renal, liver function tests, platelet count repeated 12 hourly.

Inj. MgSO<sub>4</sub> by Pritchard's regime was started in patients who presented with or developed eclampsia during labour, patients presenting or developing symptoms and signs of impending eclampsia, severe preeclampsia with no symptoms and signs of impending eclampsia, severe preeclampsia but BP of 160/110 mmHg or more on presentation or later on in labour. Patients whose coagulation profile showed abnormality were given Inj. MgSO<sub>4</sub> by University of Tennessee regime or given Inj. Phenytoin i.e. drip (loading dose) followed by Inj Phenytoin 100 mg iv 8 hourly.

Poor maternal prognostic factors were- presence of ascites, haematuria, oliguria, elevated BUN, S Creatinine, Jaundice, visual disturbances, prolonged BT and CT, thrombocytopenia, altered DIC profile, altered level of consciousness, Adult respiratory distress syndrome.

Patients with mild preeclampsia either had presented in labour or were induced at 37 completed weeks of gestation.

Patients with severe preeclampsia also either had presented in labour or were induced in view of completed 37 weeks, completed 34 weeks or more with severe IUGR and oligohydramnios or foetal well being tests showing foetal compromise or if any gestational age but developing symptoms and signs of impending eclampsia or increasing ascites or uncontrolled BP or worsening biochemical parameters.

Patients with eclampsia if not in spontaneous labour were induced. Inj. Betamethasone 12 mg i.m. stat and repeat after 24 hours given to all preeclampsics and eclamptics with gestational age (GA) less than 34 weeks.

Induction of labour was done by Foley's catheter no. 18 introduction transcervical (Balloon inflated with 30 ml normal saline) and hitched onto the anterior abdominal wall.<sup>1</sup> In patients with Bishop's cervical score of 9 or less. Foley's catheter was removed 6 hours later, followed by low artificial rupture of membranes and iv oxytocin drip. In patients with Bishop's cervical score of more than 9, labour was induced with low artificial rupture of membranes and oxytocin iv drip augmentation of labour.

LSCS was performed for obstetric indications as needed but only if the maternal risk was low; not at the cost of mother. Second stage of labour was cut short using instrumental delivery. Liberal use of concentrated Oxytocin iv drip and Inj. PG F2 $\alpha$  postpartum to prevent postpartum haemorrhage.

Postpartum strict vigilance is still continued for 24 hours in mild preeclampsia; for 48-72 hours in patients with severe preeclampsia and eclampsia. A combined team approach helps to achieve a good maternal and perinatal outcome which includes consultations by Obstetrician,

Haematologist, Intensivist, Nephrologist and any other specialist consultants, if required.

## Results

There were 143 patients with preeclampsia-eclampsia of 1357 deliveries. 70 patients presented with mild preeclampsia, 52 presented with severe preeclampsia and 21 presented with eclampsia. Table 1 shows the characteristics of study population.

Of the 70 patients with mild preeclampsia, 16 of them had preeclampsia related complications intrapartum as shown in Table 2. No patient had postpartum haemorrhage. Of the 52 patients with severe preeclampsia, 30 had no preeclampsia related complications. The remaining 22 patients had single or multiple complications related to preeclampsia (Table 3). Of the 21 patients who presented with eclampsia, 10 had no further complications. Of the remaining 11 eclamptics, 8 had DIC, 2 HELLP syndrome and 2 had impending renal failure (Table 4). 3 patients developed Congestive cardiac failure (CCF), of which 2 patients required life support systems and could not pull

**Table 1 : Characteristics of study population**

Total deliveries	1357
Patients with PIH	143
Mild Preeclampsia	70
Severe Preeclampsia	52
Eclampsia	21
Nullipara with PIH	80

**Table 2 : Complications in patients with mild preeclampsia**

Complication	No. of patients
Abruptio placentae	4
HELLP syndrome	3
Intrapartum eclampsia	4
Postpartum eclampsia	2
Severe preeclampsia	10

**Table 3 : Complications in patients with severe preeclampsia**

Complication	No. of patients
Isolated Thrombocytopenia	1
Ascites	3
HELLP syndrome	5
DIC	10
Congestive cardiac failure	3
Impending Eclampsia	12
Eclampsia	2
Impending renal failure	4
Abnormal liver function tests	3
Maternal mortality	3
Ventilator support	2

**Table 4 : Eclampsia related complications**

Complication	No. of patients
DIC	8
HELLP syndrome	2
Impending renal failure	2
Hypermagnesaemia	1

through and died. An unregistered patient who presented in advanced labour with severe preeclampsia, jaundice, oliguria and deranged coagulation profile expired inspite of all critical care offered (Table 5).

Almost 10% of preeclampsia women (45) required LSCS. 38 patients required instrumental delivery. There were 18 perinatal deaths. 8 perinatal deaths were of foetuses less than 32 weeks of gestation (prematurely and low birth weight); 4 foetuses had presented with intrauterine foetal demise. 4 foetuses had foetal distress where LSCS was deferred in view of poor

**Table 5 : Lapse in critical care**

Complication	No. of patients
Congestive cardiac failure (maternal mortality)	1
Hypermagnesaemia	1

maternal health and 2 babies died of meconium aspiration syndrome. Each patient of PIH has a probability of having any of its varying single or multiple complications irrespective of severity. Risk of complications in patient with severe PIH is 40% and patients with mild preeclampsia developing complications are 20-22%.

### Discussion

Severe pregnancy induced hypertension is a disease which is now treated in the intensive care unit rather than with sedation in the dark room. The pathophysiology is now well understood and allows for better and more effective management.<sup>2</sup> It is important that centres that care for critically ill pregnant women should form a strategy to coordinate obstetric and medical care for this unique population. Each patient of PIH has a probability of having any of its varying single or multiple organ system involvement irrespective of its severity. In our study, risk of complications in patient with severe preeclampsia is 40% and patients with mild preeclampsia developing complications are 20-22%.

A uniform baseline protocol is followed for all patients of preeclampsia, eclampsia in labour and postpartum as already mentioned in the material and methods. Important dictum in those extremely critical preeclampsia-eclampsia is maternal risk outweighs foetal risk.

The following steps help to reduce maternal morbidity by quantity; and quality-

1. Appropriate timely continued maternal foetal monitoring intrapartum and postpartum.
2. Judicious timely delivery.
3. Training of labour ward personnel, resident doctors in high risk pregnancy management.<sup>3</sup>

4. To keep vigilance on all body systems i.e. an overview on the whole body and not just labour progress, Hypertension, foetal heart rate.
5. Perform clot observation test 4 hourly, IPM 2 hourly. Repeat PIH profile 12 hourly; intrapartum and immediate postpartum.
6. Avoid LSCS for foetal reasons, if high possibility of maternal compromise.
7. Initial consultation by a consultant obstetrician a must, repeat consultations personal or telephonic as required.
8. Patient with mild preeclampsia are at 20-22% risk of progressing to severe preeclampsia and its complication intrapartum.
9. Patients should be under surveillance for the first 48 hours postpartum. Prolonged surveillance required in patients with severe preeclampsia with multiorgan system involvement and eclampsia.
10. Judicious unhesitant introduction of central venous line for Central venous pressure (CVP) monitoring.
11. Catering to illiterate, low socio-economic status women. It is important to use clinical acumen, use bedside tests and the limited laboratory resources available during emergency hours to the best. It is essential to mobilize relatives, monetary, funds, blood and blood components, laboratory reports.
12. Appropriate continued counseling of patients and relatives all through and after labour.

Resultant early diagnosis and treatment of complication with no disability limitation and no prolonged rehabilitation required.

In a study by Heinonen *et al*,<sup>4</sup> the overall need for maternal intensive care was 0.9 per

1000 deliveries during the study period. The most common admission diagnoses were obstetric haemorrhage (73%) and preeclampsia related complications (32%). They concluded that although several risk factors associated with maternal intensive care were documented, most cases occurred in low risk women which imply that the risk is relevant to all pregnancies.

Okafor, Aniebue<sup>5</sup> had a total of 816 patients admitted to the intensive care unit during the period under review. Eighteen (2.2%) were obstetric patients. Nine of them (50%) were preeclamptic and eclamptic patients; four (22.2%) had obstetric haemorrhage. 5 others (27.8%) presented with the following: asthma, postoperative respiratory distress, cervical incompetence, gestational diabetes and hypertension, and caesarean section for terminal carcinoma of the breast. There were six deaths (mortality rate 33.3%). Preeclampsia-eclampsia accounted for four deaths (44% mortality rate amongst preeclamptics/eclamptics), while two deaths accounted for a 50% mortality rate in the obstetric haemorrhage group. This study confirms similar reports from the advanced nations and Asia that preeclampsia/eclampsia and obstetric haemorrhage are the leading causes of admission to the intensive care unit. The mortality rate in this study is however higher.

Naylor Jr, Olson<sup>6</sup> emphasized that care of the critically ill pregnant patient requires a true multidisciplinary approach for optimal outcomes. Alvarez, Marin<sup>7</sup> concluded that women with pregnancy hypertension must be carefully managed by expert physicians, particularly if they are more than 30-35 years old, overweight, with previous history of hypertension or nulliparous in order to decrease the several complications. They emphasized that their evaluation and strategy

for evaluation and management of preeclampsia, eclampsia is a well defined, practical approach.

Mourad<sup>2</sup> addressed the need for strict haemodynamic monitoring and management required to prevent complications such as eclampsia, DIC, HELLP syndrome, maternal and foetal death. The nurse's role in the management of severe PIH is also emphasized.

Moller, Hartmann-Andersen<sup>8</sup> concluded that the frequency of haemodynamic complications in this analysis illustrated the potentially disastrous effect of preeclampsia in itself. Early delivery should always be considered in patients with even minor symptoms of treatment failure, regardless of the age of gestation. Should haemodynamic complications occur despite this, referral to an intensive care unit should be considered.

Dildy, Cotton<sup>9</sup> states that pregnancy induced hypertension is a disorder of unknown aetiology unique to pregnant women. Classic clinical manifestations include hypertension, proteinuria and oedema. Early recognition and proper management of this disease may serve to avoid serious maternal complications. Ultimate maternal treatment depends on delivery of the foetus and placenta. Advanced stages of this disease result in multiorgan system dysfunction that may be life threatening to the mother and foetus. Such maternal complications of PIH include severe hypertension, oliguria or anuria, HELLP syndrome, eclamptic seizures, liver rupture, pulmonary oedema, cerebral oedema, and abruptio placentae. A multidisciplinary approach of the critical care team often will effect a reduction in maternal morbidity and mortality.

## **Conclusion**

This study establishes and reaffirms that

all preeclampsics require vigilance intrapartum and postpartum preferably in an obstetric intensive care unit.

Primary prevention is a Herculean task. Secondary prevention is not always possible as most of the patients are referrals with other organ involvement. But correcting these complications and limiting the disability is possible i.e. tertiary prevention.

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#### DIAGNOSIS OF DUCTAL CARCINOMA IN SITU

*'MRI helps [to diagnose] lesions that, if left undetected, would progress to invasive breast cancer'*

The standard method for diagnosis of ductal carcinoma in situ (DCIS) is mammography; other breast imaging techniques have been shown to be unreliable. Christiane Kuhl and colleagues did a prospective observational study to assess the sensitivity of MRI and of mammography in diagnosing DCIS, and to compare the biological profiles of mammography-diagnosed DCIS versus DCIS detected by MRI alone. They found that, of the 167 intraductal cancers that were identified, 72 (43%) were mammographically occult but were diagnosed by MRI alone, and that a high proportion of those diagnosed by MRI alone were high-grade lesions at high risk of developing into invasive cancer. The researchers conclude that MRI could help improve the ability to diagnose DCIS, especially DCIS with high nuclear grade. In a Comment, Carla Boetes and Ritse Mann conclude that MRI should no longer be regarded as an adjunct to mammography but rather as a distinct method to detect breast cancer in its earliest stage.

**Lancet Oncol, 2007; 8 : 459, 485.**