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Original Research Article

Eclampsia is still a nightmare for obstetrician-maternal and perinatal outcome in eclampsia patients at tertiary hospital and factors affecting the outcome

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ABSTRACT

Background: Among the disorders that complicate pregnancy, pre-eclampsia and eclampsia are major causes of maternal and perinatal morbidity and mortality. Hypertensive disorders complicate 5% to 10% of all pregnancies and form a lethal trio with haemorrhage and infection. In India, the incidence of eclampsia ranges from 1 in 500 to 1 in 30 (0.5%-1.8%). Pre-eclampsia and eclampsia are a major cause of approximately 20% of all maternal deaths in USA and around half of them are associated with eclampsia. To study various factors associated with eclampsia and outcomes in eclampsia patients.
Methods: It is a prospective observational study conducted in the department of obstetrics and gynaecology in a tertiary care hospital in Central India. The study was conducted for duration of two years from November 2019 to October 2021.
Results: In our study we found that Maternal complications were present among 19.0% women with eclampsia. Among the patients with maternal complications, atonic PPH was present among 16.2% women, obstetric hysterectomy was required in 0.4%. Maternal mortality was present among 4.5% patients. Of maternal deaths, cerebrovascular accidents accounted for four maternal deaths followed by acute renal failure among three women. Pulmonary edema, HELLP syndrome and septicemia were the cause of maternal death among two, one and one women respectively. Among the newborns, 6.9% comprised of stillbirths and early neonatal death was observed among seven newborns 2.8%.
Conclusions: Improving the antenatal care by proper antenatal visits, early booking, meticulous BP records at each antenatal visit and special attention to high-risk groups such as primigravida, teenage pregnancy and pregnancy-induced hypertension and early referral and specialist care is important for the improvement in the maternal and perinatal outcomes.

Keywords: Preeclampsia, Eclampsia, Proteinuria, HELLP syndrome

INTRODUCTION

Among the disorders that complicate pregnancy, pre-eclampsia and eclampsia are major causes of maternal and perinatal morbidity and mortality.[1] Hypertensive disorders complicate 5% to 10% of all pregnancies and form lethal trio with haemorrhage and infection.[2] In India, the incidence of eclampsia ranges from 1 in 500 to 1 in 30 (0.5%-1.8%).[3] Pre-eclampsia and eclampsia are a major cause of approximately 20% of all maternal deaths in USA and around half of them are associated with eclampsia.[4]

Aim

To study various factors associated with eclampsia and outcomes in eclampsia patients.

METHODS

Study type

It was a prospective observational study.

Study place

The conducted in the department of Obstetrics and Gynaecology in a tertiary care hospital in Central India.

Study duration

The study was conducted for duration of 2 years from November 2019 to October 2021.

Inclusion criteria

All pregnant women with tonic-clonic convulsions in the second half of pregnancy beyond 20 weeks of gestation or within 10 days of delivery diagnosed to have eclampsia who reported to tertiary care Centre and consenting to participate were included in the study.

Exclusion criteria

Pregnancies with medical complications like anaemia, vascular or renal disease, epilepsy, encephalopathy, tetanus and meningitis, hypoglycaemia/ketoacidosis, pyrexia, suspected drug toxicity, and multiple pregnancies were excluded.

Based on the prevalence of maternal and perinatal complications in pregnant women with eclampsia was 18.8% with 5% absolute precision at 95% confidence level, the sample size was estimated to be 234 women with eclampsia.[5]

Sample size

The sample size was calculated using the formula:

$N= 3.84\times P\times Q/L^2$

Where,

P=Proportion of feto-maternal complications=18.8%, Q=100-P=81.2%, L=Absolute precision=5%, 95% confidence level=1.96 Sample size=3.84×18.8×81.2/25=234.

Ethical approval

Ethical considerations Approval from institutional ethics committee and permission from Maharashtra University of health sciences (Nashik) was obtained before commencing the study.

Methodology data was also collected regarding the ante partum and intrapartum care. Data of antenatal care included number of antenatal visits, any documented proteinuria and BP readings during those visits. Antenatal care was assessed relative to WHO standards i.e., minimum four visits model.

Data collection

The data collected included BP at admission, presence or absence of proteinuria at admission by dipstick method, eclamptic episode, timing of initiation of adequate treatment, onset of fit and delivery interval, time taken to reach health care facility, treatment given before referral of the patients from peripheral centre (if any), timing of onset of seizures in relation to delivery i.e., ante partum/ intrapartum/postpartum, total number of seizures. Adequacy of referral was taken on the standards that if any anticonvulsant was given at time of eclamptic episode before referring the patient, whether proper medical support system accompanied the women during transit and records of treatment given and previous records sent along with the women.

After noting the details, general examination was done to see if there is any presence of oedema, cyanosis, icterus, clubbing, lymphadenopathy and BMI was noted. Systemic examination includes per abdomen, CVS, RS, CNS was done.

Laboratory investigations

Laboratory investigations like complete blood count, serum creatinine, blood urea, serum bilirubin, serum aspartate amino transferases, alanine amino transferases, coagulation profile, USG obstetrics Doppler with AFI, USG abdomen and CT brain if feasible were also done. The newborns were also followed up for the occurrence of perinatal complications.

Outcome measures were maternal outcome complications like APH, PPH, HELLP syndrome, ARF, pulmonary oedema, septicaemia, requirement of ventilation, brain haemorrhage and the mortality rate in patients of eclampsia. Perinatal outcome measures were Live birth, still birth rate, low birth weight, neonatal death, NICU admission were noted.

Statistical analysis

Data was analysed using SPSS V21 for Windows. Categorical

variables like parity, gender of the baby are presented as frequency and percentages.

Continuous variables like age of mother, gestational age, birth weight of the baby are presented as mean (SD) or median (IQR). The incidence of maternal and perinatal complications is presented as percentages with 95% confidence interval (95% CI).

Chi square test or independent samples t test was used to determine the association between the factors associated with maternal and perinatal outcomes. A p value of less than 0.05 was considered statically significant.

RESULTS

A total of 6758 deliveries happened during the study period of which 247 deliveries were eclamptic deliveries and hence 247 pregnant women were included in the study. The incidence of eclampsia was hence 3.6%. The mean age of the study participants was 26.1 years. Majority (83.0%) of the women with eclampsia were below 30 years of age.

More than half (52.6%) women with eclampsia were unbooked and the remaining 47.4% were booked pregnancies. only 57 (23.1%) pregnant women with eclampsia had more than three antenatal visits and 100 (40.5%) women did not have any antenatal visits. Majority of the patients 153 (61.9%) had antepartum eclampsia followed by 77 (31.2%) with postpartum eclampsia.

Intrapartum eclampsia was present among 17 patients (6.9%). The mean BMI of the women with eclampsia was 24.3 kg/m^2. Overweight/Obesity was present among 91 (36.8%) pregnant women. systolic blood pressure≥160 mmHg was present among 89 (36.0%) women with eclampsia and diastolic blood pressure≥100 mmHg was present among 94 (38.1%) women with eclampsia. 173 (70.0%) pregnant women with eclampsia delivered by caesarean mode and the remaining 74 (30.0%) pregnant women had normal vaginal delivery. (35.7%) patients had a duration of ≥4 hours between the onset of convulsions to the time of referral and 50 (64.3%) have duration of less than 4 hours.

87 (35.2%) patients had a duration of ≥6 hours between the onset of convulsions to the time to start therapy and 160 (64.8%) had duration of less than 6 hours. 117 (50.9%) newborns were born with birthweight of less than 2.0 kg and the birth weight was >2.5 kg among 43(18.7%) newborns.

Maternal complications were present among 47 (19.0%) women with eclampsia. Of the patients with maternal complications, atonic PPH was present among 40 women. ICU stay was indicated for 43 (17.4%) women with eclampsia in our study. Maternal mortality was present among 11 (4.5%) patients.

As per table no 3, the causes are depicted for deaths. Among the newborns, 17 (6.9%) comprised of stillbirths and early neonatal death was observed among seven (2.8%) newborns. Of 230 live born neonates, 36.5% neonates required NICU admission. the mean age was lesser among the women with maternal complications when compared to the women without the maternal complications and it was found to be statistically significant (25.2 years vs 26.3 years; p=0.034). As per the table of associations Table 4, the maternal complications were higher among the eclamptic women with unbooked pregnancy when compared to the women with booked pregnancy and is statistically significant. (p=0.042).

The maternal complications were higher among the eclamptic women with no antenatal visits and is statistically significant. (p=0.010). Maternal complications were higher among the eclamptic women who were primi when compared to the women who were multiparous and is statistically significant. (p=0.012).

The maternal complications were higher among the eclamptic women had systolic blood pressure≥160 mmHg (p=0.017). Similarly, the maternal complications were higher among the eclamptic women had diastolic blood pressure≥100 mmHg (p=0.041), both are statistically significant. There was no association between the BMI and the maternal complications among the women with eclampsia. The maternal complications were high when the time between the onset of convulsions and referral was ≥4 hours and is statistically significant (p<0.001).

Table 1: Maternal characteristics in patients with eclampsia.

	No. of patients	% (95% CI)
Total patients without eclampsia	6511	96.4 (95.9-96.8)
Patients with eclampsia	247	3.6 (3.2-4.1)
Age≤19 years	7	2.8
Age 20-29 years	198	80.2
Age≥30 years	42	17.0
Antepartum eclampsia	153	61.9
Intrapartum eclampsia	17	6.9
Postpartum eclampsia	77	31.2
Primigravida	144	58.3
Multigravida	103	41.7
Gestational age<34 weeks	20	8.1
Gestational age 34-37 weeks	166	67.2
Gestational age>37 weeks	61	24.7
Family history of hypertension	78	31.6
Underweight (BMI<18.5)	6	2.5

Continued.

	No. of patients	% (95% CI)
Normal (BMI 18.5-22.5)	150	60.7
Overweight/ Obese (BMI>22.5)	91	36.8
Presenting complaints with convulsions	84	34.0
Presenting complaints with headache/blurring of vision/epi-gastric pain	63	25.5
Gestational hypertension	92	37.2
GDM	50	20.2
Hypothyroidism	25	10.2
Urine albumin Nil	80	32.4
Urine albumin +1 to +2	100	40.5
Urine albumin +3	67	27.1

Table 2: Foetal characteristics and outcome in patients with eclampsia.

	Frequency (N)	%
Birth weight <2.0 kg	117	50.9
Birth weight 2.0-2.5 kg	70	30.4
Birth weight >2.5 kg	43	18.7
Still birth	17	6.9
Early neonatal death	7	2.8
Live neonate	223	90.3

Table 3: Maternal complications in eclampsia.

Maternal complications	No. of patients	%
None	200	81.0
Atonic PPH	40	16.2
Vaginal hematoma	2	0.8
Cervical tear	4	1.6
Obstetric hysterectomy	1	0.4
Maternal deaths	11	5.5
Death due to cerebrovascular accidents (CVA)	4	1.6
Death due to pulmonary edema	2	0.8
Death due to acute renal failure	3	1.21
Death due to HELLP syndrome	1	0.40
Death due to septicemia	1	0.40

DISCUSSION

The incidence of eclampsia in our study was 3.6% (95% CI: 3.2%-4.1%). A study by Nobis et al, in which the reports from 1976 to 2015 studies showed that the incidence of eclampsia in India was 1.5% (range: 0.179% to 5.0%).[5,6] The findings of our study results also fall within the range but above the average of the incidence. Similarly, the studies conducted in the developing countries by Murthy et al, (3.5%) Akhtar et al, (3.05%) Khan et al, (3.57%) and Adamu et al, (4.4%) had reported a similar incidence of eclampsia in our study in line with our study results.[7-10]

However, contradictory to our study results, other studies conducted in the developing countries including India like studies by Rajasri et al, (1.08%) Jido et al (1.2%) Sujata et al, (1.58%) Verma et al, (0.82%) and other studies conducted elsewhere, showed lower incidence of eclampsia compared to our study.[11-17] Studies conducted in developed countries had reported a lower incidence of eclampsia when compared to our study results. A study by Lee et al, had concluded that the incidence of eclampsia was 0.27/1000 deliveries and similarly a study by Pannu et al, had reported a lower incidence of 3.2/1000 deliveries.[5,18] Some of the risk factors for eclampsia in our study were lesser maternal age (mean age of 26.1 years), primi 144 (58.3%) and ante-partum eclampsia 153 (61.9%), unbooked pregnancy 130 (52.6%) as shown in Table 1. The association of nulliparity and pre-eclampsia/eclampsia has been already documented. One of the believed mechanisms is the immune maladaptation. Immune maladaptation may interpret the elevated risk of pre-eclampsia among primiparous women because the first successful (non-pre-eclamptic) pregnancy may induce adaptive changes favourable to immune tolerance in subsequent pregnancies.[19,20] A study conducted by Saadat

et al, has also supported this hypothesis where the mean parity of the normotensive group was comparatively higher when compared to the women in the eclamptic group.[21]

In our study as shown in Table 1 the rate of eclampsia is more in primigravida (58.3%) than in multigravida (41.7%). The studies conducted by Rajasri et al, Akhtar et al, (72.5%), Raji et al, (69.2%) Murthy et al, (70.6%), Bhanu BT et al, (45%), Bandyopadhyay et al, (86%) and various other studies have shown that eclampsia was common among the primi women.[7,8,9,11,15,22-26] In our study mean age of women was 26.1 years, 83% of the women with eclampsia were below 30 years of age. With regards to age, similar results (hypertensive disorders common among the lower age group) are reported by various other studies in accordance to our study findings.

It is also noteworthy to mention that more than half of the pregnant women with eclampsia were unbooked pregnancy as shown in table 1, 52.6% women with eclampsia were unbooked and the remaining 47.4% were booked pregnancies. Similarly, studies by Rani et al, (82%), George et al, (90.1%), Rajasri et al, Jido et al, Dora et al, Bandyopadhyay et al, and various other studies conducted across the globe had shown that that eclamptic pregnancies were more common among the unbooked pregnancies.[8,11-13,22,23,27-31] In our study as shown in Table 1, 100 (40.5%) women did not have any antenatal visits. Even WHO secondary analysis among low and middle income countries had shown that poor ante-natal attendance to be an independent risk factor for eclampsia.[32]

Another important observation in our study is that majority of the patients in our study were presented with antepartum eclampsia 153 (61.9%) followed by 77 (31.2%) with postpartum eclampsia and 17 (6.9%) with intrapartum eclampsia, which is in line with many other studies conducted elsewhere. Studies by Adamu et al, Khan et al, (84%) Raji et al (77.3%) Murthy et al (81.8%) and Bhanu et al (68%) also had reported that majority of the pregnant women with eclampsia presented with antepartum eclampsia.[7,9,10,15,22] Study shows that family history of gestational hypertension was present among 78 (31.6%) women with eclampsia.

Study as shown in Table 3, 173 (70%) of eclamptic women delivered by cesarean mode and 74 (30%) by normal vaginal delivery. The higher incidence of caesarean delivery among the patients with eclampsia in our study could be explained by the lack of parenteral anti-hypertensive therapy which makes the healthcare workers anxious about monitoring of patients with uncontrollable blood pressure during vaginal delivery in addition to various other factors. Our study shows that maternal complications were present among 47 women of which atonic PPH was present among 40 (16.2%) women. In a study by Rani et al, there was high incidence of maternal complications like PPH (31%), abruption placentae (11%), renal dysfunction (8%) and others like pulmonary edema, pulmonary embolism, HELLP syndrome and DIC.[27] In a study by Lee et al, the incidence of major maternal complications was 32%.[18]

In the study Table 2 shows that among the newborns, 17 (6.9%) comprised of stillbirths and early neonatal death was observed among 7 (2.8%) newborns with about 84 (36.5%) neonates requiring NICU admission. A study by Lee et al, shows that the perinatal mortality rate was 6.4% with 56% neonates experiencing perinatal complications.[18] In a study by Rani et al, Stillbirth was observed among 28.57% newborns.[27] Even in a study by Ayaz et al, perinatal mortality was 32.8%, major cause being still births and intrauterine death (IUD).[33]

Rajasri et al, in their study had reported that maternal complications were observed among 38% eclamptic women with 4% reporting maternal death.[11] The major maternal complications in their study were status eclamptic us and HELLP syndrome. The same study had reported that perinatal death was observed among four neonates. Similarly, in a study by Raji et al, maternal complications were present among 23.97% pregnant women of which 6.2% mothers died.[22] There was also 26.4% neonatal death in the same study. Sujata et al, also had reported perinatal death rate of 285 per 1000 live births and maternal death rate of 7.7%.[13] The main causes of maternal deaths were puerperal sepsis, oliguria and pulmonary edema in a study conducted by Murthy et al.[7]

In a study by Mahran et al, the most common complication was HELLP syndrome and perinatal death was recorded among 11.9% newborns.[34] It is also noteworthy to mention that a meta-analysis by Mersha et al had shown that the pooled prevalence of maternal death was 4% and the pooled prevalence of HELLP syndrome was 13%.[35] Other complications such as pulmonary edema, kidney injury, hepatic injury, placental abruption and aspiration pneumonia were also reported. Perinatal death was observed in one-fourth of women with eclampsia 25% (95% CI: 18, 32%). All these findings were in line with the complications observed in our study. It is of prime importance to mention that the rate of complications and deaths observed in our study were higher when compared to studies conducted in Sweden, UK , Saudi Arabia and Tanzania.[37-40]

A study by Yaliwal et al had also concluded that perinatal mortality was high in patients who had a systolic blood pressure of≥160 mmHg, a diastolic blood pressure of ≥110 mmHg, babies who weighed less than 2 kgs and urine albumin>2+.[36] Similarly, a study by Adamu AN et al, had shown that the maternal deaths were significantly more amongst the women and who had no antenatal care.[10]

CONCLUSION

There is a considerable morbidity and mortality as a consequence of eclampsia both for the mother and the neonate. Eclampsia still remains an intractable obstetric

emergency in our country. It is concluded that inadequate antenatal care, delay of pregnant women in seeking help, delay in diagnosis and inadequate management of eclampsia patient at peripheral health care facilities and delay in referral are the major contributors to the poor outcome of eclamptic women. Hence improving the ante-natal and emergency obstetric and neonatal care is mandatory for the improvement in the feto-maternal outcomes. Furthermore, larger longitudinal studies on a multicentre level will help in adding strength to our study results.

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