http://jmscr.igmpublication.org/home/
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v8i6.62

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Original Research Article

Biochemical findings in patients with severe preeclampsia & eclampsia: A study from North Indian tertiary health care institution

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Abstract
Introduction: *Hypertensive disorders of pregnancy comprising of pre-eclampsia and eclampsia are a major cause of adverse pregnancy outcomes.*
Methods: *The study was conducted among 65 antenatal women diagnosed with pre-eclampsia and eclampsia at gestational age >20 weeks in the Department of Obstetrics and Gynaecology, Kamla Nehru State Hospital for Mother and child IGMC Shimla. Clinical signs and symptoms and Laboratory test were recorded for study purpose.*
Results: *The mean age of subjects in the study was 25.03±5.6 yrs, majority of subjects were between 20-29 years. 75% subjects were booked and 25% were unbooked. Majority (58%) of subjects were primigravidae and 40% were multigravidae, a single patient was admitted with postpartum eclampsia. 51(78.4%) subjects had severe preeclampsia and 14(21.5%) subjects had eclampsia. Majority of subjects had significant proteinuria. Hematocrit, LDH, serum uric acid ApTT and 24 hrs urinary protein were significantly higher with abnormal RBC morphology*
Conclusion: *Indicators of endothelial dysfunction i.e. abnormal RBC morphology, elevated LDH, deranged renal function tests were significantly higher in these patients.. We conclude that the brain edema in patients with preeclampsia-eclampsia syndrome is primarily associated with the laboratory based evidence of endothelial damage*
Keywords: *Antenatal women, Pregnancy induced hypertension, Biochemical tests.*

Introduction

Hypertensive disorders are the most common medical complications of pregnancy, with a reported incidence between 6% and 8%[1]. They are an important cause of severe morbidity and mortality among mothers and babies. In Africa and Asia, hypertensive disorders of pregnancy, especially eclampsia, are associated with nearly one-tenth of all maternal deaths[2].

Preeclampsia is a pregnancy-specific disorder clinically characterized by hypertension (blood pressure≥ 140/90 mm Hg) and proteinuria (≥300 mg in a 24-hour urine collection) occurring after 20 weeks of gestation in a previously normotensive patient. Preeclampsia can be severe or nonsevere. Criteria for Severe Preeclampsia are Blood pressure of ≥160 mm Hg systolic or ≥110 mm Hg diastolic, recorded on at least two

occasions at least 6 hours apart with patient at bed rest, proteinuria of ≥5 g in 24 hours, oliguria (<400 ml in 24 hours), Cerebral & visual disturbances, epigastric pain, nausea, and vomiting, pulmonary edema, impaired liver function of unclear etiology & thrombocytopenia. Eclampsia is the occurrence of convulsions or coma unrelated to other cerebral conditions in patients with signs and symptoms of preeclampsia. The seizures are generalized and may appear before, during, or after labor. Although most cases of postpartum eclampsia occur within the first 48 hrs of labour, some cases can occurs beyond 48 hrs. Late postpartum eclampsia is defined as eclampsia that occur more than 48 hours but less than 4 weeks after delivery. Hypertension is considered the hallmark for the diagnosis of eclampsia. However, in 16 percent of the cases, hypertension may be absent. Almost all cases (91 percent) of eclampsia develop in the third trimester (≥28 weeks). The remaining cases occur between 21 to 27 weeks' gestation (7.5 percent), or at or before 20 weeks' gestation (1.5 percent)[3].

Several theories have been proposed to explain the etiopathogenesis which includes inadequate trophoblastic invasion, imbalance in angiogenesis, coagulation abnormalities, vascular endothelial damage, cardiovascular & immunologic maladaptation, genetic predisposition, exaggerated inflammatory response& increased oxidative stress.

RBC morphology is the strongest predictor of abnormal findings. The only laboratory parameter that has been found to be abnormal a week prior to the development of neurological symptoms is serum Lactate dehydrogenase (LDH) level which is higher in the group that later developed hypertensive encephalopathy related brain oedema[18]. Alteration in Liver function tests (LFTs) includes elevated levels of serum aminotransferase, namely, aspartate aminotransferase (AST) or alanine aminotransferase (ALT). Renal perfusion and glomerular filtration rate are reduced. Plasma uric acid concentration is typically elevated in preeclampsia. The elevation exceeds the reduction in glomerular filtration rate and likely is also due to enhanced tubular reabsorption[19].

Materials and Methods

Study Area and Population: The study was conducted among the pregnant women attending antenatal clinic in the Department of Obstetrics and Gynaecology, Kamla Nehru State Hospital for Mother and child IGMC Shimla.

Study Design: Descriptive observational study.

Study Period: One year from July 2016 to June 2017.

Study Sample: As it was a time bound study, a total of 65 subjects (preeclampsia and eclampsia patients) were included in study.

Inclusion Criteria: Pregnant women diagnosed with pre-eclampsia and eclampsia at gestational age >20 weeks singleton pregnancy were included in the study.

Study Tool: A study proforma was designed to collect and record socio-demographic parameters, antenatal history, previous medical and reproductive history, clinical signs and symptoms, laboratory investigations, plan and mode of delivery and maternal/foetal outcomes were recorded on the proforma.

Methodology: Standard case definitions were utilized to identify study participants. Patients with severe preeclampsia/eclampsia at 20 weeks or beyond were enrolled for this study. On admission detailed history was taken including warning signs and symptoms i.e. headache, blurring of vision, visual field scotomas, blindness, nausea/vomiting, pain epigastrium swelling feet. Time of onset of seizure, duration & type of seizure: tonic clonic movement, uprolling of eyeballs, frothing from mouth, deviation of head, post seizure confusion, number of seizures and any focal neurological deficit were also noted. These patients were managed in the emergency set up in labour room.

Sociodemographic variables were recorded on proforma, which was followed by general physical

examination, obstetrical examination and biochemical analysis. Renal sonogram was done in subjects with chronic hypertension and decreased urinary output. All subjects enrolled for this study received antihypertensives and seizures prophylaxis with Magnesium Sulphate (Pritchards Regimen). Subjects at gestation<34 weeks received antenatal glucocorticoids for fetal pulmonary maturity. Pelvic and cervical assessment was done after stabilizing the patient and mode of delivery was decided accordingly. Caesarean section was done for the obstetric and medical indications only. Labour was monitored partographically. Second stage was cut short by prophylactic outlet forceps/ventouse. Labour and Neonatal parameters were recorded according to the performa.

The clinical findings, laboratory data of all the patients compared.

Statistical Analysis: Data were entered into Microsoft Excel spreadsheet, cleaned and transferred to Epi Info version 7.2.2.6 software for analysis. Continuous variables were presented as mean scores ± standard deviations while discrete variables as percentages and proportions of each. Pearson's Chi-squared was used to test the statistical significance of categorical data respectively. Mean of variables was compared using Independent *t*-test after checking normality of data. Two tailed *P* value < 0.05 was considered as statistically significant for all analysis.

Ethical Considerations: Prior permission was taken from Institute Ethical Committee. Personal identifiers were omitted in order to maintain confidentiality and anonymity. Potential harms and benefits were explained to the patient and guardian before taking consent. Patient was free to leave the study at any point of time and this didn't affect her clinical care. No financial expenditure was incurred by the patient for the sake of study.

Result

The study was conducted in the department of Obstetrics and Gynaecology, Kamla Nehru State Hospital for Mother and Child, Indira Gandhi Medical College. Shimla on 65 subjects with severe pre-eclampsia & eclampsia admitted in the labour ward w.e.f. 1st July 2016 to 30th June 2017 .The total number of deliveries during the period were 6576. Out of these 195 subjects were diagnosed to have preeclampsia and 29 subjects had eclampsia. Therefore the incidence of preeclampsia (mild and severe) and eclampsia was 2.96% and 0.44% respectively. Following observations were made:

The mean age of subjects in the study was 25.03±5.6 yrs, majority of subjects were between 20-29 years. 75% subjects were booked and 25% were unbooked. Majority (58%) of subjects were primigravidae and 40% were multigravidae, a single patient was admitted with postpartum eclampsia. 51(78.4%) subjects had severe preeclampsia and 14(21.5%) subjects had eclampsia. Majority of subjects had significant proteinuria

		Number (N=65)	Percentage
1.)Age (in years)	<20	3	4.61%
	20-29	50	76.92%
	30-39	10	15.38%
	≥40	2	3.07%
2.)Status	Un booked	16	24.61%
	Booked	49	75.38%
3.)Gravidity	Primigravida	38	58.46%
	Multigravida	26	40%
	G2	11	16.92%
	G3	15	23.07%
	Postpartum	1	1.54%
4.)Status	Severe pre-eclampsia	51	78.46%
	Eclampsia	14	21.54%
5.)Urine albumin	Nil	1	1.53%
	Trace	1	1.53%
	1+	5	7.69%
	2+	34	52.30%
	3+	24	36.92%

Hematocrit, LDH, serum uric acid ApTT and 24 hrs urinary protein were significantly higher with abnormal RBC morphology

Minimum and maximum values of laboratory parameters in all patients

LAB PARAMETERS	Minimum	Maximum
Hct(%)	23.2	45
WBC(10^3/ul)	4900	19880
Thrombocyte (/µl)	50000	37500
LDH (U/L)	344	1840
AST (U/L)	28	234
ALT (U/L)	16	334
ALP(U/L)	66	547
Uric acid (mg/dl)	3.7	9.2
BUN (mg/dl)	7	24.5
Creatinine (mg/dl)	0.6	1.6
TSP(g/dl)	4.7	7
Albumin (g/dl)	2	6
PT(seconds)	10	13.5
APTT (seconds)	28	39.2
24 hrs urine protein(mg)	200	6468
Abnormal red cell picture (No.)	0	16

Discussion

The study was conducted on 65 subjects with severe pre-eclampsia and eclampsia admitted in the labour ward Out of 65 subjects 42 subjects had severe preeclampsia and 23 subjects had eclampsia. The incidence of preeclampsia was 2.96% in the present study which is lower than the incidence quoted in India i.e. 8-10%. The incidence of eclampsia was 0.44% in the present study which is lower than the incidence quoted in India i.e.1.56%[17].

As uric acid is partly a surrogate marker of tissue involvement in preeclampsia as reported by James (2000)[6]. The data of the present work shows significantly increase in serum uric acid which is consistent with that reported by Akter et al; (2014)[7], Lowe et al (2014)[10], Razia et al (2013)[6] , Rizwana et al (2015)[12], James (2000)[9], Paneri et al (2011)[14] . Rising level of serum urate is indication of preeclampsia progress and a good predictor for increased fetal risk as described by Redman et al (1976)[11]. In this study all liver enzymes (AST, ALT and ALP); significantly increase in the Sudanese women with preeclampsia, this finding are consistent with that found by (Paneri et al; 2011)[14]. The elevation of liver enzymes especially AST and ALT was also reported by Remero et al (1988)[15] and Leela et al (2015)[16]. This happen because in pre eclampsia hyper vascularization and vasoconstriction of liver leads to liver cell injury and alteration of cell membrane permeability and damage to the cells which allows intracellular enzyme to leak in to the blood, leads to elevated liver enzymes as suggested by Madazila et al (1999)[8] .

Conclusion

Indicators of endothelial dysfunction i.e. abnormal RBC morphology, elevated LDH, deranged renal function tests were significantly higher in these patients.. We conclude that the brain edema in patients with preeclampsia-eclampsia syndrome is primarily associated with the laboratory based evidence of endothelial damage; more specific markers of endothelial dysfunction include fibronectin, tissue plasminogen activator, thrombomodulin, endothelin-1, and in particular Von willebrand factor. Measurement of the specific markers may be useful to evaluate endothelial integrity in patient who are preeclamptic, especially patient who are at risk of progression to hypertensive encephalopathy such as those with severe headache or other neurological signs and symptoms

Blood pressure parameters, although elevated in all patients, are not significantly different in those with or without brain edema, although the acute fluctuation of blood pressure may disrupt the cerebral autoregulatory mechanism and explains the association of neuroimaging findings with acutely high blood pressure.

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Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Study was approved by the Institutional Ethics Committee

References

1. Report of the National High Blood Pressure Education Program Working Group on high blood pressure in pregnancy. Am J Obstet Gynecol 2000;183:S1–22
2. World Health Organization. WHO Recommendations for Prevention and Treatment of Pre-Eclampsia and Eclampsia.

Geneva, Switzerland: World Health Organization; 2011
3. Gabbe SG, Niebyl JR, Simpson JL, Landon MB, Galan HL, Jauniaux ERM et al. Obstetrics: Normal and problem pregnancies: Hypertension. 6th edition Philadelphia. Saundars An imprint of Elsevier Publications; 2013, 779-824
4. Cunnighum FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL. Williams obstetrics: Hypertensive disorders in pregnancy. 24th edition. Newyork: McGraw-Hill Education; 2014. Chapter no. 10 : 1508-6135
5. Patil Mithil M. Role of Neuroimaging in Patients with Atypical Eclampsia. J of Obstet & Gynecol of India 2012; 62 (5): 526-30
6. Razia S, Selina A, Nasima S, Fazlul Karim S M, Farhana A. Association of serum uric acid with preeclampsia: a case control study, Delta Med Col J, 1(2), 2013, 46-50.
7. Akter S, Sultana S, Dabee S R. Association of hyperuricaemia with perinatal outcome in pregnancy induced hypertension, Journal of Bangladesh College of Physicians and Surgeons, 32(3), 2014, 124-129.
8. Madazli R, Benian A, Gumustas K, Uzun H. Lipid peroxidation and antioxidants in preeclampsia, Europian Journal of Obstetrics and Gynecology, 85(2), 1999, 205-208.
9. James J, Walker. Severe pre-eclampsia and eclampsia, Baillie Á re's Clinical Obstetrics and Gynaecology, 14(1), 2000, 57-71
10. Lowe S A, Bowyer L, Lust K, McMahon L, Morton M R, North R A, Paech M. Said J. The SOMANZ guideline for the management of hypertensive disorders of pregnancy, Society of Obstetric Medicine of Australia and New Zealand (SOMANZ), 2014, 3-22.
11. Redman C W, Beilin L J, Bonnar J, Wilkinson R H. Plasma urate measurements in predicting fetal death in hypertensive pregnancy, Lancet, 1(7974), 1976, 1370-1373.
12. Rizwana Habib Kant, Nousheen Mir, Safeena Sarwar3, Shruti Gupta, Rukhsana Najeeb. Role of Maternal Serum Lactate Dehydrogenase as a Biochemical Marker in Pre-Eclampsia, Journal of Dental and Medical Sciences (JDMS), 14(7), 2015, 12-19.
13. Paneri S, Panchonia A, Varma M, Yadav S. Evaluation of RFTS, LFTS and ascorbic acid in pre-eclampsia among women of Indore, Indian Journal of Fundamental and Applied Life Sciences, 1(4), 2011, 312-315.
14. Basima S. Alghazali, Alaa M S, Nabras N H. The role of trace elements (zinc, copper, magnesium and calcium) in pregnant women with preeclampsia in third trimester and fetal cord blood after delivery, Medical Journal of Al-Muthanna, 1(1), 2014, 16-26.
15. Remero R, Vizoso J, Emamian M, Duffy T, Riely C, Halford T et al. Clinical significance of liver dysfunction in pregnancy induced hypertension, Am J Perinatol, 5(2), 1988, 146- 1451.
16. Leela K V, Lakshmi Kantham A, Kasibabu A. Evaluation of biochemical parameters in HELLP syndrome cases of pregnancy induced hypertension and eclampsia, J of Evidence Based Med and Hthcare, 2(26), 2015, 3914- 3923.
17. Swain S, Ohha KN, Prakash A. Maternal and perinatal mortality due to eclampsia. Indian Pediatr 1993 Jun; 30(6):771-73.
18. Schwartz RB, Mulkern RV, Gudbjartsson H and Jolesz F: Diffusion-Weighted MR Imaging in Hypertensive Encephalopathy: Clues to Pathogenesis. AJNR Am J Neuroradiol 1998;19:859–62
19. Schwartz RB, Feske SK, Polak JF, De Girolami U, Iaia A and Beckner KM: Preeclampsia-eclampsia: clinical and neuroradiographic correlates and insights into the pathogenesis of hypertensive encephalop-athy, Radiology. 2000 No34v;217(2):371-6.