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Research Article

Clinical and Biochemical Profile of Antenatal Women Suffering from Hypertensive Disorders of Pregnancy Attending A Tertiary Care Health Institution

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Abstracts: ***Background:*** Hypertensive disorders of pregnancy are a major cause of both maternal and foetal morbidity and mortality. Although the much studied phenomenon but yet much is to be learnt about the disease, etiology, pathogenesis, clinical course as well as the complications. The present study was conducted with an objective to determine the clinical and biochemical profile of such disorders. ***Methods:*** The present study is a sub-part of a case control study conducted among 180 pregnant women (90 cases and 90 controls) in Kamla Nehru State Hospital for Mother and Child, IGMC Shimla, Himachal Pradesh. Clinical, biochemical and blood pressure parameters of all the participants were documented for the study purpose. ***Results:*** Adverse findings in all aspects were seen more often in cases than in normotensives. All non-exposed had systolic and diastolic blood pressure and in normal range. Odoema, pallor and cyanosis were more likely to be seen in hypertensives than controls. Liver function tests, renal function tests and platelet counts were deranged more often in cases than controls. Hyperhomocysteinemia was more commonly encountered among the cases of pre-eclampsia and eclampsia. Fundus examination revealed worse status in hypertensives. ***Conclusion:*** The study associates pregnancy induced hypertensive disorders and adverse biochemical, clinical and lab parameters as highlighted by vast literature. Timely screening of such parameters can definitely aid in achieving better maternal and foetal outcomes. Incorporation of homocysteine analysis in routine strategy can definitely strengthen the maternal health care.
Keywords: Hypertensive disorders, Clinical profile, Biochemical parameters.

INTRODUCTION

Hypertensive disorders of pregnancy comprising of pre-eclampsia and eclampsia are a major cause of perinatal maternal and foetal adverse outcomes (Chamotra, S. *et al.*, 2020; & Mujawar, S. A. *et al.*, 2011). Pre-eclampsia is a multisystem disorder characterized and defined by development of hypertension to the extent of 140/90 mm Hg or more with proteinuria after 20 weeks in a previously normotensive and non proteinuric woman (Dekker, G. A., & Sibai, B. M. 1998). A pregnant woman is labeled as eclamptic when pre-eclampsia is complicated with generalized tonic clonic convulsions or coma (Dutta, D.C. 2015). Among all the pregnancies, the incidence of pre-eclampsia varies from 5-7% (Yelikar, K. *et al.*, 2016).

In addition to elevated blood pressure, proteinuria, and convulsions these disorders are further characterized by ominous impaired liver function, increased serum uric acid, decreased platelet count and signs and symptoms such as headache, visual disturbance, epigastric pain and pulmonary odema (Gifford, R. *et al.*, 1990). As it is a multi-system disorder, virtually no organ is spared from the adverse effects of hypertensive disorders of pregnancy.

Keeping all this in mind and considering dearth of such studies in this geographical area, the present study was conduct at Kamla Nehru State Hospital for Mother and Child, Indira Gandhi Medical College, Shimla to determine the clinical and biochemical profile of the hypertensive disorders of pregnancy.

METHODS

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. This is a sub-part of much larger case control study conducted over a period of one year from August 2017 through

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July 2018. As it was a time bound study, a total of 90 cases (preeclampsia and eclampsia patients) and 90 age and parity matched matched controls were included in study. Pregnant women diagnosed with pre-eclampsia and eclampsia at gestational age >20 weeks and singleton pregnancy were included in the study while women with diabetes mellitus, essential hypertension, liver disease, severe anaemia, multiple pregnancies and with treatment on anti-folate drugs were excluded.

All the pre-eclampsia and eclampsia patients admitted were taken as cases. For every case, a consecutive age and parity matched control was included in the study. On admission detailed obstetric, menstrual, medical, treatment and dietary history were noted. Warning signs and symptoms such as vomiting, blurring of vision, headache, pain-epigastrium were inquired from the patients. General physical examination, systemic and obstetrics examination was done as per standard protocol. Routine and special investigations (renal function tests, liver function tests, homocystenine estimation) were also done.

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 or Fisher Exact test was used to test the statistical significance of categorical data. Two tailed *P* value < 0.05 was considered as statistically significant for all analysis.

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.

RESULTS

A total of 180 antenatal women at period of gestation more than 20 weeks were enrolled. The study group included 90 women beyond 20 weeks of gestation with hypertension fulfilling inclusion criteria. Consecutive age and parity matched 90 normotensive women were taken as controls. Among 90 cases, 69 were pre-eclamptics while 21 were labelled as eclampsia.

Table 1 highlights the clinical profile of the two groups. Cases were more likely to have pallor, cyanosis and oedema as compared with controls. None of the controls had pallor and cyanosis on the clinical examination. The difference among the two groups was found to be statistically significant.

Table1. Key Clinical Parameters among Two Groups

Variable	Sub category	Cases n=90	Controls n=90	P Value
Pallor	Absent	81 (90%)	90 (100%)	0.003*
	Present	9 (10%)	0	
Cyanosis	Absent	69 (76.7%)	90 (100%)	<0.001*
	Present	21 (23.3)	0	
Oedema	Absent	2 (2.2%)	82 (91.1%)	<0.001*
	Present	88 (97.8%)	8 (8.9%)	

Table 2 compares the blood pressure parameters of cases with the controls. All the controls had Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) in the normo-tensive range, while none of the cases had normal blood pressure parameters. These differences were statistically significant.

Table2. Distribution of Blood Pressure Parameters among Two Groups

Variable	Sub category (mm Hg)	Cases n=90	Controls n=90	P Value
SBP	<140	0	90 (100%)	<0.001*
	140-150	10 (11.1%)	0	
	150-160	38 (42.2%)	0	
	>160	42 (46.7%)	0	
DBP	<90	0	90 (100%)	<0.001*
	90-1100	47 (52.2%)	0	
	100-110	26 (28.9%)	0	
	>110	17 (18.9%)	0	

Table 3A and 3B reveal the biochemical parameters of the two study groups. Most of the adverse hematological parameters were significantly higher in those suffering with hypertensive disorders of pregnancy. Similarly liver and renal functions were significantly more deranged among the cases. Homocysteinemia was significantly more likely to be associated with the cases as compared with the cases. Peripheral smear and ocular findings were insignificant.

Table 3A. Biochemical Parameters among Two Groups

Variable	Sub category	Cases n=90	Controls n=90	P Value
Haemoglobin	>11 g/dl	6 (6.7%)	82 (91.1%)	<0.001*
	9-11 g/dl	9 (10%)	8 (8.9%)	
	7-9 g/dl	29 (32.2%)	0	
	<7 g/dl	46 (51.1%)	0	
Total Leucocyte Count	<15000	0	3 (3.3%)	<0.001*
	15000-25000	80 (88.9%)	87 (96.7%)	
	>25000	10 (11.1%)	0	
Platelet Count	Normal	23 (25.6%)	90 (100%)	<0.001*
	Decreased	67 (74.4%)	0	
Peripheral Smear	Normal	86 (95.6%)	90 (100%)	0.121
	Abnormal	4 (4.4%)	0	
Bilirubin	Normal	76 (84.4%)	90 (100%)	<0.001*
	Abnormal	14 (15.6%)	0	
SGOT	Normal	47 (52.2%)	90 (100%)	<0.001*
	Abnormal	43 (47.8%)	0	
SGPT	Normal	47 (52.2%)	90 (100%)	<0.001*
	Abnormal	43 (47.8%)	0	
LDH	Normal	34 (37.8%)	90 (100%)	<0.001*
	Abnormal	56 (62.2%)	0	

Table 3B. Biochemical Parameters among Two Groups

Variable	Sub category	Cases n=90	Controls n=90	P Value
S.Urea	<10 mg/dl	42 (46.7%)	90 (100%)	<0.001*
	10-20 mg/dl	41 (45.6%)	0	
	>20 mg/dl	7 (7.8%)	0	
S.Creatinine	Normal	34 (37.8%)	90 (100%)	<0.001*
	Elevated	56 (62.2%)	0	
Urine Albumin/Sugar	Nil	53 (58.9%)	90 (100%)	<0.001*
	1+	32 (35.6%)	0	
	≥ 2+	5 (5.6%)	0	
Fundus Examination	Normal	88 (97.8%)	90 (100%)	0.497
	Abnormal	2 (2.2%)	0	
Homocysteine	Normal	34 (37.8%)	89 (98.9%)	<0.001*
	Elevated	56 (62.2%)	1(1.1%)	

DISCUSSION

The study highlights the association of hypertensive disorders of pregnancy and the clinical and biochemical findings. Majority of the parameters were deranged in the cases as compared to the controls. This further strengthens the evidence of such parameters in the clinical spectrum of these disorders.

The present study highlights that the patients suffering from hypertensive disorders of pregnancy are more likely to have deranged haematological, biochemical and clinical parameters. The Liver functions, renal functions and blood counts; all were more likely to be worse in cases as compared to the controls. These findings were in accordance with the observations made by (Tranquilli, A. L. *et al.*, 2014; Magee, L. A. *et al.*, 2014; & Montagnana, M. *et al.*, 2017) and many more.

Further the study revealed that the elevated homocysteine level was more frequently encountered among hypertensives as compared to the normotensives. Similar finding were also observed in studies by (Yelikar, K. *et al.*, 2016; Ingec, M. *et al.*, 2005; Sangeeta, N. *et al.*, 2013; Meera, V., & Goutham, E.S.A. 2017; Shilpa, A.V. *et al.*, 2017; Patil, N. *et al.*, 2018; & Nidumuru, S., & Kishan, R.H. 2018).This finding further cements the homocysteine in the causal pathway of the pre-eclampsia and eclampsia.

CONCLUSION

The study depicts the role of clinical and biochemical parameters in screening and diagnosis of the hypertensive disorders of pregnancy. Timely investigation of such parameters will definitely help in identifying such disorders at a much earlier stage leading to early management and better maternal and foetal outcomes. The present study also underpins serum homocysteine level in the pathogenesis and

causal pathway of hypertensive disorder of pregnancy. Routine estimation of homocysteine levels prior to pregnancy may help to correctly predict and prevent further development of preeclampsia and eclampsia. Counter strategy for such diseases may be developed based upon the associated contributing factors.

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