

STUDY OF HYPERTENSIVE DISORDERS OF PREGNANCY IN CORRELATION WITH GESTOSIS SCORE



Dr. NEHA WAGDE, DNB RESIDENT.
Dr. JYOTSNA DESHMUKH, Associate Professor OBGY Department
R.C.S.M Government Medical College & C.P.R. Hospital, Kolhapur, India



INTRODUCTION

- Hypertension during pregnancy is a major health problem. Hypertensive disorder of Pregnancy (Gestational Hypertension (GHT), Pre-eclampsia (PE) & Eclampsia (E) occurs in approximately 6-8 % of all pregnancies [1]. It accounts for approximately a quarter of all antenatal admissions [2]. Favourable maternal and perinatal outcomes for women with preeclampsia/eclampsia depend on how soon the condition is identified and how quickly the woman has access to treatment [3]. Four potentially useful biomarkers at 11–13 weeks' gestation as a screening tool for preeclampsia are mean arterial pressure (MAP), uterine artery pulsatility index (UtA-PI), serum pregnancy-associated plasma protein-A (PAPP-A), and serum placental growth factor (PlGF)[4]. Abnormal uteroplacental circulation could be observed as abnormal Doppler in the uterine arteries by ultrasound (increased UtA-PI) from as early as the first trimester of pregnancy.
- The traditional approach for the identification of high-risk women for Preeclampsia follows the recommendations of organizations, such as National Institute for Health and Care Excellence (NICE) and American College of Obstetricians and Gynaecologists (ACOG). Screening as per nice guidelines includes identifying risk factors from maternal demographic characteristics and medical history [5]
- HDP Gestosis score is a newer modality of screening for preeclampsia. Score 1, 2, 3 has been given to each clinical risk factors as per its severity of development. Mild risk factor has allotted a score of 1, 2 to moderate and 3 to high risk factor. When total score is ≥ 3 , pregnant women should be marked as “AT RISK FOR HDP” [6].
- In present study, we aimed to investigate the correlation of Gestosis score with development of preeclampsia and the overall predictive performance of the score.

OBJECTIVE

- To study the predictive accuracy of HDP GESTOSIS Score parameters for development of Preeclampsia.
- Timely intervention in women likely to develop preeclampsia for better maternal and fetal outcome.

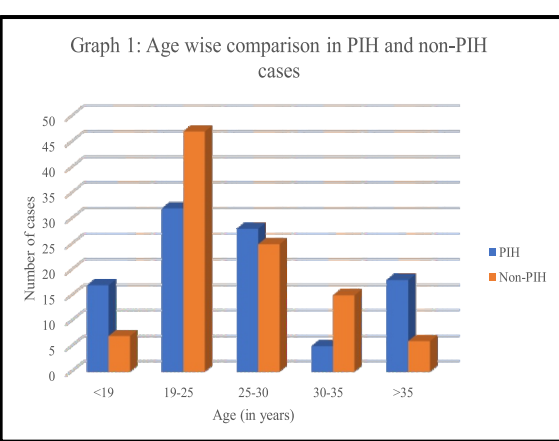
METHODOLOGY

- A hospital based observational study was conducted at department of obstetrics and Gynaecology of a tertiary care centre for a period of six months. The study included 100 Preeclampsia / Eclampsia cases and 100 cases with no Preeclampsia / Eclampsia [Normotensive] receiving medical services and delivered in our hospital during the same period. Written informed consent was obtained from each patient. Approval from our institutional review board was taken before start of the study. Patients history was taken which includes Age, BMI, obstetric scores, Interpregnancy interval, conceived with ART, medical disorders [Chronic Hypertension, Diabetes, Chronic kidney disease, Autoimmune disease like SLE], Thyroid profile, clinical parameters, Laboratory parameters [Haemoglobin, lipid profile], family history of Hypertension, History of HDP in previous Pregnancy and each parameter was scored as 1, 2, 3 as per FOGSI-GESTOSIS-ICOG. This was followed by a detailed and meticulous clinical examination including general, systemic and obstetric examination. From the collected details, HDP Gestosis score was calculated in the study groups. All the study subjects were then followed as per routine hospital protocol.

STATISTICAL ANALYSIS

- All the data was noted down in a pre-designed study proforma. Qualitative data was represented in the form of frequency and percentage. Association between qualitative variables was assessed by Chi-Square test and Fisher's exact test for all 2 X 2 tables. Quantitative data was represented using Mean $\pm$ SD.
- Analysis of Quantitative data between the two groups was done using unpaired t-test if data passed 'Normality test' and by Mann-Whitney Test if data failed 'Normality test'. A P-value of <0.05 was taken as level of significance. Results were graphically represented where deemed necessary.

RESULTS

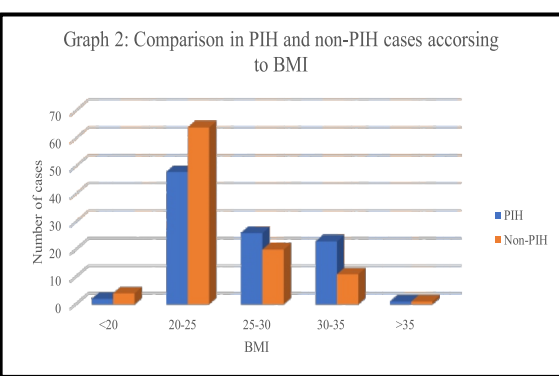


Graphs 1

shows Age wise comparison in PIH and non-PIH cases

Age is a significant factor between PIH and Non PIH cases.

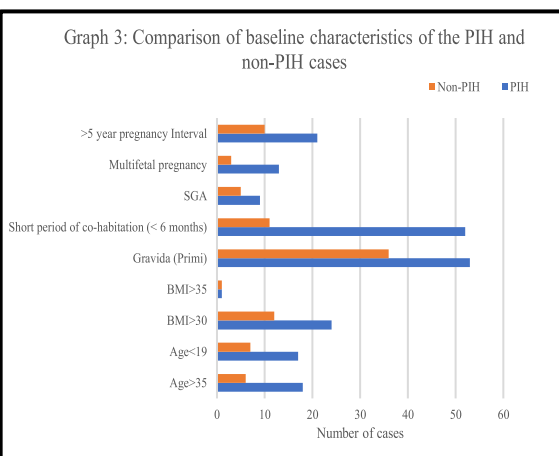
Women with Age < 19 yrs and > 35 yrs are at increased risk of developing Preeclampsia and Eclampsia.



Graph2

shows Comparison in PIH and non-PIH cases according to BMI

BMI > 30 is a significant factor between PIH and Non PIH cases, P-value < 0.05 .



Graph 3

• Bi-variate analysis of baseline characteristics between the groups.

Age more than 35 years, age less than 19 years and BMI were significant predictor of pre-eclampsia with odds ratio of 3.43 (95% CI: 1.30-9.07), P value-0.008, 2.72 (95% CI: 1.07-6.88) P value-0.027 and 2.32 (95% CI :1.08-4.94), P value-0.027 respectively.

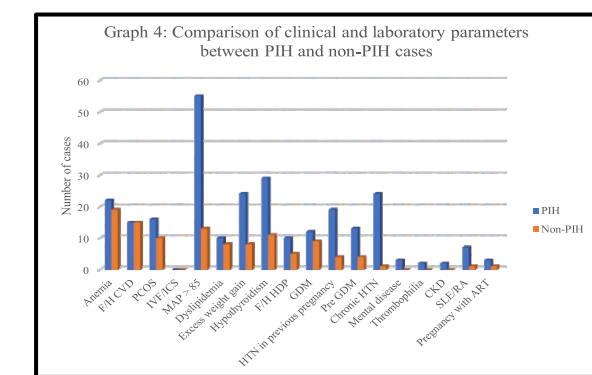
- While BMI more than 35 was not statistically significant, Short co-habitation period was significantly associated with pre-eclampsia with odds ratio 8.76 (95% CI: 4.18-18.35) P value- <0.001 . Primigravida and multi fetal pregnancy, Pregnancy interval greater than 5 years Showed a statistical significance with pre-eclampsia and had odds ratio 2 (95% CI: 1.14-3.53) P value-0.011, 4.83 (95% CI: 1.33-17.52) P value-0.016 and 2.39 (95% CI: 1.06-5.38) P value- 0.028 respectively.

DISCUSSION

• Hypertensive disorders are important cause of maternal and fetal Morbidity and Mortality. In this study we studied the correlation of HDP Gestosis score with the development of Preeclampsia. We observed that Gestosis score greater than 3 was significantly associated with pre-eclampsia. The sensitivity and specificity of Gestosis score for diagnosing PIH was 71% and 74% with diagnostic accuracy as 72.5% in our study. Mishra SS et al in a similar study aimed to investigate the level of association of risk factors enclosed in HDP GESTOSIS SCORE with development of preeclampsia and its predictive performance [6] They also observed good efficacy of the Gestosis score for identifying at risk cases for pre-eclampsia.

• In present study we had following observations,

- 1] Pregestational Diabetes and autoimmune disease like SLE/RA were significantly associated with pre-eclampsia. Autoantibodies present in preeclampsia cases activate AT 1 receptors and provoke biological responses that are relevant to the pathophysiology of preeclampsia. These findings link pre-eclampsia with other auto-immune disease like SLE and Rheumatoid Arthritis [7]
- 2] Hypertensive disease during previous pregnancy, Multi-fetal pregnancy and maternal hypothyroidism were significantly associated with pre-eclampsia. This risk factors has assigned a score of '2'. Bartsch E et al. [8] in their study observed that past history of preeclampsia increases the risk of developing preeclampsia in a subsequent pregnancy. In Twin pregnancy large placental mass and increased circulating levels of soluble fms-like tyrosine kinase-1 (sFlt-1) increases the risk. Release of NO is altered in hypothyroidism and the resulting endothelial cell dysfunction might be a pathogenetic mechanism for development of preeclampsia [9].
- 3] Age more than 35 years, less than 19 years, BMI > 30 Kg/m², Primigravida, pregnancy interval greater than 5 years, Mean arterial pressure more than 85 was significantly associated with pre-eclampsia. All this risk factors has assigned a score of '1'. Most of the studies showed that the risk of pre-eclampsia increases with age [10].
- 4] Excess of weight gain during pregnancy, pre-pregnancy obesity and overweight is associated with hyperinsulinism, insulin resistance and maternal systemic inflammation leading to endothelial damage. J. Roberts JM et al. [11] in a systemic review reported that obesity increases the risk of preeclampsia about 3-fold.
- 5) Nulliparity was observed as a risk factor for preeclampsia in our study. This is due to first exposure to chorionic vili and maternal immunological incompetence can increase risk of pre-eclampsia [12].
- 6) Family history of CVD, Family history of HDP, thrombophilia, PCOS, IVF/ICSI, GDM, mental disorder, CKD and pregnancy with ART factors were not significantly associated with pre-eclampsia in our study.



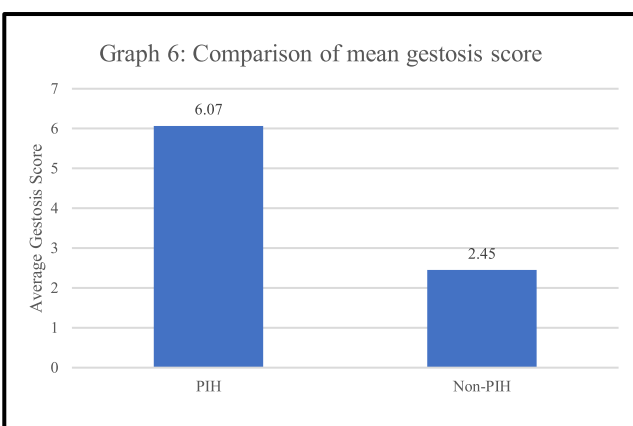
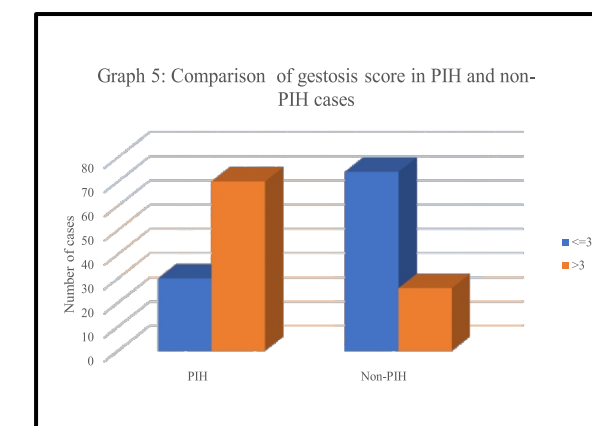
Graph 4

Comparison of clinical factors and laboratory parameters

• Mean arterial Pressure more than 85 was significantly associated with pre-eclampsia with odds ratio 8.17 (95% CI: 4.05-16.52) P value < 0.001 ,

• Hypothyroidism significantly increased the odds of pre-eclampsia in patients i.e. 3.30 (95% CI: 1.51-8.54) P value- 0.001 and dyslipidaemia was not significantly associated with pre-eclampsia. Excessive weight gain with odds ratio 3.63 (95% CI: 1.51-8.54) P value-0.002, Hypertension in previous pregnancy odds ratio 5.62 (95% CI 1.84-17.22) P value- 0.001, was significantly associated with pre-eclampsia. Pre GDM with odds ratio 3.58 (95% CI 1.12-11.41) P value- 0.040, chronic hypertension with odds ratio 31.26 (95% CI 4.13-236.29) P value < 0.001 and autoimmune disease like SLE/RA, odds ratio 7.45 (95% CI 0.89-61.73), P-value 0.004 were significantly associated with pre-eclampsia.

• Family history of CVD, Family history of HDP, anaemia, thrombophilia, PCOS, IVF/ICSI, GDM, mental disorder, CKD and pregnancy with ART factors were not significantly associated with pre-eclampsia.



Graph 5 & 6

Gestosis score greater than 3 was significantly associated with pre-eclampsia. Mean Gestosis score of pre-eclampsia cases was 6.07 with standard deviation 3.45 and non pre-eclampsia cases was 2.45 with standard deviation 1.53. The difference in mean score was statistically significant with p-value < 0.001 .

HDP GESTOSIS SCORE

RISK FACTOR	SCORE	Chronic vascular disease(dyslipidemia)	1
Age ≥ 35 years	1	Excessive weight gain during pregnancy	1
Age < 19 years	1	Maternal hypothyroidism	2
Maternal anemia	1	Family history of preeclampsia	2
Obesity(BMI ≥ 30)	1	Gestational Diabetes Mellitus	2
Obesity(BMI > 35 kg/m ²)	2	Obesity(BMI > 35 kg/m ²)	2
primigravida	1	Multifetal pregnancy	2
Short duration of sperm exposure(cohabitation)	1	Hypertensive disorder in previous pregnancy	2
Women born as small for gestational age	1	Pregestational Diabetes Mellitus	3
Family history of cardiovascular disease	1	Chronic hypertension	3
Polycystic ovary syndrome	1	Mental disorder	3
Interpregnancy interval > 5 years	1	Inherited /Acquired Thrombophilia	3
Conceived with ART(IVF/ICSI)	1	Maternal Chronic Kidney Disease	3
MAP ≥ 85 mmHg	1	Autoimmune disease SLE/RA/APLA	3
		Pregnancy with ART(OD Surrogacy)	3

CONCLUSION

Present study observed that HDP-Gestosis score is a good screening tool for pre-eclampsia. It is simple and has a very good accuracy for prediction of development of pre-eclampsia. These observations leads to increase in our ability to identify women at low resource setting, who are likely to develop preeclampsia before the onset of disease and helps in timely interventions or referral for better maternal and fetal outcomes. It is recommended that health workers should use Gestosis score and its parameters as a screening tool for pre-eclampsia prediction and early diagnoses.

BIBLIOGRAPHY

1. Kamath S. Hypertension in pregnancy. JAPI 2006; 54: 269-70
2. Bansal S. Hypertension in pregnancy. In; Desai P, Malhotra N et al, Principles & Practice of Obst & gynae. For postgraduates, 3rd. Ed. Jaypee brothers, New Delhi 2008, .pp.100-07
3. Duckitt K, Harrington D. Risk factors for preeclampsia at antenatal booking: systematic review of controlled studies. BMJ. 2005;330(7491):565
4. An MY, Wright D, Syngelaki A, Akolekar R, Cicero S, Janga D, Singh M, Greco E, Wright A, Maclagan K, et al. Comparison of diagnostic accuracy of early screening for pre-eclampsia by NICE guidelines and a method combining maternal factors and biomarkers: results of SPREE.
5. Lowe SA, Bowyer L, Lust K, et al. SOMANZ guidelines for the management of Hypertensive disorders of pregnancy 2014. Aust NZJ Obstet Gynaecol. 2015; 55:e1–e29
6. Mishra SS, Mohanty S, Ghadei R, Prabhan S, Majhi PP. HDP GESTOSIS Score as a predictor of PIH. IJSR. 2020; 9(8):25-30.
7. XiaY, Kellem RE. Is preeclampsia an autoimmune disease? Clin Immunol. 2009 Oct; 133(1):1-12.
8. Bartsch E, Medcalf KE, Park AL, Ray JG. Clinical risk factors for pre-Eclampsia determined in early pregnancy: systematic review and meta-analysis of large cohort studies. Bmj.2016 Apr 19; 353.
9. Kumar A, Ghosh BK, Murthy NS. Maternal thyroid hormonal status in Preeclampsia. Indian J Med Sci. 2005;59: 57–63.
10. Abalos E., Cuesta C., Carroli G., Qureshi Z., Widmer M., Vogel J., Souza J. Pre-eclampsia, eclampsia and adverse maternal and perinatal outcomes: A Secondary analysis of the World Health Organization Multicountry Survey on Maternal and Newborn Health. Int. J. Obstet. Gynaecol. 2014;121:14–24.
11. Roberts JM, Bodnar LM, Patrick TE, Powers RW. The Role of Obesity in Preeclampsia. Pregnancy Hypertens. 2011 Jan 1;1(1):6-16.
12. Dekker G.A., Sibai B.M. Etiology and pathogenesis of preeclampsia: Current concepts. Am. J. Obstet. Gynecol. 1998; 179:1359–1375.