

A Prospective Study on Hypertension in Pregnancy in a Tertiary Care Hospital

Jothi Sundaram¹, Kavitha D.S.²

Abstract

Hypertension in pregnancy is a high risk situation for both the mother and the fetus. A good antenatal care, control of hypertension and prevention of severe hypertension and eclampsia are essential for the well being of both the mother and the baby. All women with hypertension complicating pregnancy should be advised antenatal check and delivery at a tertiary care centre. This study was conducted on mothers with hypertension in Govt Rajaji Hospital, Madurai during a period of 6 months from February 2017 to July 2017. The study included women with known hypertensive disorder detected preconceptionally and antenatally. A total of 198 patients were included. The incidence, comorbidities, complications, maternal and perinatal outcome were studied. The mean age of the patients was 25 years. 105 patients were primigravida (53%) and 93 were multigravida (47%). Out of 198 patients, 110 patients had non severe PE (55.6%), 32 patients had chronic hypertension (16.2%), 9 patients had severe PE (4.5%), 24 patients had imminent eclampsia (12.1%), 13 patients had antepartum eclampsia (6.6%), 8 patients had HELLP syndrome (4.1%) and 2 patients had recurrent NSP (1%).

Preeclampsia-eclampsia and its variants remain the major cause of hypertension in pregnant women.

Hypertension during pregnancy is responsible for high maternal and perinatal morbidity and mortality.

Keywords: Hypertension; Preeclampsia; Eclampsia.

Definition

Chronic hypertension: Hypertension detected prior to conception or diagnosed before the 20th week of gestation. Hypertension diagnosed for the first time during pregnancy which does not resolve post-partum is also defined as chronic hypertension.

Preeclampsia: Blood pressure of $\geq 140/90$ mm Hg after 20 week of gestation, if prior blood pressure is unknown and accompanied by proteinuria are considered sufficient for the diagnosis of preeclampsia. The diagnosis of preeclampsia in absence of proteinuria is highly suggestive when hypertension is accompanied by headache, blurring of vision, abdominal pain or certain laboratory abnormalities particularly low platelet count and elevated liver enzyme either alone or in combination.

Eclampsia: Occurrence of seizure in women with preeclampsia that cannot be attributed to other causes.

Superimposed Preeclampsia

1. In women with hypertension and no proteinuria in early pregnancy (<20 week's gestation).

Documentation of new-onset proteinuria (urinary protein excretion ≥ 0.3 gm/24 hour).

2. In women with hypertension and proteinuria before 20 weeks gestation, any one of the following will suggest superimposed preeclampsia.

¹Associate Professor
²Assistant Professor,
Department of obstetrics &
Gynaecology
Madurai Medical College,
Madurai, Tamil Nadu
625020, India.

Corresponding Author:
D.S. Kavitha
Assistant Professor
Department of obstetrics &
Gynaecology, Madurai
Medical College,
Madurai, Tamil Nadu
625020, India.
E-mail:
ckdharshik@gmail.com

Received on 03.02.2018,
Accepted on 26.02.2018

- a. Sudden increase in proteinuria
- b. Sudden increase in blood pressure, where hypertension was previously well controlled.
- c. Thrombocytopenia
- d. Rise in serum AST/ALT

Gestational hypertension: Hypertension detected for the first time after mid-pregnancy but unaccompanied by proteinuria. Blood pressure returns to normal by 6 week postpartum or elevated blood pressure persist to be become chronic hypertension. This term is obsolete now.

HELLP syndrome: May occur in 2% to 12% of women with preeclampsia. Diagnosis is based on following criteria

1. Hemolysis

Peripheral smear showing evidence of hemolysis (burr cells)

Bilirubin > 1.2 mg/dl

LDH > 600 U/L

2. Elevated liver enzymes

Serum AST > 70 U/L

3. Low platelet count

< 1,00,000/mm³

All pregnant women with hypertension during pregnancy were subjected to detailed history, clinical examination and investigations. Patients were followed upto 6 weeks after delivery when blood pressure and proteinuria generally return to normal if the patient, had preeclampsia-eclampsia. In patients with hypertension persisting for more than 6 weeks, further investigation were conducted to ascertain the cause of hypertension.

Fetal parameters such as birth weight, and survival status (liveborn, stillborn, or perinatal death) were also noted in each patients.

Laboratory Investigations

- A. Hematological: Hemoglobin, total leukocyte count, reticulocyte count and peripheral blood smear examination.
- B. Biochemical: Blood urea, serum creatinine, uric acid, electrolytes, SGOT, SGPT, LDH, bilirubin (total and direct), fasting blood glucose and serum total protein and albumin.
- C. Urine analysis: Urine routine and microscopic examination and 24 hour urine for protein.
- D. Radiologic: Ultrasound of kidney, ureter and bladder and fetal assessment. Doppler assessment

of uterine arteries, umbilical arteries and renal artery in chronic HT. Screening echocardiogram was done in patients with severe PE.

- E. Other investigations - They were carried as and when required. In patients with chronic hypertension further investigations were done to ascertain the definite cause of hypertension. Coagulation profile (Bleeding time, clotting time, prothrombin time, APTT, serum fibrinogen) were carried out in patients with suspected coagulation disorder. CT brain was done in patients with eclampsia.

Result

The study was conducted in 198 patients with hypertension complicating pregnancy. The mean age of the patients was 25 years. Majority of the patients were in the age group of 21 to 25 years. Out of the 198 patients, 105 patients were primigravida (53%) and 93 were multigravida (47%). 32 patients (16.2%) had chronic hypertension, out of which one patient was detected in previous pregnancy and the remaining 31 patients were detected at the present pregnancy before 20 weeks. Among the 166 patients, 45 patients (22.7%) were detected in the 2nd trimester and remaining 121 patients (61.6%) were detected in the third trimester. About 31 patients (15.7%) were detected after 37 weeks of gestation. 2 patients out of 93 multigravida (2.2%) had preeclampsia during previous gestations. Preeclampsia was the most common cause of hypertension during pregnancy detected in 166 patients (83.8%) followed by chronic hypertension (16.2%). In 8 patients (4%) hypertension was associated with the HELLP syndrome. Chronic hypertension was seen in 32 patients of which superimposed preeclampsia was present in 5 patients (2.5%). Of the 32 patients with chronic hypertension, 2 patients had grade 1 hypertensive retinopathy, 1 patient had associated T2DM and had missed abortion for which MVA was done, 1 patient had HELLP SYNDROME, 1 patient had imminent eclampsia.

Oedema was the most common symptom occurring in all the patients. And those patients with severe hypertension had oedema extending upto knees and abdominal wall oedema. This was followed by headache in 63 patients (31.8%), seizures in 13 patients (6.6%), and blurring of vision in 11 patients (5.6%). Hemogram, LFT and LDH levels were normal in majority of the patients though it was markedly elevated in 8 (4%) patients who had HELLP syndrome. RFT was normal in majority of the patients except 6

patients with renal failure (3%) of which 4 patients had hemodialysis and 1 patient expired.

Fundus changes were divided into 4 grades as per Keith-Wagener-Barker classification. Ophthalmoscopy revealed normal fundus in 96.5%, Grade I changes in 6 patients (3%) of which one was in recurrent NSP, one in chronic hypertension and Grade II changes in 1 patient (0.5%). Grade III and Grade IV changes were not seen. Glaucoma was detected in one patient with chronic hypertension.

Anemia was present in 29 patients (14.6%), out of which 2 patients had severe anemia, 9 patients had moderate anemia and remaining 18 patients had mild anemia. 12 patients had associated GDM (6.1%) out of which 9 were on meal plan and 3 patients were on insulin. 6 patients had multiple pregnancy among which 2 patients had single fetal demise. one patient had central placenta previa, she was terminated at 34 weeks due to bleeding episode with fetal distress. 18 patients had associated hypothyroidism among which 6 patients were newly diagnosed and 3 more patients had subclinical hypothyroidism. Screening echo showed RHD with mild MR in one patient, thin sheet of pericardial effusion in one patient and ASD in one patient. 27 patients had oligohydramnios (AFI < 7) out of which 6 patients had severe oligohydramnios. IUGR was detected in 11 patients. Doppler abnormalities were detected in 14 patients (7%). 4 patients had early diastolic notch in the uterine artery in 2nd trimester, 4 more patients had absent diastolic flow in the umbilical artery and 1 patient had reversal of diastolic flow.

Preterm delivery occurred in 13 patients which were due to induction for severe preeclampsia, imminent eclampsia, AP eclampsia or reversed EDF. All the patients who were on regular follow up were terminated at 38 weeks of gestation by cerviprime gel induction. LSCS was done was obstetric indication except of 2 cases of AP eclampsia and imminent eclampsia. The perinatal mortality was 16 due to

prematurity in 5 and grade 3 HIE in 2 baby and the remaining are still birth. The maternal mortality was 5 among which 2 patients had severe preeclampsia with acute pulmonary edema, 1 patients with AP eclampsia with acute pulmonary edema, 1 patient with AP eclampsia and ICH and sudden cardiac arrest and one patient with abruption grade 3 who went for PP eclampsia, ARF and DIC.

Discussion

Over a period of 6 months from February 2017 to July 2017, 198 patients with hypertension were studied in Govt Rajaji Hospital, Madurai. Preeclampsia is a form of hypertension that is unique to pregnancy. The incidence of preeclampsia was 2.7%. and it was more in primigravida (53%) than the multigravida (47%) in this study. The incidence is further increased in patients with twin pregnancies and previous preeclampsia. It seems to be low in India because vast majority of our patients are illiterate and have low socio-economic condition such patients are non compliant even when they diagnosed at an early stage and approach health care feasibility at a later stage when complications have already occurred which in turn increases the morbidity and mortality of the situation.

The incidence, risk factors, associations, complications, maternal and perinatal outcome of patients detected with hypertension in pregnancy are studied clinically, using laboratory parameters and also ultrasound assessment.

About 198 patients detected with hypertension were included in the study during the 6 months period, the above mentioned parameters and assessed in them. The mean age of the patients was 25 years. Majority of the patients were in the age group of 21 to 25 years. Out of the 198 patients, 105 patients were primigravida (53%) and 93 were multigravida (47%).

Table 1:

Non severe PE	110 (55.6%)
Severe PE	9 (4.5%)
Imminent eclampsia	24 (12.1%)
AP eclampsia	13 (6.6%)
Recurrent NSP	2 (1%)
Chronic HT	27 (13.6%)
Chronic HT with superimposed PE	5 (2.5%)

Table 2: Age Distribution

</= 20	19 (9.6%)
21-25	83 (41.9%)
26-30	69 (34.8%)
>30	27 (13.6%)

32 patients (16.2%) had chronic hypertension, out of which one patient was detected in previous pregnancy and the remaining 31 patients were detected at the present pregnancy before 20 weeks. Among the 166 patients, 45 patients (22.7%) were detected in the 2nd trimester and remaining 121 patients (61.6%) were detected in the third trimester. About 31 patients (15.7%) were detected after 37 weeks of gestation. 2 patients out of 93 multigravida (2.2%) had preeclampsia during previous gestations. Preeclampsia was the most common cause of hypertension during pregnancy detected in 166 patients (83.8%) followed by chronic hypertension (16.2%). In 8 patients (4%) hypertension was associated with the HELLP syndrome. Chronic hypertension was seen in 32 patients of which superimposed preeclampsia was present in 5 patients (2.5%). Of the 32 patients with chronic hypertension, 2 patients had grade 1 hypertensive retinopathy, 1 patient had associated T2DM and had missed

abortion for which MVA was done, 1 patient had HELLP SYNDROME, 1 patient had imminent eclampsia. Anemia was present in 29 patients (14.6%), out of which 2 patients had severe anemia, 9 patients had moderate anemia and remaining 18 patients had mild anemia. 12 patients had associated GDM (6.1%) out of which 9 were on meal plan and 3 patients were on insulin. 6 patients had multiple pregnancy among which 2 patients had single fetal demise. one patient had central placenta previa, she was terminated at 34 weeks due to bleeding episode with fetal distress. 18 patients had associated hypothyroidism among which 6 patients were newly diagnosed and 3 more patients had subclinical hypothyroidism. Screening echo showed RHD with mild MR in one patient and she was started on tablet penicillin, thin sheet of pericardial effusion in one patient, the patient delivered a healthy baby and is on postnatal followup and ASD in one patient.

Table 3:

Anemia	29 (14.6%)
Multiple Pregnancy	6 (3%)
Gdm	12 (6.1%)
Heart Disease	3 (1.5%)
Oligohydramnios	27 (13.6%)
Iugr	11 (5.6%)
Placenta Previa	1 (0.5%)
Abruptio Placenta	5 (2.5%)
Hypothyroidism	9 (4.5%)

Table 4:

Grade I	6
Grade II	1
Grade III & IV	Nil

Table 5:

Early Diastolic Notch	4
High Resistance Flow	3
Reduced EDF	2
AEDF	4
Reversed EDF	1

Fundus examination was done routinely all the patients with hypertension to rule out hypertensive retinopathy. 96.5% of patients had normal fundus examination.

Twenty Seven patients had oligohydramnios (AFI<7) out of which 6 patients had severe oligohydramnios. Doppler abnormalities were detected in 14 patients. (7%).

Patients with early diastolic notch are started on prophylactic and kept on strict follow. Umbilical artery doppler abnormalities were followed with daily CTG and doppler twice a week with fetal lung maturity alongside.

Proteinuria above the upperlimits of normal for pregnancy (< 300 mg/day) was seen in 98% of patients. Because of plasma volume expansion that occurs during normal pregnancy, serum uric acid levels are between 2.5 and 4 mg/dl in normal pregnancy. A serum uric acid level greater than 5.5 mg/dl is consistent with preeclampsia, and values exceeding 6.0 mg/dl suggest more serious disease. When liver dysfunction occurs, mild elevation of serum transaminases is common. Almost all patients had the LFT within normal range except those with HELLP syndrome which is hemolysis, elevated liver enzymes and low platelet count. The indirect fraction predominates suggesting hemolysis

related elevation of bilirubin especially associated with increased serum LDH (> 600 U/L) is highly suggestive of HELLP, syndrome. The incidence of HELLP syndrome in our study was 4%. However, the outcome of the patients were good except one patient in PP eclampsia who developed ARF and DIC.

Acute renal failure was seen in 6 patients and 4 patients needed dialysis support. Mortality was noted in 1 patient. Fetal and neonatal outcome of chronic hypertension include increased prevalence of IUGR (intrauterine growth retardation), prematurity and perinatal mortality.

Among the patients screened for APLA, LA positivity was found in 16 patients. Those patients with Doppler abnormalities, IUGR and LA positivity were started on prophylactic dose of aspirin 75 mg once daily.

Inj enoxaparin 0.4cc sc once daily was given in patients with reduced EDF and AEDF. These patients were followed with Doppler once in 2 days. Abruption of placenta was found in 5 patients, 2 of which were grade 3 abruption. Apart from abruption, 11 patients presented with intrauterine fetal demise among which 2 were term IUD.

Table 6: Birth Weight

<1.5	16
1.5-2.5	28
2.5-3.5	39
>3.5	6

Preterm delivery occurred in 13 patients which were due to induction for severe preeclampsia, imminent eclampsia, AP eclampsia or reversed EDF. All the patients who were on regular follow up were terminated at 38 weeks of gestation by cerviprime gel induction. And patients with oligohydramnios and absent diastolic flow were terminated after achieving lung maturity and assuring fetal heart rate pattern. In patients with IUD depending on the GA and previous obstetric history (LSCS), mechanical

dilatation was done. LSCS was preserved for obstetric indication. The perinatal mortality was 16 due to prematurity in 5 and grade 3 HIE in 2 baby and the remaining are still birth. There is evidence of adverse foetal outcome in hypertensive pregnant women as compared to normotensive pregnant women. Perinatal complications in our study shows low birth weight (19.5%), preterm delivery (15.9%), IUD (15.9%), IUGR (13.4%) and neonatal deaths in (8.5%). Thus, an adverse fetal outcome was seen in 35.4% of deliveries.

Table 7: Fetal Outcome

IUD	13
Live Birth	82
Still Birth	9
Neonatal Death	7

The maternal mortality was 5 (2.5%) among which 2 patients had severe preeclampsia with acute pulmonary edema, 1 patient with AP eclampsia with acute pulmonary edema, 1 patient with AP eclampsia and ICH and sudden cardiac arrest and one patient with abruption grade 3 who went for PP eclampsia, ARF and DIC.

Conclusion

Thus, hypertension in antenatal mother is a high risk pregnancy which mandates careful antenatal maternal and fetal monitoring, failure of which can lead adverse outcome in both the mother and the fetus. Any patient detected hypertension either

preconceptionally or antenatally should be advised regarding the importance of adherence to the health care facility, treatment compliance and counselled for antenatal check up at a higher centre and explained about the complications associated with hypertension in pregnancy which can be prevented if detected at the earliest.

References

1. Chesley LC. History. In Chesley LC (ed): Hypertensive disorders in pregnancy. New York, Appleton, Century, Crofts, 1978:17034.
2. American College of Obstetricians and Gynecologists. Hypertension in pregnancy. ACOG Technical Bulletin No.: 219. Washington, DC: The College, 1996:1-8.

3. Guibert R, Franco ED. Choosing a definition of hypertension: Impact on epidemiological estimates. *J Hypertens* 1996;14:1275-80.
4. Saftlas AF, Olson DR, Franks L, Atrash HK, Pokras R. Epidemiology of preeclampsia and eclampsia in the United States 1979-86. *Am J ObstetGynaecol* 1990; 163:460-5.
5. Barron WM, Murphy MB, Lindheimer MD. Management of hypertension during pregnancy in Laragh GH, Brenner BM. *Hypertension: Pathophysiology, Diagnosis and Management*. New York. Raven 1990:1809-27.
6. Report of the National High Blood Pressure Education Program Working Group on High Blood Pressure in Pregnancy. *Am J ObstetGynaecol* 2000;183:S1-S22.
7. Villar MA, Sibai BM. Clinical significance of elevated mean arterial blood pressure in second trimester and threshold increase in systolic or diastolic blood pressure during third trimester. *Am J ObstetGynecol* 1989;60:419-23.
8. Long PA, Abell DA, Beischer NA. Parity and preeclampsia. *Aust NZJ ObstetGynaecol* 1979;19: 203-6.
9. Lyall F, Greer IA. The vascular endothelium in normal pregnancy and preeclampsia. *Rev Reprod* 1996;1: 107-16.
10. Franchi M, Pisera A, Ciolli P, Russo R. Hypertension in pregnancy. Retrospective epidemiologic study. *Minerva Gynaecol* 1999;51:183-7.
11. Long PA, Oats JN. Preeclampsia in twin pregnancy - severity and pathogenesis. *Aust NZJ ObstetGynaecol* 1987;27:1-5.
12. Campbell DM, MacGillivray I, Carr-Hill R. Preeclampsia in second pregnancy. *Br J Obstet Gynaecol* 1985;92:131-40.
13. Davies AM, Dunlop W. Hypertension in pregnancy. In: Barron SL, Thomson AM, (eds). *Obstetrical Epidemiology* London: Academic Press 1983:167-208.
14. Yadav S, Saxena U, Yadav R, Gupta S. Hypertensive disorders of pregnancy and maternal and fetal outcome: a case controlled study. *J Indian Med Assoc* 1997;95:548-51.
15. Sandhya A Kamath. Hypertension in Pregnancy. *JAPI* 2006 April;54:269-70.
16. Perloff D. Hypertension and pregnancy-related hypertension. *Cardiology Clinics* 1998;16:79-101.
17. Cunningham FG, Mac Donald PC, Gant NF, et al. Hypertensive disorders of pregnancy. In: Williams obstetrics, 20th ed. Norwalk, CT: Appleton and Lange, 1997:693-745.
18. Sibai BM. Diagnosis and management of chronic hypertension in pregnancy. *ObstetGynecol* 1991; 78:451-61.
19. Chesley LC. Hypertension in pregnancy; definitions, familial factor and remote prognosis. *Kidney Int* 1980;18:234-40.
20. Cunningham FG, MacDonald PC, Gant NF. Williams Obstetrics, ed. 18. East Norwalk, Conn, Appleton-Century-Crofts 1989.
21. Ferrazzani S, Caruso a, De Carolis S, Martino IV, Mancuso S. Proteinuria and outcome of 444 pregnancies complicated by hypertension. *Am J ObstetGynaecol* 1990;162:366-71.
22. Packham DK, Fairley KF, Ihle BU, Whitworth JA, Kincad-Smith P. Comparison of pregnancy outcome between normotensive and hypertensive women with primary glomerulonephritis. *ClinExpHypertens Pregnancy* 1987-88;B6:387-99.
23. Sibai BM, Anderson GD. Pregnancy outcome of intensive therapy in severe hypertension in first trimester. *ObstetGynecol* 1986;67:517-22.
24. Chesley LC. Hypertensive disorders of pregnancy. New York: Appleton-Century-Crofts; 1978.
25. Paller MS. Hypertension in pregnancy. *Jour Am SocNephrol* 1998;9:314-21.
26. Barton JR, Sibai BM. HELLP and the liver diseases of preeclampsia. *CI Liver Dis* 1999;3:31-48.
27. Conrad KP, Lindheimer MD. Renal and cardiovascular alterations. In: Lindheimer MD, Roberts JM, Cunningham FG, editors. *Hypertensive disorders in pregnancy*. Stamford (CT): Appleton and Lange; 1999:263-326.
28. Sibai BM. The HELLP syndrome (hemolysis, elevated liver enzymes, and low platelets) : much ado about nothing? *Am J ObstetGynaecol* 1990;162:311-6.
29. Buga GA, Lumu SB. Hypertensive disorders of pregnancy at Umtata General Hospital : perinatal and maternal outcomes. *East Afr Med J* 1999;76:217-22.
30. Eskes TK, Leon C. Chesley and hypertension in pregnant women. *Eur J ObstetGynecolReprodBiol* 2000;90:181-6.