ORIGINAL ARTICLE

Frequency of preterm delivery in proteinuric verses non proteinuric pregnancy induced hypertension

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Abstract

Objective: To compare the frequency of preterm labour associated with gestational proteinuric hypertension versus gestational non-proteinuric hypertension.

Methods: The prospective cohort study was conducted at the Department of Obstetrics & Gynaecology, Dow University of Health Sciences and Civil Hospital Karachi, from April 1 to September 30, 2012, and comprised primigravidas of more than or equal to 20th weeks of gestation having blood pressure ≥140/90 mm Hg. Those with gestational hypertension with proteinuria represented the exposed group, while the non-exposed group had primigravidas with gestational hypertension without proteinuria. SPSS 10 was used to analyse data.

Results: There were 112 subjects, with 56(50%) in each of the two groups. Mean maternal age in exposed group was 28.3±4.49 years and in the non-exposed group 26.08±0.04 years. Mean gestational age in the exposed group was 36.89±4.04 weeks and in the non-exposed group 37.75±3.428 weeks. Women with gestational hypertension with proteinuria were more likely to deliver preterm infants compared to women with gestational hypertension without proteinuria (p=0.009).

Conclusion: Gestational proteinuric hypertension increased the risk of preterm labour, therefore vigilant monitoring of gestational proteinuric hypertension is important.

Keywords: Proteinuria, Gestational hypertension, Pregnancy-induced hypertension, Preterm labour. (JPMA 65: 1178; 2015)

Introduction

Hypertensive diseases of pregnancy, including gestational hypertension and preeclampsia, remain among the most common causes of maternal morbidity and perinatal death comprising approximately 12% of the global burden of maternal and perinatal mortality.[1] Pregnancy-Induced Hypertension (PIH) is mainly a disease of primigravida.[2,3] Pregnant women with hypertension (HTN) must be subdivided into those with chronic HTN and pregnancy-induced or gestational HTN. Women with PIH are further subdivided into those having non-proteinuric HTN with minimal maternal or perinatal mortality or morbidity, whereas a minority has the major pregnancy complication of preeclampsia or proteinuric PIH. Gestational non-proteinuric HTN is defined as diastolic blood pressure >110mmHg on any one occasion or diastolic blood pressure >90mmHg on two or more consecutive occasions >4 hours apart after 20th week of pregnancy without proteinuria. Gestational proteinuric HTN is defined as hypertension in pregnancy with proteinuria of one 24-hour collection with total protein excretion >300mg/24 hours or two clean catch midstream or catheter specimen of urine collected >4 hours apart with >2+ on reagent strip. Incidence of gestational proteinuric HTN is 2.2% and non-proteinuric HTN 3 times greater than gestational proteinuric HTN.[4] Proteinuric HTN or preeclampsia is associated with increased maternal and foetal morbidity and mortality.[2] Women with proteinuric HTN have a higher perinatal mortality (25.2 versus 5.7/1000 live birth) compared to non-proteinuric HTN. Primigravidas with proteinuric and non-proteinuric HTN delivered preterm infants 30.2% and 11.3% respectively.[2] Small for gestational age were found in 12.7% versus 20.9% in non-proteinuric HTN.[3] Proteinuric HTN is associated with extensive placental infarction resulting in intrauterine growth restriction. Severe placental infarction is related to foetal distress or birth asphyxia, resulting in babies with low Appearance, Pulse, Grimace, Activity, and Respiration (APGAR) score with reported <5 APGAR score at 5 min is about 32.5%, 15.2% neonates develop respiratory distress syndrome, 12.8% develop jaundice and 18.5% neonates develop sepsis in patients with preeclampsia and eclampsia.[5,6]

The current study was planned to compare frequency of adverse foetal outcome in terms of preterm delivery associated with gestational proteinuric HTN versus gestational non-proteinuric HTN.

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Subjects and Methods

The prospective cohort study was conducted at the Department of Obstetrics and Gynaecology, Dow University of Health Sciences (DUHS) and Civil Hospital Karachi (CHK) from April to September, 2012, and comprised primigravidas of more than or equal to 20th weeks of gestation having blood pressure ≥140/90 mm Hg. Those with gestational HTN with proteinuria represented the exposed group, while the non-exposed group had primigravidas with gestational HTN without proteinuria.

Sample size was calculated by taking proportion of preterm delivery[3] in non-exposed group i.e. P1= 11.3% and in exposed group i.e. P2=30.2%, power of the test 80%, and significance level 5%.

Using non-probability consecutive sampling, all primigravidas of more than or equal to 20th weeks of gestation, assessed on dating scan, were included, having blood pressure ≥140/90 mm Hg.

Patients with history of chronic HTN without proteinuria, patients with previous history of renal disease and patients with chronic HTN with super-imposed preeclampsia (new onset proteinurea) were excluded.

After approval from the institutional ethical review committee and informed consent from the eligible primigravidas, the two groups were followed till delivery. Delivery before 37 weeks of gestation was termed preterm. This information along with the baseline characteristics, like age, gestational age, proteinurea, systolic blood pressure (SBP) and booking status, was entered in a proforma.

Data was analysed using SPSS 10. Mean ± standard deviation was computed for age, proteinuria, SBP and gestational age of the primigravidas. Frequency and percentage was computed for preterm delivery, booking status and age groups. The two groups were compared using chi square test. Relative risk (RR) of preterm delivery between the exposed and non-exposed groups was calculated. Stratification was done for age and booking status. Post-stratification chi square test was applied keeping significance level at ≤0.05.

Results

There were 112 subjects, with 56(50%) in each of the two groups. The overall mean age was 27.2±4.65 years, with 47(42%) women in 21-25 years of age group, 33(29.5%) in 26-30 group and 32(28.6%) in 31-35 years of age group. Mean gestational age was 37.3±3.76 weeks, SBP 150.7±4.78mmHg and mean proteinuria was 423.9±188.14mg/dl. Overall, 73(65.2%) women were un-booked cases compared to 39(34.8%) booked cases. Besides, 51(45.5%) women had spontaneous vaginal delivery, 43(38.4%) elective caesarean section (CS) and 18(16.1%) had emergency CS.

Table-1: Analysis of foetal outcome among the groups n=112.

Group	Foetal outcome (Preterm delivery)	
	Yes (n=28)	No (n=84)
Exposed	20	36
	35.7%	64.3%
Un-exposed	8	48
	14.3%	85.7%

P-value=0.009
RR = 3.333

Mean age of exposed group was 28.3±4.5 years and 26.1±4.58 years of the un-exposed group; mean gestational age of the exposed group was 36.9±4.04 weeks and 37.8±3.4 weeks of the un-exposed group; mean SBP of the exposed group was 149.2±4.7mmHg and 152.3±4.4mmHg of the un-exposed group; mean proteinuria of the exposed group was 573.8±159.84mg/dl and 274±11.57 mg/dl of the un-exposed group.

Out of 28 (preterm deliveries, the exposed group had 20(35.7%) and the un-exposed group 08(14.3%) (p=0.009; RR=3.33) (Table).

Out of the 28 women having preterm delivery, 18 (38.3%) were of 21-25 years of age group, 5 (15.2%) were of 26-30 years and 5 (15.6%) were of 31-35 years of age group (p=0.042). Besides, 11(39%) were booked cases and 17(61%) were un-booked cases (p=0.567).

Discussion

Hypertensive disorders of pregnancy are common major complications of pregnancy and are responsible for significant morbidity and mortality in the foetus, the newborn infant and the mother. This disorder complicates 7% pregnancies and is classified according to pre-existing chronic HTN or PIH with or without proteinuria.[7] Preeclampsia affects 2% to 3% of all pregnancies and is responsible for about 60,000 maternal deaths every year, mainly in poor countries.[8] Annually, only 10 of these deaths occur in the United Kingdom,[9] approximately 40 to 50 in the United States,[10] while in comparison more than 200 occur in South Africa.[11]

The diagnosis of preeclampsia is given by the presence

of HTN accompanied by proteinuria as evident after 20 weeks' gestation.[12]

Urinalysis by visual reagent strip tests is widely performed in antenatal clinics and in the community by various health professionals. Total protein estimation in a 24-hour urine sample is also frequently used to assess the severity of preeclampsia in patients admitted to hospital. The gold standard for measuring proteinuria is a 24-hour urine sample for total protein; patients with HTN have only <300mg, those with mild preeclampsia have 300mg to 500mg, and those with severe preeclampsia may have >500mg of protein.[13]

More recently, spot urine protein: creatinine ratio has been used to provide an accurate quantification of 24-hour proteinuria.[14] Estimation of the accuracy of the predictive value of proteinuria by any of the above methods in predicting maternal and foetal complications will aid in clinical management by identifying the highest risk women who may need aggressive management, and the lower risk women in whom unnecessary interventions may be avoided.

Proteinuria occurs due to renal glomerular endotheliosis, a manifestation of widespread endothelial damage in preeclampsia. Ever since association between proteinuria and adverse foetal outcomes was first highlighted, increased excretion of protein in women with preeclampsia has been generally associated with adverse maternal and foetal outcomes.[15]

One study[16] reported that a stepwise increase in adverse maternal and foetal outcomes occurred in gestational HTN (7.8%) and preeclampsia (4.8%). Another study[17] reported that women with proteinuric preeclampsia were more likely to have severe hypertension (39% versus 30%; p=0.003), deliver preterm infants (39% versus 30%; p=0.007) and had a higher perinatal mortality rate (25.2 versus 5.7 per 1000; p=0.02) than those with non-proteinuric HTN. Women with non-proteinuric preeclampsia were more likely to have multiple pregnancies (3.9% versus 9.9%' p<0.001), experience severe HTN(8.9% versus 29.7%; p<0.001), and deliver preterm infants (11.3% versus 30.2%; p<0.001) who were small for gestational age (12.7 versus 20.9%; p<0.001) than those with gestational HTN.

One study[18] reported that compared to mild preeclampsia, women who developed severe gestational HTN(without proteinuria) had higher rates of both preterm delivery at <37 weeks of gestation. In addition, when compared to women with mild preeclampsia, for women with severe gestational hypertension, gestational age and birth weight were significantly lower at delivery (p<0.003 for both age and birth weight). Moreover, women who developed severe gestational HTN had higher rates of preterm delivery at <37 weeks of gestation (54.2% vs 17.8%; p=0.001) and at <35 weeks of gestation (25% vs 8.4%; p=0.0161), and delivery of small-for-gestational-age infants (20.8% vs 6.5%; p=0.024) when compared to women who remained normotensive or those who developed mild gestational HTN. There were no statistically significant differences in perinatal outcomes between the normotensive/mild gestational HTN and the mild preeclampsia groups. Overall, women who had severe gestational HTN had increased rates of preterm delivery than women with mild gestational HTN or mild preeclampsia. In the presence of severe HTN, proteinuria did not increase the rates of preterm delivery or delivery of small-for-gestational-age infants.

Conclusion

Gestational proteinuric HTN increased the risk of preterm labour compared to gestational non-proteinuric HTN. As such, vigilant monitoring of gestational proteinuric HTN is important so as to anticipate preterm labour.

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