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Severity of Protienuria and Level of Hypertension in Preeclampsia and its Impact on Perinatal Outcome

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ABSTRACT

Objective: To determine the impact of different levels of pre-eclampsia (both albuminuria and hypertension) on perinatal outcome.

Materials and methods: Sixty pregnant women suffering from proteinuric hypertension were selected. patients underwent a complete obstetrical workup including history, physical examination and various investigations including blood urea, serum creatinine, liver function tests and serial scanning for fetal growth. Adverse effects on fetal outcome was recorded.

Results: The maximum number of patients was with 2gm albumin/L 55% and minimum number cases with 0.3gm albumin/L 8.3%. In booked cases 2gm albumin/L was present in 50% cases and in un-booked cases 2gm albumin/L was present in 57.5% cases. Level of hypertension with relevance to proteinuria showed that with higher proteinuria, SBP at admission was 168.0±23.5 and DBP at admission was 118.0±16.8. Similarly with higher proteinuria Apgar score was poor i.e., with 2gm albumin/L it was <5 in 61.7% cases and with 1gm albumin/L 22.2% babies had admission in neonatal unit for >24 hours.

Conclusion: With increasing proteinuria, there is increased risk of adverse maternal and fetal outcomes. This risk is augmented with increased maternal age.

Key words: Proteinuria, Hypertension, Pre-eclampsia

INTRODUCTION

Pre-eclampsia is a pregnancy specific, multisystem disorder that is characterized by the development of hypertension and proteinuria after 20 weeks gestation. The disorder complicates approximately 5 to 7 percent of all pregnancies[1].

Pre-eclampsia is a major direct cause of fetal morbidity and mortality world wide. Incidence of pre-eclampsia is 3% to 5% (in 1st pregnancy) and 1% in subsequent pregnancies[2].

The specific cause of pre-eclampsia remains unknown. It has been suggested that it is a syndrome rather than a disease[3].

Several factors contribute to the development of the disease spectrum, including the onset of vasospasm, activation of the coagulation system, oxidative stresses, increased inflammatory response and ischaemia[4]. This is due to incomplete trophoblastic invasion of the uterine vascular endothelium according to current theory[5].

Blood pressure values required for the diagnosis of pre-eclampsia include a systolic pressure in excess of 140mmHg and/or a diastolic pressure greater than 90mmHg recorded on two separate occasions at least 6 hrs apart, in a woman known to be normotensive prior to pregnancy.

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Pre-eclampsia has been classified as mild and severe. Severe pre-eclampsia consists of systolic blood pressure greater than 160mmHg or diastolic blood pressure greater than 110mmHg as well as significant proteinuria (>50g/d) with or without evidence of effects on other organ systems.

Proteinuria, primarily due to increased glomerular permeability and damage[6] is an integral part of the diagnosis of pre-eclampsia. Significant proteinuria is defined by international society for the study of hypertension in pregnancy (ISSPH) as ≥300mg/day of protein in a 24 h urine collection[7].

The degree of proteinuria that is two random clean catch catheter urine specimens with3+(2g albumin/L), 2+ (1g albumin/L) or 1+ (0.3g albumin/L) proteinuria on a reagent strip in a women with hypertension is a warning sign and changes the diagnosis from pregnancy induced hypertension to pre-eclampsia with a higher probability of placental insufficiency and adverse fetal outcome in these patients.

It was reported in a study carried by Roberts and Cooper in 2001 that offspring of woman with hypertension during pregnancy are at increased risk of low birth weight, preterm birth, diseases of pre-maturity and death[8,9].

Pre-eclampsia is quite frequent and results in various complications perinatally. This study has been designed to study the relationship of level of

severity of preeclampsia with perinatal outcome in a scientific way.

MATERIAL AND METHOD

This was a cross sectional descriptive study, carried out in the department of Obstetrics and Gynaecology Unit 1, SIMS/Services Hospital, Lahore. It was carried out over a period of six months from June 2006 to December 2006. A total of 60 pregnant women suffering from varying levels of proteinuric hypertension and with a duration of pregnancy >35 weeks, were enrolled in the study using non probability purposive sampling. Women suffering from chronic hypertension, known renal disease, systemic lupus erythmatosis and urinary tract infection were excluded from the study.

The selected patients were then evaluated by history and examination. History included duration of gestation, raised blood pressure before pregnancy and at what weeks of gestation she developed hypertension. General physical examination was done with special emphasis on blood pressure and oedema followed by detailed obstetric abdominal examination. Investigations included the routine antenatal tests like Hb, total leucocyte count, platelets, serum uric acid, urine for proteins, blood group and Rh factor. Blood urea, serum creatinine and liver function tests were done in all cases of pre-eclampsia. Serial scanning of fetal growth was done to detect IUGR and Doppler was done in selected patients, repeated after one week if required. Patients were managed according to standard protocol. Fetal outcome was assessed by adverse effects of proteinuric hypertension on fetal outcome as measured by:

Small for gestational age at the 10^{th} centile, intrauterine growth restriction, prematurity, preterm delivery, abnormal fetal Doppler waveforms, fetal hypoxaemia, fetal mortality, fetal distress during labour and fetal gestational age, effect on CTG, distress during labour, APGAR score, admission in neonatal unit and duration of stay. All the data was analyzed by SPSS version 10.

RESULTS

Distribution of cases by age showed that the maximum number of patients were between 20-24 years of age and minimum patients belonged to age group of $\geq$ 35 years. Their mean age was found to be 26.6±5.4 .55% cases had gestational age between 35-36 weeks, 26.7% cases had gestational age between 37-38 weeks and in only 18.3% patients had a gestational age > 39 weeks.60.0% patients had no antenatal visits, 16.7% had 1-3 antenatal visits and 23.3% had 4-6 visits .

2gm/L proteinuria was present in 55% cases, 1 gm/L proteinuria was present in 27% cases and 0.3 gm/L proteinuria present in 18% cases (Table 1).

Regarding the distribution of cases by level of hypertension (SBP) and with relevance to proteinuria, with 0.3gm albumin/L systolic blood pressure at admission showed values of 160.0±38.9 and after 6 hours of admission 136.3±18.6. With 1gm albumin/L, SBP at admission was 160.0±29.6 and after 6 hours of admission 139.3±16.9. With 2gm albumin/L, SBP at admission was 168.0±23.5 and after 6 hours of admission 144.2±15.2.

Distribution of cases by level of hypertension (DBP) present with relevance to proteinuria revealed; with 0.3gm albumin/L diastolic blood pressure was 103.6±10.2 and after 6 hours of admission 95.4±11.2 , with 1gm albumin/L DBP was 105.0±9.6 and after 6 hours of admission it was 91.8±7.2, with 2gm albumin/L DBP at admission was118.0±16.8 and after 6 hours of admission it was 98.4±7.6 (Table 2)

With 0.3gm albumin/L, operative vaginal delivery occurred in 16.6%, normal vaginal delivery in 30.7% and caeserian section in 18.7%. Similarly, with 1gm albumin/L operative vaginal delivery occurred in 22.2% cases, normal vaginal delivery in 30.7% and caesarean section in 25%; and with 2gm albumin/L, cases who underwent operative vaginal delivery were 61.1%, normal vaginal delivery 38.4% and caesarean section 56.2% (Table 3).

1 minute Apgar score with relevance to proteinuria showed that with 0.3gm albumin/L, 1 minute Apgar score <5 was present in 11.7% cases and > 5 in 38.8% cases. With 1gm albumin/L 1 min Apgar score <5 in 26.4% cases and >5 in again 38.8% cases and with 2gm abumin/L 1 min Apgar score <5 in 61.7% cases and > 5 in 22.2% cases out of total 52 cases (Table 4)

Neonatal outcome showed that with 0.3gm albumin/L 21% babies delivered alive, with 1gm albumin/L 26.9% babies delivered alive and there were 2 fresh still births. With 2gm albumin/L, 51.9% babies delivered alive, there were 2 macerated and 4 fresh still births (Table 5)

Admission in neonatal unit showed that with 0.3gm albumin/L 3.3% cases had admission in neonatal unit for >24 hours. With 1gm albumin/L 27.2% cases had admission in neonatal unit for > 24 hours and 32% babies had admission for < 24 hours and with 2gm albumin/L 44.4% babies were admitted for >24 hours and 0.68% had <24 hours admission (Table 6).

Table 1: Distribution of cases by degree of proteinurea (n = 60)

Proteinurea level	=n	%age

0.3 gm albumin/L	11	18.3
1gm albumin/L	16	26.7
2 gm albumin/L	33	55.0

Table 2: Distribution of cases by level of hypertension and with relevance to proteinurea (diastolic blood pressure) (n = 60)

Proteinurea	Diastolic Blood Pressure		P value
	At admission (Mean±SD)	After 6 hours of admission (Mean±SD)	
0.3 gm albumin/L (n=11)	103.6±10.2	95.4±11.2	0.001
1gm albumin/L (n=16)	105.0±9.6	91.8±7.2	0.001
2 gm albumin/L(n=33)	118.0±16.8	98.4±7.6	0.001

Table-3: Distribution of cases by mode of delivery and with relevance to proteinurea (n=60)

Proteinurea	Operative vaginal delivery	Normal vaginal delivery	Caesarean section
0.3 gm albumin/L (n=11)	3 (16.6%)	8 (30.0%)	3 (18.7%)
1gm albumin/L (n=16)	4 (22.2%)	8 (30.7%)	4 (25.0%)
2 gm albumin/L (n=33)	11 (61.1%)	10(38.4%)	9 (56.2%)

Table 4: One minute Apgar score with relevance to proteinuria (n=52)

Proteinurea	1 min Apgar score< 5	1 min Apgar score > 5
0.3 gm albumin/L	4(11.7%)	7 (38.8%)
1gm albumin/L	9(26.4%)	7 (38.8%)
2 gm albumin/L	21(61.7%)	4 (22.2%)

Note: 8 still births

Table-5: Distribution of cases by neonatal outcome (n=60)

Proteinurea	Alive	Macerated still birth	Fresh still births
0.3 gm albumin/L(n=11)	11 (21.1%)	-	-
1gmalbumin/L (n=16)	14 (26.9%)	-	2 (3.3%)
2gmlbumin/L (n=33)	27 (51.9%)	2 (100.0%)	4 (66.6%)

Table 6: Distribution of cases by admission in neonatal unit (n=52)

Proteinurea	Admission in NNU > 24 hours	Admission NNU < 24 hours
0.3gm albumin/L(n=11)	9 (3.3%)	0
1gm albumin/L(n=16)	6 (22.2%)	8 (32.0%)
2 gm albumin/L(n=33)	12 (44.4%)	17 (68%)

DISCUSSION

Despite intensive research, pre-eclampsia still accounts for significant morbidity and mortality for the mother and the neonate, especially in developing countries[10].

All sixty patients in the current study presented with proteinuric hypertension that is pre-eclampsia and this study is comparable with the studies conducted in 1992[11], and 1995[12] which showed that proteinuric hypertension has worse fetal and maternal outcomes than non-proteinuric hypertensive pregnancy.

Majority of patients presented at 20-24 years of age. This finding is consistent with the results of study carried by Ahmed[13], according to which young age and first pregnancy remained important risk factors for pre-eclampsia.

During this study only 20 patients (100%) were booked and 40 patients were unbooked and it is comparable with a study conducted at Nishtar Hospital, Multan where 9.3% patients were booked and rest were unbooked[14].

Systolic blood pressure at admission with higher proteinuria i.e. 2gm albumin/l shows higher blood pressure of 168.0±23.5 and after 6 hours 144.2±15.2. Similarly diastolic blood pressure at admission with higher proteinuria i.e. 2gm albumin/l shows higher blood pressure of 118.0±16.8 and after 6 hours 98.4±7.6.

As proteinuria rises, level of hypertension increases. In a total of sixty patients, all had proteinuria and the study is comparable to a study conducted in Nigeria[15] which showed that urinary microalbumin secretion when used as a single test at booking appeared to predict pre-eclampsia with a high sensitivity but a low positive predictive value.

In the present study, adverse fetal outcome was associated with severe pre-eclampsia that is 61.7% babies had less than five Apgar score at one minute in patients with severe pre-eclampsia. A similar study was conducted in department of obstetrics and gynaecology, University of Alabama, USA, which showed that adverse fetal outcomes were highest in women with severe pregnancy associated hypertension or pre-eclampsia[16].

A retrospective study by Schiff et al demonstrated that no differences in maternal or fetal outcomes were found between pregnancies with increase in proteinuria compared to those with modest or no increases. A recent study which assessed this issue differently demonstrated that the magnitude of proteinuria was not associated with

increased morbidity for mother or neonate in pre-eclampsia[17] and the present study was not comparable with this study.

Therefore, all cases of proteinuric pre-eclampsia should continue to be treated with equal care until new factors are identified which allow more reliable prediction of maternal and fetal outcome in pre-eclamptic women.

CONCLUSION

It is concluded that in women with pre-eclampsia there is an association between the degree of proteinuria at the time of diagnosis and subsequent adverse maternal or fetal outcomes. With increasing proteinuria, there is increased risk of adverse fetal outcomes.

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