Comparison of intravenous hydralazine versus oral nifedipine for control of blood pressure in severe pre-eclampsia

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Abstract

Background: Gynecologists have to deal with preeclampsia patients in labour rooms and multiple options are there to treat.

Objective: To compare the efficacy of I/V hydralazine with oral nifedipine in women with severe pre-eclampsia.

Methodology: Study design: Comparative study. Setting: Indoor department of Obst and Gynae, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan. Duration of study: From 1st July to 30th December 2013. Subjects: A total of 124 patients (62 cases in each group) of pre eclampsia were recruited in the study. Based on sealed envelope status each study was divided into two groups. In group A, patients received oral nifedipine (10-20mg p\o) and in group B\V hydralazine (5-10mg) administered. Data was analyzed by using SPSS version 14.

Results: In group A and group B, mean age was 23.9±4.1 and 23.1± 4 years respectively. In group A, 29 patients were primgravida (46.7%) and 33 patients (53.3%) were multigravida. In group B, 27 patients (43.5%) were primigravida and 35 (56.5%) were multigravida. Mean gestational age of group A was 37.7±3 and group B was 37.1±3.2 respectively. Blood pressure was controlled in 30 minutes in 55 patients (88.7%) in group-A (Oral Nifedipine) and 41 patients (66.1%) in group B (I/V Hydralazine).

Conclusion: Nifedipine is good alternative to hydralazine due to convenient oral administration and less side effects.

Key Words: Severe pre-eclampsia, Hydralazine, Nifedipine, Efficacy.

Introduction

Hypertensive disorders are leading cause of maternal, neonatal morbidity and mortality, which may complicate 6.8% of all pregnancies.[1] Types of hypertension in pregnancy include pregnancy induced hypertension, chronic hypertension and pre-eclampsia. Gestational hypertension is defined as a blood pressure of at least 140mmHg systolic and/or 90mmHg diastolic on at least two occasion 6 hours apart after 20 wks of gestations, women known to be normotensive before pregnancy and before 20 weeks of gestation.[2]

Pre-eclampsia is defined as pregnancy induced hypertention and proteinuria after 20 weeks of gestation.[3] In United States, 15 percent of preterm births and 17 percent of maternal mortality is due to pre-eclampsia.[4] Control of blood pressure in pre-eclampsia is very important because severe pre-eclampsia is a significant complication of pre-eclampsia and causes high maternal and neonatal deaths. Severe pre-eclampsia is defined as occurrence of blood pressure 160mmHg systolic and 110mmHg diastolic in presence of significant proteinuria 1gm per 24 hrs urine specimen.[5] Eclampsia is onset of tonic-clonic seizure in women with hypertensive disorders of pregnancy.[6] An important part of any management protocol of hypertension is administration of anti-hypertensive agents. One of the drugs used for control of severe blood pressure is hydralazine. Drug has slow on set of action (10-20 min) peaks approximately 20 min after administration.[7] In a study, hydralazine controlled the blood pressure within mean time period of 52 minutes.[8]

Another drug used for control of blood pressure is nifedipine. Nifedipine is calcium channel blocker acts on arteriolar smooth muscles, rapid onset of action and induces vasodilation by blocking calcium entry into the cells. Nifedipine dose is 10mg, PO every 15-30 minutes with a maximum of 3 doses.[9] In a study, all eclamptic patients responded to nifedipine and blood pressure was controlled in all of them successfully.[10] In a study, 90% of the patients treated with oral nifedipine and 71% of the patients given hydralazine for control of blood pressure were cared.[11] As most of emergency antihypertensive drugs like hydralazine is not easily available, remains out of stock most of the time and it is administred intravenously requiring careful monitoring. Alternative drug nifedipine is used most

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commonly in ischemic heart diseases, availability is also easy and had conveninent oral dosage. Therefore, the purpose of my study was to compare the efficacy of intravenous hydralazine with oral nifedipine in severe pre eclamptic case.

Methodology

Study design: Comparative study. Setting: Indoor department of Obs. and Gynae, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan. Duration of study: Study was carried out over a period of 6 months from 1st July to 30th December 2013. Severe Pre-eclampsia: Severe Pre-eclampsia was defined as new onset hypertension more than
160/110mmHg after 20 weeks of gestation with significant Proteinuria of 1g/24 hrs urinary specimen. Efficacy: Control of systolic blood pressure <160mmHg and diastolic blood pressure between 90-100mg within 30 minutes. Sample size: Calculated sample size by formula 2 proportions taking P1=0.9, P=0.71 with 95% confidence level, 1% margin of error and 80% power of test was 124 with 62 in each group. Sampling technique: Non-probability purposive technique.

Inclusion Criteria:
All patients of severe pre-eclampsia with:
- 20-35 years of age
- Systolic BP ≥160mmHg
- Diastolic BP ≥100mmHg
- Proteinuria ≥ 1g in 24 hrs urinary specimen.

Exclusion Criteria:
- Ischemic Heart Disease
- Chornic renal disease
- Multiple pregnancy
- Diabetes Mellitus

An informed consent from the patients was obtained to use their data in research. In this study, patient fulfilling the inclusion criteria were selected, every patient had equal chance to enter in any group by selecting a sequentially numbered, opaque, sealed envelope, which was either (A) or (B) written inside. Based on sealed envelope status each study subject selected into two groups. In group A, patient was given oral nifedipine and in group B, I/V hydralazine was administered.
For the purpose of reducing biasness and for blinding in group A every study subject also received I/V placebo and in group B oral tablet (placebo) that mimic in appearance in tablet nifedipine, was given. Neither the study subject nor researcher was knowing the status of both groups. For measuring blood pressure two trained nursing staff were taking readings, consecutively and the mean of two readings, were taken at 30 minutes and patients were labeled as having controlled the blood pressure or not based on operational definition and information was noted on to the performa. Collected data was analyzed with the help of SPSS version 14.0. Demographic data (age, parity, gestational age) was presented as mean±SD. The qualitative variable control of blood pressure within 30 minutes or not was presented and for comparison of two group Chi-square test was applied. Effect modifiers were controlled through restriction (exclusion criteria). Chi square test was applied. P = 0.05 was taken as significant.

Results

A total of 124 patients (62 patients in each group) were recruited in present study. Distribution of cases by age showed 33 patients (53.3%) in group-A and 31 patients (50.0%) in group B were 20-25 years old, and 24 patients (38.7%) between 26-30 years in group-A and 23 patients (37.1%) in group-B. There were 5 patients (8.0%) between 31-35 years of age in group-A and 8 patients (12.9%) in group-B.

Table I: Distribution of cases by parity.

Parity	Group A (Oral Nifedipine) n=62	Group B (I/V Hydralazine) n=62
	No (%)	No (%)
Primigravida	29 (46.7)	27 (43.5
Multigravida	33 (53.5)	35 (56.5)
Total	62 (100.0)	62 (100.0)

Table II: Distribution of cases by blood pressure Controlled within 30 minutes

Blood Pressure Controlled	Group A (Oral Nifedipine) n=62	Group B (I/V Hydralazine) n=62
	No (%)	No (%)
Yes	55 (88.7)	41 (66.1)
No	07 (11.3)	21 (33.9)
Total	62 (100)	62 (100)
Chi Square	9.04	
P Value	P=0.002	

In both groups mean age was 23.9±4.1 and 23.1±4.6, respectively. Patient in study were of different

parity. In group-A, 29 patients were primigravida (46.7%) and 33 patients (53.3%) were multigravida. In group-B, 27 patients (43.5%) were primigravida and 35 patients (56.5%) were multigravida. (Table I)

Patients in study were different by gestational age; 6 patients (9.7%) were at 28-34 weeks of gestation in both group-A and group-B. In group-A, 51 patients (82.3%) were between 35 -40 weeks of gestation and 46 patients (74.2%) in group-B. In group-A, 5 patients (8%) were equal to or more than 41 weeks and 10 patients (16.1%) were in group-B. Mean gestational age of group-A was 37.7±3 and in group-B was 37.1±3.2, respectively. Blood pressure was controlled within 30 minutes in 55 patients (88.7%) in group-A (oral Nifedipine) and in 41 patients (66.1%) in group-B (I/V Hydralazine). (Table II)

Discussion

Preeclampsia remains a serious and poorly under stood complication of pregnancy.[12] Risk factors for preeclmpsia are family history of chronic hypertension, young ages, and 1st pregnancy.[12] Adeyinka et al and had observation that hypertension is more common in young age patients.[12] In our study, most of the patients were young of 20-30 years age, had hypertension, in both of the groups patients belonged to this group. Same results were also found in study of Babar et al, at Lady Reading Hospital, Peshawar.[13] Mostly preeclampsia affects extremes of ages i.e. less than 20 years or more than 40 years. We found same observation. 47% patients were at extremes of ages in this study. Al Mulhim et al study also found same results.[14]

Pre-eclampsia has long been considered to affect first pregnancies but now it is clear that pre-eclampsia does occur in second or subsequent pregnancies. In our study, we selected 124 severe pre-eclamptic patients (62 in each group) and found that approximately half of them were parous women; (29 were primigravida and 33 were multigravida in group-A and 27 primigravida and 35 multigravida in group-B. Brown and Buddle in their research on 825 women with pre-eclampsia, concluded that mostly women were parous.[15] This observation was same to our study. In a study, by Aali and Nejad,[16] noted better efficacy for nifedipine than hydralazine, because of fewer doses, more rapid effect and greater mean urinary output for nifedipine treated group and there was no significant difference between other variables like gestational age, the results are similar to our study. The study of Fenakel et al,[17] showed greater efficacy of nifidepine than hydralazine to achieve desired blood pressure, further more they showed less fetal distress and less average days spent in neonatal intensive care unit (NICU) for nifidepine.[17]

In another study, by Montan demonstrated that nifedipine calcium channel blocker is better alternative to hydralazine which is preferred treatment of severe hypertension in pregnancy from so many years.[18] Magee et al, found magnesium related side effects will not increase when we used it along with it in severe preeclamptic patients.[19] In 2002, Khedun et al concluded that hydralazine seems to be safe for use in pregnancy. They found few cases of fetal adverse effects and concluded that its use in pregnancy should be restricted to intravenous treatment of hypertensive emergencies.[20] Although Nifedipine is administered orally so presence of trained health personnel is not required but when used in severe hypertensive patients with diabetes and ischemic heart disease lead to excess cardiovascular morbidity and mortality.[21] Kwawukume and Ghosh also agreed to our findings, their results revealed better efficacy for nifedipine in controlling blood pressure in severe pre-eclampsia than hydralazine because of greater proportion of effectively controlled patients.[22] In our study, hypotension occurred in one patient receiving oral nifedipine, which was corrected within 5 min with intravenous fluids therapy, and did not lead to any fetal heart abnormalities. The same has been experienced in the study of Vermilion et al. when they compared oral nifedipine with intravenous labetalol.[23] Recently many studies concluded that nifidipine is safe and could be used in pregnancies complicated by hypertension.[24,25]

Conclusion

Nifedipine was more effective and benefits of oral administration and compliance as compared to hydralazine, which require intravenous administration and strict monitoring so Nifedipine is good alternative for treatment of severe preeclampsia.

Authors Contribution: SZ: Conception of work, drafting and final approval. **SZ:** Acquisition and

analysis of data, drafting and final approval. **NR:** Interpretation of data, revising and final approval. **SZ :** Design of work, interpretation of data, drafting and final approval. **SZ:** Acquisition and analysis of data, drafting and final approval. **MKR:** Conception of work, design of work, drafting and final approval.
All the authors gave final approval for publication and agreed to be accountable for all aspect of work.

Conflict of Interest: None
Sources of Funding: Self

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Article Citation: Zulfiqar S, Zulfiqar S, Rasheed N, Zahoor S, Zulfiqar S, Razaq MK. Comparison of intravenous hydralazine versus oral nifedipine for control of blood pressure in severe pre-eclampsia. JSZMC 2019;10(2): 1617-1620