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ORIGINAL ARTICLE

A Comparison Of Nifedipine With Methyldopa For Control Of Blood Pressure In Mild To Moderate Pregnancy Induced Hypertension

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ABSTRACT

Objectives: To compare efficacy of nifedipine and methyldopa for control of blood pressure in mild to moderate pregnancy induced hypertension (PIH).

Methods: A comparative study of efficacy of nifedipine and methyl dopa was carried out in 50 pregnant women with pregnancy induced hypertension. Patients were randomly selected who were on either oral nifedipine or oral methyl dopa on a standard dose and blood pressure was measured at 0, 6, 24, 48 and 72 hours of initiation of therapy. Adverse and side effects of drugs were also recorded during this treatment period. Control of blood pressure was assessed in each treatment group by statistical analysis using one way ANOVA followed by Dunnett's test. P values <0.05 were considered as significant.

Results: The result showed both nifedipine and methyl dopa were equally effective in control of blood pressure. Both treatments were well tolerated with minimal side effects.

Conclusion: Data analysis of the study shows both nifedipine and methyl dopa are equally effective in reducing the blood pressure in pregnancy induced hypertension, nifedipine may be preferred in view of low cost and easy availability.

Key Words:Pregnancy induced hypertension, nifedipine, methyl dopa.

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Introduction

Hypertensive disorders of pregnancy complicate 5 to 8 % of pregnancies and are a major cause of maternal and perinatal morbidity and mortality[1]. Most clinicians commence antihypertensives if BP is more than 140/90 mm of Hg; some start if BP is more than 170/110 mm of Hg.Treating the hypertension does not alter the progression of disease. However it has been shown that early treatment decreases not only the frequency of hypertensive crisis, but also the rate of neonatal complications. The management of pregnancy induced hypertension is mainly termination of pregnancy, which can not be done in many cases due to preterm by gestational age. It is thus prudent to continue the pregnancy till the stage where in the foetal survival is good. During this period the maternal and foetal conditions are monitored along with control of hypertension by antihypertensive

drugs. Occasionally pregnancy needs to be terminated due to non control of blood pressure, deterioration of maternal or foetal conditions.

Despite years of research, there remains a lack of consensus on what constitutes an appropriate antihypertensive agent in pregnancy, the maternal-foetal risk-benefit analysis of therapy, short and long term maternal-foetal/neonatal adverse effects, as well as cost effectiveness[2]. The agents suggested include methyldopa, nifedipine and labetalol [3],[4]. This study compares the efficacy of nifidipine and methyl dopa in control of blood pressure in mild to moderate pregnancy induced hypertension.

Materials And Methods

The study was a randomised prospective study and conducted at Kempegowda Institute of Medical Sciences Hospital, K.R.Road, Bangalore-560 004.Ethical clearance was obtained from Ethics committee, Kempegowda Institute of Medical Sciences and hospital, Bangalore.

Inclusion Criteria:

All pregnant patients with systolic blood pressure of more than 140 mm of Hg and a diastolic blood pressure of more than 90 mm of Hg on two occasions four hours apart after 20 weeks of gestation admitted in the hospital between July 2006-July 2007.

Exclusion Criteria:

1. Severe PIH with imminent eclampsia
2. Heart diseases including IHD.
3. Haematological disorders.

a. Liver diseases.

b. History of intolerance/hypersensitive to dihydropyridine/methyl dopa.

The study group consists of 50 pregnant patients selected on the basis of inclusion and exclusion criteria with pregnancy induced hypertension, according to International Society for the Study of Hypertension in Pregnancy (ISSHP). These patients were further categorised in to two groups based on treatment. Nifedipine group consists of 25 randomly selected patients receiving oral nifedipine in the dose 10mg t.i.d and methyl dopa group with 25 randomly selected patients receiving oral methyldopa 250mg q.i.d. All the patients were inpatients. Besides complete obstetric examination, detailed history was taken, with special attention to hemorrhagic disorders, thromboembolic episode, epilepsy, hepatic or renal disorder and drug intake. Blood samples were taken for estimating Hb%, total and differential white cell counts, blood sugar, blood urea, serum uric acid and total platelet count. Foetal kick count chart, and ultrasound, fundoscopy, cardiotocography, and Doppler ultrasound were also done. Blood pressure was recorded using Mercury Spygmomanometer with patient in 15 degrees left lateral recumbent position. Korotkoff V sound was used for determining diastolic blood pressure [5].Blood pressure was recorded at 0, 6, 24, 48 and 72 hours of initiation of antihypertensive treatment. Side and adverse effects of the drugs were also recorded. Control of blood pressure was assessed in each treatment group by statistical analysis using one way ANOVA followed by Dunnett's test. $P < 0.05$ were considered as significant.

Results

The two groups on admission to the study had almost similar periods of gestation [Table/Fig 1]. Both group had similar blood pressure recordings at the initiation of therapy i.e., mean systolic blood pressure and mean diastolic blood pressure in mm of Hg [Table/Fig 2], [Table/Fig 3]. When systolic blood pressure was compared between the groups after initiation of antihypertensive therapy, a rapid fall in systolic blood pressure was observed at 6 hours in both groups, but was significant with $p<0.01$ only in nifedipine group.

However systolic blood pressure was controlled significantly in both groups at the end of 24 hours with $p<0.01$.Reduction progressed further and systolic blood

pressure was almost normal i.e., below 140 mm of Hg in both groups by the end of 42 hours and was maintained up to 72 hours[Table/Fig 2].

Almost similar results were obtained when diastolic blood pressure was compared between the groups. A significant fall in diastolic blood pressure was observed in both groups at 24 hours of initiation of antihypertensive therapy with p<0.01 and was maintained normotensive up to 72 hours of treatment[Table/Fig 3].

When side effects were compared between the groups [Table/Fig 4] observed during the treatment period (up to 72 hours), head ache was the most common side effect recorded in nifedipine group and palpitation in methyl dopa group. Dizziness and weakness were observed only in methyl dopa group and not in nifedipine group.

However 32% and 36% of patients did not show any side effects in methyl dopa group and nifedipine group respectively. There were no adverse effects observed in both groups during the treatment period.

(Table/Fig 1) Gestational Age At Presentation.

Gestational age in weeks	Methyl dopa group (n=25)	Nifedipine group (n=25)
20 to 24 weeks	2	2
25 to 28 weeks	4	5
29 to 32 weeks	7	5
33 to 36 weeks	7	6
37 to 40 weeks	5	7
More than 41 weeks	Nil	Nil

(Table/Fig 2) Measurement Of Systolic Blood Pressure.

Treatment Group	Systolic Blood pressure in mm of Hg at				
	0 hour (Control)	6 hour	24 hour	48 hour	72 hour
Methyl dopa group(n=25)	156.4± 4.32	146.64±3.12	141.12±2.15**	135.84±1.94**	138.0±1.96**
Nifedepine group (n=25)	160.72±3.16	147.52±2.24**	142.64±2.47**	138.4±2.34**	138.88±2.77**

All values are in mean±SEM, one way ANOVA followed by Dunnett's test.
****P<0.01Vs Control**

(Table/Fig 3) Measurement Of Diastolic Blood Pressure.

Treatment Group	Diastolic Blood pressure in mm of Hg at				
	0 hour (Control)	6 hour	24 hour	48 hour	72 hour
Methyl dopa Group (n=25)	105.04± 3.13	100.0±1.65	92.56±1.15**	92.00±1.12**	91.52±1.40**
Nifedepine group (n=25)	105.52±2.89	99.68±1.37	93.76±0.92**	92.32±1.23**	91.2±1.31**

All values are in mean±SEM,one way ANOVA followed by Dunnett's test .
****P<0.01Vs Control**

(Table/Fig 4) Side Effects Of Nifedipine And Methyl Dopa Group Recorded During The Treatment.

Side effects observed	Methyl dopa group(n=25)		Nifedepine group(n=25)	
	Number of patients	%	Number of patients	%
Headache	04	16	11	44
Palpitation	06	24	03	12
Dizziness	04	16	-	-
Weakness	01	04	-	-
Insomnia	02	08	02	08
None	08	32	09	36

Discussion

The aim of antihypertensive therapy in the management of pregnancy induced hypertension is to prevent complications due hypertension while prolonging the course of pregnancy. It is generally indicated that severe hypertension (systolic blood pressure > 169 mm of Hg and diastolic blood pressure >109 mm of Hg) require antihypertensive therapy. But in mild and moderate hypertension the need for antihypertensive therapy is to prevent progression to severe hypertension. The commonly used antihypertensive drugs in pregnancy are nifidipine, methyl dopa, labetolol and hydralazine [4]. Most of these drugs are quiet safe for mother and foetus [6],[7]. The aim of antihypertensive therapy is to achieve a blood pressure lower than 170/110 mm of Hg but not lower than 130/90 mm of Hg without compromising uteroplacental blood flow and placental perfusion [8].

In this study the efficacy of nifidipine and methyldopa in controlling blood pressure in patients with mild to moderate pregnancy induced hypertension were studied. These drugs have different mode of action, nifedipine is calcium channel blocker and methyl dopa is centrally acting drug which inhibits sympathetic outflow. The

pathophysiology of pregnancy induced hypertension is centred on vasospasm due to various factors like increased pressor response, vasoactive agents, endothelial damage, inflammatory response, genetic predisposition and immunological factors.Inspite of these varied pathophysiology and different mode of action of nifedipine and methyl dopa, both the drugs were effective in controlling the pregnancy induced hypertension with minimal side effects [9],[10],[11],[12]. These studies were with use of either nifedipine or methyldopa separately as individual study on various aspects of hypertension in pregnancy ,but not comparative with respect to efficacy. In the present study patients were randomly treated with nifedipine or methyldopa simultaneously, efficacy was assessed based on control of blood pressure up to 72 hours. It was found that both nifedipine and methyldopa were equally effective in controlling mild to moderate blood pressure in pregnancy. Therapeutic goal was achieved in both the groups by 24 hours of initiation of therapy. When we consider undesirable side effects between the groups, they were found to be minimal and well tolerated. Also there were no incidences of adverse effect. Nifedipine may be preferred in view of low cost and easy availability.

As this study was to access the efficacy of the drugs to control blood pressure in pregnancy, a long term study for the effects of these antihypertensives on the both mother and new born is desired.

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