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Comparision of efficacy of labetalol vs nifedipine in pregnancy induced hypertension

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Abstract
In pregnancy, if diastolic blood pressure rises above 110mmHg, and does not settle with rest, there is increase in danger to both mother and foetus with potential fatal complication of cerebro vascular accidents, eclampsia and placental abruption in mother and IUGR and increased perinatal mortality in foetus. One hundred and twenty four cases of Pregnancy Induced Hypertension were studied during the period of 2 years at the Department of Obstetrics and Gynaecology, Government General Hospital, a Teaching Hospital attached to Medical College.
30.65% of Labetalol group were preterm deliveries where as 43.55% of Nifedipine group delivered preterm. Intra Uterine Growth Retardation was 6.45% with Labetalol and 4.83% with Nifedipine. Over all Perinatal Mortality was 11.29% with Labetalol and 19.35% with Nifedipine.

Keywords: Efficacy, labetalol, nifedipine

Introduction
Hypertensive disorders of pregnancy are responsible for significant Maternal and Perinatal mortality and morbidity. They form one among the "Deadly Triad" along with Haemorrhage and Infection [1].
The clinical course of Pre-Eclampsia is Progressive and is characterized by continuous deterioration that is ultimately stopped only by delivery.
Many of the problems relating to maternal mortality arise from a failure by clinicians to appreciate the varied presentation of Pre-Eclampsia and its severity or from inappropriate and in adequate treatment [2].
Thus it is critical that obstetricians appreciate fully the protean nature of this condition and avoid complacency in its management.
Pre-Eclampsia is a multi organ disease that can affect virtually every organ and body system with common pathological features of vasoconstriction, endothelial damage and dysfunction of micro circulation. The vasoconstriction results in Hypertension which is the one fact of a complex disease process [3].
In pregnancy, if diastolic blood pressure rises above 110mmHg, and does not settle with rest, there is increase in danger to both mother and foetus with potential fatal complication of cerebro vascular accidents, eclampsia and placental abruption in mother and IUGR and increased perinatal mortality in foetus. To control blood pressure, an antihypertensive have to be used in the mother. Adequate reduction of blood pressure prevents complications and allows pregnancy to be continued safely until foetal maturity is achieved. This results in a reduced foetal loss from prematurity by preventing premature induction of labour for uncontrolled hypertension. Thus the control of blood pressure is both of maternal as well as of fetal interest [4].
Keeping the above view in mind a prospective study of clinical trial of 'Comparison of efficacy of Labetalol vs Nifedipine in Hypertensive disorders of Pregnancy' was carried out.
Labetalol is combined Alfa and Beta (non selective) Blocker. It is compared with the calcium channel blocker-Nifedipine.

Methodology
One hundred and twenty four cases of Pregnancy Induced Hypertension were studied during the period of 2 years at the Department of Obstetrics and Gynaecology, Government General Hospital, a Teaching Hospital attached to Medical College.

50% of the cases belong to The Labetalol Group, while the other 50% comprise The Nifedipine Group, selected randomly. Each group comprised a total of 62 cases, 50 of them are Mild PIH cases while the other 12 cases are the cases of Severe Hypertension, Imminent Eclampsia, Eclampsia, Placental Abruption etc.

Labetalol: Initial oral doses of 100mg tablets twice a day at fixed timings preferably with food, to achieve a reasonable blood pressure. If the control of blood pressure is not satisfactory even after three days continuous treatment dose increment of another 100 mg twice a day and so on.
In severe Pre eclampsia with blood pressure more than 160/110 mm Hg, I.V Labetalol starting with a 20 mg intra venous bolus, if not effective within 10 min, this is followed by 40mg, then 80mg every 10 min but not exceeding 220 mg total dose per episode treated.

Nifedipine: Initial doses of 10mg tablets 8th hourly at fixed timings. If satisfactory blood pressure is not obtained dose increments of another 10mg.
In Emergencies half an hourly oral dose of 10mg tablets repeated until the blood pressure is controlled.
Blood Pressure recorded at 6 hourly intervals in mild group, once in every 5min in severe hypertension group until it is controlled satisfactorily.
Pulse should be counted for complete one minute, character, volume, rhythm were also noted. Patient should be closely monitored for after drug administration for any side affects. Foetal Heart rate was also monitored.
Urine Albumin is measured daily, USG once weekly along with Biophysical profile.

Post Partum
Treatment with Labetalol/Nifedipine was continued after delivery for 24-48 Hrs, blood pressure monitored 2 hrly during the period also. Woman was kept in the hospital for one week till blood pressure was controlled.

Results

Table 1: Changes in blood pressure in mild pre-eclampsia

Blood Pressure		Mean Systolic Pressure in mm of Hg	Mean Diastolic Pressure in mm of Hg
Labetalol	At Admission	138.6	98.00
(n: 50)	After treatment	126.6	82.8
Nifedipine	At Admission	138.4	97.8
(n:50)	After treatment	130.4	88.4

Mean Systolic pressure fell from 138.6 to 126.6with Labetalol and from 138.4 to 130.4 with Nifedipine in Mild Pregnancy induced Hypertension group.

Mean Diastolic Pressure fell from 98.00 mm Hg to 82.8 mm Hg with Labetalol and from 97.8 to 88.4 mm Hg with Nifedipine.

Table 2: Severe pregnancy induced hypertension and hypertensive emergensies group

Blood Pressure		Mean Systolic Pressure in (mm Hg)	Mean Diastolic Pressure in (mm Hg)
Labetalol	At Admission	191.67	124.16
	After treatment	139.1	98.33
Nifedipine	At Admission	192.5	125.83
	After treatment	143.33	103.33

Fall of Mean Systolic pressure from 191.67 mm Hg to 139.1 mm Hg with Labetalol and from 192.5 to 143.33 mm Hg with Nifedipine.
Fall Diastolic Pressure from 124.16 mm Hg to 98.33 mm Hg with Labetalol where as with Nifedipine it is from 125.83 mm Hg to 103.33 mm Hg.
Fall in Diastolic Blood Pressure is more significant with Labetalol in both mild and severe Groups.

Table 3: Duration of treatment

Duration	Labetalol (n:62)	Nifedipine (n:62)
1 week	16 (25.80%)	18 (29.03%)
2 weeks	18 (29.03%)	16 (25.80%)
3 weeks	15 (24.19%)	11 (17.74%)
4 weeks	6 (9.68%)	9 (14.51%)
5 weeks or more	7 (11.29%)	8 (12.90%)

Table 4: Apgar score

APGAR Score	Labetalol Group		Nifedipine Group	
	Mild (n:50)	Severe (n:12)	Mild (n:50)	Severe (n:12)
8-10	42 (84%)	4 (33.33%)	38 (76%)	2 (16.67%)
5-7	6 (12%)	2 (16.67%)	8 (16%)	1 (8.33%)
2-4	1 (2%)	2 (1.67%)	2 (4%)	3 (25%)
0	1 (2%)	3 (25%)	2 (4%)	6 (50%)

37.1% of Nifedipine group had low Apgar when compared to 24.19% of Labetalol group.

Table 5: NICU admissions

Labetalol Group (N=62)	Nifedipine Group (N=62)
19 (30.32%)	22 (35.48%)

There is not much difference between the two groups.

Table 6: Birth weight against gestational age

GA at Delivery	Labetalol Group Baby wt in Kg					Nifedipine Group Baby Wt in Kg				
	≥3	2.5-2.9	2-2.4	1.5-1.9	<1.5	≥3	2.5-2.9	2-2.4	1.5-1.9	<1.5
40-41	-	1	-	-	-	-	-	-	-	-
38-39	6	16	4	-	---	3	16	2	----	----
36-37	----	10	2	----	---	---	11	4	----	----
34-35	----	6	2	----	---	---	3	5	----	----
32-33	----	----	2	1	---	---	----	2	3	----
30-31	----	----	1	2	---	---	----	----	2	1
28-29	----	----	----	2	1	---	----	----	3	2
<28	----	----	----	----	1	---	----	----	----	2

No. of babies crossing 2.5 Kg is 39(62.96%) in Labetalol Group, where as 33(53.22%) in the Nifedipine group.

With Labetalol as there is effective control of blood pressure and pregnancy is prolonged up to term, ample time is there for baby to grow.

In Nifedipine group, due to uncontrolled BP, labour has to be induced in much earlier weeks of gestation.

Table 7: Perinatal Complications

Complications	Labetalol Group		Nifedipine Group	
	Mild	Severe	Mild	Severe
Preterm	10 (16.1%)	9 (14.51%)	16 (25.80%)	11 (17.74%)
IUGR	2 (3.22%)	2 (3.22%)	1 (1.61%)	2 (3.22%)
Respiratory Distress Syndrome	1 (1.61%)	1 (1.61%)	2 (3.22%)	1 (1.61%)
Hypoxic Ischaemic Encephalopathy	-	1 (1.61%)	-	1 (1.61%)
Meconium Aspiration Syndrome	1 (1.61%)	1 (1.61%)	2 (3.22%)	1 (1.61%)
Still Birth	-	1 (1.61%)	1 (1.61%)	2 (3.22%)
Early Neonatal Death	-	2 (3.22%)	-	1 (1.61%)
Intra Uterine Death	1 (1.61%)	3 (4.83%)	2 (3.22%)	6 (9.68%)

30.65% of Labetalol group were preterm deliveries where as 43.55% of Nifedipine group delivered preterm. Intra Uterine Growth Retardation was 6.45% with Labetalol and 4.83% with Nifedipine. Over all Perinatal Mortality was 11.29% with Labetalol and 19.35% with Nifedipine.

Table 8: Maternal complications

Complication	Labetalol Group	Nifedipine Group
Uncontrolled hypertension	**Nil**	7 (11.29%)
Placental Abruption	2 (3.22%)	2 (3.22%)
Oligohydramnios	4 (6.45%)	3 (4.83%)
Eclampsia	9 (14.51%)	9 (14.51%)
Post partum Hemorrhage	4 (6.45%)	5 (8.06%)

Although there is no significant mortality, morbidity due to complications in both the groups, However in the Nifedipine Group pregnancy was terminated due to uncontrolled hypertension in as many as 11.29% of cases, while it is NIL in the Labetalol Group.

Table 9: Side Effects

Labetalol		Nifedipine	
Postural Hypotension	2 (3.22%)	Headache	5 (8.06%)
Bradycardia	1 (1.61%)	Tachycardia and Palpitations	2 (3.22%)
Nausea & Vomiting	1 (1.61%)	Nausea & Vomiting	1 (1.61%)
Bronchospasm	1 (1.61%)	Ankle Edema	1 (1.61%)
Depression	NIL	Hypotension	1 (1.61%)

One case with oral Labetalol developed Bronchospasm[11] at the time of elective caesarean section. Headache due to Nifedipine was often confused with the imminent symptoms.

Discussion

In mild hypertension group effective control of blood pressure is more rapid with Labetalol when compared with Nifedipine. When treatment is initiated with Labetalol, blood pressure is controlled to (≤ 130/90 mm Hg) in 2 days in most of the cases i.e., about 39 cases out of 50 cases(78%) only few of them i.e., 8 cases (16%) required increments of doses after 3rd day.

Rest of 3 cases (6%) required further increment of doses after which the blood pressure was controlled.

In severe hypertension group out of 12 cases, initial dose of 20 mg of Labetalol Iv was sufficient to bring down the blood pressure ≤150/100 mm Hg. In about 7 cases, 4 patients require 2nd dose of 40mg Iv and only one of them required a 3rd dose of 80mg Iv.

In 50 cases, who used Nifedipine for mild PIH, 32 (64%) of them got satisfactory control of hypertension. The initial 10mg TID got satisfactory control of hypertension.

14 cases out of 50 cases (28%) required an increment of dose to

10mg. Other 4 cases require a dose of 20mg TID. In emergency group- out of 12 cases, only 4 cases first dose of Nifedipine, 3 of them required second dose. Another 4 required a third dose of Nifedipine only 1 patient required a fourth dose of Nifedipine.

There is no much improvement, this may be due to associated physiological edema of pregnancy of late- edema has been excluded from the diagnosis of pre-eclampsia.

Trace or (+) Proteinuria is not significant, However no case progressed to persistent (++) Proteinuria in Labetalol Group, where as 2 cases (3.22%) of Nifedipine group progressed to (++) (dipstick method) [5, 6].

The mean duration of pregnancy is also prolonged but not much significantly 36.86 ± 4 wks Labetalol group and 35.54 wks in Nifedipine group. This is because even when the blood pressure is well under control and the growth of baby is normal. Most of the pregnancies were terminated as soon as attainment of 37-38 wks Gestational age was achieved, as per the norms of the department in which the study has been conduction [7, 8]. However, as many as 70% of Labetalol group crossed 37 weeks Gestational age where the probability of foetal lung maturity and survival is 100%. When compared to only 50% in the control group.

As many as 69.35% (43 cases) delivered vaginality in Labetalol Group, where as the Caesarean section rate for Nifedipine group is about 48.39%.

Emergency Caesarean section rate was 25.80% in Labetalol group where as it was 37.10% in the Nifedipine Group.

Emergency Caesarean sections with uncontrolled Blood Pressure and its complications are very less in Labetalol Group.

Most of the cases in Labetalol group were induced after 37 weeks even when blood pressures were under control. Induction for uncontrolled hypertension is more in Nifedipine group.

Induction due to uncontrolled hypertension is Labetalol group is none and 3.22% in Nifedipine group. Induction due to imminent symptoms is 1.6% in Labetalol group and 3.22% in Nifedipine group.

Induction due to Oligohydromnios, IUGR, and IUD is 1.61% which is same in both Labetalol group and Nifedipine group. Induction due to PROM is 1.61% in Labetalol group.

Induction due to Eclampsia is 6.44% in Labetalol group and 8.05% in Nifedipine group. Induction due to Abruptio placenta is 3.22% in Labetalol group and Nifedipine group.

No. of babies crossing 2.5 Kg is 39(62.96%) in Labetalol Group, where as 33(53.22%) in the Nifedipine group.

With Labetalol as there is effective control of blood pressure and Pregnancy is prolonged up to term, ample time is there for baby to grow [9, 10].

In Nifedipine group, due to uncontrolled BP, labour has to be induced in much earlier weeks of gestation.

30.65% of Labetalol group were preterm deliveries where as 43.55% of Nifedipine group delivered preterm. Intra Uterine Growth Retardation was 6.45% with Labetalol and 4.83% with Nifedipine. Over all Perinatal Mortality was 11.29% with Labetalol and 19.35% with Nifedipine.

35.48% (22 cases) of Nifedipine group required NICU admissions, where as 30.32% (19 cases) required NICU admissions. Early neonatal deaths were almost equal in both groups (3.22%).

Although maternal mortality is zero in both the groups there is significant morbidity in the Nifedipine group, as many as 11.29% suffered from uncontrolled Hypertension which is almost not seen the Labetalol group.

One case (1.61%) with tablet Labetalol developed Bronchospasm at the time of elective caesarean section. She had no prior history or family history of Bronchial asthma. One patient developed Bradycardia (less than 60/Min). 5 cases (8.06%) with Nifedipine often complained of headache which was confused to imminent symptoms. 2 cases (3.22%) with Nifedipine developed tachycardia. Hypotension, Ankle edema, Nausea Vomiting was seen in 1.61% of patients.

Conclusion

1. Labetalol is more effective when compared Nifedipine in controlling mean Systolic and mean Diastolic blood pressure P value is < 0.001 which is highly significant indicating Labetalol is more effective than Nifedipine.
2. In majority of the cases pregnancy is prolonged up to term when Labetalol is used (67.74%) when compared to Nifedipine (56.45%).
3. Number of Vaginal deliveries was more with Labetalol (43 vaginal deliveries 69.35% and 19 LSCS 30.65%) where as LSCS (48.39%) especially emergency LSCS (37.10%) were more with Nifedipine.
4. Caesarean sections for uncontrolled Hypertension are almost 'Nil' in Labetalol group. They are 8.06% in Nifedipine group.
5. Perinatal complications and number of NICU admissions were less when Labetalol was used.
6. Maternal complications due to uncontrolled hypertension were less with Labetalol.

References

1. Cunningham GG, Norman F, Grant Kenneth J, Levene Larry C, Gilstrap III, John Hanth C, Katharine Wenstorm D. Hypertensive Disorders in Pregnancy, Williams Obstetrics, 22nd edition, 34th chapter, 761-898.
2. Ian Greer A. Geoffrey Chamberlain & Philip Steer: Pregnancy-induced Hypertension, Turnbulls Text Book of Obstetrics, 3rd edition, Chapter, 21:333-354.
3. Fernando Arias. Pre eclampsia & Eclampsia, Practical Guide to High-Risk Pregnancy and Delivery, 2nd edition, Chapter, 10:183-208.
4. Mudaliar AL, Krishna Menon MK. Hypertensive Disorders of Pregnancy, Mudaliar and Menon's Clinical Obstetrics, 9th edition, Chapter, 18:133-154.
5. Satoskar Kale. Bhandarkar's Pharmacology and Pharmacotherapeutics, 18th edition, Chapter 15- Adrenergic and Adrenergic Blocking Drugs pg. & Chapter 27- Pharmacotherapy of Hypertension. 407:251-275.
6. Tripathi KD. Essentials of medical Pharmacology, 4th edition, Antiadrenergic Drugs-Chapter, 9:133-147. & Antihypertensive Drugs-Chapter, 36:539-555.
7. Orlowsky JP, Vidt DG, Walker S, Haluska JF. Haemodynamic effects of I.V. Labetalol – British Medical Journal. 1999; 318:1332-1336.
8. Oslen KS *et al*. Labetalol & its effects on Cerebral Blood Flow, British Journal of Anaesthesia. 1995; 75(1):51-54.
9. Naomi DL. Fisher/Gordon H. Williams: Hypertensive Vascular Disease, Harrison's textbook of Medicine, 16th edition, Chapter, 230:1463-1480.
10. Odou P *et al*. Grape fruit juice &Nifedipine interaction, Journal of Clinical Pharmacy & Therapeutics. 2005; 30(2):153-158.