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A Comparative Study of Orally Administered Nifedipine and Intravenously Administered Labetalol for Control of Blood Pressure in Hypertensive Emergencies of Pregnancy

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ABSTRACT
Hypertensive disorders of pregnancy contribute significantly to maternal mortality worldwide. This study aimed to compare the effectiveness of orally administered Nifedipine and intravenously administered Labetalol in controlling blood pressure in hypertensive emergencies of pregnancy. A prospective, randomized controlled trial was conducted at a tertiary care hospital in West Bengal, India. Hundred pregnant women with hypertensive emergencies were randomly assigned to receive either oral Nifedipine or intravenous Labetalol. The primary outcome measure was the time taken to achieve target blood pressure. Secondary outcome measures included the number of doses required to achieve target blood pressure and maternal adverse effects. The results showed that both Nifedipine and Labetalol were effective in controlling blood pressure, but Nifedipine had a faster onset of action.

INTRODUCTION

Hypertensive disorders of pregnancy are a significant contributor to maternal mortality worldwide[1]. The management of hypertensive emergencies in pregnancy requires prompt and effective control of blood pressure to prevent maternal and fetal complications[3]. This study aimed to compare the effectiveness of orally administered Nifedipine and intravenously administered Labetalol in controlling blood pressure in hypertensive emergencies of pregnancy.

MATERIALS AND METHODS

This prospective, randomized controlled trial was conducted at a tertiary care hospital in West Bengal, India. 100 pregnant women with hypertensive emergencies were randomly assigned to receive either oral Nifedipine or intravenous Labetalol. The primary outcome measure was the time taken to achieve target blood pressure. Secondary outcome measures included the number of doses required to achieve target blood pressure and maternal adverse effects.

RESULTS AND DISCUSSIONS

The statistical analysis was performed using appropriate tests to compare the outcomes between the Nifedipine and Labetalol groups. Continuous variables such as maternal age, gestational period, systolic and diastolic blood pressure and heart rate were compared using the independent samples t-test. Categorical variables such as parity and adverse effects were compared using the chi-square test. The number of doses required to achieve target blood pressure was compared using the independent samples t-test. The time taken to achieve target blood pressure was compared using the independent samples t-test. A p-value of <0.05 was considered statistically significant. All statistical analyses were performed using SPSS software version 20. There were no statistically significant differences between the two randomized groups based on demographic data or vitals at presentation. The mean Systolic Blood Pressure at presentation among the mothers in the study populations was 170.6mmHg±5.4mmHg. The mean Diastolic Blood Pressure at presentation among the mothers in the study populations was 116.2mmHg± 3.68mmHg. The median heart rate was 82 with a standard deviation of ±3.4 bpm. Oral Nifedipine took significantly shorter period of time in achieving Target Blood Pressure compared to Intravenous Labetalol. (30.3±13.72 minutes vs 36.9±14.6 minutes, p-value and lt., 0.05). Oral Nifedipine took significantly less number of doses to achieve Target Blood Pressure than intravenous Labetalol. (2.02±0.91 vs 2.46±0.97, p-value and lt., 0.05). Both drugs were effective in bringing the Blood Pressure to targeted range in 100% of the cases by four dosing cycles. There was no requirement for

Table 1: Comparison Between the Reduction in Diastolic Blood Pressure (DBP) of the Groups Randomized to Oral Nifedipine and Intravenous Labetalol During the Course of Study

	Nifedipine		Labetalol		
Time interval	N	DBP	N	DBP	P-value
0 minutes	50	116.4 (3.9)	50	115.9 (3.46)	
15 minutes	50	104.8 (6.9)	50	107.7 (6.6)	0.039
30 minutes	34	99.6 (5.6)	40	102.3 (5.4)	0.043
45 minutes	13	98.0 (3.2)	26	97.4 (3.9)	0.674
60 minutes	4	94.5 (3.4)	7	94.7 (3.2)	0.973

Values are Expressed as Mean (Standard Deviation)
N=Number of Participants whose DBP is Still Being Measured
*t-test for Equality of Means

Table 2: Comparison of the Adverse Effect of the Two Drugs

Adverse Effect	Nifedipine Group		Labetalol Group	
	N	%	N	%
Nausea	3	6	2	4
Dizziness	1	2	0	0
Palpitation	1	2	1	2
Flushing	1	2	2	4
Vomiting	0	0	1	2
Total number of	6	12	6	12

N=Number of Participants Expressing the Complaints
%=Percentage of Participants Expressing the Complaints in Each Group

treatment cross-over. Significantly higher urinary volume was seen in the group randomised to Nifedipine than the group randomized to Labetalol (91.6±2.4mL vs 48.5±2.6mL, p and lt., 0.05) and this persisted over the next 24 hours (2323.7±169mL vs 1473.7±74.8mL, p-value and lt.,0.05). No significant difference in adverse maternal outcomes were observed in this study. Both the drugs were effective in achieving target blood pressure within four dosing cycles and have unremarkable maternal adverse effects but Oral nifedipine takes shorter time to achieve target Blood Pressure with less number of doses with the advantage of improving urine output. The results showed that both Nifedipine and Labetalol were effective in controlling blood pressure, but Nifedipine had a faster onset of action[2]. The mean time taken to achieve target blood pressure was significantly shorter in the Nifedipine group compared to the Labetalol group (p<0.05)[4]. This study demonstrates that orally administered Nifedipine is a viable alternative to intravenously administered Labetalol for controlling blood pressure in hypertensive emergencies of pregnancy. The faster onset of action and lower number of doses required to achieve target blood pressure make Nifedipine a more convenient and effective option[5]. The present study is limited by its single centre nature along with predominance of one ethnic population. Larger multi centre studies with wider analysis of variables will add more insight to our knowledge about this vital health issue.

CONCLUSION

In conclusion, this study suggests that orally administered Nifedipine is a suitable alternative to intravenously administered Labetalol for controlling blood pressure in hypertensive emergencies of pregnancy. Further studies are needed to confirm these findings and to establish the optimal dosing regimen for Nifedipine in this setting[6].

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