ORIGINAL RESEARCH PAPER

Obstetrics & Gynecology

COMPARATIVE STUDY OF INTRAVENOUS LABETALOL VERSUS ORAL NIFEDIPINE IN HYPERTENSIVE DISORDERS OF PREGNANCY IN A TERTIARY CARE HOSPITAL

KEY WORDS: Labetalol, Nifedipine, Hypertensive Disorders

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ABSTRACT

Objective: To compare intravenous Labetalol and oral Nifedipine in terms of rapidity to control BP, no. of doses required, maternal and fetal outcome in hypertensive disorders of pregnancy .

Methods:-All pregnant women with BP more than 150/100mmHg were randomized to receive IV labetalol (in escalating dose i,e 20,40,80,80,80 mg) and oral Nifedipine(10mg) until the target BP of 140/90 mmHg was achieved .

Results:- Mean time required in labetalol group was 43.5±15.7mins and Nifedipine was 44.7±15.7 mins with P >0.05. There was significant fall in DBP with labetalol than nifedipine within 15mins. Maternal heart rate increased in nifedipine group and decreased in labetalol group. No patients required cross over treatment.

Conclusion:- Both drugs are equally effective and safe in controlling BP in hypertensive disorders of pregnancy but labetalol stood better to decrease DBP and no. of patients responding to 1st dose than Nife dipine

INTRODUCTION

Hypertensive disorders are the most common medical complications of pregnancy and are the leading causes of maternal and perinatal mortality and morbidity. Hypertensive disorders complicate 5-10% of all pregnancies worldwide.[1] In India, pregnancy induced hypertension along with sepsis and hemorrhage contributes to 80% maternal mortality[2]. American College of Obstetrician and Gynecologists (ACOG) 2000[3], classified hypertensive disorders into five categories-

(1) Gestation hypertension
(2) Preeclampsia
(3) Eclampsia
(4) Chronic hypertension
(5) Superimposed preeclampsia on chronic hypertension

Dangerous hypertension is a harbinger of cerebrovascular accidents, eclampsia, hypertensive encephalopathy and other end organ damage with poor perinatal outcome[4]. Maternal and fetal risks are decreased by controlled lowering of blood pressure to safer levels with antihypertensive drugs. National Institute for Health and Clinical Excellence (2019) suggest used of antihypertensive in patients having BP ≥ 150/100 mm Hg.[5]

Hydralazine had been drug of choice for a long time but its use was dwindled due to increased maternal and fetal complications. Hence, Labetalol and Nifedipne have now emerged as first line drugs for treatment of hypertension in pregnancy. This study was undertaken to compare oral Nifedipine versus intravenous Labetalol in their efficacy, time taken and number of dosage required to achieve target blood pressure, adverse effects, maternal and perinatal outcomes.

MATERIALS & METHODS

This was a hospital based prospective randomized comparative study carried out in the Department of Obstetrics & Gynecology from November 2017 to September 2019 in 102 pregnant patients admitted to the labour room. The Study Protocol was approved by ethical committee of the institution and written informed consent was taken from all the patients.

Inclusion Criteria-

- women aged 18-35 years with ≥28 weeks of gestation having blood pressure >150/100 mm Hg.

Exclusion -

- History of Cardiac disease, asthma, diabetes.
- Eclampsia, HELLP Syndrome
- History of allergy to Labetalol or Nifedipne
- Pre existing liver and kidney disease.

After thorough history taking , examination and sending all the routine investigations patients were randomly allocated by lottery system.

Group A- women receiving intravenous Labetalol were given 20 mg iv stat followed by escalating doses of 40mg, 40mg, 80mg every 15 min until our target blood pressure of 140/90 mm Hg was achieved.

Group B-women receiving oral Nifedipine received 10mg initially followed by 10mg every 15 min till target blood pressure was achieved.

During treatment, fetal heart rate, maternal pulse and blood pressure were monitored. Once blood pressure was 140/90mm Hg no further medications given. The primary outcome was the time taken and number of doses required and the mean fall of SBP and DBP in both groups were noted. Maternal and fetal outcomes were compared in each group.

OBSERVATION AND RESULTS:-

Data on 102 pregnant women , 51 allocated to labetalol group(group A) and 51 to nifedipine (group B) were analysed and interpreted.

Table 1 .Characteristics of patients randomized to IV Labetalol or oral Nifedipine for acute BP control at the time of admission

Characteristic	Labetalol	Nifedipine	
Age (years) Mean ±SD	24.8 yrs	25.5yrs	0.557
Parity • Primigravida(%) • Multigravida(%)	72.5% 27.5%	62.7% 37.3%	0.769
Gestational Age (Mean±SD)weeks	34.4±3	34.2±2.7	0.777
Booking Booked Unbooked	22 29	22 29	1.00

BMI(%) <25kg/m2 25-29.9kg/m2 ≥30kg/m2	11.8 31.4 56.9	5.9 33.3 60.8	0.578
Systolic BP(mmHg)	169.4	169.2	0.871
Diastolic BP(mmHg)	112.5	112.6	0.839
Heart Rate (Beats/min)	81	80	0.966
Table 1 depicts that the base line characteristics of both the groups at beginning of the study were comparable.			

Table 2 :- Outcomes of patients after receiving IV Labetalol and Nifedipine

Outcome		Labetalol (a)	Nifedipine (b)	P Value
Time(minutes) taken to achieve target BP 140/90 mmHg		43.5±15.7	44.7±15.7	0.706
No. of doses required		2.9±1	3±1	0.706
Mode of delivery	Vaginal	26	32	0.230
	Caesarean	25	19	
Birth Weight(kg) Mean±SD		2.4±0.7	2.4±0.65	0.744
Neonatal outcome	Alive	50	48	0.308
	Dead	1	3	
Side Effects (%)				0.123
No adverse effects		64.7	58.8	
Dizziness		15.7	7.8	
Headache		7.8	11.8	
Palpitation		0	7.8	
Nausea		5.9	9.8	
Tremor		3.9	0	
Pain at site of injection		2	0	
Postural Hypotension		0	3.9	

Table 2 depicts that IV labetalol took less time to achieve target BP than oral nifedipine but was not significant.

Table 3 Comparison of DBP at different time interval with groups

Diastolic blood pressure	Group 1 (Labetalol)			Group 2 (Nifedipine)			p' value
	N	Mean	SD	N	Mean	SD	
15 min	51	107.2	8.6	51	110.7	6.6	0.024
30 min	45	100.8	6.8	51	99.6	8.8	0.483
45 min	36	92.6	4.2	29	97.0	7.2	0.003
60 min	13	91.7	3.3	15	94.5	5.8	0.129
75 min	3	90.0	0.0	6	90.0	0.0	*

Table 3 depicts that IV Labetalol had maximum mean fall of DBP at 15 and 45 min compared to oral Nifedipine which was significant .

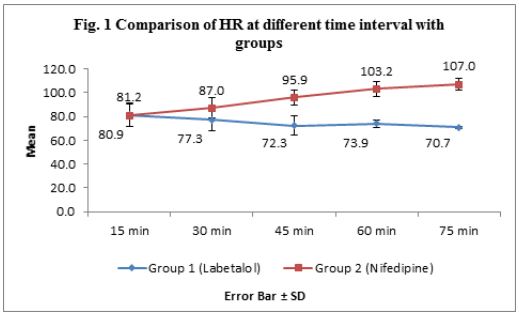

Fig1 shows that maternal heart rate progressively increased after 15 mins of administration in oral nifedipine and decreased in IV Labetalol and (P=0.000) which was significant.

DISCUSSION

In this study mean age of recruited pregnant hypertensive patients was 25.2 yrs. Hansel et al (1986) also found that age group 21-30 yrs were commonly affected.

67.6% of recruited patients were primigravida. Lakshmi BS et al[6](2012) found that it is most commonly affected in 1st pregnancy.

Mean GA in labetalol was 34.4±3weeks and nifedipine was 34.2±2.7weeks .Alam A et al[7] (2019) had similar finding having mean GA in labetalol 35.8 ±2.4 and Nifediine 36.05±2.12 .

58.8% of the patients enrolled in both groups fail under BMI of > 30kg /m^2 .Sibai and colleagues elucidated that there is progressive risk of preeclampsia in obese. Risk increased by 13.3% having BMI > 30 kg/m^2.

Mean time to achieve target BP in case of labetalol was 43.5± 15.7 mins and Nifedipine was 44.7±15.7mins. Though Labetalol achieved quicker target BP but was not significant (p=0.706) and hence both are equally effective. Lakshmi et al(2013) also showed labetalol took less time to achieve target BP than oral Nifedipine . Vermillion et al [8](1999) showed Labetalol took more time to achieve target BP than nifedipine as they use higher dose of nifedipine(20mg) in four doses subsequently after 10mg initially.

In our study, 11.8% achieved target BP with 1st dose of IV labetalol and none in case of oral Nifedipine which was significant (P=0.005) and is similar to study conducted by Lakshmi et al.

Magnitude of fall in mean DBP was greater in IV Labetalol in comparison to oral Nifedipine which is similar to Lakshmi et al.

There was no crossover and all enrolled patients achieved target BP with 5 doses. Vermillion et al (1999), Gavit Y et al [9](2018) in their study reported 100% success rate without crossover.

There was increased maternal heart rate in group B and decreased maternal heart rate in group A after 15 mins of administration which was statistically significant(p=0.00). Raheem I A et al[10] (2011) had similar finding.

49% of recruited patients in labetalol group and 37 % of patients in Nifedipine group were delivered by caesarean section which is relatable to the study of Alam A et al (2019).

96% of babies were live born.21.6% of babies in group A and 25.5% in group B required NICU admission comparable to Lakshmi A et al (2012). All neonatal death occurred due to complication of prematurity. Swapan et al (2015), Sujit et al (2017) also recorded comparable perinatal death in their study. Mean birth weights in both the groups were comparable which is similar to the study of Raheem et al (2012), Kumari RV et al[11] (2016).

There were no serious and only few adverse effects were noted. Hence, both the drugs appeared to be safe. Side effects like headache, palpitation, postural hypotension were more in Nifedipine than Labetalol which is comparable to the study of Chawla D et al[12] (2018).

CONCLUSION

Hypertensive disorders of pregnancy is one of the most common cause of maternal death in India and globally. Management includes control of BP, prevention of complication, fetal surveillance and expedition of delivery if indicated. Present study compared the trends in reduction of BP in both the groups.

In present study, both the drugs are found to be safe and equally effective in reduction of BP with good tolerance and

no detrimental maternal and fetal outcomes. However, IV labetalol stood better in reducing DBP and number of patients responding to first dose.

To conclude, both the drugs are equally effective for use in acute control of BP in hypertensive disorders of pregnancy. At present Labetalol is more expensive, require IV administration. However Nifedipine is orally given, widely available, low cost and has flat dose regimen.

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