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ORIGINAL ARTICLE

Postpartum Discharge on Labetalol was Associated with Increase Risk of Readmission for Hypertension Compared with Discharge on Nifedipine

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ABSTRACT

Introduction: Hypertension complicating pregnancy is common and, when uncontrolled, can have devastating consequences.
Objectives: The main objective of the study is to find the postpartum discharge on labetalol was associated with increase risk of readmission for hypertension compared with discharge on nifedipine.
Material and methods: This cross-sectional study was conducted in Islam medical college and teaching hospital Sialkot during June 2022 to September 2022. The data was collected with the permission of ethical committee of hospital. Data was collected with the permission of ethical committee of hospital. Participants were randomized to labetalol versus extended release nifedipine using a computerized random number generator.
Results: Data was collected from 50 female patients. Baseline maternal characteristics were similar between groups, including age, race, body mass index (BMI), gravidity and parity, rate of twins, and presence of medical comorbidities including chronic hypertension. Data was collected in two groups, one group of labetalol and second group of nifedipine.
Practical implication: This study will help us to find the efficacy of both the drugs that we used in the study for the purpose of postpartum hypertension.
Conclusion: It is concluded that both oral labetalol and oral extended release nifedipine are effective and well tolerated for management of postpartum hypertension.
Keywords: Hypertension, Postpartum, Oral, Management, Labetalol, Nifedipine

INTRODUCTION

Hypertension complicating pregnancy is common and, when uncontrolled, can have devastating consequences. Persistent postpartum hypertension can occur de novo or follow an antepartum diagnosis of hypertension complicating pregnancy. While the true incidence of postpartum hypertension is unknown, blood pressure (BP) is known to initially decrease 48 hours following delivery then peak on postpartum days, likely from the mobilization of interstitial fluids following parturition[1].

An estimated 10% of pregnancies are complicated by hypertensive disorders of pregnancy (HDP) gestational hypertension (HTN), chronic HTN, preeclampsia, hemolysis, elevated liver enzymes, and low platelet count (HELLP) syndrome (hemolysis, elevated liver enzymes, and low platelet count), and eclampsia[2]. HDP are a leading cause of postpartum readmission (PPR), accounting for approximately 30% of PPR. Previous studies report that 2.5% to 5.7% of patients with HDP experience PPR. PPR has multiple detrimental effects: it represents poor hypertensive control that predisposes women to medical complications, it disrupts typical postpartum recovery, and it has considerable financial implications[3]. Complications of poorly controlled postpartum HTN, such as stroke, seizure, pulmonary edema, and renal failure, are potentially life-threatening[4].

Although identification and management of HTN in the postpartum period remains a subject of research interest, there is a paucity of data comparing individual antihypertensive agents, blood pressure goals or data to affirm these medications provide benefit in the postpartum period[5]. A recent publication from our group demonstrated the association between optimal blood pressure control in the immediate postpartum period and a reduced risk of postpartum readmission for hypertensive complications[6].

Labetalol, hydralazine and nifedipine are commonly used to manage acute HTN during pregnancy with a Cochrane review in 2013 finding no significant differences between the medications for management of acute HTN. After acute HTN is controlled, current American College of Obstetrics and Gynecology guidelines allow permissive HTN (up to 150/100 mmHg) prior to treatment and recommend labetalol as the initial choice for ongoing therapy followed by nifedipine if adequate control is not achieved[7].

Although labetalol and nifedipine are well studied for acute treatment of HTN in the parturient, less is known on their effectiveness or safety in the postpartum period. Two small studies evaluated time to BP control and safety while initiating therapy but none have evaluated their efficacy beyond initiation of treatment in the postpartum period. Nifedipine is a calcium channel blocker, which does not have a well-defined mechanism of action but is thought to reduce blood pressure via a vasodilatory effect. In addition to direct vasodilation, it is theorized preferential vasodilation of the afferent renal vessels may increase renal blood flow, fluid clearance and reduce transient hypervolemia leading to faster recovery from pregnancy-related HTN[8]. In contrast, labetalol is a mixed alpha-adrenergic and beta-adrenergic receptor blocker. This mechanism is known to reduce BP through arterial vasodilation as well as directly affect cardiac inotropy as well as chronotropy[9].

Objectives: The main objective of the study is to find the postpartum discharge on labetalol was associated with increase risk of readmission for hypertension compared with discharge on nifedipine.

MATERIAL AND METHODS

This cross-sectional study was conducted in Islam medical college and teaching hospital Sialkot during June 2022 to September 2022.The data was collected with the permission of ethical committee of hospital.

Inclusion criteria

- Women of all ages were included.
- Hypertension is defined during the study as either a systolic blood pressure ≥140mmHg or diastolic blood pressure ≥90mmHg on two occasions at least 4 hours apart.

Exclusion criteria

- All those patients who do not want to participate in the study.
- Contraindication to either Nifedipine or Labetalol
- HR <60 or >110

Data Collection: Data was collected with the permission of ethical committee of hospital. Participants were randomized to labetalol versus extended release nifedipine using a computerized random number generator. Patient blood pressure information was reviewed every 12 hours by the treatment team, which consisted of

a primary obstetrician co-managing the blood pressure medication in conjunction. Labetalol was started at 200 mg PO BID and increased up to 800 mg PO BID as needed to control BP. Nifedipine was started at 30 mg PO daily then increased up to 90 mg PO daily as needed to control BP.

Statistical Analysis: Data was collected and analyzed using SPSS version 19. All the values were expressed as mean and standard deviation.

RESULTS

Data was collected from 50 female patients. Baseline maternal characteristics were similar between groups, including age, race, body mass index (BMI), gravidity and parity, rate of twins, and presence of medical comorbidities including chronic hypertension. Data was collected in two groups, one group of labetalol and second group of nifedipine.

Table 1: Baseline characteristics and maternal age

	Labetalol	Nifedipine	
	(N = 25)	(N = 25)	p-Value
Maternal age	35.0 (7.4)	34.3 (6.4)	0.80
Body mass index	31.3 (4.1)	32.0 (7.8)	0.12
Gestational Diabetes	8 (32%)	9 (36%)	0.43
Thyroid Disorders	7 (28%)	11 (44%)	
HT	7 (28%)	4 (16%)	
Sclerosis	3 (12%)	1 (4%)	
Twin pregnancy	3 (12%)	2 (8%)	0.64

No major side effects were observed. Minor side effects were more common in women taking nifedipine compared to labetalol.

Table 2: Side effects of medication in both groups

Side effects	Labetalol	Nifedipine	p-Value
Constipation	5 (20%)	12 (45%)	0.04
High heartbeat	3 (12%)	4 (16%)	
Flushing	1 (4%)	0 (0%)	
Headache	0 (0%)	1 (4%)	
Itching	1 (4%)	0 (0%)	

Table 3: Primary and secondary outcomes in both groups

Outcomes	Labetalol	Nifedipine	p-Value
Discharged at starting medication dosage	17 (78%)	12 (45%)	0.01
Length of stay after medication initiated	3 (12%)	4 (16%)	
Total postpartum length of stay	1 (4%)	9 (37%)	
Time to control (hours)	37.56	35.78	

DISCUSSION

Several previous studies investigated the optimal management for postpartum hypertension. Methyldopa was compared to timolol for postpartum BP control and both had similar efficacy[10]. However, neither medication is commonly used postpartum for this purpose in the United States. In another study, intramuscular hydralazine was found to be superior to IV methyldopa to achieve goal blood pressure, but given the parenteral route of medication administration, neither medication can be widely used on an outpatient basis and these findings therefore have limited clinical utility[11]. Two additional studies investigated severe acute elevations in BP specific to the postpartum period. One compared IV hydralazine to IV labetalol and found no differences in persistent severe hypertension or maternal side effects[12].

The finding labetalol may increase risk of hypertensive complications does not have a previously described biologic plausibility in the obstetric literature. One possible explanation for how nifedipine may mitigate this effect is via the improvement in renal blood flow, while labetalol may impair cardiac adaptation[13]. Studies on physiology of preeclampsia show similarities to acute heart failure; increased systemic vascular resistance, decreased stroke volume, hypervolemia, decreased cardiac output and derangements of the renin–angiotensin–aldosterone system[14]. Beta blockers have been shown to increase mortality in acute heart failure, and it is possible the increased risk of hypertensive complications and readmission in patients on labetalol is related to impairment in adaptation to postpartum preeclampsia. Prospective RCTs and physiologic studies would lend further data to confirm these findings and further delineate the underlying cause[15].

CONCLUSION

It is concluded that both oral labetalol and oral extended release nifedipine are effective and well tolerated for management of postpartum hypertension.

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