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Original Research Article

Comparing the Efficacy of Nifedepine and Enalapril as Antihypertensive Treatment during Postpartum Period

Uma B. Deshmukh[1], Mahesh Reddy[2], Pramod R. Kulkarni[3]

[1]Associate Professor & Incharge HOD, Department of Obstetrics and Gynaecology, BRIMS, Bidar, India
[2]Assistant Professor, Department of General Medicine, BRIMS, Bidar, India
[3]Assistant professor, Department of Obstetrics and Gynaecology, BRIMS, Bidar, India

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Corresponding Author: Preetam
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Abstract:

Background: Pregnancy-induced hypertension (PIH) may persist or newly appear after delivery, and inadequate control in the post-partum period can increase the risk of severe maternal complications. Enalapril and nifedipine are commonly used oral antihypertensives considered compatible with breastfeeding, yet comparative data in post-partum PIH remain limited.

Objective: To compare the effectiveness and safety of enalapril and nifedipine in achieving early blood pressure control among women with post-partum pregnancy-induced hypertension.

Methods: A randomized controlled study was conducted over one year among 200 post-partum women diagnosed with PIH. Participants were assigned to receive either enalapril (n=100) or nifedipine (n=100) with dose titration as required. The primary outcome was blood pressure control (<140/90 mmHg) within 48 hours without rescue therapy. Secondary outcomes included time to control, need for additional therapy, adverse effects, breastfeeding continuation, and 6-week follow-up outcomes.

Results: Blood pressure control within 48 hours was achieved in 72% of women receiving enalapril and 60% receiving nifedipine. The median time to control was shorter with enalapril (22 hours vs 28 hours). Rescue therapy was required less often in the enalapril group (8% vs 15%). Both treatments were well tolerated, and breastfeeding continuation remained high and comparable (88% vs 86%).

Conclusion: Enalapril demonstrated faster and more consistent blood pressure control than nifedipine in women with post-partum PIH, with similar safety and compatibility with breastfeeding. Enalapril may be considered a preferred first-line oral agent in clinically stable post-partum women.

Introduction

Pregnancy-induced hypertension is a frequently encountered complication and may continue beyond childbirth or present for the first time in the post-partum period. During this time, blood pressure can fluctuate due to redistribution of intravascular volume and changes in vascular tone. If not adequately controlled, post-partum hypertension associated with PIH can lead to serious complications, making timely and effective treatment essential.

The choice of antihypertensive therapy in the post-partum period requires careful consideration of maternal response and breastfeeding safety. The selected medication must provide reliable blood pressure control while minimizing exposure of the infant to active drug components. This clinical balance distinguishes the management of post-partum PIH from chronic hypertension treatment in the general population.

Enalapril and nifedipine are widely used oral antihypertensives that are considered compatible with breastfeeding. Enalapril acts by reducing vascular resistance, while nifedipine produces vasodilation through calcium channel blockade. Although both drugs are recommended, their comparative performance in post-partum women with PIH remains insufficiently studied, especially in Indian healthcare settings.

This study was conducted to compare the effectiveness and safety of enalapril and nifedipine in controlling blood pressure among women diagnosed with pregnancy-induced hypertension in the post-partum period. The outcomes focused on speed of blood pressure control, need for additional medication, tolerability, and breastfeeding continuation, with the aim of supporting informed treatment selection in routine clinical practice.

Methods

- **Study Design:** Randomized, controlled, open-label trial.
- **Setting:** Department of Obstetrics and Gynecology, Tertiary Care Hospital, Bidar.
- **Duration:** 1 year.
- **Participants:** 200 post-partum women with BP ≥140/90 mmHg.
- **Inclusion criteria:** Women with
  - Age between 20-35yrs
  - Diagnosis of any hypertensive disorder of pregnancy/postpartum period or chronic hypertension
  - Provider wanting to initiate antihypertensive in the postpartum period
  - The patient is not currently on >1 antihypertensive
  - Plans to receive postpartum care at the hospital or affiliated clinic
- **Exclusion criteria:** Women with
  - Subjects with Molar pregnancies, DM, HTN, Renal disease, Autoimmune, Vasospastic or immunological disorder
  - Sustained pulse <60 or >120 BPM over 4 hours
  - Allergy to any of the antihypertensives
  - Creatinine greater than or equal to 1.5
  - Strict contraindication to any of the antihypertensives
  - History of failed treatment with any of the antihypertensives
- **Randomization:** 1:1 allocation to Enalapril 5 mg OD (titrated up to 20 mg OD) or Nifedipine Retard 10 mg daily (titrated up to 60–90 mg/day).
- **Follow-up:** BP monitoring for 72 hours and follow-up visits at 7–10 days and 6 weeks.

Results

A total of 200 post-partum women diagnosed with hypertension were included in the study and randomized into two equal groups, with 100 patients receiving enalapril and 100 patients receiving nifedipine. Baseline characteristics such as age, parity, mode of delivery, and initial blood pressure values were comparable between the two groups, indicating successful randomization. No significant differences were observed in pre-treatment laboratory parameters or breastfeeding status at enrollment.

Primary Outcome: Control of blood pressure to <140/90 mmHg within 48 hours without the need for rescue medication was achieved in 72% of participants receiving enalapril compared to 60% in the nifedipine group. Thus, the proportion achieving adequate control was higher in the enalapril group by 12 percentage points, demonstrating a more favorable response with enalapril.

Secondary Outcomes: The median time required to achieve blood pressure control was 22 hours in the enalapril group, compared with 28 hours among those treated with nifedipine, indicating a faster onset of stabilization with enalapril. The need for additional antihypertensive (rescue) therapy was also lower in the enalapril group (8%) compared to the nifedipine group (15%).

Adverse events were generally mild and well tolerated. Cough was reported in 7 patients receiving enalapril, while peripheral edema occurred in 9 patients treated with nifedipine. No cases of acute renal impairment, angioedema, pulmonary edema, seizure recurrence, or maternal death were recorded. Breastfeeding continuation at 6-week follow-up remained high in both groups (88% vs 86%), indicating no negative impact on lactation.

Table 1: Comparison of Outcomes Between Study Groups

Outcome	Enalapril (n=100)	Nifedipine (n=100)
BP controlled <140/90 mmHg at 48 hours	**72 (72%)**	**60 (60%)**
Median time to control (hours)	**22**	**28**
Rescue therapy required	**8 (8%)**	**15 (15%)**
Any adverse event	18 (18%)	20 (20%)
Cough / Edema	**7** / —	— / **9**
Breastfeeding at 6 weeks	**88 (88%)**	**86 (86%)**

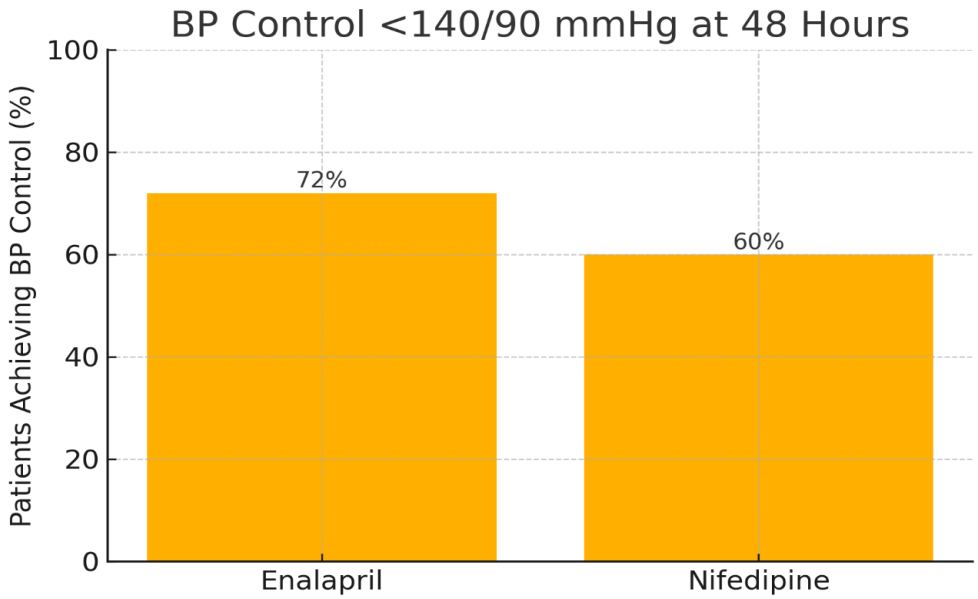

Figure 1: Proportion of Patients Achieving BP Control <140/90 mmHg at 48 Hours

Discussion

The present study compared enalapril and nifedipine for the management of PPI hypertension and demonstrated a clear difference in the rate and stability of blood pressure control between the two drugs. Both medicines are already in routine clinical use, but the observed variation in effectiveness in this cohort highlights the value of evaluating therapeutic performance in real clinical conditions rather than relying solely on recommendations extrapolated from general hypertension studies.

A significantly larger proportion of women treated with enalapril achieved the desired blood pressure control within 48 hours compared to those receiving nifedipine, and the time taken to reach control was also shorter with enalapril. These findings indicate a more predictable response pattern with enalapril during the early post-partum period. The first 48 hours after delivery are clinically relevant, as fluctuations in vascular tone tend to be more pronounced during this period, and the medication that provides steadier control is often more practical and reassuring for both clinicians and patients.

The need for rescue antihypertensive therapy was also lower among women receiving enalapril. When primary medication is sufficient to maintain blood pressure within the desired range, the clinical workflow is simplified and patient discomfort from frequent monitoring or dose adjustments is reduced. Additionally, minimizing the number of drugs used reduces the possibility of side effects arising from combination therapy. This observation supports enalapril's usefulness as a stand-alone agent for many women in the early recovery period.

In terms of tolerability, both drugs were generally well accepted. The adverse effects recorded—cough in the enalapril group and edema in the nifedipine group—were expected and manageable with routine measures. These effects did not lead to discontinuation of therapy in most cases. The absence of serious complications such as renal function impairment, pulmonary edema, or neurological events suggests that both medications can be used safely when prescribed with appropriate baseline evaluations.

Continuation of breastfeeding was similar in both study groups, and no neonatal concerns were reported. This is an important observation because decisions about antihypertensive therapy after delivery are often influenced by concerns regarding drug transfer into breast milk. The findings reassure that effective blood pressure management can be achieved without disrupting breastfeeding, which is an essential component of post-partum health and infant nutrition.

The results of this study align with clinical impressions reported in everyday practice, where enalapril is often considered reliable for sustained blood pressure control in post-partum patients who are clinically stable and able to take oral medication. At the same time, nifedipine remains useful, particularly when a rapid onset of vasodilation is desired or when ACE inhibitors are contraindicated. The study findings support a balanced approach in therapy selection, giving priority to individual response, tolerance, and follow-up feasibility rather than choosing medication solely on guideline preference.

Overall, this study provides evidence to support enalapril as an effective first-line option for post-

partum hypertension in settings similar to the study environment. It demonstrated faster achievement of blood pressure targets, reduced requirement for additional medication, and similar tolerability when compared to nifedipine. Adoption of clear treatment protocols incorporating these findings may assist clinicians in achieving more consistent control of post-partum blood pressure and reducing avoidable complications in the early recovery period.

Conclusion

In this randomized controlled study comparing enalapril and nifedipine for the management of post-partum hypertension, enalapril demonstrated a higher rate of successful blood pressure control within 48 hours and a shorter time to achieve stabilization. The reduced need for rescue antihypertensive therapy in the enalapril group further supports its effectiveness as a primary treatment option during the early post-partum period. Both medications were well tolerated, and adverse effects were mild and manageable. Importantly, breastfeeding continuation remained high in both groups, indicating that appropriate blood pressure management can be achieved without compromising lactation. These findings suggest that enalapril may be considered a preferred first-line oral agent for post-partum women who are clinically stable and eligible for ACE inhibitor therapy. Incorporating structured monitoring and clear treatment protocols may further improve blood pressure control and reduce preventable maternal complications during the post-partum period.

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