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Sustained blood pressure control and rebound hypertension after acute antihypertensive therapy for severe preeclampsia: A multicenter randomized trial of intravenous labetalol versus nicardipine

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Abstract

Background: Severe preeclampsia is an obstetric emergency requiring rapid and safe blood pressure control to reduce maternal and fetal complications. Although intravenous labetalol and nicardipine are used for acute antihypertensive therapy, studies comparing the two first-line agents in severe preeclampsia are limited. This study aimed to compare the effectiveness and safety of intravenous labetalol and nicardipine in pregnant women with severe preeclampsia.

Methods: This multicenter, outcome-assessor-blinded randomized controlled trial was conducted in ten hospitals in West Java, Indonesia. One hundred and twenty-three pregnant women with severe preeclampsia were included. The primary outcome was time to target blood pressure (BP). The secondary outcomes included minimum-dose response, dose-escalation response, rebound hypertension, sustained blood pressure control, exploratory (ROC)-derived systolic BP (SBP) cut-off for rebound hypertension, adverse events.

Results: Of 123 randomized women, three women allocated to labetalol were excluded due to infusion preparation or dilution error leaving 120 patients for modified intention-to-treat analysis. Labetalol achieved target blood pressure faster than nicardipine [15.50 vs 30.00 min; $p = 0.002$]. Labetalol was also faster with the minimum dose [11.00 vs 22.00 min; $p = 0.003$] and after dose escalation [21.00 vs 30.00 min; $p = 0.013$]. Rebound hypertension was lower with labetalol [8.3% vs 20.0%; $p = 0.067$] and sustained blood pressure control was higher [91.7% vs 80.0%; $p = 0.067$]. Exploratory ROC analysis identified an SBP cut-off of ≥193 mmHg for rebound hypertension in both groups. Among women with baseline systolic blood pressure ≥193 mmHg, rebound hypertension occurred less frequently with labetalol than nicardipine [17.6% versus 45.5%]. Baseline SBP showed good discrimination in the nicardipine group [AUC 0.839; $p < 0.001$], but not in the labetalol group [AUC 0.644; $p = 0.291$]. No hypotension, tachycardia, headache, nausea/vomiting, or fetal bradycardia was observed. Dizziness occurred in one labetalol recipient and two nicardipine recipients.

Conclusions: Intravenous labetalol achieved faster target BP control than nicardipine, with comparable short-term maternal and fetal safety. Women with systolic blood pressure ≥193 mmHg, particularly those receiving nicardipine, may require closer post-target blood pressure monitoring.

Trial registration: ISRCTN registry, ISRCTN76310309, registered on 16 September 2026. Retrospectively registered.

Background

Preeclampsia is a pregnancy-specific multisystem hypertensive disorder defined by new-onset hypertension after 20 weeks of gestation, with or without proteinuria, maternal organ dysfunction, or uteroplacental dysfunction.[1,2] Severe preeclampsia is an obstetric emergency because severe-range blood pressure and endothelial dysfunction may lead to eclampsia, stroke, pulmonary edema, hepatic or renal injury, placental abruption, fetal growth restriction, preterm birth, and neonatal intensive care

admission.[3,4] Globally, preeclampsia affects approximately 2–8% of pregnancies and remains a major cause of maternal and perinatal morbidity and mortality, especially where referral systems and emergency care capacity vary.[4,5]Rapid but controlled treatment of acute severe hypertension is essential because persistent systolic blood pressure ≥160 mmHg or diastolic blood pressure ≥110 mmHg increases the risk of life-threatening maternal complications.[2,6] Current guidelines recommend urgent antihypertensive therapy while avoiding maternal hypotension and impaired uteroplacental perfusion.[2,7] Intravenous labetalol, intravenous hydralazine, and oral immediate-release nifedipine are commonly recommended first-line agents, although selection may depend on availability, contraindications, adverse-effect profiles, clinician experience, and local protocols.[8,9]Intravenous labetalol reduces systemic vascular resistance through alpha-1 and non-selective beta-adrenergic blockade; whereas, nicardipine lowers blood pressure through L-type calcium-channel blockade and arterial vasodilation without substantial negative inotropic effects.[1,10] While both are the recommended first-line agents for acute blood pressure control, the evidence of their efficacy and safety is limited and heterogeneous highlighting the need for a larger randomized trial.[11,12] [11] Thus, this multicenter randomized controlled trial aimed to compare the effectiveness and safety of intravenous labetalol and intravenous nicardipine for acute blood pressure control in severe preeclampsia in routine emergency obstetric settings.

Methods

Study design and setting

This multicenter, parallel-group, outcome-assessor-blinded randomized controlled trial compared the effectiveness and safety of intravenous labetalol and intravenous nicardipine as acute antihypertensive treatments in women with severe preeclampsia. The trial was conducted in the emergency departments, labor and delivery units, and obstetric high-care units of ten hospitals in West Java, Indonesia: RSUP Dr. Hasan Sadikin, RSUD Bandung Kiwari, RSUD Welas Asih, RS Otista Soreang, RSUD Lembang, RSUD Cililin, RS Cibabat Cimahi, RSUD Slamet Garut, RSUD Gunung Jati Cirebon, and RSUD Waled. Participants were recruited between 1 September 2025 and 28 February 2026, and final outcome data collection was completed on 31 March 2026. The trial was conducted in accordance with the approved study protocol and is reported in accordance with the CONSORT 2025 Statement. A completed CONSORT 2025 checklist is provided as a supplementary file, and participant flow is presented in Figure 1.

Trial registration and ethical approval

The trial was registered with the ISRCTN registry (ISRCTN76310309) on 16 September 2026 and was retrospectively registered. The study was approved by the Research Ethics Committee of Dr. Hasan Sadikin General Hospital, Faculty of Medicine, Universitas Padjadjaran, Bandung, Indonesia (Approval No. DP.04.03/D.XIV.6.5/395/2025; approval date: 29 August 2025). Written informed consent was obtained from all participants before enrollment.

Participants

Eligible participants were pregnant women at 20 weeks of gestation or more who were diagnosed with severe preeclampsia, had blood pressure of at least 160/110 mmHg, were treated in an emergency, delivery, or obstetric high-care unit, and fulfilled the American College of Obstetricians and Gynecologists (ACOG) 2020 criteria for severe preeclampsia. Patients were excluded if they had asthma, cardiac disease including heart failure or atrioventricular block, bradycardia, contraindication or allergy to either study drug, incomplete data, twin pregnancy, or fetal congenital anomaly.

Sample size, randomization, and blinding

The sample size was calculated using a standardized mean difference of 0.60, a two-sided significance level of 0.05, and 90% power. The required sample size was 58.3 participants per group, rounded up to 60 participants per group yielding a planned analyzed sample size of 120 participants. To achieve this final sample, 123 eligible participants were randomized; three participants allocated to labetalol did not receive the intervention because of labetalol infusion preparation/dilution error and were excluded from the modified intention-to-treat analysis.

Participants were assigned to intravenous labetalol or intravenous nicardipine using permuted block randomization with a block size of six, with each complete block containing three allocations to each group in random order. An independent statistician, not involved in recruitment, allocation, intervention delivery, or outcome assessment, generated the random sequence. Allocation was concealed using sequentially numbered, opaque, sealed envelopes opened only after eligibility confirmation and informed consent. Treating clinicians were not blinded because the regimens differed in preparation and administration, but the trained midwife collecting outcome data was blinded to treatment allocation.

Interventions

Women received either intravenous labetalol or intravenous nicardipine by infusion according to the assigned treatment group. In the labetalol group, intravenous labetalol was administered by continuous infusion at an initial rate of 1–2 mg/min and titrated according to the blood pressure response, up to a maximum total dose of 300 mg within 24 hours. Labetalol was prepared by diluting one ampoule containing 25 mg/5 mL in 20 mL of 0.9% sodium chloride.

In the nicardipine group, intravenous nicardipine was administered by continuous infusion at an initial rate of 5 mg/h. Blood pressure was evaluated every 5 minutes. If blood pressure had not decreased or the target blood pressure had not been achieved, the infusion rate was increased by 5 mg/h, from 5 mg/h to 10 mg/h and subsequently to a maximum rate of 15 mg/h. Nicardipine was prepared by diluting one 10-mL ampoule containing 1 mg/mL nicardipine in 90 mL of 0.9% sodium chloride.

Outcomes and statistical analysis

Target blood pressure was defined as a controlled reduction in mean arterial pressure not exceeding 20%, or achievement of blood pressure ≤140/90 mmHg. The primary outcome was time to target blood pressure. The secondary outcomes included target achievement with the minimum dose, dose

escalation, rebound hypertension, sustained blood pressure control, and safety outcomes, including maternal hypotension, reflex tachycardia, headache, dizziness, nausea or vomiting, and fetal bradycardia. Rebound hypertension was assessed during 6-hour blood pressure monitoring after target blood pressure achievement, and sustained blood pressure control was defined as the absence of rebound hypertension during this period. The primary analysis followed a modified intention-to-treat approach, including participants who received the allocated intervention and had complete outcome data. Analyses were performed using SPSS 26.0. Normality was assessed using the Shapiro–Wilk test. Numerical and categorical variables were compared using appropriate parametric or non-parametric tests.

Results

A total of 123 eligible participants were randomized. Sixty-three participants were allocated to intravenous labetalol and 60 participants were allocated to intravenous nicardipine. Three participants allocated to labetalol did not receive the allocated intervention because of a labetalol infusion preparation/dilution error and were excluded from the modified intention-to-treat analysis. Therefore, 120 participants were included in the final analysis, with 60 participants in each treatment group. The participant flow through enrolment, allocation, follow-up, and analysis is presented in Figure 1.

Table 1. Baseline characteristics of participants according to antihypertensive treatment group

Baseline characteristics	Labetalol IV (n = 60)	Nicardipine IV (n = 60)	p-value
Maternal age, years	31.25 ± 7.32	32.77 ± 6.06	0.219
Gestational age, weeks	37.00	36.00	0.077
Parity, n (%)			0.056
P0	26 (43.3)	16 (26.7)	
≥P1	34 (56.7)	44 (73.3)	
BMI status, n (%)			0.491
Normal	54 (90.0)	57 (95.0)	
Obesity	6 (10.0)	3 (5.0)	
History of preeclampsia, n (%)	11 (18.3)	9 (15.0)	0.624
History of chronic hypertension, n (%)	6 (10.0)	10 (16.7)	0.283
Diabetes mellitus, n (%)	0 (0.0)	1 (1.7)	1.000
Dyslipidemia, n (%)	5 (8.3)	3 (5.0)	0.717
HELLP syndrome, n (%)	6 (10.0)	2 (3.3)	0.272
Baseline hemodynamic parameters			
Baseline SBP, mmHg	179.50 (28.00)	187.50 (22.00)	0.064
Baseline DBP, mmHg	113.50 (10.00)	110.00 (18.00)	0.661
Baseline MAP, mmHg	136.00 (13.00)	138.00 (18.00)	0.467

Note: Maternal age is presented as mean ± standard deviation because it was normally distributed. Gestational age is presented as median because it was not normally distributed. Baseline SBP, DBP, and MAP are presented as median (interquartile range) because they were not normally distributed. Parity, BMI status, history of preeclampsia, history of chronic hypertension, diabetes mellitus, dyslipidemia, and HELLP syndrome are presented as frequency and percentage, n (%). BMI: body mass index; DBP: diastolic blood pressure; HELLP: hemolysis, elevated liver enzymes, and low platelet count; IV: intravenous; MAP: mean arterial pressure; SBP: systolic blood pressure. Independent samples t-test; Mann–Whitney U test; Pearson chi-square test; Fisher's exact test. A *p*-value <0.05 was considered statistically significant.

A total of 120 pregnant women with severe preeclampsia were included in this study. The participants were allocated into two treatment groups, with 60 women receiving intravenous labetalol and 60 women receiving intravenous nicardipine. Table 1 shows the baseline demographic, obstetric, clinical risk, and hemodynamic characteristics of the study participants according to treatment group. Overall, the two

groups were comparable at baseline, with no statistically significant differences in maternal age, gestational age, parity, BMI status, history of preeclampsia, history of chronic hypertension, diabetes mellitus, dyslipidemia, HELLP syndrome, baseline SBP, baseline DBP, or baseline MAP.

Table 2. Acute and sustained blood pressure control after intravenous antihypertensive therapy

Outcome	Labetalol IV (n = 60)	Nicardipine IV (n = 60)	*p*-value
Time to target blood pressure, min	15.50 (5–49)	30.00 (6–80)	0.002‡
Rebound hypertension after target blood pressure achievement, n (%)	5 (8.3)	12 (20.0)	0.067†
Sustained blood pressure control, n (%)	55 (91.7)	48 (80.0)	0.067†

Note: Continuous variables are presented as median (minimum–maximum), and categorical variables are presented as n (%). Sustained blood pressure control was defined as the absence of rebound hypertension after target blood pressure achievement. IV: intravenous. ‡Mann–Whitney U test; †Chi-square test. A p-value <0.05 was considered statistically significant.

Acute and sustained blood pressure control outcomes are summarized in Table 2. The median time to target blood pressure was significantly shorter in the labetalol IV group than in the nicardipine IV group [15.50 min (5–49) vs 30.00 min (6–80), $p = 0.002$]. Rebound hypertension occurred less frequently in the labetalol IV group than in the nicardipine IV group, although the difference was not statistically significant [5 (8.3%) vs 12 (20.0%), $p = 0.067$]. Consequently, sustained blood pressure control was numerically higher in the labetalol IV group [55 (91.7%) vs 48 (80.0%), $p = 0.067$].

Table 3. **Exploratory ROC and baseline systolic blood pressure cut-off analysis for rebound hypertension after target blood pressure achievement**

Parameter	Labetalol IV (n = 60)	Nicardipine IV (n = 60)
Rebound hypertension, n (%)	5 (8.3)	12 (20.0)
Baseline SBP, mean ± SD (range), mmHg	184.00 ± 17.10 (160–233)	188.70 ± 16.79 (160–223)
AUC (95% CI)	0.644 (0.360–0.927)	0.839 (0.692–0.985)
ROC-derived SBP cut-off	≥193 mmHg	≥193 mmHg
Sensitivity	60.0%	83.3%
Specificity	74.5%	75.0%
p-value for ROC analysis	0.291	<0.001
Rebound hypertension in SBP <193 mmHg, n (%)	2/43 (4.7)	2/38 (5.3)
Rebound hypertension in SBP ≥193 mmHg, n (%)	3/17 (17.6)	10/22 (45.5)
p-value for SBP cut-off comparison	0.132	<0.001

Exploratory ROC and SBP cut-off analyses are presented in Table 3 and Figure 2. In the labetalol IV group, baseline SBP showed limited and non-significant discrimination for rebound hypertension after target blood pressure achievement (AUC 0.644; 95% CI 0.360–0.927*; p* = 0.291). In the nicardipine IV group, baseline SBP showed good and statistically significant discrimination (AUC 0.839; 95% CI 0.692–0.985*; p* < 0.001). The ROC-derived SBP cut-off was ≥193 mmHg in both groups. Among participants with baseline SBP ≥193 mmHg, rebound hypertension occurred in 3 of 17 participants (17.6%) in the labetalol IV group and 10 of 22 participants (45.5%) in the nicardipine IV group. These findings suggest that baseline SBP ≥193 mmHg may identify patients, particularly those receiving nicardipine IV, who require closer post-target blood pressure monitoring.

Table 4. Dose-stratified comparison of blood pressure response between intravenous labetalol and intravenous nicardipine

Parameter	Minimum-dose response		Dose-escalation response	
	Labetalol IV (n = 60)	Nicardipine IV (n = 60)	Labetalol IV (n = 60)	Nicardipine IV (n = 60)
Number of participants, n (%)	18 (30.0)	27 (45.0)	42 (70.0)	33 (55.0)
Time to target blood pressure, min	11.00 (5–45)	22.00 (7–50)	21.00 (8–49)	30.00 (6–80)

Dose-stratified blood pressure response is presented in Table 4. Among participants who achieved target blood pressure with the minimum dose, the median time to target blood pressure was shorter in the labetalol IV group than in the nicardipine IV group. A similar pattern was observed among participants requiring dose escalation, in whom labetalol IV also showed a shorter median time to target blood pressure than nicardipine IV.

Table 5. Maternal and fetal safety outcomes after intravenous antihypertensive therapy

Safety outcome	Labetalol IV (n = 60)	Nicardipine IV (n = 60)	*p*-value
Hypotension, n (%)	0 (0.0)	0 (0.0)	—
Tachycardia, n (%)	0 (0.0)	0 (0.0)	—
Headache, n (%)	0 (0.0)	0 (0.0)	—
Dizziness, n (%)	1 (1.7)	2 (3.3)	1.000
Nausea/vomiting, n (%)	0 (0.0)	0 (0.0)	—
Fetal bradycardia, n (%)	0 (0.0)	0 (0.0)	—

Note: Data are presented as n (%). A dash indicates that statistical testing was not applicable because no events occurred in either group. IV: intravenous. Fisher's exact test. A p-value <0.05 was considered statistically significant.

Maternal and fetal safety outcomes are summarized in Table 5. No cases of hypotension, tachycardia, headache, nausea/vomiting, or fetal bradycardia were observed in either treatment group. Dizziness occurred in 1 participant (1.7%) in the labetalol IV group and 2 participants (3.3%) in the nicardipine IV group, with no significant between-group difference *(p* = 1.000). Overall, the safety profiles of labetalol IV and nicardipine IV were comparable.

Discussion

This multicenter randomized controlled trial found that intravenous labetalol achieved target blood pressure more rapidly than intravenous nicardipine in women with severe preeclampsia treated in routine obstetric emergency settings. The faster response was observed in the overall analysis and remained consistent among patients who achieved target blood pressure with the minimum dose and those who required dose escalation. Rebound hypertension was numerically less frequent and sustained blood pressure control was numerically higher in the labetalol group, although these differences were not statistically significant. Both regimens showed comparable short-term maternal and fetal safety profiles. These findings suggest that intravenous labetalol may offer faster acute blood pressure stabilization without an apparent increase in short-term safety concerns.

The clinical importance of faster blood pressure control should be interpreted in the context of severe preeclampsia as an obstetric emergency. Severe-range blood pressure requires urgent treatment to reduce the risk of maternal stroke, eclampsia, and end-organ complications.[13] NICE guidance also emphasizes antihypertensive treatment in women with preeclampsia and supports labetalol as a preferred option, with nifedipine as an alternative when labetalol is unsuitable.[14] Reviews of hypertensive disorders of pregnancy similarly note that treatment aims to prevent maternal complications while avoiding excessive blood pressure reduction and potential uteroplacental compromise.[15,16] Therefore, the shorter time to target blood pressure in the labetalol group may be clinically relevant in emergency, delivery, and high-care obstetric units where rapid stabilization is required.

The findings of previous evidence comparing antihypertensive agents for severe hypertension in pregnancy remains heterogeneous. Meta-analyses have shown that commonly used agents, including labetalol, hydralazine, and calcium-channel blockers, can reduce severe blood pressure, but differences in population, route of administration, dosing strategy, and target definition limit direct comparison.[9,17] A meta-analysis comparing oral nifedipine with intravenous labetalol suggested that nifedipine may achieve target blood pressure more rapidly in some settings, highlighting that calcium-channel blocker effects may depend strongly on the specific agent, route, and protocol.[18] A recent systematic review of randomized trials also found labetalol and hydralazine to be effective for hypertensive disorders in pregnancy, with labetalol associated with lower maternal hypotension.[19] In contrast, a trial comparing intravenous labetalol and nicardipine did not demonstrate clear superiority, which may reflect differences in protocol, clinical workflow, and study completion.[12]

The pharmacological profiles of both drugs may explain the observed pattern. Labetalol combines selective alpha-1 blockade with non-selective beta-adrenergic blockade, producing peripheral vasodilation while limiting reflex sympathetic activation and tachycardia.[1] This mechanism is clinically relevant in severe preeclampsia, in which vascular dysfunction and increased vasoconstrictive tone contribute to severe-range hypertension. [1,2,7] By reducing peripheral vascular resistance while attenuating sympathetic-mediated tachycardia, labetalol may provide a more stable hemodynamic response during acute blood pressure control.[1,7] Nicardipine, a dihydropyridine calcium-channel blocker, lowers blood pressure mainly through arterial vasodilation and is effective as a titratable intravenous infusion.[10] However, vasodilatory agents may require careful titration to avoid blood pressure fluctuation and post-target rebound in susceptible patients.[7] The numerically higher rebound hypertension observed with nicardipine should therefore be interpreted cautiously and considered hypothesis-generating.

Exploratory ROC analysis showed that baseline SBP ≥193 mmHg discriminated rebound hypertension well in the nicardipine IV group, but not in the labetalol IV group. This suggests that patients receiving nicardipine IV with baseline SBP ≥193 mmHg may need closer post-target blood pressure monitoring, without implying that nicardipine should be avoided. This interpretation is clinically relevant because severe preeclampsia requires timely but controlled blood pressure reduction.[1,2,7] Nicardipine remains a

useful titratable option when labetalol is unsuitable.[10] However, this post-hoc threshold remains hypothesis-generating and requires external validation.[20]

These findings may support the consideration of intravenous labetalol when rapid target blood pressure achievement is prioritized and no contraindications are present. In Indonesia, where preeclampsia remains a major contributor to maternal morbidity and mortality, locally generated comparative evidence may help inform hospital protocols and emergency obstetric decision-making.[21,22] results should not be interpreted as evidence that nicardipine should be replaced, because nicardipine remains a useful option when labetalol is unavailable, contraindicated, or unsuitable.[10]

This study has several strengths, including its randomized multicenter design, concealed allocation, blinded outcome assessment by a trained midwife, standardized outcome recording, and relevance to routine obstetric emergency care. Limitations should also be acknowledged. Treating clinicians were not blinded because the regimens required different preparation and administration procedures. The modified intention-to-treat analysis excluded three participants allocated to labetalol who did not receive the intervention because of infusion preparation/dilution error. The study may also have limited power to detect rare adverse events or modest differences in rebound hypertension. The post-hoc ROC analysis requires external validation. Overall, intravenous labetalol achieved faster target blood pressure control than intravenous nicardipine with comparable short-term safety, but further trials with standardized titration and longer maternal and neonatal follow-up are warranted.

Conclusions

In this multicenter randomized trial involving pregnant women with severe preeclampsia, intravenous labetalol achieved target blood pressure more rapidly than intravenous nicardipine. This finding was consistent in the overall analysis, among participants who achieved target blood pressure with the minimum dose, and among those who required dose escalation. Rebound hypertension was numerically less frequent and sustained blood pressure control was numerically higher in the labetalol group, although these differences were not statistically significant. Both treatments showed comparable short-term maternal and fetal safety profiles, with few adverse events observed. These findings support intravenous labetalol as an effective option for rapid blood pressure control in severe preeclampsia and provide locally relevant evidence to guide antihypertensive selection in acute obstetric care settings where both labetalol and nicardipine are available.

Abbreviations

ACOG : American College of Obstetricians and Gynecologists

BMI : Body mass index

BP : Blood pressure

DBP : Diastolic blood pressure

HCU : High-care unit

HELLP: Hemolysis, elevated liver enzymes, and low platelet count

IV : Intravenous

MAP : Mean arterial pressure

RCT : Randomized controlled trial

SBP : Systolic blood pressure

SPSS : Statistical Package for the Social Sciences

Declarations

Ethics approval and consent to participate

The study protocol was reviewed and approved by the Research Ethics Committee of Dr. Hasan Sadikin General Hospital Bandung, Indonesia (Ethical Approval No. DP.04.03/D.XIV.6.5/395/2025; Registration No. 08.25.395; approval date: 29 August 2025). The study was conducted in accordance with the Declaration of Helsinki and all applicable institutional and national ethical guidelines and regulations. Site-specific ethics approvals and/or institutional research permissions were obtained, as applicable, from all participating hospitals, including RSUD Bandung Kiwari, RSUD Welas Asih, RS Otista Soreang, RSUD Lembang, RSUD Cililin, RS Cibabat Cimahi, RSUD Dr. Slamet Garut, RSUD Gunung Jati Cirebon, and RSUD Waled, before participant recruitment and data collection. Written informed consent was obtained from all participants before enrollment. Participant confidentiality was maintained throughout the study, and all data were de-identified before analysis.

Consent for Publication

Not applicable.

Availability of Data and Materials

The datasets generated and/or analyzed during the current study are not publicly available because they contain clinical data from pregnant women with severe preeclampsia, but are available from the corresponding author on reasonable request and with permission from the relevant institutional authorities.

Competing Interests

The authors declare that they have no competing interests.

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Authors' contributions

AW conceptualized and designed the study, coordinated participant recruitment and data collection, performed data management, interpreted the data, and drafted the initial manuscript. SI, MAA, and JCM contributed to the study design, supervised the research process, interpreted the data, and critically revised the manuscript for important intellectual content. AP, SRK, BH, ADA, AS, DS, and AYP contributed to participant recruitment and clinical data collection across the participating centers, provided clinical and scientific supervision, interpreted the findings, and critically revised the manuscript for important intellectual content. All authors read and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

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Figures

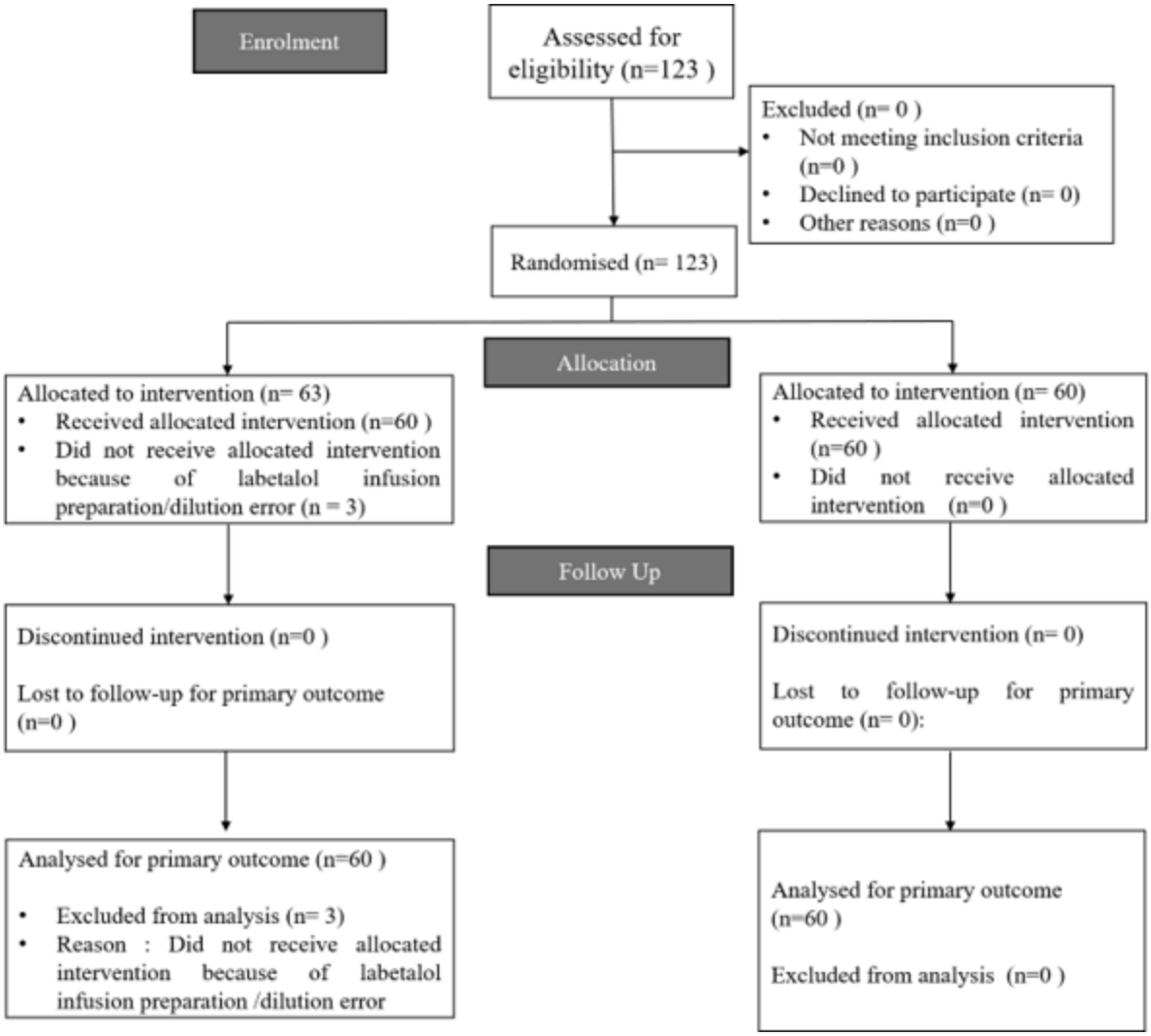


Figure 1

Flowchart of patients' enrolment, allocation, follow-up and analysis

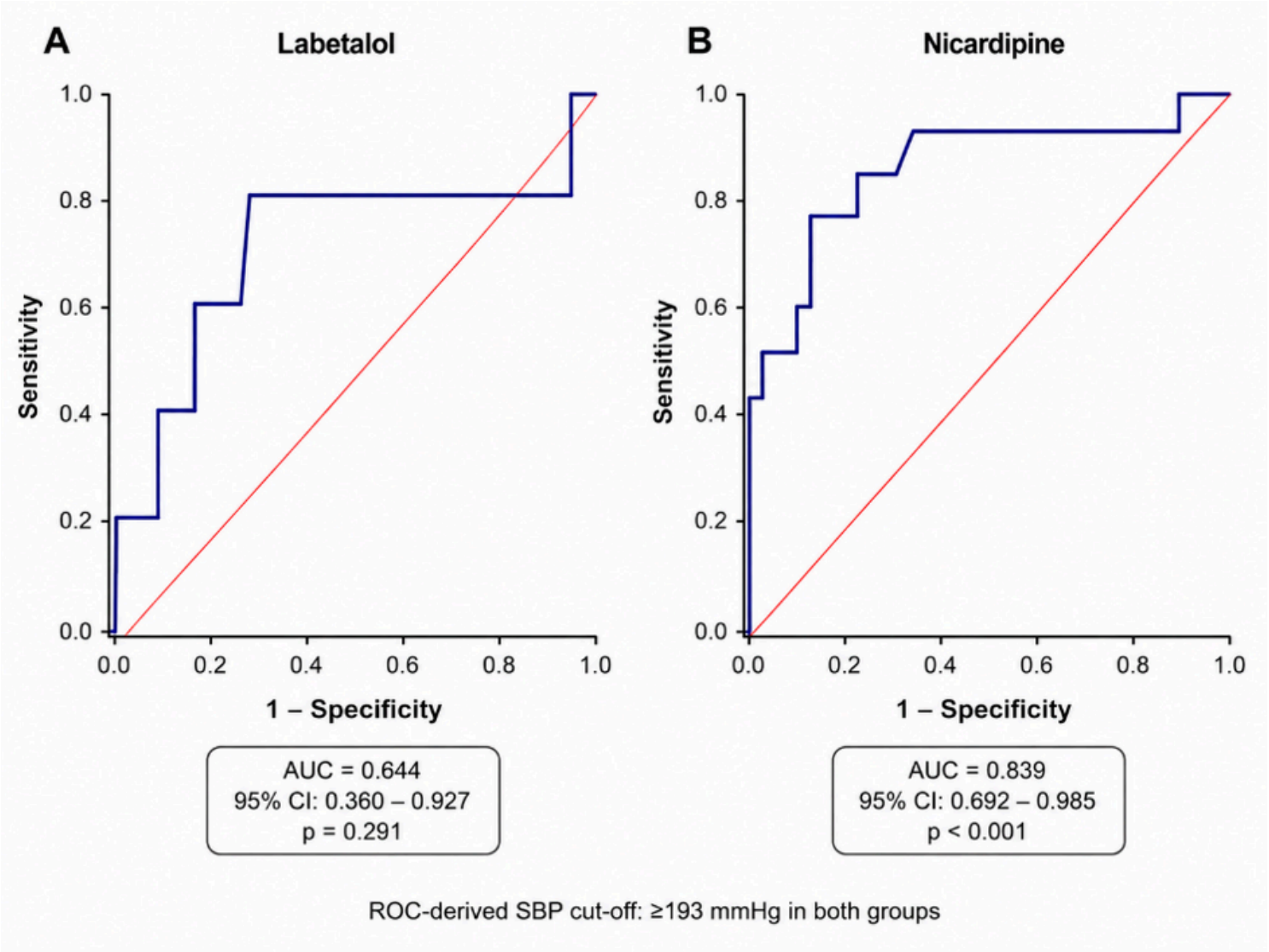


Figure 2

Receiver operating characteristic (ROC) curves of baseline systolic blood pressure for predicting rebound hypertension after target blood pressure achievement.

(A) ROC curve for the intravenous labetalol group, showing an area under the curve (AUC) of 0.644 (95% confidence interval [CI] 0.360–0.927; *p*= 0.291). (B) ROC curve for the intravenous nicardipine group, showing an AUC of 0.839 (95% CI 0.692–0.985; *p* < 0.001). The ROC-derived systolic blood pressure cut-off was ≥193 mmHg in both groups.

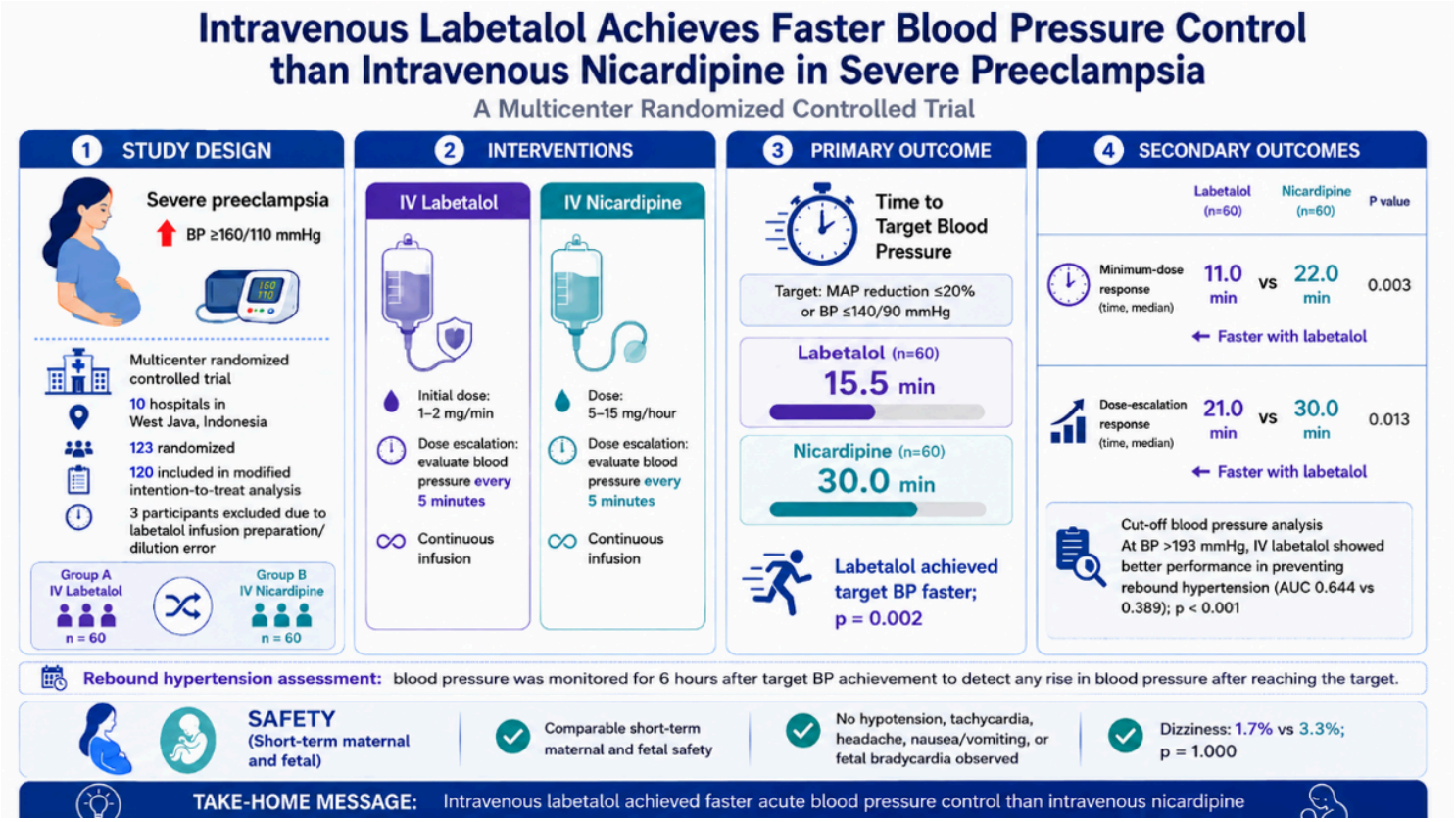


Figure 3

Graphical Abstract

Supplementary Files

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