ДРУЖЕСТВО НА КАРДИОЛОЗИТЕ В БЪЛГАРИЯ
Българска кардиология
том XXXII, 2026, № 3
ОБЗОРИ
REVIEWS
doi: 10.3897/bgcardio.32.e188105

MANAGEMENT CRISIS HYPERTENSION IN UNIT EMERGENCY: THE ROLE OF PARENTERAL THERAPY IN BLOOD PRESSURE CONTROL BASED ON PATIENT CHARACTERISTICS

Barkah Djaka Purwanto[1], Danang Prasetyaning Amukti[2], Maratush Sholihah[3]

[1]Faculty of Medicine, Ahmad Dahlan University, Yogyakarta, Indonesia
[2]Department of Pharmacy, Faculty of Medicine and Health Sciences, Alma Ata University, Yogyakarta, Indonesia
[3]Medical Professional Education Study Program, Ahmad Dahlan University, Yogyakarta, Indonesia

УПРАВЛЕНИЕ НА КРИЗИСНИ СЪСТОЯНИЯ ПРИ ХИПЕРТОНИЯ В СПЕШНОТО ОТДЕЛЕНИЕ: РОЛЯТА НА ПАРЕНТЕРАЛНАТА ТЕРАПИЯ ЗА КОНТРОЛ НА КРЪВНОТО НАЛЯГАНЕ В ЗАВИСИМОСТ ОТ ХАРАКТЕРИСТИКИТЕ НА ПАЦИЕНТА

Барка Джака Пурванто[1], Дананг Прасетянинг Амукти[2], Маратуш Шолиха[3]

[1]Медицински факултет, Университет „Ахмад Дахлан“ – Йогякарта, Индонезия
[2]Катедра по фармация, Факултет по медицина и здравни науки, Университет „Алма Ата“ – Йогякарта, Индонезия
[3]Програма за обучение на медицински специалисти, Университет „Ахмад Дахлан“ – Йогякарта, Индонезия

Abstract. **Introduction:** Hypertensive crisis in the emergency department (ED) is a heterogeneous clinical condition, with a wide variety of presentations and management implications, making a blood pressure-based approach alone inadequate to guide clinical decisions. **Methods:** A literature review was conducted through the PubMed database using a combination of keywords related to hypertensive crises and their management in the ER. Included publications included article year 2021-2025, And discuss definition And criteria clinical crisis hypertension, principles of parenteral antihypertensive therapy, targeting and rate of blood pressure reduction based on target organ involvement, and an algorithm-based approach to therapeutic decision-making in the ED. Nine studies were subsequently reviewed. **Results:** The study results consistently demonstrate that the presence of acute target organ damage is a key determinant of the diagnosis of hypertensive emergency and the indication for intravenous antihypertensive therapy. A target organ and clinical syndrome-based approach facilitates more precise risk stratification, helping to differentiate cases requiring immediate intervention from those requiring very high blood pressure. tall without damage organ I, as well as potential reduce practice overtreatment in ER. **Conclusion:** Management of hypertensive crises in the ER should focus on identifying acute target organ damage to improve therapeutic accuracy and prevent overtreatment.

Key words: crisis hypertension; emergency unit; hypertension emergency; damage organ target; intravenous antihypertensive therapy

Address for correspondence: Barkah Djaka Purwanto, e-mail: barkah.purwanto@med.uad.ac.id

Резюме. **Въведение:** Хипертоничната криза в спешното отделение (СО) е хетерогенно клинично състояние с голямо разнообразие от прояви и последствия за лечението, което прави подходът, основан единствено на кръвното налягане, недостатъчен за вземане на клинични решения. **Методи:** Беше проведен преглед на литературата чрез базата данни PubMed, като се използва комбинация от ключови думи, свързани с хипертоничните кризи и тяхното лечение в спешното отделение. Включените публикации обхващаха периода 2021-2025 г. и разглеждаха дефиницията и критериите за клинична хипертонична криза, принципите на парентералната антихипертонична терапия, целевите стойности и темпото на понижаване на кръвното налягане в зависимост от засегнатите целеви органи, както и алгоритмичен подход към вземането на терапевтични решения в спешното отделение. Впоследствие бяха прегледани

This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

девет проучвания. **Резултати:** Данните от проучването показват, че наличието на остро увреждане на целеви органи е ключов фактор за поставянето на диагноза „хипертонична спешна ситуация“ и за индикацията за интравенозна антихипертензивна терапия. Подходът, основан на целевите органи и клиничните синдроми, улеснява по-прецизната стратификация на риска, като помага да се разграничат случаите, изискващи незабавна интервенция, от тези, при които се наблюдава много високо кръвно налягане без увреждане на целеви органи, както и потенциално да се намали свръхлечение в спешното отделение. **Заключение:** Лечението на хипертоничните кризи в спешното отделение трябва да се фокусира върху идентифицирането на остро увреждане на целевите органи, за да се подобри терапевтичната точност и да се предотврати свръхлечение.

Ключови думи: кризисна хипертония; спешно отделение; спешно състояние, свързано с хипертония; увреден целеви орган; интравенозна антихипертонична терапия

Автор за кореспонденция: Барка Джака Пурванто, e-mail: barkah.purwanto@med.uad.ac.id

Introduction

Hypertension has become a health problem world Because improvement prevalence and outcomes of resulting complications [1). Hypertensive crisis is an acute complication of hypertension that is often found in emergency units with a high level of... death 10% during time maintenance [2]. Hypertensive crisis is defined as an increase in pressure blood systolic > 180 mmHg and diastolic blood pressure > 120 mmHg accompanied by acute organ damage (hypertensive emergency) or without acute organ damage (hypertensive urgency/severe hypertension) [2]. This condition can manifest as several symptoms depending on the type of organ damaged, such as cardiac ischemia, neurological disorders, pulmonary edema, kidney failure, and even eclampsia [3].

Management of hypertensive crisis aims to minimize damage organ target And initiation early treatment antihypertensive right [4]. Therapy must be closely monitored to avoid excessively rapid blood pressure reduction, which can lead to organ hypoperfusion due to loss of autoregulation [5, 6]. According to *the American Heart Association (AHA)*, the target reduction is pressure blood on case hypertensive emergency approximately 25% in the first hour followed with decline gradually in 24-48 O'clock next [4]. In practice Clinically, the management of patients with hypertensive crises is often carried out heterogeneously, considering the differences in case characteristics, comorbidities, and variations in clinicians' understanding of blood pressure reduction targets [7].

The main challedamagedn managing hypertensive crises in The ER lies in the clinician's ability to differentiate hypertension emergency from a condition of very high blood pressure that is not accompanied by damage organ target I [8]. On hypertensive emergency, the presence of damage organ target I is the primary determinant of diagnosis and the basis for the need for gradual and controlled blood pressure reduction with close monitoring, generally through the administration of intravenous antihypertensives that can be titrated according to the patient's clinical response [9]. In contrast, in patient with hypertension heavy without evidence of acute target organ involvement, a more conservative management strategy is recommended [10]. In condition certain, patients can even be treated on an outpatient basis through optimization therapy, so that Aggressive intervention in the ER actually risks causing overtreatment [4].

Reviewed from external clinical, crisis Hypertension cannot be viewed solely as an increase in blood pressure. A prospective study of patients with acute severe hypertension who came to the hospital EDs have shown that this condition is associated with significant morbidity and mortality during follow-up, particularly in elderly patients and those with complications such as stroke or acute kidney injury [11]. Furthermore, data from ED registry studies reveal significant variation. wide in manifestation involvement target organs and use therapy intravenous antihypertensives on case hypertension emergency [12]. These findings underscore the importance of strengthening evidence-based management standards to improve the consistency and quality of care in emergency services. Considering blood pressure lowering strategies in crisis hypertension must customized Given the clinical condition of each patient, a uniform approach for all cases is considered inadequate and potentially unsafe [13]. Therefore, an algorithm-based approach that takes into account involvement organ Targets – including assessment of the brain, heart, kidneys, great vessels, and retina – are recommended to support more rational, targeted, and safe parenteral therapy decisions. This review aims to summarize the concepts and clinical criteria of hypertensive crisis in the ER, outline the principles of using parenteral antihypertensive therapy in hypertensive emergencies, explain strategies for determining the target and rate of blood pressure reduction, and present a comprehensive approach.

practical/algorithmic based organ targets to guide parenteral therapy decision-making in the ED.

Method

This article was written using a *literature review method* which aims to synthesize scientific evidence related to hypertensive crisis management in the ER, with an emphasis on the role of parenteral antihypertensive therapy in controlling blood pressure. blood based on characteristics of patients. A literature search was conducted through the PubMed database to identify publications that relevant in range year 2021 to 2025 to obtain the most up-to-date scientific evidence. The search strategy used a combination of keywords and Medical Subject Headings (MeSH) terms related to crisis hypertension And management in the ER, including hypertensive crisis, hypertensive emergency, severe *hypertension, emergency department, parenteral antihypertensive therapy, intravenous antihypertensive agents,* And *blood pressure management*.

The articles included are articles that discuss the definition and clinical criteria of hypertensive crisis, principles of using antihypertensive therapy parenteral, determination target and the rate of blood pressure reduction based on target organ involvement, as well as an algorithm-based approach to therapeutic decision-making in the ED. Articles that were not relevant to the emergency care context, did not address parenteral therapy, or were published outside the specified time period were excluded from the analysis. All selected articles were narratively reviewed and qualitatively analyzed to identify themes main Which in line with the research objectives, then synthesized into a conceptual framework and practical approach in hypertension crisis management in the ER.

Results

This review includes nine selected articles, a summary of which is presented in Table 1.

Definition and Terminology of "Hypertensive Crisis" in the Emergency Department

Hypertensive crisis is a serious clinical condition characterized by a rapid and acute increase in blood pressure, generally defined as systolic blood pressure ≥180 mmHg and/or diastolic blood pressure ≥ 180 mmHg. diastolic ≥ 120 mmHg. Crisis Hypertension is more fully explained in Fig. 1.

a Hypertension Emergency: pressure blood very high with evidence of acute target organ damage (*target-organ damage*) which requires immediate therapy in a monitored setting, generally with antihypertensives intravenous [7, 15, 18].

b Very high blood pressure without acute organ damage: often called *acute severe hypertension*. The

Table 1. Characteristics And Findings Main Studies Which Included in Review

No	Writer (Year)	Design / Type of Study	Focus Main	Findings Key Relevant
1	Kulkarni *et al.* (2022) (7)	*Clinical review*	Definition & hypertensive crisis classification	Emphasizes that hypertensive crises should be classified based on the presence of acute target organ damage (HMOD/TOD), with distinction clear between *hypertensive emergency* And improvement pressure blood severe without acute organ damage.
2	Miller *et al.* (2024) (14)	*Clinical review*	Hypertension management I in the emergency room	State that therapy antihypertensive intravenous indicated especially in *hypertensive emergencies*, while the use of aggressive therapy in patients without acute target organ damage has the potential to cause overtreatment.
3	Bress *et al.* (2024) (15)	*Scientific statement*	Therapy intravenous antihypertensives	Recommend the use of titratable intravenous antihypertensive agents. For reach decline pressure blood Which fast, controlled, and safe in patients with *hypertensive emergency.*
4	Balahura *et al.* (2022) (16)	*Narrative review*	Target & rate of decline pressure blood	Explain that target And speed decline pressure blood is syndrome-specific and must take into account the risk of organ hypoperfusion target.
5	Rossi *et al.* (2021) (17)	*Review*	Approach target organ based	Propose implementation algorithm-based involvement organ target with principle *treat the organ, not the number* For guide decision parenteral therapy.
6	Davies, Charlesworth & Agarwal (2024) (18)	*Clinical review*	Pharmacology antihypertensive intravenous	Emphasizes that the selection of intravenous antihypertensive agents should take into account characteristics pharmacological drug, including onset, offset And ability titration, in accordance with syndrome clinical patient.
7	Kotruchin *et al.* (2021) (12)	Studies cohort	Data real-world crisis hypertension	Show existence variation practice clinical in use therapy intravenously as well height proportion involvement organ neurological on *hypertensive emergency* cases.
8	Razzak *et al.* (2024) (11)	Studies prospective	External clinical	Shows that *hypertensive emergency* is associated with increased morbidity And mortality, especially on patient age carry on And they Which accompanied by complications organ.
9	Fragoulis *et al.* (2024) (19)	Studies cohort	External medium term	Show that external term medium on patients with *hypertensive emergency* is worse than in patients with severe hypertension without damage organ I, so that confirm importance risk stratification and follow-up planning.

Note: HMOD, Hypertension-Mediated Organ Damage; TOD, Target Organ Damage

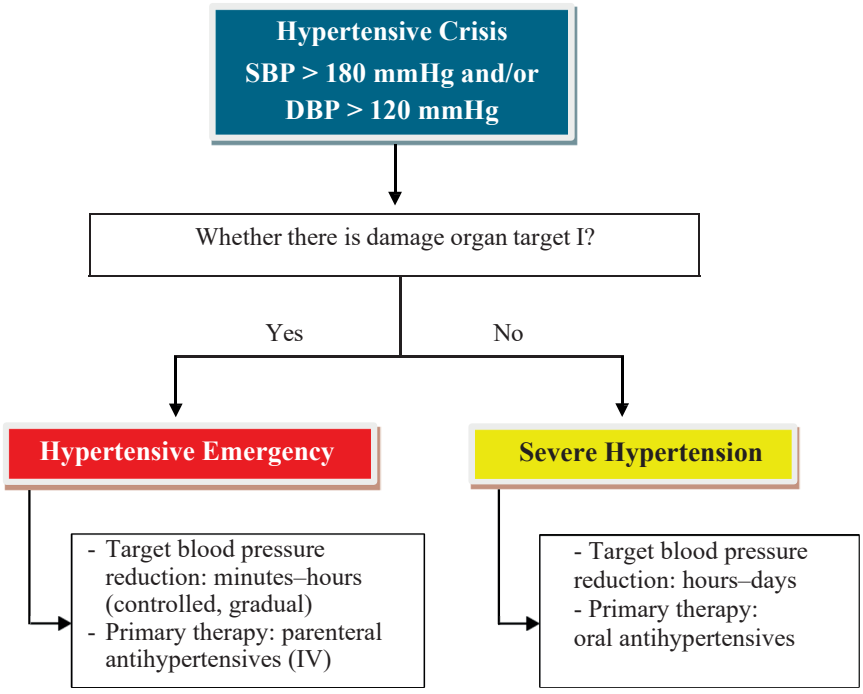

Fig. 1. Difference hypertension emergency And hypertension urgency / severe hypertension [4]

term "hypertensive urgency" is increasingly seen as less useful because it can imply the need for "urgent/ aggressive" therapy. whereas Lots case does not require rapid reduction [7, 14].

Rationale for Parenteral Therapy of Hypertensive Emergencies

In *hypertensive emergencies*, the primary goal of therapy is not to achieve rapid normalization of blood pressure, but rather to reduce the risk of progression of target organ damage through gradual and controlled reduction of blood pressure using appropriate antihypertensive agents. Work fast and easy titrated [16, 18]. In this context, parenteral or intravenous antihypertensive therapy is preferred because it has a rapid onset of action, allows for dose adjustment or prompt discontinuation if side effects occur, and facilitates the achievement of blood pressure reduction targets tailored to the clinical syndrome. The use of this therapy requires close hemodynamic monitoring, often in the intensive care unit (ICU), high dependency unit (HDU), or monitoring area of the emergency department (ED) to prevent organ hypoperfusion [16, 18].

Determining the management strategy for a hypertensive crisis is based on several key findings. First, identifying target organ involvement or damage is the initial, crucial step, as management must be directed at the underlying clinical condition, not solely at lowering blood pressure. Precipitating factors for acute blood pressure increases include pregnancy, too, play a role in influence choice therapy. Second, the rate and the degree of blood pressure reduction needs to be determined in a way individual For avoiding the risk of hypoperfusion and complications. Third, the selection of the appropriate antihypertensive agent is crucial, with short-acting intravenous drugs that can be titrated gradually being the primary choice and requiring continuous hemodynamic monitoring in an adequate facility.

Principle Safety: Avoid Too Rapid Decline (except certain syndromes)

The concept of autoregulation, especially in patients with Chronic hypertension is an important basis for determining blood pressure lowering strategies, as too rapid a reduction can increase the risk of cerebral, coronary, and renal hypoperfusion. Therefore, a number of literature consistently reports that the initial target for blood pressure reduction should be conservative in various clinical scenarios, such as a reduction in *mean arterial pressure* (MAP) of around 20-25% in the initial phase, followed by gradual decline according to the underlying clinical syndrome [16-18]. In line with matter the publications from *the British Medical Journal* (BMJ) and *the American Heart Association* (AHA) emphasize importance caution against overtreatment, especially on patients without evidence of acute target organ damage that is not automatically need decline pressure fast and aggressive blood [14, 15].

Organ-Based Approach Patient Target/ Characteristics

A widely used conceptual framework in emergency practice emphasizes the assessment of target organs most at risk of damage, including the brain, heart, kidneys, retina, and great vessels. Rossi et al. (2021) developed an algorithmic approach to expedite the identification of *hypertensive emergencies* based on target organ involvement, known as the "BARKH" framework (*Brain, Arteries, Retina, Kidney, Heart*). This approach allows the selection of intravenous therapy oriented to the specific clinical syndrome, rather than solely on mark pressure blood. Draft This is in line with the British and Irish Hypertension Society (BIHS) *position document*, which emphasizes the heterogeneity of clinical presentations and the importance of individualizing

treatment targets and strategies [7, 17]. Therapy selection can be adjusted according to the hypertension guidelines summarized in Tables 2 and 3. The BARKH algorithm is presented in Fig. 2.

Table 2. Condition hypertension emergency Which need decline pressure blood immediately with intravenous drugs and their targets (4, 20)

Condition Clinical / Comorbidity	Target & Time BP decrease	Drug Main Choice (IV)	Alternative / Notes
Hypertension without fail kidney I	A number of clock; lower FOLDER ±20-25%	Labetalol, Nicardipine	Nitroprusside, Urapidil
Hypertensive encephalopathy	Immediately; get down FOLDER 20-25%	Labetalol, Nicardipine	Nitroprusside
Syndrome acute coronary	Immediately; SBP < 140 mmHg	Nitroglycerin, Labetalol	Nicardipine, Esmolol; avoid beta-blockers if heart failure is severe/bradycardia
Edema lungs I	Immediately; SBP < 140 mmHg	Nitroglycerin, Nitroprusside	Clevidipine; beta-blocker contraindications
Dissection acute aortic	Coming soon; SBP < 120 mmHg & HR < 60/min	Esmolol, Labetalol	Add a vasodilator (Nicardipine/Nitroprusside) after the beta-blocker.
Eclampsia / severe preeclampsia	Quick; SBP < 160 mmHg & DBP < 105 mmHg	Labetalol, Nicardipine, Hydralazine	Oral nifedipine; consider termination of pregnancy
Injury acute kidney	Gradually; FOLDER ↓20-25%	Clevidipine, Fenoldopam, Nicardipine	Avoid nitroprusside when kidney function is severe
Perioperative hypertension	Fast in accordance condition intraoperative	Clevidipine, Esmolol, Nikardipine	Nitroglycerin
Catecholamine crisis (e.g. pheochromocytoma)	Quick; SBP < 130 mmHg in 1 first hour	Phentolamine, Clevidipine, Nicardipine	Beta-blockers only after alpha-blockade
intracerebral hemorrhage (ICH)	Quick; SBP 130-140 mmHg (avoid < 130) and maintained ±7 days	Clevidipine, Nicardipine, Labetalol	Esmolol, Hydralazine
Stroke acute ischemic	Thrombolysis : < 185/110 mmHg before, < 180/105 mmHg after EVT : ≤ 180/105 mmHg During & 24 hours post-EVT Without Reperfusion: lower BP 15% gradually	Clevidipine, Nicardipine, Labetalol	Esmolol, Hydralazine

Note: MAP (mean arterial pressure), SBP (systolic blood pressure), DBP (diastolic blood pressure), HR (heart rate), IV (intravenous), BP (blood pressure), ICH (intracerebral hemorrhage), And EVT (endovascular therapy)

Table 3. Medicines hypertension emergency Which available in Indonesia (20)

Name Drug	Job Start	Length of working	Dose	Contraindications	Side effects
Nicardipine	5–15 min	30–40 min	IV continuous start 5 mg/hour, titration each 15–30 min with increase of 2.5 mg until target BP is reached, then lower it to 3 mg/hour	Disturbance liver function	Sick head, reflex tachycardia
Nitroglycerin	1–5 min	3–5 min	5–200 µg/min IV, starting at 5 µg/min, raise each 5 mins	—	Sick head
Clonidine	±30 min	4–6 O'clock	150–300 µg IV during 5–10 min	—	Sedation, rebound hypertension
Diltiazem	±3 min	0.5–10 O'clock	Dose beginning 0.25 mg/kg IV during 2 min, to be continued infusion 5–15 mg/hour	Bradycardia, heart failure	Bradycardia
Metoprolol	1–2 min	5–8 O'clock	2.5–5 mg bolus IV for 2 min, can be repeated every 5 min up to a maximum dose of 15 mg	AV block degrees ≥ 2, failed heart systolic, asthma, bradycardia	Bradycardia
Labetalol	5–10 min	3–6 O'clock	IV bolus 0.25–0.5 mg/kg or infusion 2–4 mg/min until target TD achieved, to be continued 5–20 mg/hour	AV block degrees ≥ 2, failed heart systolic, asthma, bradycardia	Bronchospasm, bradycardia, nausea
Nitroprusside	Quick	1–2 min	0.3–10 µg/kg/min IV, titration go on 0.5 µg/kg/min each 5 mins until the BP target is reached	Fail liver/kidney function	Cyanide intoxication

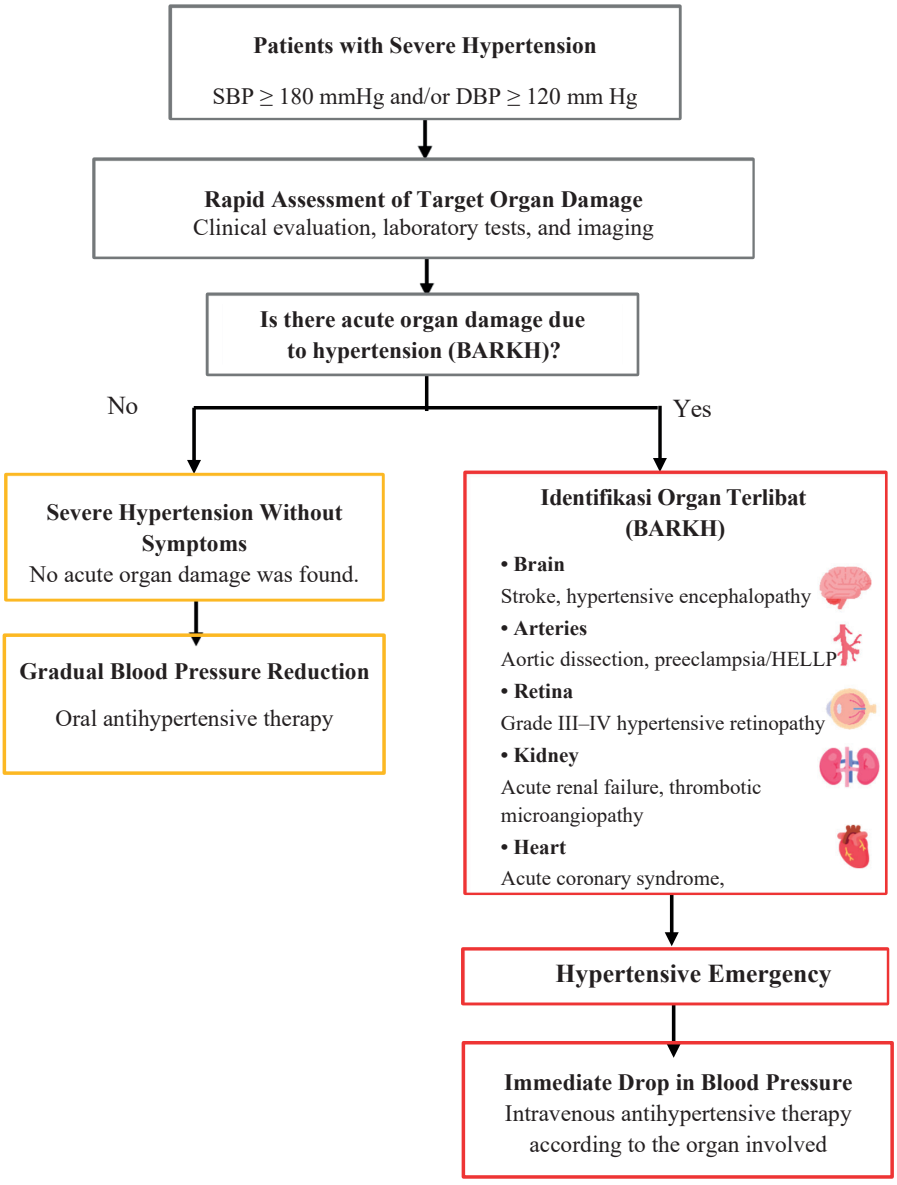

Fig. 2. Clinical decision algorithm for the management of hypertensive emergencies based on target organ involvement using the BARKH framework. Patients with severe hypertension undergo rapid assessment to detect damage Acute organ failure due to hypertension. Adapted from Rossi et al., 2021 [17]

Discussion

The results of the literature review show that hypertensive crises in Emergency Room nature heterogeneous, so that clinical approach Which only focus on number blood pressure is inadequate to describe the complexity of this condition. The main findings of the articles Which reviewed confirm that distinction between *hypertensive emergency* and very high blood pressure without acute target organ damage is a key point in taking decision clinical, particularly regarding the use of parenteral antihypertensive therapy. Consistently, all the literature reviewed agrees that the diagnosis of hypertensive emergency requires the presence of organ damage. target I, and not only extreme increase in blood pressure. This statement is strengthened by the framework proposed by Kulkarni et al. and reinforced by Miller et al. and Bress et al., who criticized a purely numbers-based approach [7, 14, 15]. In the context of the ER, these findings have implications. important Because pressure blood Very high levels are often found incidentally, but do not always reflect a condition requiring aggressive intervention. This Also supported by study other which emphasizes the importance of evaluating target organ damage that may be caused by hypertension. and require handling quick [21-25].

Data observational from Kotruchin et al. and Razzak et al. showed that in real practice, hypertensive emergencies are often dominated by certain syndromes, especially neurological involvement, while management variations, including the use of intravenous antihypertensives, are still very wide [11, 12]. This indicates a gap. between principle conceptual evidence-based And implementation clinical daily, especially in environment Emergency Room with pressure time and resource lim-

itations. In addition, the results of this study strengthen that therapy antihypertensive parenteral have a central role in hypertension emergency because it allows rapid but controlled lowering of blood pressure, with titration capabilities Which in accordance with response clinical patients. Balahura et al. and Davies et al. emphasized that the choice of intravenous agent is not universal, but must customized with clinical syndromes, drug pharmacokinetics, and the risk of hypoperfusion organs [16, 18]. This approach emphasizes the principle that the goal of therapy is not to immediately normalize blood pressure, but rather to prevent the progression of target organ damage. This concept is particularly relevant in patients with chronic hypertension, where autoregulatory mechanisms have shifted, so that too rapid a reduction in blood pressure can actually worsen perfusion. organ vital like Which explained in other studies [26-29]. One of the important points that is much discussed on literature Which reviewed is The term hypertensive urgency or severe hypertension. The results of the study indicate the potential dangers of unnecessary intensification of therapy in patients. asymptomatic in *acute care settings* [14, 15]. In the context of the ED, these findings confirm that not all patients with blood pressure ≥ 180/120 mmHg require intravenous therapy, and that a conservative approach with therapy oral And planning more continue often time more safe And rational [30, 31]. Therefore, risk stratification based on target organ involvement become crucial to avoid *overtreatment* while ensuring that patients with hypertensive emergencies do not experience delays in therapy [19, 32].

Framework algorithmic based target organs, such as BARKH Which developed by Rossi et al., emerged as a practical tool that bridges pathophysiological concepts with clinical decision-making in the ED [17]. This approach encourages clinicians to apply the principle of *treat the organ, not the number*, with a focus on the rapid identification of brain, heart, kidney, retina, and great vessel involvement. In ED practice, such an algorithm has the potential to improve management consistency, accelerate screening of patients who truly require parenteral therapy, and optimize resource allocation such as monitoring areas or the ICU [30, 33-35]. Although the conceptual framework and clinical recommendations for hypertensive crises in the ED have evolved, this literature review identified several significant gaps and challenges that remain. One major limitation is the lack of high-quality comparative evidence, particularly randomized *controlled trials* (RCTs), directly comparing the efficacy and safety of various intravenous antihypertensive agents in various clinical syndromes of hypertensive emergency. Consequently, many existing recommendations remain based on consensus. expert, rationality pathophysiological, as well as observational data, thus opening up space for fairly wide variations in practice between facilities and between countries [15, 16].

The next challenge relates to implementation recommendation on settings with limited resources. Ideally, titratable intravenous antihypertensive therapy requires close monitoring and system support such as a monitoring area, ICU, or high-dependency unit (HDU). However, in many healthcare facilities, limitations in monitoring facilities, drug availability, and internal referral systems mean that these recommendations are not always implemented optimally [11, 15]. phase I in Emergency Room, transition The transition from the ER to inpatient or outpatient care also remains a weak point. The finding of worse medium-term outcomes in the hypertensive emergency group confirms that interventions in The ER is not enough Treatment should stop at stabilizing blood pressure but should be followed by a clear and structured follow-up plan. However, systemic strategies for ensuring *continuity of care* after the ER are still not uniform and well-standardized [11, 19]. Review findings This support A shift in clinical approaches from a focus on blood pressure readings to assessing acute target organ damage and identifying clinical syndromes. This approach has the potential to reduce overtreatment, improve the appropriate use of intravenous therapy, and optimize the use of ER resources. Strengthening competence doctor guard ERs, using target organ-based algorithms, are also crucial for standardizing clinical decision-making, particularly in first-line care. Furthermore, developing local standard operating procedures (SOPs) tailored to facility capacity and monitoring systems is crucial for ensuring the safety of intravenous therapy.

Conclusion

Hypertensive crisis is a heterogeneous spectrum of clinical conditions and cannot be defined solely on the basis of blood pressure values. The diagnosis of hypertensive emergency requires the presence of acute target organ damage and is the primary basis for election therapy antihypertensive controlled intravenous administration. A clinical approach based on target organ involvement, such as the BARKH framework, supports informed decision-making. more rational And potential reduce the risk of overtreatment. However, limited evidence comparative strong, variety terminology, as well as implementation challenges in various healthcare contexts underscore the need for standardization practice Which adaptive and strengthening continuity of care after the acute phase in the ER.

Author Contributions: Barkah Djaka Purwanto (B.D.P.): Conceptualization, Study design, Literature search, Data interpretation, Writing – original draft, Writing – review & editing, Supervision. Danang

Prasetyaning Amukti (D.P.A.): Methodology, Literature screening and selection, Data curation, Critical revision of the manuscript, Writing – review & editing. Maratush Sholihah (M.S.): Data extraction, Analysis of study findings, Visualization (tables/figures), Writing – original draft support. All authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

Conflict of Interest – The authors declare that there is no conflict of interest regarding the publication of this article.

Funding Statement – This study received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Ethical Approval – Ethical approval was not required for this study because it was a literature review based on previously published articles and did not involve human participants or animal subjects.

Informed Consent – Not applicable.

Data Availability Statement – All data used in this study are derived from publicly available published articles indexed in the PubMed database. No new data were generated or analyzed in this study.

Acknowledgments – The authors would like to thank their respective institutions for academic support and access to scientific literature resources that facilitated the completion of this review.

Author Agreement – All authors have read and approved the final manuscript and agree to its submission and publication.

Reference

1. Desta DM, Wondafrash DZ, Tsadik AG, Kasahun GG, Tassew S, Gebrehiwot T, et al. Prevalence of Hypertensive Emergencies and Associated Factors Among Hospitalized Patients with Hypertensive Crisis: A Retrospective Cross-Sectional Study. Integr Blood Press Control [Internet]. 2020 [cited 2026 Jan 9];13:95. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC7455594/

2. Siddiqi TJ, Usman MS, Rashid AM, Javaid SS, Ahmed A, Clark D, et al. Clinical Outcomes in Hypertensive Emergencies: A Systematic Review and Meta-Analysis. J Am Heart Assoc [Internet]. 2023 [cited 2026 Jan 9];12(14). Available from: /doi/pdf/10.1161/JAHA.122.029355?download=true

3. Khan NN, Zurayyir EJ, Alghamdi AM, Alghamdi SF, Alqahtani MA, Abdalla EM, et al. Management Strategies for Hypertensive Crisis: A Systematic Review. Cureus [Internet]. 2024 Aug 12 [cited 2026 Jan 9];16(8):e66694. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC11389756/

4. Johnson HM, Shimbo D, Abdalla M, Altieri MM, Bress AP, Carter J, et al. 2025 AHA/ACC/AANP/AAPA/ABC/ACCP/ACPM/AGS/AMA/ASPC/NMA/PCNA/SGIM Guideline for the Prevention, Detection, Evaluation and Management of High Blood Pressure in Adults: A Report of the American College of Cardiology/American Heart Association Joint Committee…. Circulation [Internet]. 2025 Sep 16 [cited 2026 Jan 9];152(11):e114–218. Available from: /doi/pdf/10.1161/CIR.0000000000001356?download=true

5. Arnett DK, Goodman RA, Halperin JL, Anderson JL, Parekh AK, Zoghbi WA. AHA/ACC/HHS strategies to enhance application of clinical practice guidelines in patients with cardiovascular disease and comorbid conditions: from the American Heart Association, American College of Cardiology, and US Department of Health and Human Serv…. Circulation [Internet]. 2014 [cited 2026 Jan 9];130(18):1662–7. Available from: https://pubmed.ncbi.nlm.nih.gov/25212466/

6. Levine GN, O'Gara PT, Beckman JA, Al-Khatib SM, Birtcher KK, Cigarroa JE, et al. Recent innovations, modifications, and evolution of acc/aha clinical practice guidelines: An update for our constituencies: A report of the american college of cardiology/american heart association task force on clinical practice guidelines. Circulation [Internet]. 2019 Apr 23 [cited 2026 Jan 9];139(17):E879–86. Available from: /doi/pdf/10.1161/CIR.0000000000000651?download=true

7. Kulkarni S, Glover M, Kapil V, Abrams SML, Partridge S, McCormack T, et al. Management of hypertensive crisis: British and Irish Hypertension Society Position document. Journal of Human Hypertension 2022 37:10 [Internet]. 2022 Nov 22 [cited 2026 Jan 9];37(10):863–79. Available from: https://www.nature.com/articles/s41371-022-00776-9

8. Janke AT, McNaughton CD, Brody AM, Welch RD, Levy PD. Trends in the Incidence of Hypertensive Emergencies in US Emergency Departments From 2006 to 2013. J Am Heart Assoc [Internet]. 2016 Dec 5 [cited 2026 Jan 25];5(12). Available from: /doi/pdf/10.1161/JAHA.116.004511?download=true

9. Bryam Esteban Coello García, Doris Alexandra Caguana Quizhpi, Maria Alexandra Verdugo González, Alejandra Gabriela Villa García, Andrés Esteban Timuño Espinosa, Pamela Elizabeth Castillo Segovia, et al. HYPERTENSIVE CRISES-HYPERTENSIVE EMERGENCY AND CRISIS MANAGEMENT DURING ANESTHESIA. EPRA International Journal of Multidisciplinary Research (IJMR) [Internet]. 2024 Oct 14 [cited 2026 Jan 25];10(10):1–1. Available from: https://eprajournals.com//IJMR/article/14139

10. GAUER R. Severe Asymptomatic Hypertension: Evaluation and Treatment. Am Fam Physician [Internet]. 2017 Apr 15 [cited 2026 Jan 25];95(8):492–500. Available from: https://www.aafp.org/pubs/afp/issues/2017/0415/p492.html

11. Razzak JA, Ali N, Khan U, Ismail M, Khan BA, Raheem A, et al. Assessing the impact of acute severe hypertension in the emergency department: A prospective cohort study in Karachi, Pakistan. PLOS Global Public Health [Internet]. 2024 Dec 4 [cited 2026 Jan 25];4(12):e0003948. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC11616827/

12. Kotruchin P, Pratoomrat W, Mitsungnern T, Khamsai S, Imoun S. Clinical treatment outcomes of hypertensive emergency patients: Results from the hypertension registry program in Northeastern Thailand. J Clin Hypertens (Greenwich) [Internet]. 2021 Mar 1 [cited 2026 Jan 25];23(3):621–7. Available from: https://pubmed.ncbi.nlm.nih.gov/33615688/

13. Carey RM, Wright JT, Taler SJ, Whelton PK. Guideline-Driven Management of Hypertension: An Evidence-Based Update. Circ Res [Internet]. 2021 Apr 2 [cited 2026 Jan 25];128(7):827. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC8034801/

14. Miller JB, Hrabec D, Krishnamoorthy V, Kinni H, Brook RD. Evaluation and management of hypertensive emergencies. BMJ. BMJ Publishing Group; 2024.

15. Bress AP, Anderson TS, Flack JM, Ghazi L, Hall ME, Laffer CL, et al. The Management of Elevated Blood Pressure in the Acute Care Setting: A Scientific Statement From the American Heart Association. Vol. 81, Hypertension. Lippincott Williams and Wilkins; 2024. p. e94–106.

16. Balahura AM, Moroi Ștefan I, Scafa-Udriște A, Weiss E, Japie C, Bartoş D, et al. The Management of Hypertensive Emergencies – Is There a "Magical" Prescription for All? Vol. 11, Journal of Clinical Medicine. MDPI; 2022.

17. Rossi GP, Rossitto G, Maifredini C, Barchitta A, Bettella A, Latella R, et al. Management of hypertensive emergencies: a practical approach. Vol. 30, Blood Pressure. Taylor and Francis Ltd.; 2021. p. 208–19.

18. Davies EA, Charlesworth M, Agarwal S. Hypertensive emergencies. Vol. 24, BJA Education. Elsevier Ltd; 2024. p. 371–80.

19. Fragoulis C, Polyzos D, Mavroudis A, Tsioufis PA, Kasiakogias A, Leontsinis I, et al. One-year outcomes following a hypertensive urgency or emergency. Eur J Intern Med. 2024 Feb 1;120:107–13.

20. Ministry of Health of the Republic of Indonesia. National Guidelines for Hypertension Medical Services (PNPK). Jakarta; 2021.

21. Koracevic G, Lovic D, Stojanovic M, Djordjevic D, Koracevic M. Hypertensive emergency is characterized by acute hypertension-mediated organ damage but also a life-threatening status. Hypertension Research 2020 43:12 [Internet]. 2020 Jun 29 [cited 2026 Jan 28];43(12):1457–8. Available from: https://www.nature.com/articles/s41440-020-0501-6

22. Desta DM, Wondafrash DZ, Tsadik AG, Kasahun GG, Tassew S, Gebrehiwot T, et al. Prevalence of Hypertensive Emergency and Associated Factors Among Hospitalized Patients with Hypertensive Crisis: A Retrospective Cross-Sectional Study . Integr Blood Press Control [Internet]. 2020 Aug 18 [cited 2026 Jan 28];13:95–102. Available from: https://www.dovepress.com/prevalence-of-hypertensive-emergency-and-associated-factors-among-hosp-peer-reviewed-fulltext-article-IBPC

23. Paini A, Aggiusti C, Bertacchini F, Agabiti Rosei C, Maruelli G, Arnoldi C, et al. Definitions and Epidemiological Aspects of Hypertensive Urgencies and Emergencies. High Blood Pressure & Cardiovascular Prevention 2018 25:3 [Internet]. 2018 Jun 18 [cited 2026 Jan 28];25(3):241–4. Available from: https://link.springer.com/article/10.1007/s40292-018-0263-2

24. Kotruchin P, Tangpaisarn T, Mitsungnern T, Sukonthasarn A, Hoshide S, Turana Y, et al. Hypertensive emergency in Asia: A brief review. J Clin Hypertens [Internet]. 2022 Sep 1 [cited 2026 Jan 28];24(9):1226–35. Available from: /doi/pdf/10.1111/jch.14547

25. Rampengan SH, Sunarto HJ. Hypertensive emergency: An overview of heart as target organ damage. Bali Medical Journal. 2020 Dec 1;9(3):903–6.

26. Yu Y, Gong Y, Hu B, Ouyang B, Pan A, Liu J, et al. Expert consensus on blood pressure management in critically ill patients. Journal of Intensive Medicine [Internet]. 2023 Jul 31 [cited 2026 Jan 28];3(3):185–203. Available from: https://www.sciencedirect.com/science/article/pii/S2667100X23000324

27. Miller J, McNaughton C, Joyce K, Binz S, Levy P. Hypertension Management in Emergency Departments. Am J Hypertens [Internet]. 2020 Oct 21 [cited 2026 Jan 28];33(10):927–34. Available from: https://dx.doi.org/10.1093/ajh/hpaa068

28. El Hussein MT, Nguyen A. The Essence of Hypertensive Crises – A Mnemonic Approach. Journal for Nurse Practitioners [Internet]. 2021 Apr 1 [cited 2026 Jan 28];17(4):377–81. Available from: https://www.npjournal.org/action/showFullText?pii=S1555415520307212

29. Dunnsiri T, Kawashita T, Woo BKP. Hypertensive emergencies and urgencies: A single-centre experience in Northern Italy 2008-2015. J Hypertens [Internet]. 2020 Mar 1 [cited 2026 Jan 28];38(3):557. Available from: https://journals.lww.com/jhypertension/fulltext/2020/03000/hypertensive_emergencies_and_urgencies__a.27.aspx

30. Manolis AJ, Kallistratos MS, Koutsaki M, Doumas M, Poulimenos LE, Parissis J, et al. The diagnostic approach and management of hypertension in the emergency department. Eur J Intern Med [Internet]. 2024 Mar 1 [cited 2026 Jan 28];121:17–24. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0953620523004259

31. Jolly H, Freel EM, Isles C. Management of hypertensive emergencies and urgencies: narrative review. Postgrad Med J [Internet]. 2023 May 19 [cited 2026 Jan 28];99(1169):119–26. Available from: https://dx.doi.org/10.1136/postgradmedj-2021-140899

32. Breu AC, Axon RN. Acute treatment of hypertensive urgency. J Hosp Med [Internet]. 2018 Jan 1 [cited 2026 Jan 28];13(12):860–2. Available from: /doi/pdf/10.12788/jhm.3086

33. Buso G, Weber T, Fragoulis C, Grassi G, Agabiti-Rosei C, Delles C, et al. Diagnostic and therapeutic approach to acute blood pressure elevations: results of an international survey among centers of excellence of the European society of hypertension. Blood Press [Internet]. 2025 [cited 2026 Jan 28];34(1):2535689. Available from: https://www.tandfonline.com/action/journalInformation?journalCode=iblo20

34. Bender SR, Filippone JD, Heitz S, Bisognano JD. A Systematic Approach to Hypertensive Urgencies and Emergencies. Curr Hypertens Rev. 2005 Oct 27;1(3):275–81.

35. Sali SR, Ampeti S, Srivastava M, Begum Sheikh R, Shashikala BVS, Kirankumar PN. Hypertensive Emergencies in Diverse Settings: Diagnostic Strategies, Therapeutic Approaches, and Outcome Disparities. medtigo Journal of Emergency Medicine [Internet]. 2025 Jul 23 [cited 2026 Jan 28];2(3):1–5. Available from: https://journal.medtigo.com/hypertensive-emergencies-in-diverse-settings-diagnostic-strategies-therapeutic-approaches-and-outcome-disparities/