

Management of Severe Hypertension in Acute Medical Unit(AMU)

Tamer Shalaby Boutrus^{1*} and Zain Alqudah²

Abstract

Prevalence of hypertension (HTN) is expected to affect 1.5 billion patients by 2025 due to aging and sedentary lifestyle, HTN will contribute to increase in morbidity and mortality due to significant rise in cardiovascular disease (CVD) and CVD events. This means that acute physicians are expected to deal with more hypertensive emergencies, related comorbidities, and complications. We will discuss in this review the optimal management of hypertensive emergencies, investigations for secondary hypertension and follow up management plan.

Keywords: Hypertension; Hypertension emergencies; Hypertension urgencies, Secondary hypertension, Cardiovascular disease.

Abbreviations: HTN: Prevalence of Hypertension; AMU: Acute Medicine Unit; CVD: Cardiovascular Disease; BP: Blood Pressure; SH: Secondary Hypertension; HU: Hypertension Urgency.

Introduction

Prevalence of hypertension (HTN) is expected to affect 1.5 billion patients by 2025 due to aging and sedentary lifestyle, HTN will contribute to increase in morbidity and mortality due to significant rise in cardiovascular disease (CVD) and CVD events [1].

Definition of hypertension emergency (HE) is acute or severe rise in blood pressure (BP) leading to life threatening and organ damage which require intravenous medication to lower BP [2]. The severity of BP which is usually grade three (systolic BP 180 or more

and diastolic BP 110 or more) as well the rate of rise are responsible for the end organ damage by causing acute small artery fibrinoid necrosis which can affect multiple organs like the eyes leading to papilledema or flame hemorrhage, brain leading to encephalopathy or stroke, heart leading to acute heart failure with pulmonary oedema or aortic dissection, kidneys leading to acute renal failure with active urinary sediment, preeclampsia in pregnancy usually after 20 weeks, and less commonly disseminated intravascular coagulation [3].

¹Consultant Internal Medicine, The View Hospital, Lusail, Qatar

²Senior Internal medicine specialist, The view hospital, Lusail, Qatar

***Corresponding Author:** Tamer Shalaby Boutrus, Consultant Internal Medicine, The View Hospital, Lusail, Qatar.

Received Date: 08-16-2023

Accepted Date: 08-23-2023

Published Date: 09-04-2023

Copyright© 2023 by Boutrus TS. All rights reserved. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Discussion

Symptoms depends on which organ is affected, crushing chest pain with ECG changes and troponin rise may point towards aortic dissection or acute coronary syndromes, hypoxia, shortness of breath and respiratory distress may point towards pulmonary oedema, visual disturbance, headache, dizziness or focal neurology point towards eyes or stroke consequently. Encephalopathy rarely presents with focal neurology and mainly presents with generalized tonic clonic seizures, delirium, and loss of consciousness [3].

Recommended investigations for HE, renal profile (acute renal failure), albumin creatinine ratio (proteinuria), urinalysis (hematuria) and microscopy (casts), full blood count, fibrinogen, APTT/PT, and LDH (DIC), fundoscopy (retinopathy), ECG, high sensitive troponin, and NT-proBNP (cardiac events), chest X-ray (pulmonary oedema), urine drug screen (cocaine, methamphetamine), renal ultrasound (acute kidney injury, suspected renal artery stenosis), CT angiography (dissection), and CT brain or MRI (stroke) [3].

Rapid and controlled reduction in BP in an enhanced care or high dependency unit using intravenous medications is recommended, uncontrolled reduction to normal BP levels or lower can cause harm in many cases [3].

Recommendations is to lower mean arterial blood pressure (MAP)-measured automatically or can be calculated by adding diastolic BP to $\frac{1}{3}$ systolic-diastolic BP-by 25% in cases of HE presents with acute renal failure or encephalopathy, while reduction of systolic BP to below 140 mm Hg is recommended in acute coronary events or

pulmonary oedema, and in acute intracerebral hemorrhage in the first six hours [4]. While systolic BP below 120 mm Hg with heart rate below 60 in aortic dissection is preferred. Pregnant patients with preeclampsia or eclampsia the recommendations are to lower systolic BP to below 160 and diastolic BP below 105 mm Hg to maintain perfusion to fetus [3]. Following acute ischemic stroke, it is not recommended to treat HTN in the first 72 hours unless more than 220/120 or thrombolysis is planned where BP should be kept below 180/105 mm Hg [5].

Labetalol is commonly used in most of these scenarios but pulmonary oedema where nitroprusside or nitroglycerine can be used instead. Hypertension urgency (HU) is defined as severe HTN without evidence of any end organ damage explained above, BP usually grade 3 but patients with HU do not require admission in hospital and BP reduction can be achieved with oral medications in a clinic setting [6].

Secondary hypertension (SH)

Patients who present with hypertension emergency or urgency who are not using illicit drugs should be investigated for SH, the prevalence of SH is reported to be 5-15% of people with HTN, SH should also be suspected in those who are younger than 40-year-old or has a history of resistant HTN (HTN that remains above target albeit the use of three antihypertensive agents [7].

Common causes of SH are renovascular disease (atherosclerosis in elderly or fibromuscular dysplasia in younger patients), renal parenchymal disease, obstructive sleep apnea (OSA), endocrine causes (pheochromocytoma, Cushing's disease,

thyroid and parathyroid disease and primary hyperaldosteronism), coarctation of the aorta is usually discovered in childhood and has a prevalence of less than 1% in young patients with HTN. Drug history including illicit drugs is important and common medications which can cause HTN are calcineurin inhibitors, steroids, NSAIDs, oral contraceptive pills, and nasal decongestants [8].

Investigations for SH should include renal function and ultrasound with duplex renal artery or MR angiography, plasma aldosterone and renin with ratio (K can be normal in conns syndrome), plasma or 24 h urinary metanephrines, 24 h urinary-free cortisol, thyroid function test, parathyroid and calcium levels, echocardiography (helpful for coarctation as well as signs of left ventricular hypertrophy) and Epworth score and ambulatory polysomnography if suspicion of OSA [8].

Management of HTN in ambulatory care unit

Definition of HTN is office systolic BP of 140 or more and/or diastolic BP of 90 mmHg or more, these measures found to be equivalent to a 24 h ambulatory blood pressure monitoring of average 130/80 mmHg and home blood pressure monitoring average of 135/85 mmHg. Screening for HTN in adults should be at least every five years and more frequent in patients with high normal BP, screening should be repeated measures in office or once out-of-office (ambulatory or home BP monitoring) [9].

Cardiovascular risk assessment including metabolic syndrome, left ventricular hypertrophy, renal disease with proteinuria, and retinopathy is essential as these factors increase cardiovascular morbidity and

mortality further and influence the BP treatment target.

Assessment of SH as mentioned above is important as when a cause for HTN is found and dealt with this could essentially treat HTN if dealt with early, patients who are younger, who present with HTN emergency, resistant HTN or suddenly develop significant HTN should be screened for SH. Treatment of hypertension involves lifestyle interventions and drug therapy, lifestyle interventions include sodium restriction, moderate alcohol intake, regular exercise and avoiding sedentary lifestyle, healthy eating, weight loss, and smoking cessation [9].

Drug treatment should be initiated after a period of lifestyle intervention in grade 1 hypertension (office BP 140-159/90-99, ambulatory average 130/80, or home average 135/85) even in the absence of cardiovascular disease or end organ damage. Both (lifestyle intervention and drug treatment) should be started in patients with grade 1 HTN with cardiovascular disease or end organ damage or patients with grade 2 HTN (160/100), for elderly patients over 80, recommendations are to start treatment for grade 2 HTN. Higher risk patients with diabetes or chronic kidney disease with proteinuria a lower systolic target between 120-130 mmHg is acceptable if it is tolerated [9].

Combination of two antihypertensives is favorable in most patients unless mild hypertension close to recommended target or frail elderly patients where a monotherapy can be initiated, and BP monitored for few weeks. Single-pill strategy (combination of two or three antihypertensives) has shown better compliance than multiple pills strategy.

Recommended combination is angiotensin converting enzyme (ACE) inhibitor or angiotensin receptor blocker (ARB) with a calcium channel blocker (CCB) and if target BP is not achieved after at least 4 weeks (assuming compliance with treatment) to add a thiazide/thiazide-like diuretic. Beta-blockers are added for specific indications like heart failure with reduced ejection fraction (HFrEF) or ischemic heart disease.

ACE inhibitors or ARBs and diuretics are contraindicated in women who are planning for pregnancy, and the preferred antihypertensives in pregnancy include labetalol, alpha-methyldopa, and non-dihydropyridine CCB, target BP in pregnancy is 135/85 mmHg [9].

Statin therapy has shown a reduction in stroke risk by 25% and myocardial infarction risk by one-third even when BP is controlled, therefore statin therapy is strongly indicated in patients with HTN even if cardiovascular risk is low-moderate. Antiplatelet therapy is recommended for secondary prevention in hypertensive patients but is not recommended for primary prevention [9].

References

1. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global Burden of Hypertension: Analysis of Worldwide Data. *Lancet*. 2005;365(9455):217-23. [PubMed](#) | [CrossRef](#)
2. Van den Born BJ, Lip GY, Brguljan-Hitij J, Cremer A, Segura J, Morales E, et al. ESC Council on Hypertension Position Document on the Management of Hypertensive Emergencies. *Eur Heart J Cardiovasc Pharmacother*. 2019;5(1):37-46. [PubMed](#) | [CrossRef](#)
3. Vaughan CJ, Delanty N. Hypertensive Emergencies. *Lancet*. 2000;356(9227):411-7. [PubMed](#) | [CrossRef](#)
4. Anderson CS, Heeley E, Huang Y, Wang J, Stapf C, Delcourt C, et al. Rapid Blood-Pressure Lowering in Patients with Acute Intracerebral Hemorrhage. *N Engl J Med*. 2013;368(25):2355-65. [PubMed](#) | [CrossRef](#)
5. Lee M, Ovbiagele B, Hong KS, Wu YL, Lee JE, Rao NM, et al. Effect of Blood Pressure Lowering in Early Ischemic Stroke: Meta-Analysis. *Stroke*. 2015;46(7):1883-9. [PubMed](#) | [CrossRef](#)
6. Grassi D, O'Flaherty M, Pellizzari M, Bendersky M, Rodriguez P, Turri D, et al. Hypertensive Urgencies in the Emergency Department: Evaluating Blood Pressure Response to Rest and to Antihypertensive Drugs with Different Profiles. *J Clin Hypertens*. 2008;10(9):662-7. [PubMed](#) | [CrossRef](#)
7. Rimoldi SF, Scherrer U, Messerli FH. Secondary Arterial Hypertension: When, Who, and How to Screen. *Eur Heart J*. 2014;35(19):1245-54. [PubMed](#) | [CrossRef](#)

Conclusion

Hypertensive emergency is usually grade 3 HTN (180/110 or more) with end organ damage, treatment should be initiated urgently in enhanced care or high dependency unit and BP reduced in a controlled manner with target according to the damaged organ.

While hypertensive urgency is usually grade 3 HTN without end organ damage and can be managed in ambulatory care clinics. Suspect secondary hypertension in younger patients (below 40), acute severe hypertension, or resistant hypertension on three or more medications assuming compliance.

Dual antihypertensives and single-pill strategy are recommended for initial management of HTN. A lifestyle intervention and low sodium diet should be offered, firstly to improve other cardiovascular risk factors and secondly to ensure optimum control and reduce polypharmacy.

Strong recommendations for statin therapy in patients with HTN and no role for antiplatelet therapy in primary prevention yet.

8. Grossman E, Messerli FH. Drug-Induced Hypertension: An Unappreciated Cause of Secondary Hypertension. *Am J Med.* 2012;125(1):14-22. [PubMed](#) | [CrossRef](#)
9. Williams B, Mancia G, Spiering W, Agabiti Rosei E, Azizi M, Burnier M, et al. ESC Scientific Document Group. Guidelines for the Management of Arterial Hypertension. *Eur Heart J.* 2018;39(33):3021-3104.