Worcestershire Acute Hospitals NHS Trust

Management of Hypertensive crisis in adults

This guidance does not override the individual responsibility of health professionals to make appropriate decision according to the circumstances of the individual patient in consultation with the patient and /or carer. Health care professionals must be prepared to justify any deviation from this guidance.

Introduction

Hypertensive emergency and hypertensive urgency constitute the spectrum of hypertensive crisis. They are both characterized by severe hypertension but distinguished by the presence or absence of target organ damage.

This guideline is intended to provide guidance in the management of hypertensive crisis in adults presenting to the Worcestershire Acute Hospitals Trust.

Specifically, this guideline addresses:

1) What constitutes and how to define a hypertensive crisis
2) How to manage hypertensive crises.

This guideline is for use by the following staff groups:

Emergency Department Doctors and Nurses
Acute Medical Team Doctors and Nurses
Other Doctors and Nurses in Medical Departments

Lead Clinician(s)

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Approved by ***DMB*** on: 17th Jan 2023

Approved by Medicines Safety Committee on: 11th Jan 2023

Review Date: 17th Jan 2026
This is the most current document and should be used until a revised version is in place

Key amendments to this guideline

Date	Amendment	Approved by:
January 2023	New document approved	DMB/ MSC

Contents

Abbreviations

DBP Diastolic blood pressure
SBP Systolic blood pressure
GCS Glasgow Coma Score
JVP Jugular Venous pressure
LVH Left Ventricular Hypertrophy
MAP Mean Arterial pressure
RAS Renal Artery Stenosis

Purpose

This guideline is intended to provide guidance in the management of hypertensive crisis in adults presenting to the Worcestershire Acute Hospitals Trust.

This guideline is for use by the following staff groups:

Emergency Department Doctors and Nurses

Acute Medical Team Doctors and Nurses

Other Doctors and Nurses in the Medical wards/Departments

Scope

This guideline is not intended to provide guidance in the management of hypertensive emergencies such as **Acute Stroke, Intracerebral haemorrhage, Aortic dissection or Pre-eclampsia.**

Definitions

- Severe hypertension is defined as SBP ≥180mmHg and/or DBP ≥120mmHg
- Hypertensive emergency is defined as severe hypertension associated with evidence of ongoing target organ damage.
- Hypertensive urgency is defined as severe hypertension without evidence of ongoing target organ damage.
- Malignant hypertension (Accelerated Hypertension), is a type of hypertensive emergency in which severe hypertension, is associated with grade III or grade IV retinopathy. (*See appendix for details on classification of retinopathy)*
- Hypertensive encephalopathy refers to transient neurological symptoms such as headache, seizures, confusion, visual disturbance, nausea and vomiting, that occur with malignant hypertension. These are usually reversible with prompt treatment and lowering of BP.

Evidence of Target Organ Damage

Table 1

System	Target organ Damage	Symptoms & signs
Eye	Retinopathy	Blurring or loss of vision, dizziness, retinal haemorrhage, papilloedema
Neurology	Hypertensive Encephalopathy Intracerebral haemorrhage/Acute ischaemic stroke	Headache, nausea, vomiting, confusion, seizures, visual disturbance, altered sensorium focal deficit, dysphagia, altered sensorium.
Cardiac	Acute Coronary Syndrome Acute pulmonary Oedema	Chest pain, shortness of breath, ischaemia. Shortness of breath, elevated JVP, bi-basal crackles.
Renal	Acute kidney Injury	Oliguria, haematuria, proteinuria, acute rise in creatinine

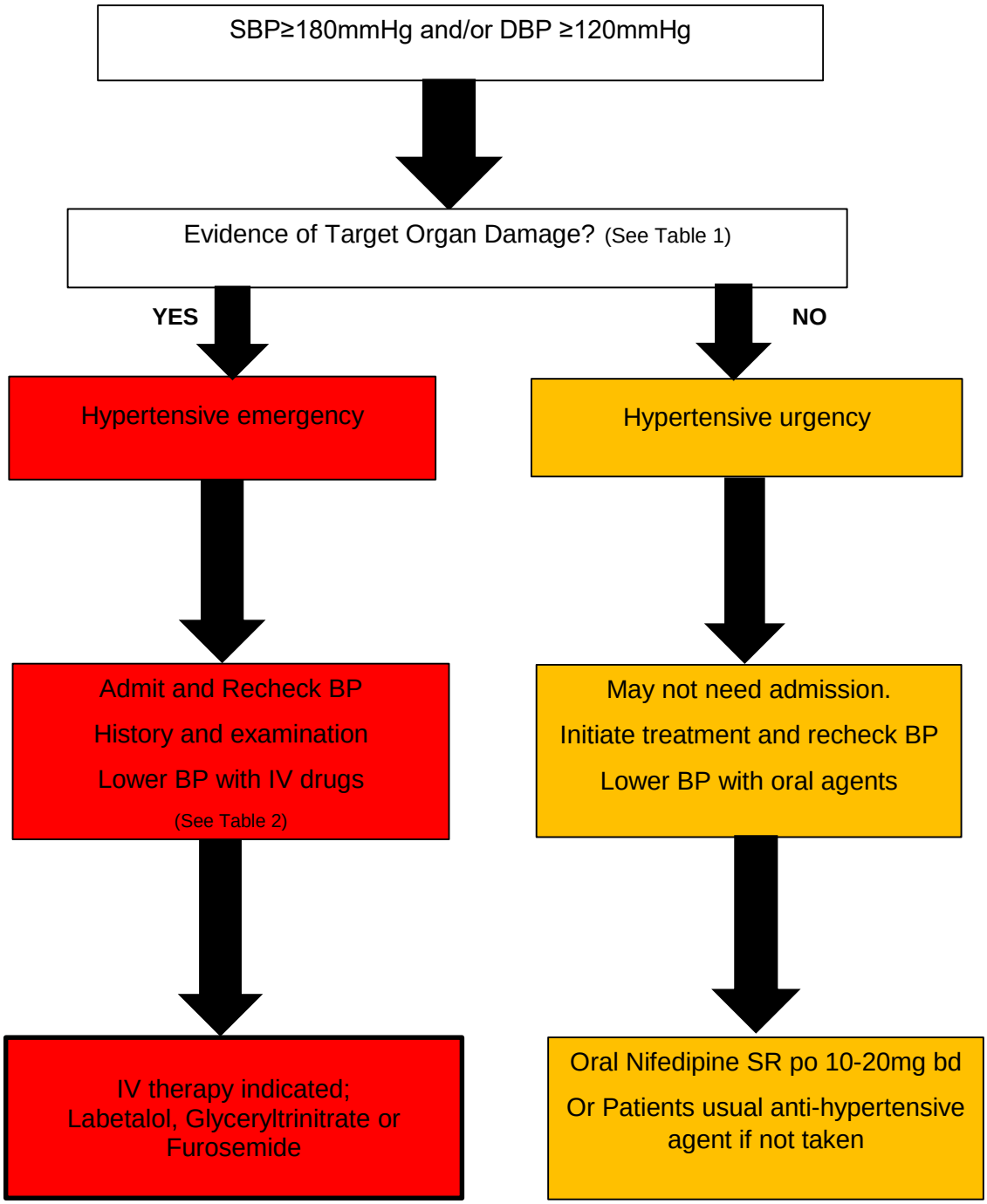
Assessment

- Focused history and examination, to ascertain if the presentation is a hypertensive urgency or emergency.
- Drug history, this should exclude over the counter agents, recreational drugs such as cocaine, amphetamines and tyramine ingestion in a patient on monoamine oxidase inhibitors.
- Enquire about compliance with anti-hypertensive medications if patient is known to be hypertensive.
- Monitor BP regularly.
- Ensure cuff is correctly sized and check BP in both arms.

Initial Investigations

- Urea, electrolytes, creatinine, FBC, Hba1c, Lipid profile, Thyroid Function Tests
- Urine dip for blood and protein, Urine for Albumin Creatinine ratio
- Fundoscopy – consider an ophthalmological assessment
- 12 lead ECG
- ECHO if evidence of LVH on ECG
- Chest X-ray
- CT head - if there is a neurological deficit/low GCS or seizures
  (Consider additional investigations for secondary hypertension based on individual presentations

FLOWCHART OF MANAGEMENT



Management of Hypertensive Emergency

- Rapid, uncontrolled reductions of blood pressure in patients with hypertensive crisis is dangerous due to autoregulation. This can lead to cerebral infarction, acute kidney injury and myocardial ischemia.
- Initial therapy is targeted at reducing MAP* by 25% within 1-2 hours, then, aim to lower SBP to 160mmhg and DBP to 100mmhg over the next 2-6 hours.
  NB: this does not apply to presentations with aortic dissection, intracerebral haemorrhage, pre-eclampsia, eclampsia, pheochromocytoma, acute pulmonary oedema and coronary ischaemia where a more rapid decrease in BP is often indicated.
- Intravenous treatment is indicated. BP should be monitored closely and patients will require ECG monitoring, this can be either on CCU, or via telemetry on a medical bed.
- Oral medication should be commenced within the first 24-48h to allow for the gradual phasing out of IV medications.

***MAP = *1/3* (SBP) + *2/3* (DBP) or 1/3(pulse pressure) + DBP (Pulse pressure = SBP – DBP)**

Intravenous Drugs, Indications and Dosing

Table 2

Drug	Indications	Contraindications	Dosage
Labetalol See appendix 2 for labetalol infusion chart	Hypertensive Encephalopathy Severe Hypertension and Acute Coronary event	2nd or 3rd degree AV block, systolic heart failure, asthma and bradycardia	10-20mg iv bolus (can be repeated) Iv Infusion - 200mg labetalol in 200mls 5% glucose at 1-6mg/min
*Glyceryl trinitrate	Hypertensive Encephalopathy Severe Hypertension and Acute Coronary event Severe hypertension with Acute pulmonary oedema	Aortic Stenosis Hypertrophic Cardiomyopathy Mitral stenosis Raised intracranial pressure due to head trauma or cerebral haemorrhage	Start at 10micrograms/min (0.6ml/hour) and increase by 0.3-0.6ml/hr every 30min until target BP is achieved*.
Furosemide	Severe hypertension with Acute pulmonary oedema	Volume depletion Severe hypokalaemia Severe hyponatremia	40-80mg iv bolus If requiring infusion 120-250mg at rate not exceeding 4mg/min

* **see Glyceryl Trinitrate for Intravenous Infusion - Standard Operating Procedure WAHT-CAR-064**
http://whitsweb/KeyDocs/KeyDocs/DownloadFile/3426

Management of Hypertensive Urgency

NB: These patients do not usually need admission and can be managed as an OP or via the AEC.

- Caution should be exercised in patients with chronic hypertension who may have adapted to a high BP, lowering it too quickly can be harmful.
- Initial treatment will depend on the patient's usual anti-hypertensive regimen and their concordance.
- The patient's normal antihypertensive medication can be given, if this has not already been taken on that day.
- Dihydropyridine calcium channel blockers such as Nifedipine SR (**po not sublingual**), 10mg - 20mg B.D can be used for initial treatment if the patient is not on a calcium channel blocker already. This can be titrated up as required and has a faster onset of action compared to amlodipine. There is often a requirement for an overlap of 1-2 days, during which a patient can receive both Nifedipine and Amlodipine, to allow for the latter to reach adequate therapeutic levels.
- Calcium channel blockers are also 1st line if there are any concerns regarding a diagnosis of RAS.
- If the patient is already on a calcium channel blocker, an alternative agent such as ACEI/ARB or a Beta-blocker can be prescribed. Avoid ACEI/ARB if suspected RAS.
- In general, once the hypertensive urgency has been addressed, treatment pathways should be guided by NICE and BHS algorithms.
- A Target BP reduction of 25% within 1 -2 hours is recommended. Aim for a BP of <160/100 within 6 hours.
- **Please seek specific guidance for lowering blood pressure in acute ischemic stroke, intracerebral haemorrhage, pre-eclampsia or aortic dissection as therapeutic targets differ**

Investigations for Secondary Causes

If the patient has features suggestive of a secondary cause of hypertension, please refer to the relevant specialty for further investigations.

- Endocrine - Cushing's, Pheochromocytoma, Primary Aldosteronism, Thyrotoxicosis.
- Renal - Glomerular disease, proteinuria, urine dip 2+ or more, or ACR > 30, PCR > 100, AKI, ADPKD, Renal Artery Stenosis
- Rheumatology - Scleroderma crisis
- Cardiac - Coarctation of the aorta – *rarely diagnosed in adulthood*.
- Hypertension with hypokalaemia and metabolic alkalosis may suggest underlying Mineralocorticoid excess or renal artery stenosis.
- Respiratory – Obstructive sleep apnoea

Basic investigations should include the following;

- TFTs
- Total cholesterol, HDL, and triglycerides.
- HbA1C.
- Urine ACR.
- Echocardiogram - can be done as an OP
- CXR

More specific investigations can be considered where indicated as follows;

- Renin and aldosterone studies
- 24-hour urinary catecholamines X 3 samples
- 24h urinary cortisol
- MRI adrenals
- MRI or CT of the renal arteries
- Immunology
- Sleep studies

Discharge Planning for patients admitted with a hypertensive emergency.

Discharge Criteria - BP < 160/100

Follow Up

- Ideally patients should be discharged with plans for follow up with the appropriate specialist service.
- Anyone with grade 3 and 4 retinopathy should be referred to Ophthalmology for retinal screening. We also recommend an optician review for all other patients with hypertensive crises.
- All those with evidence of left ventricular hypertrophy on ECG should have an outpatient echo.

Advice for GPs

- If the patient is being discharged with ACE inhibitors or a change in dose, please give clear advice to the GP to check U+E's in 10-14 days, to ensure Potassium does not rise >5.5 and/or creatinine rise is not >30% of baseline.

Advice for Patients

- Low salt diet.
- Reduced intake of caffeinated products.
- Smoking cessation advice.
- Limit alcohol intake if excessive.
- Increase physical activity.
- Weight loss if overweight or obese.
- Home blood pressure monitoring where appropriate.

Monitoring

Page/ Section of Key Document	Key control:	Checks to be carried out to confirm compliance with the Policy:	How often the check will be carried out:	Responsible for carrying out the check:	Results of check reported to: *(Responsible for also ensuring actions are developed to address any areas of non-compliance)*	Frequency of reporting:
	WHAT?	**HOW?**	**WHEN?**	**WHO?**	**WHERE?**	**WHEN?**
	These are the 'key' parts of the process that we are relying on to manage risk. We may not be able to monitor every part of the process, but we MUST monitor the key elements, otherwise we won't know whether we are keeping patients, visitors and/or staff safe.	What are we going to do to make sure the key parts of the process we have identified are being followed? (Some techniques to consider are; audits, spot-checks, analysis of incident trends, monitoring of attendance at training.)	Be realistic. Set achievable frequencies. Use terms such as '10 times a year' instead of 'monthly'.	Who is responsible for the check? Is it listed in the 'duties' section of the Policy? Is it in the job description?	Who will receive the monitoring results? Where this is a committee the committee's specific responsibility for monitoring the process must be described within its terms of reference.	Use terms such as '10 times a year' instead of 'monthly'.
4	Identifying and stratifying hypertensive crisis as per guideline	Audit	Annually	Foundation Year 1 Doctor as part of programme	Adult Directorate Clinical Governance	Annually
6	Treatment of hypertensive crisis as per guideline	Audit	Annually	Foundation Year 1 Doctor as part of programme	Adult Directorate Clinical Governance	Annually

References

1. International Society of Hypertension Global Hypertension Practice Guidelines 2020 https://doi.org/10.1161/HYPERTENSIONAHA.120.15026

2. Williams B, Mancia G, Spiering W, Agabiti Rosei E, Azizi M, Burnier M, Clement DL, Coca A, de Simone G, Dominiczak A, et al.. 2018 ESC/ESH Guidelines for the management of arterial hypertension: The Task Force for the Management Of Arterial Hypertension of the European Society of Cardiology and the European Society of Hypertension.**J Hypertens**. 2018; 36:1953–2041

3. National Institute for Health and Care Excellence. Hypertension in adults: diagnosis and management. March 2022 https://www.nice.org.uk/guidance/ng136/

4. British Hypertension Society: https://bihsoc.org/guidelines/hypertension-management/

5. Keith NM, Wagener HP, Barker NW Some different types of essential hypertension : their course & prognosis. Am J Med Sci, 1939; 197, 332-4

6. Hypertensive Emergency Guidelines, University Hospitals of Leicester .

7. Worcester Acute Hospitals Trust, Intravenous Labetalol Prescription Form Management of Hypertension in Acute Stroke Thrombolysis (available on Trust page)

8. Glyceryl Trinitrate for Intravenous Infusion - Standard Operating Procedure WAHT-CAR-064

Contribution List

Contribution List

This key document has been circulated to the following individuals for consultation;

Designation	
Dr Weng Oh	Consultant Nephrologist
Dr Jasper Trevelyan	Consultant Cardiologist
Dr Sarah Abbas	Consultant Nephrologist
Dr Taimoor Shafiq	Consultant Nephrologist
Dr Hana See Tho	Consultant Nephrologist

This key document has been circulated to the chair(s) of the following committee's / groups for comments;

Committee
Renal Departmental meeting
Renal Business meeting
DMB
MSC

Appendix 1

Grading of Hypertensive retinopathy

Grade 1	Generalized narrowing of arterioles
Grade 2	1 +Arterio-venous nipping
Grade 3	2 +Haemorrhages and exudates: Flame shaped haemorrhages Dot and blot haemorrhages Cotton wool spots Hard (waxy) exudates
Grade 4	grade 3 with papilloedema

Appendix 2

INTRAVENOUS LABETOLOL PRESCRIPTION FORM

Labetolol Prescription Form

Supporting Document 1 - Equality Impact Assessment Tool

To be completed by the key document author and included as an appendix to key document when submitted to the appropriate committee for consideration and approval.

Herefordshire & Worcestershire STP - Equality Impact Assessment (EIA) Form
Please read EIA guidelines when completing this form

Section 1 - Name of Organisation (please tick)

Herefordshire & Worcestershire STP		Herefordshire Council		Herefordshire CCG	
Worcestershire Acute Hospitals NHS Trust	✓	Worcestershire County Council		Worcestershire CCGs	
Worcestershire Health and Care NHS Trust		Wye Valley NHS Trust		Other (please state)	

Name of Lead for Activity	**Dr Thelma Mushambi**

Details of individuals completing this assessment	**Name**	**Job title**	**e-mail contact**
	Dr Thelma Mushambi	**Consultant Nephrologist**	**thelma.mushambi@nhs.net**
Date assessment completed	**01/12/2022**		

Section 2

Activity being assessed (e.g. policy/procedure, document, service redesign, policy, strategy etc.)	**Title: Hypertensive emergency & urgency guideline**			
What is the aim, purpose and/or intended outcomes of this Activity?	Provide guidance to clinicians in the management of hypertensive emergencies.			
Who will be affected by the development & implementation of this activity?	❑	Service User	✖	Staff
	✖	Patient	❑	Communities
	❑	Carers	❑	Other _____

	❑	Visitors	❑	
Is this:	✖Review of an existing activity - patients within the trust are already been managed for hypertensive emergencies but there was no trust guidance in place. ❑ New activity ❑ Planning to withdraw or reduce a service, activity or presence?			
What information and evidence have you reviewed to help inform this assessment? (Please name sources, eg demographic information for patients / services / staff groups affected, complaints etc.	British Hypertension Society Nice Guidelines on Hypertension Local trust guidance			
Summary of engagement or consultation undertaken (e.g. who and how have you engaged with, or why do you believe this is not required)	Renal Physicians Pharmacists Cardiologist Above teams contacted as they are already engaging in the management of patients with hypertension.			
Summary of relevant findings	It was agreed that a formal guideline on management of hypertensive emergencies was required.			

Section 3

Please consider the potential impact of this activity (during development & implementation) on each of the equality groups outlined below. **Please tick one or more impact box below for each Equality Group and explain your rationale**. Please note it is possible for the potential impact to be both positive and negative within the same equality group and this should be recorded. Remember to consider the impact on e.g. staff, public, patients, carers etc. in these equality groups.

Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
Age	✓			Improved management of hypertensive emergencies presentations
Disability	✓			Improved management of hypertensive emergencies presentations
Gender Reassignment	✓			Improved management of hypertensive emergencies presentations
Marriage & Civil Partnerships	✓			Improved management of hypertensive emergencies presentations
Pregnancy & Maternity		✓		Guidance not applicable to hypertensive emergencies in pregnancy
Race including Traveling Communities	✓			Improved management of hypertensive emergencies presentations

Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
Religion & Belief	✓			Improved management of hypertensive emergencies presentations
Sex	✓			Improved management of hypertensive emergencies presentations
Sexual Orientation	✓			Improved management of hypertensive emergencies presentations
Other Vulnerable and Disadvantaged Groups (e.g. carers; care leavers; homeless; Social/Economic deprivation, travelling communities etc.)	✓			Improved management of hypertensive emergencies presentations
Health Inequalities (any preventable, unfair & unjust differences in health status between groups, populations or individuals that arise from the unequal distribution of social, environmental & economic conditions within societies)		✓		Guideline is formulated for all patient presenting to WAHT who meet the specific clinical criteria for hypertensive emergencies

Section 4

What actions will you take to mitigate any potential negative impacts?	Risk identified	Actions required to reduce / eliminate negative impact	Who will lead on the action?	Timeframe
N/A	N/A	N/A	N/A	
How will you monitor these actions?				
When will you review this EIA? (e.g in a service redesign, this EIA should be revisited regularly throughout the design & implementation)				

Section 5 - Please read and agree to the following Equality Statement

1. Equality Statement

1.1. All public bodies have a statutory duty under the Equality Act 2010 to set out arrangements to assess and consult on how their policies and functions impact on the 9 protected characteristics: Age; Disability; Gender Reassignment; Marriage & Civil Partnership; Pregnancy & Maternity; Race; Religion & Belief; Sex; Sexual Orientation

1.2. Our Organisations will challenge discrimination, promote equality, respect human rights, and aims to design and implement services, policies and measures that meet the diverse needs of our service, and population, ensuring that none are placed at a disadvantage over others.

1.3. All staff are expected to deliver services and provide services and care in a manner which respects the individuality of service users, patients, carer's etc, and as such treat them and members of the workforce respectfully, paying due regard to the 9 protected characteristics.

Signature of person completing EIA	
Date signed	
Comments:	
Signature of person the Leader Person for this activity	T Mushambi
Date signed	01/12/2022
Comments:	I have completed the EIA

Supporting Document 2 – Financial Impact Assessment

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

	Title of document:	Yes/No
1.	Does the implementation of this document require any additional Capital resources	
2.	Does the implementation of this document require additional revenue	
3.	Does the implementation of this document require additional manpower	
4.	Does the implementation of this document release any manpower costs through a change in practice	
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	
	Other comments:	

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval.