HYPERTENSIVE EMERGENCIES AND URGENCIES

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Overview

- Definition and diagnosis
- Epidemiology
- Pathophysiology
- Management
- Clinical scenarios
Definition and diagnosis

- Patients with systolic BP greater than 220 mm Hg or a diastolic BP greater than 120 mm Hg are defined as having ‘hypertension crisis’

- Hypertension crisis are divided into 2 groups
  
  a) Hypertensive emergencies
  
  b) Hypertensive urgencies (severe uncontrolled hypertension)
Hypertensive urgencies vs emergencies

• Severe elevations of BP in the presence of acute life threatening end organ damage are classified as ‘hypertensive emergencies’ and

• In the absence of life threatening target organ damage are classified as ‘hypertensive urgencies’.
Why is it important to differentiate both?

<table>
<thead>
<tr>
<th>Hypertension emergencies</th>
<th>Hypertensive urgencies</th>
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<tbody>
<tr>
<td>• BP needs to be reduced immediately</td>
<td>• BP needs to be reduced over a period of 24-48 hours</td>
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<td>• Would require I.V antihypertensives</td>
<td>• Usually treated with oral antihypertensives</td>
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<td>• Would need close monitoring in ITU/HDU</td>
<td>• Can be managed on the ward</td>
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Introduction

• Hypertensive emergencies were first described by Volhard and Fahr in 1914

• They described patients with severe hypertension accompanied by vascular injury to heart, brain, retina and kidneys

• In 1939 first large study of malignant hypertension were published
Introduction-cont’d

• The results at the time by Keith et al. revealed that untreated malignant hypertension had a one year mortality of 79%.

• Prior to introduction of antihypertensive medications, approximately 7% of hypertensives developed a hypertensive crisis.
Epidemiology

- The distribution is parallel to that of essential hypertension
- Higher incidence in elderly and afro-Caribbean's
- Men are twice as affected as women
Epidemiology-cont’d

- Hypertensive emergencies occur in about 2% of patients with systemic hypertension.

- Mortality has reduced over the last 4 decades but the prevalence and demographics have remained same.

- Vast majority of patients have been previously diagnosed with hypertension.
Patient groups

- Hypertension patients with prior sub-optimal control.
- Obesity, coronary artery disease and nonadherence to medication
- In metropolitan areas, illicit drug use is reported to be a major risk factor
Pathophysiology

- The factors leading to severe and rapid elevations in blood pressure are poorly understood.

- Likely to be related to abrupt increase in systemic vascular resistance from humoral vasoconstrictors.

- The increase in BP leads to mechanical stress and endothelial damage.
Pathophysiology-cont’d

• This leads to activation of coagulation cascade and platelets and deposition of fibrin.

• With severe elevations in BP, endothelial injury and fibrinoid necrosis of the arterioles ensues.

• This results in ischemia and further activation of vasoactive mediators and leads to vicious cycle of ongoing injury
Pathophysicsiology-cont’d

• The renin angiotensin system is activated with further vasoconstriction and production of proinflammatory cytokines.

• The volume depletion which results from pressure natriuresis further stimulates the kidney to release further vasoconstrictor substances.

• This collective mechanism can result in end organ hypoperfusion, ischemia and dysfunction.
Clinical presentation

- Patients can present with shortness of breath, chest pain, headache, altered mental status and focal neurological deficit.

- Microangiopathic haemolytic anaemia can occur in up to 27% of patients with hypertensive crisis.

- An absolute BP measurement may not be as important as the rate of rise in BP.
Initial evaluation

• Appropriate triage of patients and a focussed medical history

• If known to have hypertension, document current antihypertensive medication and compliance

• Enquire into recreational drug use and monoamine oxidase inhibitors
Initial evaluation-cont’d

• Confirm BP in both arms and use appropriate cuff

• It is essential to perform a fundoscopical examination

• The presence of advanced retinopathy is closely associated with widespread microvascular dysfunction with renal injury.
Fundoscopy findings - Malignant HTN
Initial evaluation-cont’d

• Aortic dissection should always be considered in patients with chest pain

• Initial evaluation should also include U&E’s, FBC, LDH, peripheral smear and a urine dipstick.

• Microangiopathic haemolytic anaemia is diagnosed by the presence of low platelet count (≤150) with an elevated LDH (≥220 U/L) or presence of schistocytes.
ECG-LVH
Initial management

- Patients with severe hypertension with no evidence of target organ damage are treated as hypertensive urgency.

- In these patients, use of oral therapy to lower the blood pressure over 24-48 hours is the best approach.

- Rapid reduction of BP is associated with significant morbidity in these patients.
Figure 2. CBF autoregulatory curves (hypothetical) under various conditions.

- Normal
- Chronic HTN
- Pregnancy
- Eclampsia

Cerebral blood flow (ml/100g·min)

Cerebral perfusion pressure (mmHg)

Marilyn J. Cipolla Hypertension. 2007;50:14-24
Initial management

• Rapid correction of severely elevated BP below the auto regulatory range may lead to hypo perfusion and ischemia

• The BP should be lowered in a slow and controlled fashion
Hypertensive emergencies

- In these patients end organ damage is already present and rapid and excessive drop in BP can further reduce perfusion and exacerbate further injury.

- Should use short acting, titratable antihypertensive agent

- Because of unpredictable pharmacodynamics, the sublingual and intramuscular route should be avoided.
Clinical scenarios

• With each clinical scenario consider 2 questions

• a) Should I manage this patient’s BP emergently?
• b) If yes, what is the optimal treatment plan?

• In all clinical scenarios the BP is 220/120 mm Hg, heart rate is 100 beats/min, RR is 20 breaths/min and temperature is 36.9 degree centigrade
1\textsuperscript{st} CASE

• 65 year old patient admitted with nausea, vomiting and confusion

• Physical examination reveals papilledema but no obvious focal neurological deficit

• What is the diagnosis and its management
Diagnosis and management

• Hypertensive encephalopathy—here cerebral autoregulation is overwhelmed

• Results in vasodilatation, oedema and increased intracranial pressure.

• Controlled BP reduction results in rapid improvement of neurological symptoms.
Management

• Pure vasodilators such as nitroprusside have theoretical risks of intracranial shunting with worsening cerebral oedema

• Labetolol allows measured reduction in titrated doses or continuous drip

• The patient requires monitoring in ITU

• Target: reduce MAP by 20-25% over 2-6 hrs
2nd case

• 73 year old lady with sudden onset of shortness of breath, pink sputum and heavy chest pain

• Physical examination reveals bilateral crackles and elevated JVP

• ECG reveals LVH with no acute ischemic change
Diagnosis and management

- Acute pulmonary oedema

- Patient requires emergent management of elevated BP to reduce cardiac preload and after load

- Vasodilatation with nitroglycerin is the choice of treatment
Management

• There may be a case to add ACEi cautiously at a very small dose to reduce the after load.

• Furosemide has little effect in the initial phase

• Target: reduce MAP by 20-25%
3rd case

• 56 year old man with sharp, tearing chest and back pain.

• Pain started suddenly and he complains of weakness and paresthesia in left arm

• Patient has differential BPs in both arms and has a new diastolic murmur of aortic regurgitation
Diagnosis and management

- Aortic dissection, a sudden increase in the BP and heart rate create a shear stress that tears into the intimal layer of aorta

- Diagnosis requires high index of suspicion

- Treatment involves control of both the BP and heart rate to control the shear stress
Management-cont’d

• Nitroprusside has a rapid onset of action and provides both a arterial and venous dilatation

• Heart rate control with β-blockers should be initiated first to avoid reflex tachycardia

• Alternatively labetolol with its α and β blocking properties is user friendly option for controlling heart rate and BP simultaneously

• Target: Rapidly reduce systolic BP to 110 mm Hg
4th case

- 64 year old women with 6 hour history of right sided weakness

- Patient is aphasic and unable to walk

- On physical examination, marked right sided hemiplegia is noted
Diagnosis and management

- Both haemorrhagic and embolic strokes can be related to markedly elevated BP.

- In either case, injured brain shifts the cerebral auto regulation to the right.

- As a result, an higher MAP essential in maintaining adequate cerebral blood flow.
Management

- Therefore BP should not be reduced in stroke unless in extreme situations such as
  
  - a) BP > 220/120 mm Hg in ischemic strokes
  
  - b) BP > 180/100 mm Hg in hemorrhagic strokes

- Drug of choice: Labetolol or hydralazine

- Target: Reduce BP only if greater than above readings
Management

• If a thrombolytic is given, reduce BP to

- 180/105 mm Hg before treatment and 180/100 mm Hg after treatment.
**5**\(^{\text{th}}\) case

- 51 year old lady with complains mild headache and concerned about her history of hypertension

- She is anxious and has pain in knees from osteoarthritis

- There is evidence of some target organ damage but it is not life threatening
Diagnosis and management

• This is hypertensive urgency

• These patients would require gradual reduction of BP

• Immediate drop in BP in the A&E risks hypoperfusion and should only be done cautiously.
Hypertension urgencies

- Choice of agent:
  - a) It should have a short half life
  - b) Should be easily titratable
  - c) It should not have any major side effects on heart or kidneys and
  - d) It should be able to bring the BP cautiously down in a few hours to days
Calcium channel blockers

- They fit the bill and among them, we prefer to use Nifedipine moderate release.

- It can be started at 10mg TDS and can be titrated up to 20mg QDS.

- Alternative is Amlodipine 5-10mg OD

- Please do not use Nifedipine plain release! It can plummet the BP and can be dangerous.
Grading hypertension urgencies

- When patients have BP greater than 180/120 mmHg with no life threatening end organ damage - I grade them into 3 groups
  - a) Asymptomatic and no target organ damage
  - b) Asymptomatic with some target organ damage
  - c) Symptomatic with some target organ damage
Treatment options for GPs

• a) Start amlodipine and depending on age consider investigations for secondary causes

• b) Start Nifedipine MR 10mg TDS and make an urgent referral to BP clinic

• c) Start Nifedipine MR 10mg TDS and refer to medical team at Croydon.
Case 1

- 45 year old Caucasian gentleman had a routine medical at work and noted the BP was >180/120 mmHg

- Has high BMI and sedentary life style

- At Gp surgery, BP repeated 3 times and is still high.

- Patient is asymptomatic and urine dip is negative for blood or protein
Treatment options

• 1. Start him on amlodipine 5 mg od
• 2. Start him on Nifedepine MR 10mg TDS make an urgent OP referral
• 3. Start him on Nifedepine MR 10 mg TDS and refer him to medics same day
• 4. Reassure him and see him in few months
Case 2

- 36 year old Afro-Caribbean gentleman, 2 years ago when registering with GP noted to high BP

- Was asked to make some lifestyle changes and come back in few months time.

- Life got busy and did not come back
Clinical findings

• This time while joining gym noted to have a BP of 180/120 mmHg

• Made an appointment with GP, and BP was consistently in the same range even when repeated several times

• He was asymptomatic but urine dip showed 2+ protein and on fundoscopy showed silver wiring and AV nipping
Treatment options

• 1. Start him on amlodipine 5 mg od
• 2. Start him on Nifedepine MR 10mg TDS make an urgent OP referral
• 3. Start him on Nifedepine MR 10 mg TDS and refer him to medics same day
• 4. Reassure him and see him in few months
Case 3

- 42 year old Asian lady came to GP with complaints of headache and dizziness for past couple of weeks.

- Gradual onset with no weakness and no infective symptoms

- At the surgery noted to have a BP consistently above 180/120 mmHg.

- Urine dip showed 2+ proteinuria and fundoscopy showed silver wiring and AV nipping
Treatment options

• 1. Start her on amlodipine 5 mg od
• 2. Start her on Nifedepine MR 10mg TDS make an urgent OP referral
• 3. Start her on Nifedepine MR 10 mg TDS and refer him to medics same day
• 4. Reassure her and see her in a few months
Any questions?
References


References