Presentation of hypertensive emergency

Definitions surrounding hypertensive emergency

- Hypertension: elevated blood pressure (BP), usually defined as BP >140/90; pathological both in isolation and in association with other cardiovascular risk factors
- Severe hypertension: systolic BP (SBP) >200 mmHg and/or diastolic BP (DBP) >120 mmHg
- Hypertensive urgency: severe hypertension with no evidence of acute end organ damage
- **Hypertensive emergency**: severe hypertension with evidence of acute end organ damage
- Malignant/accelerated hypertension: a hypertensive emergency involving retinal vascular damage

Causes of hypertensive emergency

- Usually inadequate treatment and/or poor compliance in known hypertension, the causes of which include:
- Essential hypertension
    - Age
    - Family history
    - Salt
    - Alcohol
    - Caffeine
    - Smoking
    - Obesity
- Secondary hypertension
    - Renal
        - Renal artery stenosis
        - Glomerulonephritis
        - Chonic pyelonephritis
        - Polycystic kidney disease
    - Endocrine
        - Cushing's syndrome
        - Conn's syndrome
        - Acromegaly
        - Hyperthyroidism
        - Phaeochromocytoma
    - Arterial
        - Coarctation of the aorta
    - Drugs
        - Alcohol
        - Cocaine
        - Amphetamines
    - Pregnancy
        - Pre-eclamplsia

Pathophysiology of hypertensive emergency

- Abrupt rise in systemic vascular resistance
- Failure of normal autoregulatory mechanisms
- Fibrinoid necrosis of arterioles
- Damage to red blood cells from fibrin deposits causing microangiopathic haemolytic anaemia
- Microscopic haemorrhage
- Macroscopic haemorrhage

Clinical features of hypertensive emergency

- Hypertensive encephalopathy
  - Headache
  - Visual disturbance
  - Nausea & vomiting
  - Confusion
  - Seizures
  - Drowsiness
  - Coma
- Hypertensive retinopathy
  - Visual disturbance
  - Silver wiring
  - Cotton wool spots
  - Flame haemorrhages
  - Papilloedema
- Hypertensive cardiomyopathy
  - Ischaemic chest pain
  - Dyspnoea
  - Bibasal crepitations
  - Raised jugular venous pressure (JVP)
- Hypertensive nephropathy
  - Oliguria
- Intracerebral haemorrhage
  - Drowsiness
  - Coma
  - Focal neurological signs
- Aortic dissection
  - Tearing chest pain radiating to the back
  - Differential in pulse and BP between right and left upper limbs
- Eclampsia
  - Seizures in late pregnancy

Initial investigation of hypertensive emergency

- CT head
  - Exclude intracranial pathology that may cause, complicate or masquerade as hypertensive emergency
- Fundoscopy
  - Silver wiring
  - Cotton wool spots
  - Flame haemorrhages
  - Papilloedema
- 12-lead ECG
  - Left ventricular hypertrophy (LVH)
    - S wave in V1 or V2 + R wave in V5 or V6 >35 mm
  - Ischaemic changes
    - ST depression and/or T wave inversion
- Urinalysis
  - Proteinuria
  - Haematuria
  - Beta human chorionic gonadotropin (hCG)

- Urea & electrolytes
    - Acute kidney injury (AKI)
- Chest radiograph (CXR)
    - Pulmonary oedema
    - Widened mediastinum

Further investigation of hypertensive emergency

- Ambulatory BP monitoring in patients not known to have hypertension who present with hypertensive urgency
- Exclude secondary causes if not already done so

Initial management of hypertensive emergency

- Assess the patient from an ABCDE perspective
- Maintain a patent airway: use manoeuvres, adjuncts, supraglottic or definitive airways as indicated and suction any sputum or secretions
- Deliver high flow oxygen 15L/min via reservoir mask and titrate to achieve oxygen saturations (S_pO_2) 94-98% or 88-92% if known to have COPD
- Attach monitoring
    - Pulse oximetry
    - Non-invasive blood pressure
    - Three-lead cardiac monitoring
- Request 12 lead ECG and portable CXR
- Obtain intravenous (IV) access and take bloods
- Obtain a CT head to exclude intracranial pathology that may cause, complicate or masquerade as hypertensive emergency
- Controlled BP reduction; rapid BP reduction should be avoided because this may compromise blood flow to tissues in which autoregulatory mechanisms are already impared; pharmacological options are:
    - Nitroprusside IV
    - Labetalol IV
    - Nitrates IV
- Referral to high dependency unit (HDU) for:
    - Invasive BP monitoring, cardiac monitoring, urine output monitoring, neurological observations
- Patients with hypertensive urgency can be discharged once their BP has settled; should this require pharmacological management, a stat dose of amlodipine 5 mg orally (PO) is usually adequate

Further management of hypertensive emergency

- Advise lifestyle changes
    - Reduce intake of salt, alcohol and caffeine
    - Health diet
    - Regular exercise
    - Smoking cessation
- Control other cardiovascular risk factors e.g. diabetes mellitus
- Review of antihypertensive medication
    - If age <55 years: angiotensin converting enzyme inhibitor (A) +/- calcium channel blocker (C)/thiazide diuretic (D) +/- D/C
    - If age >55 years or black patient: C/D +/- A +/- D/C, respectively

Common questions concerning hypertensive emergency

- Define the term hypertensive emergency and explain how this differs from hypertensive urgency
  - Hypertensive emergency: severe hypertension with evidence of acute end organ damage
  - Hypertensive urgency: severe hypertension with no evidence of acute end organ damage
- List seven risk factors for essential hypertension
  - Age
  - Family history
  - Salt
  - Alcohol
  - Caffeine
  - Smoking
  - Obesity
- Outline the causes of secondary hypertension
  - Renal
    - Renal artery stenosis
    - Glomerulonephritis
    - Chonic pyelonephritis
    - Polycystic kidney disease
  - Endocrine
    - Cushing's syndrome
    - Conn's syndrome
    - Acromegaly
    - Hyperthyroidism
    - Phaeochromocytoma
  - Arterial
    - Coarctation of the aorta
  - Drugs
    - Alcohol
    - Cocaine
    - Amphetamines
- List the different types of end organ damage that may occur in hypertensive emergencies
  - Brain: hypertensive encephalopathy, intracerebral haemorrhage
  - Heart: hypertensive cardiomyopathy
  - Kidneys: hypertensive nephropathy
  - Eyes: hypertensive retinopathy
  - Aorta: aortic dissection
- Describe the clinical features of hypertensive encephalopathy
  - Headache
  - Visual disturbance
  - Nausea & vomiting
  - Confusion
  - Seizures
  - Drowsiness
  - Coma
- What initial investigation is important to exclude intracranial pathology that may cause, complicate or masquerade as hypertensive emergency?
  - CT head
- What other investigations would you perform and what abnormalities would you look for?
  - Fundoscopy
    - Silver wiring
    - Cotton wool spots

        - Flame haemorrhages
        - Papilloedema
    - 12 lead ECG
        - Left ventricular hypertrophy (LVH): S wave in V1 or V2 + R wave in V5 or V6 >35 mm
        - Ischaemic changes: ST depression and/or T wave inversion
    - Urinalysis
        - Proteinuria
        - Haematuria
        - Beta human chorionic gonadotropin (hCG)
    - Urea & electrolytes
        - Acute kidney injury (AKI)
    - Chest radiograph (CXR)
        - Pulmonary oedema
        - Widened mediastinum
- Outline your approach to BP reduction in a patient with hypertensive emergency
    - Controlled BP reduction; rapid BP reduction should be avoided because this may compromise blood flow to tissues in which autoregulatory mechanisms are already impared; pharmacological options are:
        - Nitroprusside IV
        - Labetalol IV
        - Nitrates IV
    - Referral to HDU for:
        - Invasive BP monitoring
        - Cardiac monitoring
        - Urine output monitoring
        - Neurological observations
- How would you manage a patient with hypertensive urgency who was otherwise fit for discharge?
    - Patients with hypertensive urgency can be discharged once their BP has settled; should this require pharmacological management, a stat dose of amlodipine 5 mg PO is usually adequate
- What follow up investigation would you consider for a patient with hypertensive urgency who was not previously known to have hypertension
    - Ambulatory BP monitoring
- What lifestyle advice would you give patients about reducing their BP
    - Reduce intake of salt, alcohol and caffeine
    - Health diet
    - Regular exercise
    - Smoking cessation