

SESLHD GUIDELINE COVER SHEET

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SUMMARY	This document will provide a guideline for the assessment and management of hypertension in ADULTS (excluding pregnant females and patients <18 years old) in the inpatient ward setting (excluding ICU/ED).

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Management of Hypertension in the SESLHD Ward Settings

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Section 1 - Background and Scope

Hypertension is increasingly common in the Australian adult population and this is especially true with increasing age. Chronic hypertension is a risk factor for the development of coronary artery disease, cerebrovascular disease, chronic renal impairment and heart failure. A combination of an ageing population and multi-morbidity has further contributed to the high rates of hypertension. Diagnosed and undiagnosed chronic hypertension is common in patients admitted to hospital with 71% of all adults with measured high blood pressure in 2014/15 not reporting having hypertension (96.5% of adults aged 18-43 years, and 53.3% of adults aged >75 years).

In addition to the reason for hospital admission being a potential stressor for elevations in blood pressure, the other common causes for asymptomatic markedly elevated blood pressure in the hospital setting include underlying undiagnosed chronic hypertension, inadequate or non-compliance with treatment, incorrectly charted medications, anxiety and pain, fluid overload and/or medications exacerbating hypertension e.g. NSAIDs, steroids.

There are many guidelines available for the management of chronic hypertension, hypertensive emergencies and urgencies, but there is a dearth of information regarding the management of asymptomatic severe hypertension in hospital inpatients. Studies have suggested that symptomatic severe hypertension is often managed aggressively with intravenous hydralazine and topical glyceryl trinitrate (GTN), but these are not recommended in the setting of asymptomatic hypertension in ward inpatients. Rapid blood pressure lowering is associated with increased risks of myocardial and cerebral hypoperfusion as well as an increase in falls especially in elderly patients.

The scope of this document is to provide a guideline for **the assessment and management of hypertension in ADULTS (excluding pregnant females and patients <18 years old) in the inpatient ward setting (excluding ICU/ED)**; and to suggest appropriate therapies for asymptomatic patients, as well as those presenting with hypertensive urgencies and emergencies who may require consultation with senior medical staff and/or transfer to an intensive care setting

NOTE: A patient's individual circumstances/comorbidities should be taken into account when considering choice of drug and dose

Section 2 – Clinical Tips

Do's

1. Reduce blood pressure in a patient with severe asymptomatic hypertension slowly, using oral agents.
2. If a patient reports a history of missed doses, we suggest administering a standard dose of their prescribed medication.
3. Document a blood pressure goal and treatment timeframe. This should be over hours to days in a patient with asymptomatic severe hypertension.
4. Seek further guidance when reviewing a patient with documented blood pressure targets.
5. The goal is not always a normal BP.

Dont's

1. Do not prescribe excessive doses of antihypertensives to normalise blood pressure rapidly in asymptomatic patients. This can lead to iatrogenic hypotension and falls which may need emergency management.
2. Sublingual nifedipine, previously used for the management of severe asymptomatic hypertension has been reported to cause severe myocardial ischaemia and infarction. Dosing with intravenous medications or fast-acting agents such as nifedipine or hydralazine should be avoided.
3. Do not use glyceryl trinitrate (GTN) patches to manage asymptomatic hypertension as it causes rapid and often dramatic reductions in BP, which can lead to decreased cerebral perfusion to the brain, headaches and additionally falls in hospital.

Section 3 - Definitions

Severe asymptomatic hypertension:

- Blood pressure greater than 180/120mmHg with no symptoms of hypertension and no evidence of acute target organ damage and no risk factors for end-organ damage.

Hypertensive urgency

- Severe asymptomatic hypertension (SBP >180mmHg and/or DBP >120mmHg) without target organ damage seen in hypertensive emergencies but with risk factors for end organ damage.

Hypertensive emergency

- Severe asymptomatic hypertension (SBP >180mmHg and/or DBP >120mmHg) with end-organ damage such as acute coronary syndrome, aortic dissection, hypertensive encephalopathy, acute renal failure, acute heart failure, ischaemic stroke and haemorrhagic stroke.

Section 4 - Responsibilities

Medical officers are responsible for:

- Assessment of patients identified by nursing staff in accordance with NSW Health PD2013_049 [Recognition and Management of Patients who are Clinically Deteriorating](#)
- Assessment and management of hypertension
- Prescription of anti-hypertensives as required
- Junior medical officers should escalate and consult with senior medical officers to ensure the appropriate management and monitoring of patients with hypertensive emergencies (i.e. senior registrars, consultants, ICU registrars).

Registered/Enrolled Nurses responsible for:

- Assessment and escalation of hypertension in accordance with NSW Health PD2013_049 [Recognition and Management of Patients who are Clinically Deteriorating](#)
- Provision of prescribed anti-hypertensives
- Assessment and ongoing monitoring of patients with elevated blood pressures.

Section 5 Severe Asymptomatic Hypertension

Definition

Blood pressure greater than 180/120mmHg with no symptoms of hypertension and no evidence of acute end organ damage and no risk factors for end-organ damage.

Assessment

- (1) Stay calm and confirm the presence of severe asymptomatic hypertension by verifying the SBP is greater than 180 mmHg or the DBP is greater than 120 mmHg in both arms
- (2) Verify the absence of symptoms of hypertension and of end-organ damage on history and examination (Box 1)
- (3) Determine if the patient is at risk of end-organ damage
- (4) Screen for possible causes of elevated blood pressure (Box 2).

If the patient does not describe symptoms of **hypertension** or **evidence of end-organ damage** and does not have **risks for end-organ damage**, they are considered to have severe asymptomatic hypertension. In this case, the goal of therapy is to reduce BP to < 160 mmHg SBP and < 100 mmHg DBP over several hours.

Box 1: Red Flags on history/examination

Acute head injury/trauma
Generalised neurological symptoms (agitation/delirium/seizures)
Focal neurological symptoms consistent with stroke
Nausea/vomiting
Chest pain
Acute severe back pain
Dyspnoea
Pregnancy
Recent drug withdrawal e.g. anti-hypertensives

Initial Investigations

- ECG
- Urinalysis
- EUC
- Early morning cortisol*
- Plasma renin and aldosterone*
- Fasting plasma metanephrine and normetanephrine*

*Only needs to be performed once and can be sent by the caring team.

Box 2: Correctable causes for severe asymptomatic hypertension

History of poorly controlled blood pressure or untreated hypertension
Withheld medications or nonadherence to medications
Uncontrolled pain/stress/anxiety
Fluid overload
Recent institution of medication associated with hypertension e.g. systemic corticosteroids.
Drug withdrawal

Following assessment, treatment should be commenced. Do not wait for results of all investigations before initiating treatment. Further investigations should be directed based on history and examination findings.

Section 5 Severe Asymptomatic Hypertension

Management Principles

Initial treatment should be to correct the underlying reversible causes of elevated blood pressure (e.g. pain, anxiety, missed anti-hypertensives or drug withdrawal). Secondary treatment options include increasing the dose of existing antihypertensive medications or adding on additional antihypertensive medications.

Instituting antihypertensive therapy in treatment naïve patients should be performed slowly with reference to the suggested therapies below. In the absence of features of end-organ damage, first line therapy should be oral agents.

Once medications have been given, blood pressure should be rechecked in two hours – if it is decreasing, recommence standard blood pressure testing intervals and consider starting a long-term antihypertensive. If BP is unchanged or increasing, reassess the patient, consider secondary causes of hypertension and discuss the case with the registrar.

Treatment

Treatment may be instituted prior to completion of investigations. Document blood pressure target and rate of blood pressure reduction: Aim reduction in BP to 160/120mmHg over several hours to days. The rate of BP reduction should be no greater than 25% of mean arterial pressure (MAP) within 24 hours (Box 3).

Box 3: Mean Arterial Pressure (ref)

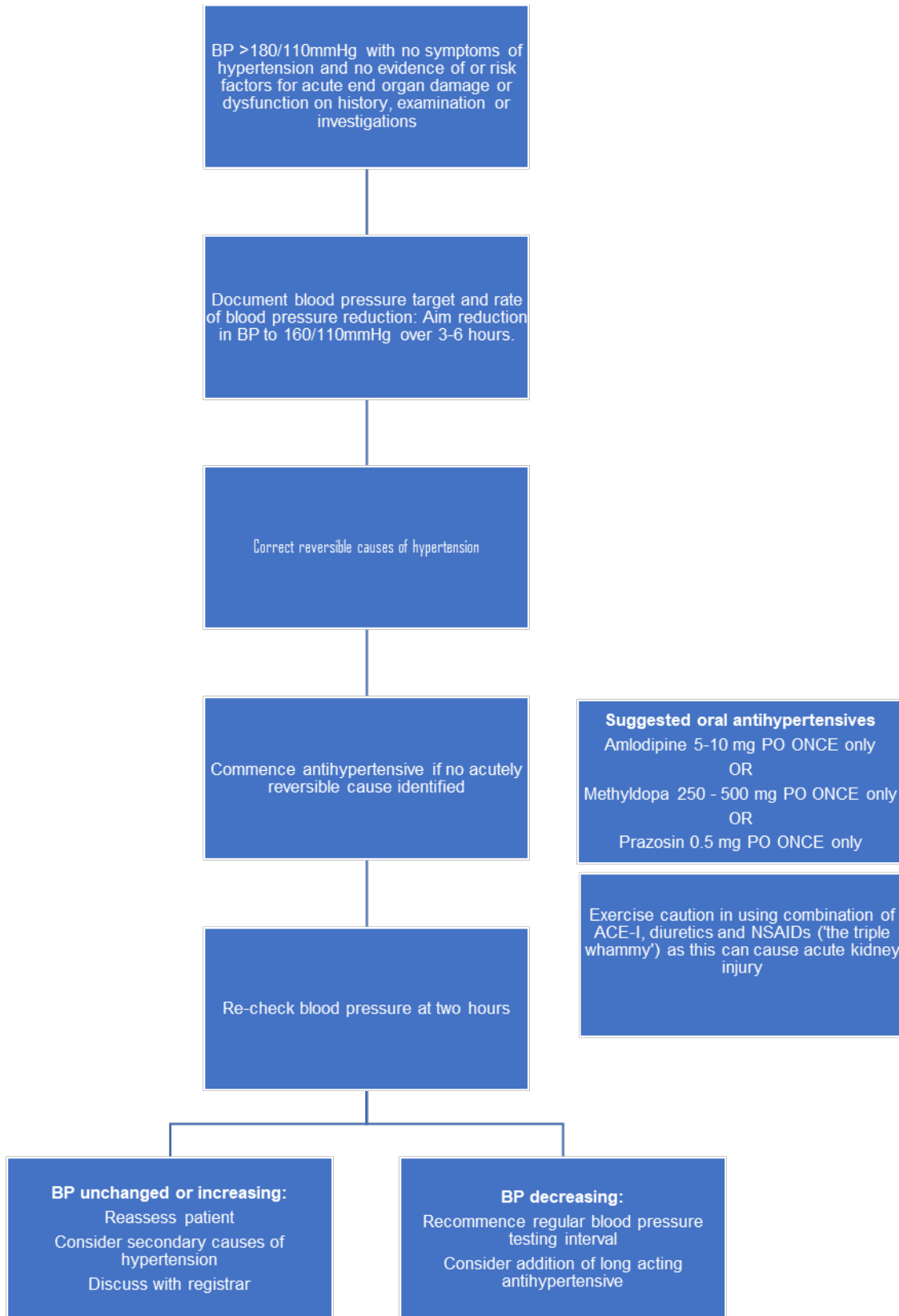
Mean arterial pressure (MAP) is the average arterial pressure during one cardiac cycle. It may be estimated using systolic (SBP) and diastolic (DBP) blood pressures.

$$MAP = \frac{SBP + 2DBP}{3}$$

Suggested oral medications for use in severe asymptomatic hypertension

Amlodipine 5-10 mg PO ONCE only
OR
Methyldopa 250 to 500 mg PO ONCE only
OR
Prazosin 0.5 mg PO ONCE only

Chart 1: Flowchart for severe asymptomatic hypertension



Section 6 - Hypertensive Urgency

Definition

Severe asymptomatic hypertension (SBP >180mmHg and/or DBP >120mmHg) without end organ damage seen in hypertensive emergencies but with risk factors for end organ damage.

- End organ damage in hypertensive emergency includes major neurological changes, hypertensive encephalopathy, cerebral infarction, intracranial haemorrhage, acute LV failure, acute pulmonary oedema, aortic dissection, acute kidney injury, or eclampsia
- Risk factors for end-organ damage include conditions such as heart failure, ischaemic heart disease, chronic kidney disease, transient ischaemic attack or stroke.

Assessment

- (1) Confirm the presence of severe asymptomatic hypertension by verifying the SBP is greater than 180 mmHg or the DBP is greater than 120 mmHg in both arms
- (2) Verify the absence of symptoms of hypertension and of end-organ damage on history and examination (Box 4)
- (3) Determine if the patient is at risk of end-organ damage
- (4) Screen for possible causes of elevated blood pressure.

Box 4: Red Flags on history/examination

Acute head injury/trauma
 Generalised neurological symptoms (agitation/delirium/seizures)
 Focal neurological symptoms consistent with stroke
 Acute dyspnoea
 Nausea/vomiting
 Chest pain
 Acute severe back pain
 Pregnancy
 Recent drug withdrawal

If the patient does not describe symptoms of hypertension or evidence of end-organ damage but is at risk of end-organ damage, they are considered to have hypertensive urgency. In this case, the goal of therapy is to reduce BP to < 160 mmHg SBP and < 100 mmHg DBP over three to six hours.

Basic investigations needed for de novo presentation in an untreated patient (as listed above):

- ECG
 - Urinalysis
 - EUC
 - Early morning cortisol*
 - Plasma renin and aldosterone*
 - Fasting plasma metanephrine and normetanephrine*
- *Only needs to be performed once

Following assessment, do not wait for results of all investigations before initiating treatment. Further investigations should be directed based on history and examination findings.

Management Principles

Initial treatment should be to correct the underlying reversible causes of elevated blood pressure (e.g. pain, anxiety, missed anti-hypertensives or drug withdrawal). Secondary treatment options include increasing the dose of existing antihypertensive medications or adding on additional antihypertensive medications.

Instituting antihypertensive therapy in treatment naïve patients should be performed slowly with reference to the suggested therapies below. In the absence of features of end-organ damage, first line therapy should be oral agents.

Treatment

Treatment should be instituted prior to completion of investigations. Treatment should begin quickly but the aim is to **lower BP over three to six hours using oral therapy** to around 160/100mmHg. The rate of BP reduction should be **no greater than 25% of MAP within 24 hours**. Document blood pressure target and rate of blood pressure reduction.

Adjust usual antihypertensives or start treatment if previously untreated, and discuss with the on-call nephrologist or renal registrar for advice.

Suggested oral medications for use in hypertensive urgency

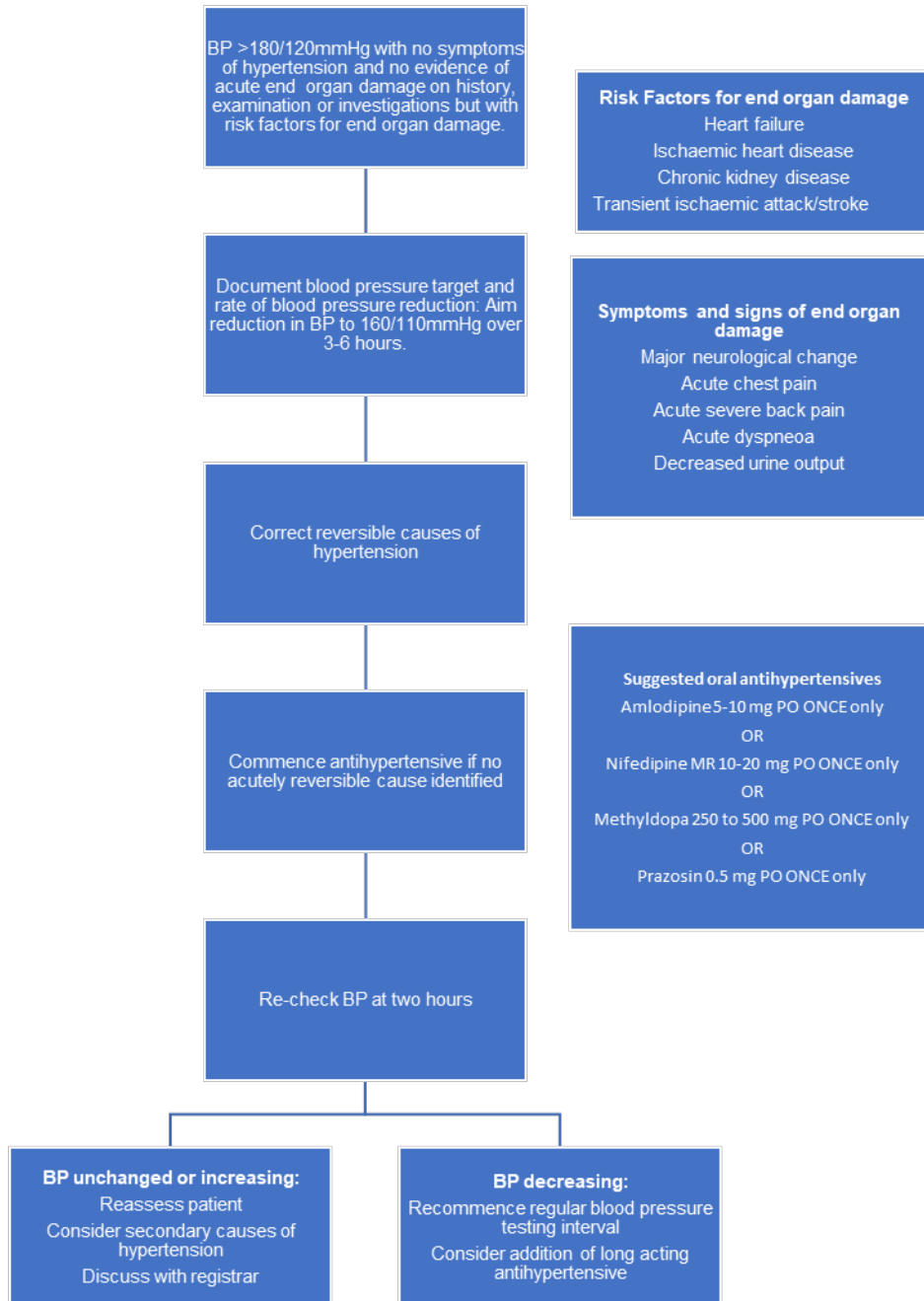
Amlodipine 5-10 mg PO ONCE only
OR
Nifedipine MR 10-20 mg PO ONCE only
OR
Methyldopa 250 to 500 mg PO ONCE only
OR
Prazosin 0.5 mg PO ONCE only

Once medications have been given, **blood pressure should be rechecked in two hours** – if it is decreasing, recommence regular blood pressure testing intervals and arrange for nephrology follow up (either inpatient or outpatient) within the week. If it is unchanged or increasing, reassess the patient, consider secondary causes of hypertension and discuss the case with the registrar.

All patients with hypertensive urgency and hypertensive emergency should have nephrology or GP follow up.

If patient is unable to tolerate oral medications, then CCU or ICU may need to be contacted as a monitored bed is usually required to give IV anti-hypertensives.

Chart 2: Flowchart for hypertensive urgency



Section 7 – Hypertensive Emergency

Definition

Severe hypertension (SBP \geq 180 mmHg and/or DBP \geq 120mmHg) with deteriorating end organ function:

End organ dysfunction in hypertensive emergency

- Acute coronary syndromes
- Aortic dissection
- Hypertensive encephalopathy
- Subarachnoid haemorrhage
- Malignant hypertension with acute kidney injury, acute retinopathy or acute pulmonary oedema.

Escalation

It is essential that hypertensive emergencies be escalated to the appropriate medical officers (senior registrars, nephrologists on call or consultants) to ensure timely and appropriate management. Vasoactive intravenous drug management will likely require high dependency or intensive care level monitoring to ensure patient safety and optimal clinical outcomes, and will also depend on local HDU/ICU departmental protocols.

Investigations

- ECG
 - Urinalysis
 - EUC
 - Early morning cortisol*
 - Plasma renin and aldosterone*
 - Fasting plasma metanephrine and normetanephrine*
- *Only needs to be performed once

Further investigations to consider based on the presenting symptoms include:

- Chest X-ray
- Troponin
- CT-angiogram
- CT-brain

Following assessment, do not wait for results of all investigations before initiating treatment. Further investigations should be directed based on history and examination findings. Start treatment prior to the availability of these results.

Management Principles

- Aim to lower BP, initially to around 160/110mmHg or reduction in MAP of no more than 25% in 24 hours to avoid cerebral hypoperfusion. It is often necessary to monitor BP invasively, which can be done in the ICU/HDU setting
- In aortic dissection, aim for a systolic BP 100-120mmHg
- Hypertension in acute ischaemic stroke is common and is often not reduced within the first three days of hospitalisation
- Commence oral antihypertensive therapy as soon as a response to I/V agents is apparent; this allows the smooth transition from I/V to oral agents.

Treatment

Suggested IV medications for use in hypertensive emergency

Sodium Nitroprusside 0.3 micrograms/kg/min infusion

OR

Clonidine 150 to 300 micrograms slow IV injection over 10 minutes

OR

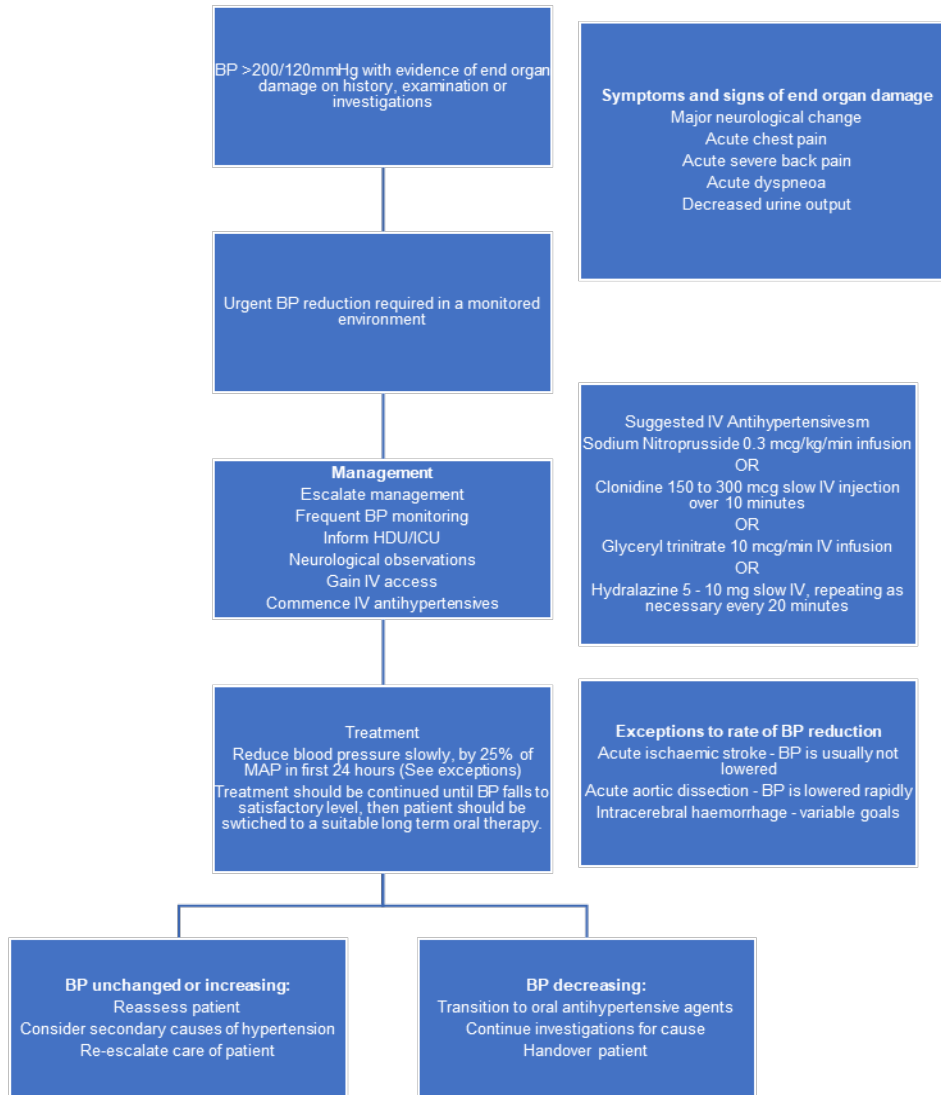
Glyceryl trinitrate 10 micrograms/min IV infusion

OR

Hydralazine 5 - 10 micrograms slow IV, repeating as necessary every 20 minutes

Commence oral antihypertensive therapy as soon as a response to IV agents is apparent; this allows the smooth transition from I/V to oral agents. However, there is insufficient RCT evidence to determine which drug or drug class is most effective in reducing mortality and morbidity. Therefore the drug of choice is largely determined by the type of hypertensive emergency and the hospital formulary. The dosing of IV antihypertensives is complex and should be closely supervised by an experienced practitioner.

Chart 3: Flowchart for hypertensive emergency



Section 8 – References

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Revision and Approval History

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