

13. Hypertensive Emergencies Algorithm

This clinical pathway is intended to supplement, rather than substitute for, professional judgment and may be changed depending upon a patient's individual needs. Failure to comply with this pathway does not represent a breach of the standard of care.

BEGIN 12. HYPERTENSION ALGORITHM

Features of progressive or impending end organ damage
(especially if BP > 180/120 mmHg)?

- Monitor, support ABCs
- Check vital signs (BP, PR, RR, SPO₂, T° C, **RBS**)
- Start Oxygen IF SPO₂ < 94%. Maintain SPO₂ ≥ 94%
- Establish IV Access and send samples for **FBC, UEC, Urinalysis** (for proteinuria) and **PDT** (as applicable)
- Obtain/review 12-lead ECG
- Perform brief, targeted history, physical exam
- Consult a **Physician/ (Obstetrician for Eclampsia)** and consider treatments as below in consultation with a Physician/Obstetrician

See **Hypertensive Emergencies Drug Infusions for Dosages and Precautions**

Neurological Emergencies

Preferred medications	Medications to avoid
<ul style="list-style-type: none"> • Labetalol • Nicardipine • Esmolol 	<ul style="list-style-type: none"> • Nitroprusside • Hydralazine

Hypertensive Encephalopathy - Reduce mean arterial pressure (MAP) **25% over 8 hours**.

Acute Ischemic Stroke - Evidence exists that patients who have acute strokes have **better outcomes** with **higher BPs**. Antihypertensive therapy is **not routinely recommended** for patients with acute stroke and HTN.

- Patient otherwise eligible for acute reperfusion therapy except that BP is **>185/110 mm Hg**:
 - Labetalol
 - Other agents (hydralazine, enalaprilat, etc.) may be considered when appropriate
 - If BP is not maintained at or below 185/110 mm Hg, do not administer rtPA
- Management of BP **during and after rtPA or other acute reperfusion therapy** to maintain BP **at or below 180/105 mm Hg**:
 - Monitor BP every 15 minutes for 2 hours from the start of rtPA therapy, then every 30 minutes for 6 hours, and then every hour for 16 hours
 - If **systolic BP >180-230 mm Hg or diastolic BP >105-120 mm Hg**:
 - Labetalol
 - If BP not controlled or diastolic BP >140 mm Hg, consider IV sodium nitroprusside
 - After treatment with fibrinolysis, the SBP should be maintained **< 180mmHg** and **DBP < 105mmHg for 24 hours**.
- In patients with markedly elevated blood pressure (**SBP > 220 mm Hg or DBP > 120 mm Hg**) who **do not receive fibrinolysis**, a reasonable goal is to lower blood pressure by **15% during the first 24 hours after onset of stroke**.

Acute Intracerebral Haemorrhage - No evidence exists to suggest that HTN provokes **further bleeding** in patients with ICH. A precipitous fall in SBP may compromise cerebral perfusion and increase mortality. The controlled lowering of BP with **IV labetalol** (in the absence of bradycardia) is currently **recommended only when the SBP is >200mmHg or the DBP is >110mmHg**. Treatment based on clinical/radiographic evidence of increased intracranial pressure (ICP).

- If signs of **increased ICP**, maintain **MAP just below 130mmHg (or SBP < 180mmHg)** for first 24 hours after onset.
- Patients **without increased ICP**, maintain **MAP < 110mmHg (or SBP < 160mmHg)** for first 24 hours after symptom onset.

Subarachnoid Haemorrhage - Maintain **SBP < 160mmHg** until the aneurysm is treated or cerebral vasospasm occurs. Oral **nimodipine** is used to **prevent delayed ischemic neurological deficits**, but it is **NOT indicated** for treating acute hypertension.

Cardiovascular Emergencies

Aortic Dissection - **Immediately** reduce the **SBP < 120mmHg** and maintain it at this level unless signs of end-organ hypo perfusion are present. Preferred treatment includes a combination of;

- narcotic analgesics (morphine sulphate),
- vasodilators (nicardipine, **nitroprusside**).
- β-blockers (labetalol, esmolol) or calcium channel blockers (verapamil, diltiazem); **Avoid β-blockers** if there is;
 - aortic valvular regurgitation or
 - suspected cardiac tamponade.

Acute Coronary Syndrome - Treat if **SBP >160 mmHg** and/or **DBP >100 mmHg**. Reduce BP by **20-30%** of baseline. Thrombolytics are **contraindicated** if BP is **>185/100 mmHg**. Preferred medications include **β-blockers & Nitroglycerin**

Acute Heart Failure - Treatment with vasodilators (in addition to diuretics) for **SBP ≥ 140 mmHg**. **IV or sublingual nitroglycerin** is the preferred agent.

Other Disorders

Cocaine toxicity/Pheochromocytoma - Hypertension and tachycardia from cocaine toxicity rarely require specific treatment.

- **Benzodiazepines** are the preferred agents for cocaine-associated acute coronary syndromes.
- Pheochromocytoma treatment guidelines are similar to that of cocaine toxicity. **β-blockers can be added** for BP control **only after α-blockade**.

Preferred medications - Diazepam, Phentolamine, Nitroglycerin/nitroprusside

Medications to avoid - β-adrenergic antagonists prior to phentolamine administration

Preeclampsia/eclampsia - In women with eclampsia or preeclampsia, **SBP should be < 160 mmHg** and **DBP <110 mm Hg** in the prepartum and intrapartum periods. If the **platelet count is < 100,000 cells/mm³** BP should be maintained below **150/100mmHg**. Patients with eclampsia or preeclampsia should also be loaded with **IV Magnesium sulphate 4gm** diluted in 100mL NS over 15 mins then with an **infusion of 2gm/hr** to avoid seizures.

Preferred medications - Hydralazine, Labetalol, Nifedipine

Medications to avoid - Nitroprusside, Angiotensin-converting enzyme inhibitors, Esmolol

Hypertensive Emergencies Drug Infusions

*For adults with a compelling condition (i.e., aortic dissection, severe preeclampsia or eclampsia, or pheochromocytoma crisis), SBP should be reduced to < 140 mm Hg during the first hour and to < 120 mm Hg in aortic dissection. For adults without a compelling condition, SBP should be reduced by no more than 25% within the first hour; then, if stable, to 160/100 mm Hg within the next 2 to 6 hours; and then cautiously to normal during the following 24 to 48 hours.

AGENT	MOA	DOSE	ONSET/DURATION OF ACTION (AFTER DISCONTINUATION)	PRECAUTIONS
Parenteral Vasodilators				
Nitroglycerin	Decreases coronary vasospasm, which increases coronary blood flow. Also, induces vessel dilatation, decreasing cardiac workload.	Initial 5 mcg/min; increase in increments of 5 mcg/min every 3–5 min to a maximum of 20 mcg/min.	2-5 min / 5-10 min	Use only in patients with acute coronary syndrome and/or acute pulmonary oedema. Do not use in volume-depleted patients.
Hydralazine	Decreases systemic resistance through direct vasodilation of arterioles.	Initial 10 mg via slow IV infusion (maximum initial dose 20 mg); repeat every 4–6 h as needed.	10 min / > 1 hr	BP begins to decrease within 10–30 min and the fall lasts 2–4 h. Unpredictability of response and prolonged duration of action do not make hydralazine a desirable first-line agent for acute treatment in most patients.
Parenteral Adrenergic Inhibitors				
Labetalol	α , β 1, β 2 Blocker	Initial 0.3–1.0 mg/kg dose (maximum 20 mg) slow IV injection every 10 min or 0.4–1.0 mg/kg/h IV infusion up to 3 mg/kg/h. Adjust rate up to total cumulative dose of 300 mg. This dose can be repeated every 4–6 h.	5-10 min / 15-30 min	Contraindicated in reactive airways disease or chronic obstructive pulmonary disease. Especially useful in hyperadrenergic syndromes. May worsen HF and should not be given in patients with 2nd or 3rd degree heart block or bradycardia.
Esmolol	Ultra-short-acting β -adrenergic blocker	Loading dose 500–1,000 mcg/kg/min over 1 min followed by a 50 mcg/kg/min infusion. For additional dosing, the bolus dose is repeated, and the infusion increased in 50 mcg/kg/min increments as needed to a maximum of 200 mcg/kg/min.	1-5 min / 15-30 min	Contraindicated in patients with concurrent beta-blocker therapy, bradycardia and/or decompensated HF. Monitor for bradycardia. May worsen HF. Higher doses may block β 2 receptors and impact lung function in reactive airway disease.