# Management of Hypertension within Critical Care

NHS Lanarkshire

**Definitions**

**Asymptomatic Severe Hypertension**[1] – Systolic blood pressure ≥ 180mmHg and/or Diastolic blood pressure ≥ 120mmHg **without** evidence of end organ damage

**Hypertensive Emergency**[2] - Systolic blood pressure ≥ 180mmHg and/or Diastolic blood pressure ≥ 120mmHg **with** evidence of end organ damage

**Evidence of End Organ Damage** may include:
- Acute aortic dissection
- Acute coronary syndrome
- Acute pulmonary oedema
- Cerebral infarction or haemorrhage
- Hypertensive encephalopathy
- Acute renal failure
- Eclampsia

**Initial Management**

Reversible causes should be considered first and treated as appropriate:
- Deepening of sedation
- Adequate analgesia and bowel management
- Stopping any medications that cause hypertension

**Further Treatment**

**Hypertensive emergencies**
Requires treatment with intravenous therapy to prevent further organ damage.
Specific guidelines should be referred to where appropriate
**Exclusions to this Guideline:** Acute Type B Aortic Dissection, Pregnancy/Pre-Eclampsia, Phaeochromocytoma

**Severe asymptomatic hypertension**
The evidence for the benefit of treatment is limited.
Rapid lowering of the blood pressure in this scenario can cause harm[3].
Both Intravenous or oral therapies can be used.
Intravenous therapy should only be used in uncontrolled hypertension or if the oral route is unavailable

Targets for treatment in **severe asymptomatic hypertension**:
- Systolic blood pressure <160mmHg
- Diastolic blood pressure < 100 mmHg,
- Maximum reduction of 30% of blood pressure within the first 4 hours

Authors: R. Dryden, N. Karim
Date Approved: December 2022. Date for Review: December 2024

# Management of Hypertension within Critical Care

NHS Lanarkshire

**Intravenous Therapy**[4]

**Labetalol** (First line)

In fluid restricted patients in critical care: administer undiluted through central venous access at 5mg/ml (e.g. 200mg in 40ml)
Otherwise dilute to 1mg/ml in 5% dextrose (e.g. 500mg in 500ml).

Infusion started at 15mg/hour titrated to effect.
Maximum rate of infusion: 120mg/hour.

**NB** Prolonged labetalol use may result in tachyphylaxis

**Nicardipine**
(Second line In addition to labetalol, first line if labetalol contraindicated)

Dilute 25mg in 250ml 5% dextrose, administered via central or peripheral venous access.

Titrate to clinical effect – Start at 3-5mg per hour (30 – 50ml/hour) for at least 15 minutes.
Rates can be increased by increments of 0.5 to 1.0 mg (5 or 10mls) every 15 minutes.
Infusion rate should not be exceed 15mg/hour (150mls/hour)

For maintenance, reduce infusion rate gradually when target blood pressure achieved (usual maintenance infusion rate 2-4mg/hr (20-40mlls/hour).

**Hydralazine**
(Third line in addition to Labetalol and/or nicardipine)

Reconstitute three 20mg vials of hydralazine, each with 1ml water for injections.
Further dilute three 20mg vials with 0.9% saline to make 60ml at 1mg/ml.
Administered via central venous access or large peripheral vein.

**Dose is calculated in micrograms/minute.**
Initial infusion rate 200-300 micrograms/minute (12-18ml/hr)
Titrated to individual blood pressure but maintenance rate usually within range of 50-150 micrograms/minute (3-9ml/hr)

Oral Therapy

Intravenous therapies should be switched to oral agents as soon as possible and should follow the NICE hypertension guidelines[5].

Examples of Oral Antihypertensives Include:
- ACE inhibitors/Angiotensin receptor blockers (e.g. Ramipril 2.5 to 5mg OD)
- Thiazide diuretic (e.g. Bendroflumethiazide 2.5mg OD)
- Calcium channel blocker (e.g. Amlodipine 5 to 10mg OD)
- Beta blocker (e.g. Bisoprolol 5 to 20mg OD)

**References**


1. Varon J, Elliot WJ (2021) *Management of severe asymptomatic hypertension (hypertensive urgencies) in adults, UptoDate* Available from: https://www.uptodate.com/contents/management-of-severe-asymptomatic-hypertension-hypertensive-urgencies-in-adults
2. Varon J, Elliot WJ (2022) *Evaluation and Treatment of Hypertensive Emergencies in Adults, UptoDate* Available from: https://www.uptodate.com/contents/evaluation-and-treatment-of-hypertensive-emergencies-in-adults
3. Rastogi, R., Sheehan, M. M., Hu, B., Shaker, V., Kojima, L., & Rothberg, M. B. (2021). Treatment and outcomes of inpatient hypertension among adults with noncardiac admissions. *JAMA Internal Medicine*, *181*(3), 345-352.
4. NHS Injectable Medicines Guide group (2022) *Medusa NHS Injectable Medicines Guide, NHS Wales* Available from: https://medusa.wales.nhs.uk
5. Jones, N. R., McCormack, T., Constanti, M., & McManus, R. J. (2020). Diagnosis and management of hypertension in adults: NICE guideline update 2019. *British Journal of General Practice*, *70*(691), 90-91.



Authors: R. Dryden, N. Karim


Date Approved: December 2022. Date for Review: December 2024