Document detail	
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This guideline provides evidence-based recommendations for the safe and effective use of intravenous (IV) nicardipine in the management of acute hypertension in adult critical care patients.

Scope

This guideline applies to all medical, nursing, and pharmacy staff involved in the management of adult patients in the critical care units across critical care in Gloucestershire Hospitals Foundation Trust.

Pharmacodynamics

- **Drug Class:** Dihydropyridine calcium channel blocker
- **Mechanism of Action**:
  - Blocks L-type calcium channels in vascular smooth muscle.
  - This inhibits the influx of extracellular calcium across the vascular smooth (and to a less extent cardiac) muscle cell membranes, which is needed for muscle contraction.
  - Result: Vasodilation, especially of arterial smooth muscle (little to no effect on venous tone). Leads to decreased systemic vascular resistance (SVR) → lowers blood pressure.

Pharmacokinetics

- **Absorption:** Not applicable to IV route (100% bioavailability)
- **Onset of Action:** 5–15 minutes

- **Peak Effect:** 45 minutes (continuous infusion).
- **Duration of Action:** Short. Blood pressure effects wane within 30–60 minutes after discontinuation.
- **Distribution:** Highly protein bound (~98%), large volume of distribution into tissues (not amenable to haemofiltration).
- **Metabolism:** In the liver via cytochrome P450 enzymes
- **Elimination Half-Life:** 2–4 hours (may be prolonged in hepatic impairment).
- **Excretion:** Primarily via urine (up to 60%) and faeces.

Indications and Systolic Blood Pressure (sBP) targets

For more detail please navigate to Management of hypertensive crisis: British and Irish Hypertension Society Position document and go to the Tables section under *Pathophysiology-based management of hypertensive crisis* and *Specific hypertensive emergency states*. Also review local protocols for management of specific conditions; this document offers an overview of blood pressure management only.

Hypertensive encephalopathy

- Reduce mean arterial pressure (MAP) by no more than 20–25% over several hours and/or reduce diastolic BP to 100–110 mmHg.

Acute ischaemic stroke

- Patients eligible for reperfusion therapy e.g. thrombolysis/ thrombectomy: target sBP 140-185mmHg.
- Patients NOT eligible for reperfusion therapy target sBP <220mmHg. If sBP >220mmHg lower MAP by ~15% over 24 hours

Acute intracerebral haemorrhage (ICH)

- Treat sBP >140mmHg in patients who present < 6 hours of symptom onset
- Aim for a sBP target of 130 to 139 mmHg within 1 hour and sustained for at least 7 days, ensuring that the magnitude drop does not exceed 60 mmHg within 1 hour of starting treatment. Link to NICE guideline
- Do not treat sBP in patient with an ICH with the following:
  - underlying structural cause of ICH (eg, an arteriovenous malformation, intracranial aneurysm, intracranial tumour, intracranial trauma, or previous cerebral infarction)
  - GCS <6
  - going for neurosurgery to evacuate the haematoma
  - Very large haematoma with a poor expected prognosis

Subarachnoid haemorrhage (SAH)

- Aim sBP 120-160mmHg prior to aneurysm being secured (coiling or clipping). Note nimodipine (60 mg every 4 hrs) is used for neuroprotection to reduce the risk of delayed cerebral ischaemia from vasospasm, rather than BP control

Aortic dissection

- Aim for systolic BP of 100-120mmHg within 30 minutes of diagnosis. Heart rate target ≤60 bpm, or the lowest level that allows adequate perfusion of vital organs

Post-operative hypertension (Consultant anaesthetist, or intensivist decision)

Contraindications

- Hypersensitivity to nicardipine or other dihydropyridine calcium channel blockers
- Cirrhosis (cleared by the liver)
- Acute coronary ischaemia (may cause reflex tachycardia).
- Avoid within 8 days of myocardial infarction
- Severe aortic stenosis

Preparation and Administration

BNF Nicardipine link

Drug: Nicardipine hydrochloride
Dilution: Central: Neat. Peripheral: 20 mg in 100 ml of 5% dextrose.
Concentration: Central: 1mg/ml (1mg=1ml). Peripheral 0.2 mg/ml (1mg=5ml).
Route: IV infusion via central line preferred. Peripheral line acceptable for short-term use with site monitoring.

Initial Rate: 3-5 mg/hr for 15 minutes
Titration: Adjust by 0.5–1 mg/hr every 15 minutes based on response. When target BP achieved, reduce the infusion to 2-4 mg/hr to prevent accumulation. If Bp falls below target decrease infusion to 2.5 mg/hr or stop entirely. If the BP falls substantially below target, stop the infusion entirely.
Maximum Rate: 15 mg/hr

For patients who are elderly, pregnant, hepatic impairment, or renal impairment.

Initial Rate: 1–5 mg/hour for 30 minutes
Titration: Adjust by 0.5mg/hr every 30 minutes based on response. When target BP achieved, reduce the infusion to 2-4 mg/hr to prevent accumulation. If Bp falls below target decrease infusion to 2.5 mg/hr or stop entirely. If the blood pressure falls substantially

below target, stop the infusion entirely.
Maximum Rate: 15 mg/hr

Example prescription

Prescription			
Drug NICARDIPINE	Amount 50 mg	Concentration 1mg/mL	Route CVC
Preparation Neat	Total volume 50 mL	Rate 3 – 15 mL/hour	Pharmacy
Drug NICARDIPINE	Amount 20 mg	Concentration 200 microgramsg/mL	Route Peripheral IV
Preparation 5% Glucose	Total volume 100 mL	Rate 15-75mL/hour	Pharmacy

Monitoring Requirements

Parameter	**Frequency**
Blood Pressure	Every 5–15 minutes (arterial line is not essential for all cases)
ECG & Heart Rate	Continuous
Urine Output	Hourly
Neurological Status	As clinically indicated
Infusion Site (if peripheral)	Hourly

Weaning and Discontinuation

- Taper infusion once BP is controlled
- Transition to oral antihypertensives when appropriate
- Avoid abrupt cessation to prevent rebound hypertension

Adverse Effects and Management

- **Hypotension**: Stop infusion, administer IV fluids, re-evaluate
- **Reflex Tachycardia**: Consider beta-blockade
- **Infusion Site Reaction**: Switch to central line if phlebitis occurs

In the rare event of nicardipine toxicity, please inform the intensive care consultant and refer to the Toxbase website: https://www.toxbase.org/poisons-index-a-z/n-products/nicardipine/. Contact UK NPIS 0344 892 0111

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