PHENYLEPHRINE SHORTAGE GUIDELINES

Clinical indications

1. Anaesthesia where maintaining mean arterial pressure without increase in heart rate is important
2. To oppose neuraxial anaesthesia-related vasodilation
3. Organ dysfunction present or anticipated, particularly associated with pressure decreases
4. Inflammatory response accompanied by vasodilation (distributive shock)

Suggested ways by which phenylephrine usage can be minimised

1. Phenylephrine not to be drawn up routinely (draw up alternate vasopressor and anticholinergic agent routinely in obstetric anaesthesia)
2. Extend the shelf life of available phenylephrine ampoules
3. Ampoule sharing in theatre to be allowed, standardised and best practices utilised
4. Consider alternatives to phenylephrine
5. Consider noradrenaline: a cost-effective catecholamine with comparable pharmacodynamic and pharmacokinetic effects to those of phenylephrine, but with slightly more β1 agonist effects
Clinical indications
Phenylephrine is a selective α-1 adrenergic drug. Its primary action is therefore vasoconstriction or reversal of neuraxial and general anaesthesia-induced vasodilation. It has little or no direct effect on heart rate and may decrease heart rate.

1. Anaesthesia where maintaining mean arterial pressure without increase in heart rate is important
   i. Mitral stenosis
   ii. Aortic stenosis
   iii. Ischaemic heart disease
   iv. Paediatric patients with congenital heart disease and potential right to left shunting

2. To oppose neuraxial anaesthesia related vasodilation.
   During obstetric spinal anaesthesia: A vasopressor and an anticholinergic agent (atropine) should always be drawn up routinely, as follows:
   i. Phenylephrine stock limited, but available: Draw up phenylephrine as the first line vasopressor (10 mg in 200 mL saline, 50-100 µg bolus and/or 500 µg/L by infusion). Use the 200 mL bag for 24 hours, because the theoretical risk of sepsis is insignificant compared with that of maternal hypotension/collapse. Ephedrine/etilefrine are the alternative/additional vasopressors.
   ii. Phenylephrine unavailable or critically limited: Draw up ephedrine or etilefrine as the first line vasopressor.
   iii. Adrenaline should be available in all cases, for administration in small doses if there is a poor response to phenylephrine/ephedrine/atropine. High doses should only be used as necessary where there is maternal collapse.
   iv. Noradrenaline is contraindicated in obstetrics in our context.

3. Organ dysfunction present or anticipated particularly if mean arterial pressure decreases
   i. Patient with pre-existing hypertension
   ii. Renal or hepatic dysfunction
   iii. CNS injury or carotid stenoses

4. Inflammatory response accompanied by vasodilation [distributive shock]
   i. Septic shock with a dominant distributive shock phenotype and where the adrenaline dose requires reduction to limit tachycardia, hyperglycaemia and hyperlactataemia.
   ii. Post cardiac bypass, post aortic clamping, after prolonged surgery.
   iii. Following resuscitation from hypovolaemic shock where volume alone is insufficient.
   iv. These situations ideally require cardiac output monitoring. Noradrenaline and/or vasopressin may be very useful in these circumstances.

Disclaimer: While every effort has been made to ensure scientific accuracy, SASA shall not be responsible or in any way liable for errors, omissions or inaccuracies in this publication, whether arising from negligence or otherwise or for any consequences arising therefrom. These guidelines are designed to provide a guide to the minimum standards considered best clinical care. However, every clinician retains responsibility for the care of the patient and must exercise independent clinical judgement.
Suggested ways by which phenylephrine usage can be minimised

1. **Phenylephrine not to be drawn up routinely.**
   During obstetric spinal anaesthesia, routinely draw up a vasopressor and an anticholinergic agent (atropine).

2. **Extend the shelf life of available phenylephrine ampoules**
   i. SASA will request that suppliers certify phenylephrine ampoules for an extended shelf life.
   ii. In the absence of such recertification, phenylephrine ampoules will not be considered “expired” even after the expiration date.

3. **Ampoule sharing in theatre to be allowed, standardised and best practices utilised.**
   i. Ideally, a registered pharmacist, would prefill and label syringes utilising a laminar flow facility. The shelf life of such syringes to be determined by pharmaceutical services. The syringe volume and concentration will be according to individual institutional need.
   ii. Alternatively, one ampoule phenylephrine is diluted into a 200 ml saline bag (50 µg/ml) daily and will be available at a central location in the theatre complex. Clinicians requiring phenylephrine should withdraw from this centrally located bag.
   iii. Each bag must be labelled with the date, time and name of person doing the mixing.
   iv. Each withdrawal should be entered on an adjacent sheet with time, volume and name of withdrawer.
   v. The remainder of a bag should be discarded after 24 hours.
   vi. The port of the bag is to be scrubbed with alcohol before accessing it.
   vii. The bag must only be accessed using a sterile, unused 10, 20 or 50 ml syringe.
   viii. When instructing junior doctors or interns to fetch phenylephrine, clarify that the phenylephrine must come from the bag and not from unused ampoules.

4. **Consider alternatives to phenylephrine**
   i. In many scenarios, ephedrine, etilephrine, and/or low-dose adrenaline are useful alternatives.
   ii. Preferably restrict use of phenylephrine to clinical scenarios without safe alternatives.

Disclaimer: While every effort has been made to ensure scientific accuracy, SASA shall not be responsible or in any way liable for errors, omissions or inaccuracies in this publication, whether arising from negligence or otherwise or for any consequences arising therefrom. These guidelines are designed to provide a guide to the minimum standards considered best clinical care. However, every clinician retains responsibility for the care of the patient and must exercise independent clinical judgement.
5. **Consider Noradrenaline**

Noradrenaline is a cost-effective catecholamine with comparable pharmacodynamic, pharmacokinetic effects to those of phenylephrine, but with slightly more β1 agonist effects. Thus, it produces less bradycardia and less deleterious effects on cardiac output.

i. It is a schedule 21 medicine.

ii. It is presented in 4 mg ampoules, the cost of four [10 mg] phenylephrine ampoules is similar to one [4 mg] noradrenaline ampoule.

iii. The suggested concentration for a central stock bag is 4 mg noradrenaline in 1000 ml saline.

iv. Noradrenaline 4 ug and phenylephrine 50 ug have similar pharmacodynamic effects. The infusion rate is typically 0.05-0.1 ug/kg/minute [range 0.02 to 0.4 ug/kg/minute]. Dosages exceeding 0.1 ug/kg/minute should probably be administered via central venous catheter.

**References**


Disclaimer: While every effort has been made to ensure scientific accuracy, SASA shall not be responsible or in any way liable for errors, omissions or inaccuracies in this publication, whether arising from negligence or otherwise or for any consequences arising therefrom. These guidelines are designed to provide a guide to the minimum standards considered best clinical care. However, every clinician retains responsibility for the care of the patient and must exercise independent clinical judgement.