Hypotension Management in Obstetric Regional Anaesthesia (GL763)

Approval

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<tr>
<th>Approval Group</th>
<th>Job Title, Chair of Committee</th>
<th>Date</th>
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<tr>
<td>Maternity &amp; Children’s Services Clinical Governance Committee</td>
<td>Chair, Maternity Clinical Governance Committee</td>
<td>14th July 2017</td>
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Change History

<table>
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<tr>
<th>Version</th>
<th>Date</th>
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<th>Reason</th>
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<tr>
<td>1.0</td>
<td>Oct 2007</td>
<td>Dr K J Bird, Dr P Dill-Russell (Consultant anaesthetists)</td>
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<td>1.1</td>
<td>Oct 2010</td>
<td>Dr K J Bird, Dr P Dill-Russell (Consultant anaesthetists)</td>
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<td>Dr G Jackson, Dr P Dill-Russell (Consultant anaesthetists)</td>
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<td>3.0</td>
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<td>Dr J Mayer, Dr G Jackson (Consultant anaesthetists) Dr W Rattenberry (CT2 Anaesthetics)</td>
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Overview

Hypotension during induction of regional anaesthesia in obstetric patients is associated with both maternal and fetal morbidity.

Background

The sympathectomy that occurs with neuraxial blockade causes hypotension in up to 71% of women who receive spinal anaesthesia for Caesarean section\(^2\). Spinal hypotension can occur precipitously and may lead to cardiovascular collapse. It causes maternal nausea and vomiting and fetal acidosis\(^2\).

Crystalloid pre-loading has been shown to be clinically ineffective at preventing hypotension. Rapid crystalloid administration after induction of spinal anaesthesia (co-loading) provides better maternal blood pressure control than pre-loading\(^5\) but should be combined with the use of vasopressors to prevent hypotension.

Phenylephrine is now the vasopressor of choice in obstetrics. When compared to ephedrine it has been shown to be:

- Easier to titrate
- Faster onset
- More effective at increasing systemic vascular resistance
- Causes less maternal tachycardia and hypertension (but does cause more bradycardia)
- Associated with improved fetal pH (Ngan Kee et al. 2009)

Phenylephrine can be administered by bolus or infusion. A prophylactic bolus strategy has been shown to be superior to a therapeutic bolus strategy with regards to incidence of hypotension, nausea and vomiting\(^4\).

**Current advice is to use bolus technique for all emergency theatre cases.**

**Only consider phenylephrine infusion for elective caesarean sections and if received training in equipment and technique.**

A meta-analysis demonstrated that when compared to a therapeutic bolus strategy, phenylephrine infusions result in a lower incidence of hypotension with a similar incidence of bradycardia and hypertension\(^6\). There is limited evidence to compare phenylephrine infusions to a prophylactic bolus strategy. One study has found an infusion strategy to be superior\(^4\).

Dose-finding studies suggest that 50 mcg/min is a preferable starting point for a prophylactic phenylephrine infusion\(^1, 15\). This minimises maternal bradycardia whilst having a sufficient vasopressor action. The infusion rate should be titrated to maintain maternal systolic blood pressure (SBP) close to baseline SBP to minimize maternal nausea, vomiting, and fetal acidosis\(^9\).

The vast majority of studies on vasopressors have been conducted in ASA 1 and 2 patients undergoing elective Caesarean section. The impact of phenylephrine infusions on
maternal cardiac output and neonatal outcomes in women with altered vascular reactivity, pre-eclampsia, hypertension, compromised cardiac function or a non-reassuring fetal status who require unplanned Caesarean delivery are not well elucidated. Future studies to determine optimal vasopressor regimens for these high-risk populations are required before clear recommendations can be made. It is probably not wise to aim for a SBP >140 mmHg whatever the baseline SBP.

**General management**

- Large (16G) IV cannula connected to Plasmalyte (ensure adequate flow) prior to neuraxial blockade
- Establish baseline blood pressure
- 1 minute NIBP cycling post neuraxial blockade (until baby delivered)
- Apply wedge for left lateral tilt, consider full left lateral/asking surgeon to lift the uterus if refractory hypotension
- Co-load with Plasmalyte
- Maintain systolic blood pressure above 100 mmHg or >80% of pre-regional blood pressure
- Bradycardia (<60bpm), particularly if associated with hypotension, should be treated immediately with Glycopyrrolate (first-line anti-muscarinic drug, as it does not cross the placenta)
- Do not use ephedrine before the baby is born
- Monitor blood loss to ensure that absolute hypovolaemia does not contribute to hypotension
- **Do not treat hypovolaemia (e.g. haemorrhage) with vasopressors**

**Phenylephrine bolus technique**

- Draw up Phenylephrine from ampoule (100mcg/ml) into 10ml syringe and label
- Give prophylactic 50-100mcg boluses as required to maintain blood pressure >100mmHg or >80% baseline
- Try to be proactive rather than reactive to avoid hypotension and/or large swings in blood pressure

**Phenylephrine infusion technique**

- Only use this technique if you have been appropriately trained
- Preparation of the infusion is the responsibility of the anaesthetist
- Inject 10mg of phenylephrine into 100ml of 0.9% NaCl, creating a 100mcg/ml solution
- Draw off 50ml and clearly label both with yellow infusion labels
- The infusion must be attached directly to the IV cannula and there must be a non-return valve on the IV fluid side
- As soon as the spinal has been performed, start the infusion at 30ml/hr (50mcg/min)
- Small changes in BP can be treated altering the rate by 5 – 10 ml/hr
• Larger falls in BP may require a bolus, these can be given by the pump or from a separate phenylephrine syringe
• Wean the infusion slowly towards the end of the case to avoid sudden falls in BP

References


