Prevention of spinal hypotension

We take a proactive approach to preventing spinal hypotension. The clinical evidence for this is quite clear; vasoconstrictor agents are needed prophylactically titrated against the blood pressure response in elective [i,ii] and emergency cases [iii]. The traditional agent used has been ephedrine, based on animal studies decades ago in which it was demonstrated that ephedrine does not reduce blood flow to the ovine uteroplacental unit [iv]. Though better than not using vasopressors, ephedrine is associated with maternal tachycardia, anxiety and palpitations, and fetal acidosis; we recommend the use of α-sympathomimetics [v]. Metaraminol is the most conveniently presented drug in this class.

Indication: for the prevention and treatment of hypotension and nausea induced by spinal anaesthesia. This method should also be used in patients with pre-eclampsia. For severe pre-eclampsia, where blood pressure is labile or high, use this technique with an arterial line for monitoring, and seek senior advice and help.

Method:

1. Determine the baseline systolic blood pressure. The patient may be anxious in the operating theatre and you should take antenatal and preoperative blood pressure readings into account.
2. Make up a 50 ml syringe containing 10 mg metaraminol diluted to 50 ml with normal saline, flush this through the infusion lines and set the infusion rate to 50 ml h⁻¹. Do not commence the infusion until after the spinal block is in.
3. Establish intravenous access as usual. Use a Coventry valve which has two drug infusion lines and a volume fluid line. Make sure that the metaraminol infusion has been primed through the side port of the Coventry valve to avoid a dead-space effect when starting the infusion.
4. Cophydration is an important part of this procedure. Connect one litre of Hartmann’s solution at a slow rate. Do not add ephedrine or any other drug to the bag. Make sure the bag runs freely. Assess previous fluid intake and give Hartmann’s solution as necessary, usually no more than 500 ml prior to delivery.
5. Perform the spinal block as usual (hyperbaric bupivacaine 15 mg and fentanyl 25 µg).
6. Start the NIBP on the ‘stat’ setting. This will run for five minutes and then default to your auto setting – 2.5 minutes is suggested. Alternatively, use the ‘one-minute’ setting until delivery and then measure blood pressure as needed (minimum five-minute intervals).
7. Start the metaraminol infusion immediately at 50 ml h⁻¹ (167 µg min⁻¹).
   a. The aim is to maintain maternal blood pressure at the baseline pressure. Continue to infuse metaraminol at the same rate if the SBP is less than or equal to the baseline SBP; stop the infusion if the SBP is greater than baseline. The infusion should be either on or off; resetting the rate during infusion can introduce errors, and it is not normally necessary to change the infusion rate from 50 ml h⁻¹. If the patient demonstrates a need for a different infusion rate, change it but avoid doing so repeatedly.
   b. You should normally continue metaraminol until delivery; use afterwards at discretion.
   c. Watch the pulse rate and blood pressure. A pulse rising above 100 bpm or a systolic blood pressure that does not rise to baseline may indicate the need for a 0.5-1.0 ml bolus (100-200 µg) from the pump; a pulse falling towards or below 60 bpm may indicate stopping the infusion.
   d. In the event of bradycardia (<60 bpm) without hypotension, stop the metaraminol infusion. If bradycardic with hypertension give glycopyrrolate 300 µg.
   e. On ceasing metaraminol infusion, the blood pressure may fall transiently. Volume given to replace blood loss should be run in swiftly to help prevent this.
8. Do not use metaraminol to treat hypotension secondary to hypovolaemia (post partum haemorrhage). The treatment for haemorrhage is to stop the bleeding and replace blood lost, not to use vasoconstrictors (although these drugs have a role in patients whose blood volume has been restored, to promote organ perfusion). If the patient is bleeding heavily call for help.
9. Do not use metaraminol infusions on the obstetric high dependency unit. Patients who remain persistently hypotensive should be diagnosed and treated; they may be haemorrhaging. It is not safe to expect midwives to manage metaraminol infusions.

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