The Department of Anesthesia at the University of Vermont has a large ongoing registry of spinal anesthesia in neonates and infants. Our first infant spinal was performed in 1977 by Dr. J. Christian Abajian and to date we have performed approximately 1600 infant spinals. The goals of this workshop are to delineate why one would choose a spinal rather than a general anesthetic, and to help maximize success with this underutilized technique.

Benefits of & indications for subarachnoid block

Data from the Pediatric Perioperative Cardiac Arrest Registry (POCA) demonstrate that infants are at significantly higher risk than older children from complications associated with general anesthesia. Techniques that avoid the use of general anesthesia in this group of high-risk patients would have important safety advantages. Spinal anesthesia in infants has a documented lower incidence of complications such as hypoxemia, bradycardia and postoperative apnea when compared to general anesthesia. While there may not exist a risk-free anesthetic, spinal anesthesia would then seem a logical alternative to general anesthesia for a variety of surgical procedures.

Patient selection

Consider the following patients for spinals: high-risk infants, premature infants, ex-premature infants, IUGR babies, patients with congenital heart disease & anomalies, and any infant without absolute contraindications.

Any infant up to 8-9 kg range. Infants larger than this may be difficult to hold still, though not impossible.

Specific techniques for success

1. Position the infants sitting for the spinal. Finding midline is much easier in the sitting rather than the lateral decubitus position.
2. Who holds is critical. This person must be able to hold the child still, otherwise your attempts will be off midline. Have the holder place their thumb around the humerus and fifth finger around the femur.
3. Stay midline. If you are off midline, you are likely to see blood.
4. When CSF is obtained, do not aspirate before or after administration of the tetracaine, as this may result in movement of the needle and incomplete or no block.
5. Once the spinal is in, quickly lay the infant supine with your hand behind the shoulders to prevent the hyperbaric spinal medication from going too high. Additionally, have one or two hand towels folded under the neck to support the infant’s head.
6. If an electrocautery pad needs to be placed, one should lift the whole infant level up in the air rather than lifting the legs.
**Dosing parameters**

The vast majority of infant spinals have been with hyperbaric tetracaine or hyperbaric bupivicaine with or without epinephrine. Our mix consists of an equal volume of 1% tetracaine and 10% dextrose, combined with 0.02 cc of 1:1,000 epinephrine or an epinephrine wash. The drug is drawn up in a tuberculin syringe. Dosing is based on weight rather than age. The average dose for all patients is 0.55 mg tetracaine/kg. Higher doses are used for upper abdominal surgery like pyloromyotomies, in the range of 0.75-1.0 mg/kg. In selecting the dose, consider the duration of the intended surgery and the skills/speed of the specific surgeon. Consider the placement of a caudal epidural catheter if the surgery is likely to take longer than one and a half hours.

**Tips for pyloromyotomies**

Evacuate the stomach using a red rubber catheter before positioning the infant for the spinal. We preferentially use a red rubber catheter rather than a Replogle because it is softer and less traumatic.

Use slightly higher doses of tetracaine, 0.75-1.0 mg/kg

Anticipate transient fussiness for the brief duration that the pylorus is exteriorized.

**Surgical cooperation**

Surgeon cooperation is a must.

**Complications**

Fussy infants: >75% of infants require no IV supplementation. Comfort the child with stroking and a nuk. If necessary, titrate small doses of midazolam 20-50 mcg/kg or propofol 0.25-0.5 mg/kg to calm a fussy baby.

Oxygen desaturation, bradycardia and hypotension can occur, but are very unlikely.

Constant vigilance and preparedness is necessary.

New-onset postoperative apnea?? No infant in our series who has undergone a successful spinal anesthetic has developed new onset, post-operative apnea unless a supplemental adjunct was administered.

**Summary:**

There appears to be an extremely low incidence of complications associated with spinal anesthesia in infants. Spinal anesthesia can be performed safely, efficiently and with the expectation of a high degree of success. Spinal anesthesia should be considered as an alternative to general anesthesia for any neonate or infant with appropriate indications.

**References**

28. Steward D. Preterm infants are more prone to complications following minor surgery than are term infants. Anesthesiology 1982;56:304-306.