



Spinal Anesthesia for Open Gastrostomy in an Infant After Stage I Norwood For Hypoplastic Left Heart

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BACKGROUND

- 2 out of 10,000 of children are born with hypoplastic left heart syndrome (HLHS), every year in the US.
- Feeding dysfunction is common after stage I Norwood procedure for HLHS. Many infants require a feeding gastrostomy.
- Anesthesia for non-cardiac surgery for infants with HLHS during the Norwood inter-stage period between stage I and II (hemi-Fontan, Glenn) is associated with hemodynamic instability and adverse events.
- If possible, elective non-cardiac surgeries are to be scheduled after stage II of palliation, or superior cavo-pulmonary shunt is created.

CASE DESCRIPTION

- 1 month old male infant (3.5 kg) with prenatally diagnosed HLHS s/p stage I Norwood procedure at one week of age. Postoperative course: uneventful.
- Scheduled for gastrostomy tube placement due to poor weight gain, under spinal anesthesia.
- Preoperative vital signs were BP: 79/43; HR: 142 BPM, SPO₂ on room air: 83%.
- 5 mg/kg of intramuscular (IM) ketamine was administered in OR
- After placement of a peripheral IV catheter, the spinal was performed in sitting position with 0.7 ml of 0.5% bupivacaine (3.5 mg) and 3.5 mcg of clonidine through a one inch 25-gauge needle.
- The infant was then placed supine; spontaneous vent. On room air.
- Intra-OP vitals: SBP: 80- 95 mm Hg and HR:130 -135 BPM. SPO₂: 81- 83%.
- Surgical time: 12 minutes.
- Post-op: Uneventful, and the infant required only two doses of acetaminophen (15 mg/kg) during the first 24 hours after surgery for analgesia.

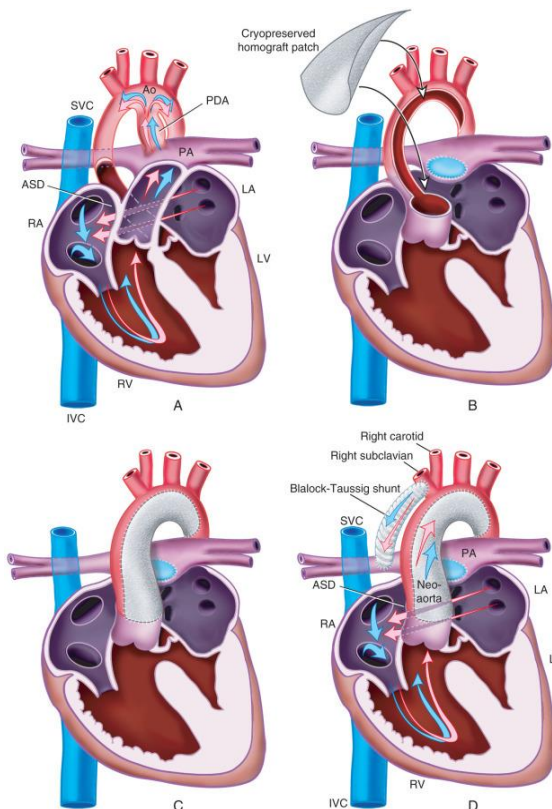


Figure 1. Graphic of Norwood stage I procedure for HLHS. Obtained from Cote et al.



Figure 2. Positioning and technique for a spinal in an infant. Image courtesy of NYSORA.com

DISCUSSION

- Anesthetic challenge managing infants with HLHS: maintaining good balance between pulmonary and systemic blood.
- Anesthetic goals: SPO₂ of 75 to 85% and a SBP greater than 60/30 which would be indicative of satisfactory pulmonary and systemic blood flow.
- An anesthetic technique that minimizes the risk of myocardial depression, hypotension, and hyper-oxygenation is desired.

DISCUSSION CONTINUED

- General anesthesia and controlled ventilation is conventionally used: provides the best control of all hemodynamic parameters.
- IV placement, intubation and positive pressure ventilation all can lead to unfavorable consequences: Increase in afterload, pulmonary over-circulation, and atelectasis to name a few which can all disrupt the optimal Qp:Qs ratio and cause hemodynamic instability and arterial oxygen desaturations.
- Spinal anesthesia produces fewer hemodynamic changes in infants, eliminates the need for tracheal intubation, oxygen supplementation and mechanical ventilation.
- Spinal anesthesia also minimizes or eliminates the need for perioperative opioid analgesics.
- Prerequisites: open gastrostomy tube vs laparoscopic; duration of operation be limited to less than 60 minutes.

CONCLUSIONS

- In conclusion, we demonstrated successful spinal anesthetic technique for an open gastrostomy tube placement in an infant with HLHS who is s/p Norwood stage I palliation.
- The result was a safe peri-operative course without hemodynamic instability. There was no need for narcotic use intra- or post-operatively.

REFERENCES

1. Torres et al. J Pediatr Surg 2002;37:1399-403
2. Brown et al. Pediatr Anesth 2015;25:846-51
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