

Intraoperative Esophageal Doppler Monitoring in a neonate with severe heart defect for non-cardiac surgery

Syed Z. Ali, MD and Dien N. Vu, MD
University of Kentucky Department of Anesthesiology, Lexington, KY

Background

3- day old female with prenatally diagnosed duodenal atresia and congenital heart defect. Upon birth, she was stable from a cardiorespiratory standpoint. She had distal gas on KUB so an UGI was obtained. This demonstrated evidence of a duodenal web with malrotation.

ECHO demonstrated double outlet right ventricle with anomalous pulmonary venous return, small ASD and a small sub-aortic VSD. She remained stable in preoperative period and no cardiac intervention was imminently planned.

Laparotomy with excision of duodenal web versus duoduodenostomy and Ladd's procedure was scheduled after discussions with pediatric ICU, CT surgery, cardiology and anesthesiology.

Post-op note: Duoduodenostomy for bypass of annular pancreas. Ladd's Procedure with appendectomy.

Delivery note

Full term 38 6/7 weeks, 3990 grams with Apgar 9/9 at 1 and 5 minutes. Stable vital signs with 95% room air oxygen saturation at birth.

Figure 1

BP = 64/36

CI = 1.4



Figure 2

BP = 65/38

CI = 2.2



Figure 3

BP = 72/47

CI = 2.5



References

1. Knirsch, W et al. Cardiac output measurement in children: comparison of the Ultrasound Cardiac Output Monitor with thermodilution cardiac output measurement. Intensive Care Med, 2008. 34(6): p. 1060-4.
2. Raux, O. et al. Intraoperative use of transoesophageal Doppler to predict response to volume expansion in infants and neonates. Br J Anaesth, 2012. 108(1): p. 100-7.

Anesthesia Course

ASA standard monitors were utilized. Additionally, CVP and EDM were used. Patient underwent general endotracheal anesthesia with a morphine caudal block.

She required significant amounts of crystalloids (LR) and colloid (5% albumin) due to open abdomen.

CVP did not correlate well as an indicator of filling pressure in this case. Patient responded to fluid treatments with improved hemodynamics which were confirmed by EDM data. The improvement in BP and CI after 30 ml albumin is shown in the figures 1 and 2. Sustained effect (about an hour later) was noted toward the end of surgery (Figure 3).

The patient tolerated the procedure well, extubated in the OR and transferred to NICU. Post-op labs (CBC, BMP, VBG) were unremarkable. No anesthesia complications were noted.

Conclusion

Esophageal Doppler Monitoring is a minimally invasive technology that provided clinically relevant CI data in a 3-day old neonate with complex cardiac pathophysiology.

The improvement of BP and CI data confirmed our therapeutic choices.