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Introduction

Congenital heart disease increases short-term and 30-day morbidity & mortality of children undergoing non-cardiac surgery. Risk factors increasing the likelihood of complications include premature neonates, complex cardiac lesions, severe cyanosis, poorly compensated congestive heart failure or pulmonary hypertension, emergency status, and major surgical procedures.

Case Report

19 day old, 2.8kg neonate with double outlet right ventricle, pulmonary atresia and large VSD s/p a right modified Blalock-Taussig shunt with PDA ligation. Postop course was complicated by feeding intolerance requiring NGT feeds. G-tube placement was scheduled within two weeks of her BT shunt. Intraoperatively, patient was managed with ketamine, sevofluorane, and fentanyl after 10m/kg of PRBC and 20ml/kg of crystalloid. Less than 30 minutes into the procedure, the patient showed hemodynamic changes consistent with shunt closure as surgeons were running the bowel. Despite aggressive resuscitative measures, the patient required intraoperative placement on ECMO. Postoperatively, the patient developed abdominal compartment syndrome and failed to come off ECMO.

Anesthetic Considerations

Single ventricle neonates undergoing staged palliation have tenuous physiology prone to unpredictability and are less able to compensate for hemodynamic insults. Potential causes of shunt closure include shunt thrombosis, kinking or spasm in addition to hemodynamic compromise causing an unfavorable QP:QS ratio. Intraoperative measures to promote shunt flow include preventing increases in pulmonary vascular resistance, maintaining adequate depth of anesthesia and analgesia, adding inotropic support such as dopamine (sooner than later), and maintaining ideal volume and hematocrit to compensate for a reduced oxygen carrying capacity and a reduced diastolic pressure from the systemic to pulmonary shunt, while not overloading the single ventricle.

Discussion

Hebson studied the impact of feeding modality at discharge after single ventricle palliation on interstage mortality and concluded that neonates requiring G-tube +/- Nissen are not only at an increased risk of interstage mortality but that this may be a marker for other unmeasured comorbidities. In addition, discharge home with nasogastric feeds may not increase interstage mortality. Decision to submit this high-risk subgroup to non-cardiac surgical cases should be made wisely. As discharge home with nasogastric feeds may not increase interstage mortality, elective G-tube placements should be postponed until after second-stage palliation in this particular group of high risk cardiac patients.

References