[C-19] Patients with Single Ventricle Physiology Undergoing Noncardiac Surgery are at High-Risk for Adverse Events

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Background & Objective:
Patients with single ventricle physiology are at high anesthetic risk when undergoing noncardiac surgery. Our objective was to review the outcomes of anesthetics for patients with single ventricle physiology undergoing noncardiac surgery.

Methods:
A retrospective chart review was conducted of all patients who underwent a palliative procedure for single ventricle physiology (pulmonary artery band, Blalock-Taussig shunt, or Sano shunt) between January 1, 2007 and June 30, 2012. Records were reviewed for any noncardiac procedure which required sedation or general anesthesia. Any noncardiac procedure occurring prior to completion of a bidirectional Glenn procedure was included. Diagnostic procedures, including cardiac catheterization, insertion of permanent pacemaker, and procedures performed in the intensive care unit, were excluded.
Outcomes:
During the review period, 591 patients with single ventricle physiology had initial palliation. Of these, 61 (10.3%) patients underwent 92 anesthetics for 107 noncardiac procedures. The noncardiac procedures included line insertion (n=23); minor surgical procedures such as percutaneous gastrostomy or airway surgery (n=31); or major surgical procedures including abdominal and thoracic operations (n=38). These interventions occurred on median day 62 of life (range 1 to 233 days), and median day 60 (6 to 1226 days) after initial palliative cardiac procedure. The procedures occurred most commonly in the operating room (n=69, 75%). Patients' median weight was 3.4kg (range 2.4-15 kg) at time of noncardiac intervention. In 92 anesthetics, 24 patients had an endotracheal tube or tracheostomy in situ and 51 patients underwent endotracheal intubation. An intravenous induction was performed in 71 patients, an inhalational induction in 14, and a combination technique in 7. The median total anesthetic time was 127 minutes (36-594 minutes). In 20 anesthetics, patients were on inotropic support initially; an additional 23 patients required inotropic support, of which dopamine was the most common medication. There were 10 adverse events (10.9%) including: arrhythmias requiring treatment (n=5), conversion from sedation to a general anesthetic (n=2), difficult airway (n=1), inadvertent extubation with desaturation and bradycardia (n=1), and hypotension and desaturation (n=1). Age, weight, type of cardiac palliation, time after cardiac palliation, and type of procedure were not associated with adverse outcome. In 59 anesthetics (64%), patients went postoperatively to the cardiac ICU. Patients who were undergoing major surgical procedures were independently associated with postoperative disposition to the ICU ($P<0.001$). There were no deaths at 48 hours.
Conclusion: We observed no mortality after noncardiac surgery in a high-risk subgroup of cardiac surgical patients with single ventricle physiology. However, over 10% of patients had an adverse event associated with their anesthetic.
