Dexmedetomidine controls junctional ectopic tachycardia during tetralogy of Fallot repair in an infant

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Abstract
Introduction: Dexmedetomidine is a highly selective α2-adrenergic agonist approved for short term sedation and monitored anesthesia care in adults. Though not specifically approved for use in pediatric patients, an increasing number of reports describe its use in pediatric patients during the intraoperative period and in the intensive care unit. Dexmedetomidine can potentially have an adverse impact on the cardiovascular system secondary to its negative chronotropic and dromotropic effects. However, it is these circulatory effects that are currently being explored as a therapeutic option for the treatment of perioperative tachyarrhythmias in pediatric patients with congenital heart disease.
Case Report: We present a single patient case report describing the use of dexmedetomidine to treat the perioperative development of junctional ectopic tachycardia (JET) in a 6 week old male during tetralogy of Fallot (TOF) repair. Anesthetic induction was carried out with fentanyl (20 µg) and pancuronium (1 mg) via an existing peripheral intravenous catheter. Maintenance anesthesia included isoflurane, fentanyl (25 µg/kg), and a dexmedetomidine infusion (0.5 µg/kg/hr). During placement of central venous and arterial cannulae, the patient was hemodynamically stable; however, phenylephrine was administered while going onto cardiopulmonary bypass (CPB). The TOF was repaired with a CPB time of 117 minutes and a cross clamp time of 78 minutes. After releasing the aortic cross clamp, the patient developed JET. The heart rate (HR) abruptly increased to 190 beats per minute (bpm) and the systolic blood pressure decreased to 30 mmHg. The dexmedetomidine infusion was increased from 0.5 µg/kg/hr to 3 µg/kg/hr for 15 minutes during which time the rhythm converted to normal sinus. The HR decreased to 152 bpm while the blood pressure increased to 50/24 mmHg. The dexmedetomidine infusion was decreased to 1 µg/kg/hr and the patient was weaned from CPB he was able to come off pump. The dexmedetomidine infusion was titrated back to 0.5 µg/kg/hr and was discontinued by the next morning. The remainder of his postoperative course was uneventful.
Discussion: This case report provides additional evidence that dexmedetomidine may have a therapeutic role in the treatment of perioperative tachyarrhythmias in pediatric patients with congenital heart disease. Previous reports describe using a loading doses of 0.5 to 1.6 µg/kg often followed by infusions of 0.3 to 1 µg/kg/hr as a treatment for perioperative tachyarrhythmias. We report treating perioperative JET using a dexmedetomidine infusion rate of 3 µg/kg/hr without a loading dose. No adverse effects were noted and the patient remained in normal sinus rhythm throughout the perioperative course.