Acute Asystole During Dexmedetomidine and Remifentanil Infusion

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Introduction
During suspension laryngoscopy, dexmedetomidine’s lack of respiratory depression can be helpful in simulating laryngeal changes present during spontaneous ventilation. Despite these beneficial effects, dexmedetomidine has additional effects on the cardiovascular system. The aim of this abstract is to present a case of acute asystole during suspension laryngoscopy using dexmedetomidine and remifentanil and to review the cardiovascular effects of these drugs.

Case
A 17 year old male with obstructive sleep apnea presented for laryngoscopy under general anesthesia with spontaneous ventilation. Resting heart rate was 62 bpm. Induction consisted of a 1 mcg/kg load of dexmedetomidine over 10 minutes followed by an infusion at 2 mcg/kg/min, as previously described for MRI sedation(1). The heart rate was 50 bpm after loading. Glycopyrrolate was considered as treatment at this time, but deferred due to stable blood pressure and reports of glycopyrrolate inducing malignant hypertension when used to treat bradycardia caused by dexmedetomidine(2). Upon laryngoscopy, the patient’s heart rate increased to 102 bpm and blood pressure went from 116/45 to 138/96. Remifentanil 0.05 mcg/kg/min was added in response to the sympathetic surge. Within 4 minutes of starting remifentanil, the patient’s heart rate dropped to 58 bpm and progressed to asystole. The patient was immediately resuscitated with return of spontaneous circulation. He was extubated in the operating room and recovered without incident.

Discussion
There have been several case reports of cardiac arrest in adult patients on dexmedetomidine, although it has not been described in the pediatric anesthesia literature. This 17 year old without significant co-morbidities is the youngest report of cardiac arrest known to the authors. Dexmedetomidine can cause bradycardia and hypotension mediated by alpha 2 adrenergic receptors and direct depression of the cardiac conduction pathways. After a loading dose of 1 mcg/kg, heart rate may decrease up to 30%. Infusions of dexmedetomidine up to 3 mcg/kg/hr have been shown to increase the risk of bradycardia when dexmedetomidine is the sole anesthetic in children undergoing MRI(1). In this case, other factors contributed to asystole. Remifentanil causes bradycardia by decreasing centrally mediated sympathetic tone and increasing vagal tone. Suspension laryngoscopy can also lead to vagally mediated bradycardia. Despite preoperative cardiac evaluation including a normal electrocardiogram and Holter monitoring, this patient became aystolic in response to this combination of events. Although both dexmedetomidine and remifentanil are common anesthetic adjuncts, the authors would caution against using both during suspension laryngoscopy. The additive sympatholytic and vagotonic properties of both drugs, combined with the stimulation of laryngoscopy, may lead to asystole.

References