

Effect of Dexmedetomidine on Pacemaker Function During Cardiac Surgery

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Introduction

- Anecdotal reports suggest that dexmedetomidine may adversely affect sinoatrial pacemaker function by limiting the ability of the impulse to elicit an atrial or ventricular response, therefore requiring a stronger impulse to be used.
- To address this possibility, we prospectively compared dexmedetomidine dosing to intraoperative pacemaker function during congenital cardiac surgery.

Methods

- After Institutional Review Board approval, we prospectively enrolled children undergoing cardiac surgery with cardiopulmonary bypass and placement of temporary pacemaker leads.
- Following the insertion of the temporary pacing wires by the surgeon, we recorded the amplitude required for atrial or ventricular capture, and total dexmedetomidine dose received.
- We used a Spearman correlation coefficient to determine whether amplitudes were higher when larger doses of dexmedetomidine were used.

Results

- One boy and 6 girls, ages 5 months to 4 years, have been enrolled in the study to date.
- All patients received 0.5 µg/kg/hr dexmedetomidine infusion with no supplemental boluses. At the intraoperative evaluation all patients were either still receiving dexmedetomidine (n=3) or had dexmedetomidine discontinued <20 minutes prior (n=4).
- Total dexmedetomidine dose averaged 1.8 ± 0.9 µg/kg.
- Three of the children were in sinus rhythm following pacing wire insertion but were briefly paced for the purposes of the study. The other 4 children had brady-arrhythmias including AV-block, sinus bradycardia and a junctional rhythm, each requiring pacing in the postoperative period.
- 6 children underwent ventricular lead placement. The amplitude required to elicit ventricular responses was (1.2 ± 0.4 mA), and this did not correlate with the dexmedetomidine dose administered (rho=-0.43, p=0.397).
- 1 child had atrial pacing wires inserted. The amplitude required to elicit atrial capture was 3.5 mA.

Table

Characteristic	Mean (SD)	N (%)
Age (y)	1.6 (1.5)	
Weight (kg)	10 (6)	
Gender (Female)		6 (86%)
CPB Time	116 (74)	
Procedure		
VSD closure ± ASD closure		4 (57%)
ASD closure + PAPVR repair		1 (14%)
Fontan + TVR		1 (14%)
Complete AV canal repair		1 (14%)

Discussion

- In this prospective study of temporary pacemaker function during pediatric cardiac surgery, we did not find a correlation between the intraoperative dose of dexmedetomidine administered and the requirement for a greater amplitude in order to elicit ventricular capture.
- Larger studies are needed to fully elucidate the relationship of intrinsic pacemaker propagation with the administration of dexmedetomidine in pediatric cardiac surgery.