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# IV amiodarone vs IV sotalol use in postoperative junctional ectopic tachycardia (JET): A randomized study

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**Research Days May 12, 2021**



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# Disclosures

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  - CMH resident research days, May 2020
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# Background

- Junctional ectopic tachycardia (JET) is one of the most common arrhythmias encountered in pediatrics following heart surgery.
- Amiodarone: effective but with significant adverse effects
- Sotalol: recent IV approval, shown to be equally as effective with a better safety profile

# Texas Children's Hospital Case Report

## Intravenous sotalol for the management of postoperative junctional ectopic tachycardia



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### Introduction

Junctional ectopic tachycardia (JET) is a common postoperative arrhythmia seen in children undergoing surgery to repair congenital heart defects.<sup>1,2</sup> If conservative interventions such as cooling, sedation, weaning of inotropic therapy, and atrial overdrive pacing<sup>3,4</sup> are not adequate, intravenous (IV) antiarrhythmic drugs are used. The most commonly used antiarrhythmic drugs for the treatment of JET include amiodarone and procainamide.<sup>4-6</sup> Recently IV sotalol has become available, and initial studies and case reports have shown it to be safe and effective in the management of supraventricular and ventricular arrhythmias in children.<sup>7-9</sup> We report the first use of IV sotalol for the treatment of postoperative JET.

### KEY TEACHING POINTS

- Intravenous sotalol can be considered as a treatment option for postoperative junctional ectopic tachycardia in patients with congenital heart disease.
- A single intravenous bolus of sotalol 1 mg/kg was able to achieve rate and rhythm control of postoperative junctional ectopic tachycardia.
- Administration of intravenous sotalol should be performed in a setting that allows close monitoring of rhythm, heart rate, corrected QT interval, and blood pressure.

# Aims

- Aims 1: To study the safety of IV sotalol as well as in comparison to IV amiodarone in patients postoperatively with JET through monitoring of blood pressure, heart rate, telemetry, and frequent EKGs.
- Aim 2: To evaluate the efficacy of IV sotalol as well as in comparison to IV amiodarone by assessing tachycardia termination, reduction or rate control.

# Hypothesis

- We hypothesize that IV sotalol is as safe and effective as IV amiodarone in achieving rate and/or rhythm control in patients with postoperative JET in our patient population

# Methods

- Non-blinded prospective randomized controlled trial
- Patients: AV canal, VSD, tetralogy of Fallot, and any infant < 6 months of age undergoing any open-heart procedure
- Inclusion: neonate to age 18, postoperative JET
- Exclusion: patient on sotalol prior to surgery for another indication
- Measures: heart rate, blood pressure, EKG, QTc
- Primary outcome measures: successful termination of the rhythm, adequate rate control, effective use of AAI/DDD pacing, time to rate control/termination, and recurrence of JET.



**Appendix A.**

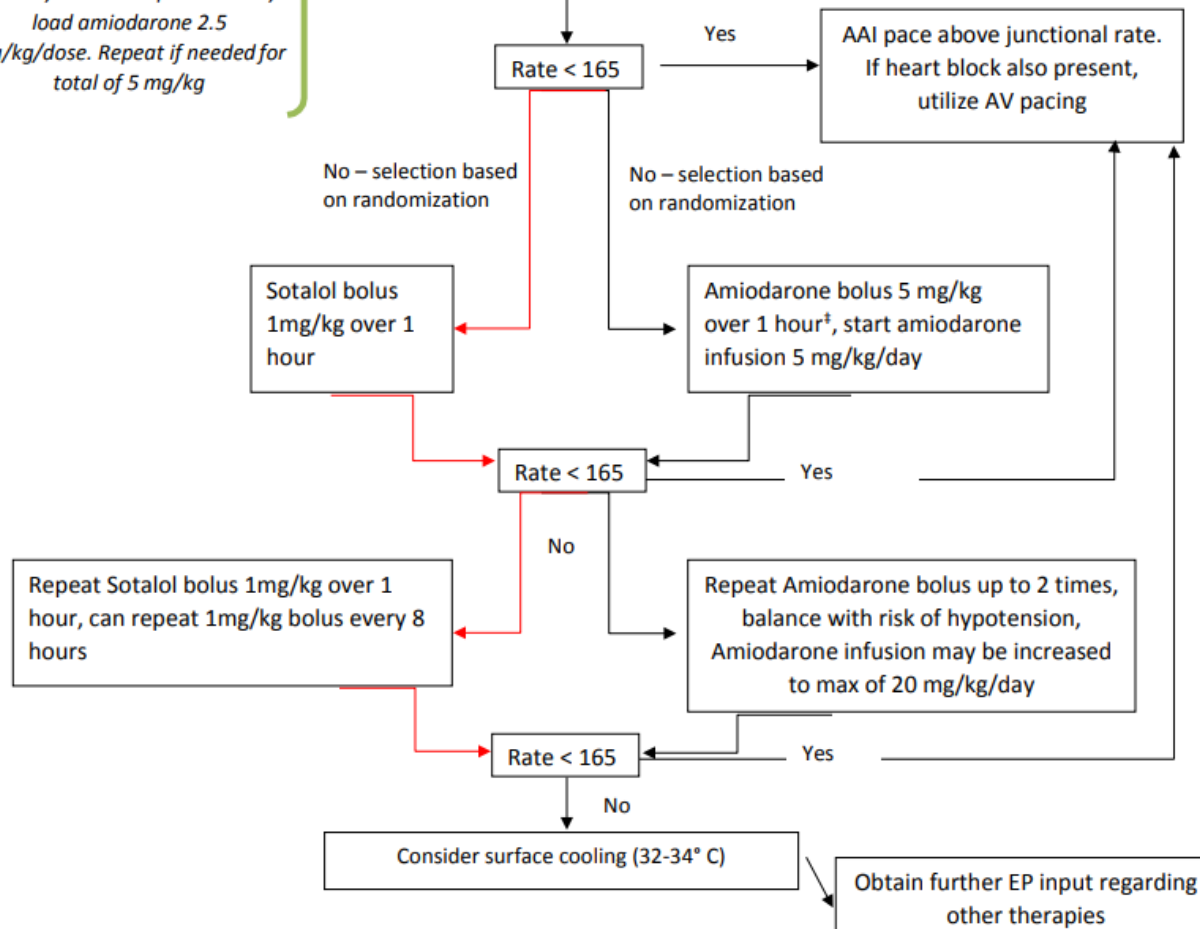
**JET Algorithm**

**General Measures**

Ensure adequate sedation  
 Continuous temp monitoring if < 6 mos old or TOF repair  
 Maintain normothermia (35 - 37°C)  
 Check electrolytes and replete as needed†  
 Reduce inotropes if possible

†Electrolyte Goals  
 Mg > 2  
 iCa > 1.4  
 K > 4

‡For patients with significant hemodynamic compromise may load amiodarone 2.5 mg/kg/dose. Repeat if needed for total of 5 mg/kg



\*\* If the clinical team feels that other treatment beyond the study protocol is needed, the clinic team can bypass the study protocol if they believe it is clinically necessary.

# Results

- Data collection began September 2019
  - 198 qualified
  - 183 approached
  - 103 consented
  - 6 enrolled

CHD type (age)	Drug	Dosage	Outcome (Time to adequate rate control ( <165bpm ) )	Adverse Events
Total anomalous pulmonary venous return (TAPVR) (15 days)	sotalol	1 mg/kg bolus over 60 minutes  Repeat 1mg/kg bolus for different rhythm	Successfully AAI paced (60 minutes)	Patient deceased from suspected bacterial sepsis due to Klebsiella pneumoniae. Unrelated to administration of sotalol.
TOF (5 months)	amiodarone	5 mg/kg bolus x 3 3mg/kg bolus x 8 over 60-120 minutes  5-20 mg/kg/day infusion x 8 days	Successfully DDD paced (Intermittent control over 5 days)	None
Transposition of the Great Arteries (TGA) , VSD (6 days)	sotalol	1 mg/kg bolus x 2 over 60 minutes	Successfully AAI paced (1 <sup>st</sup> bolus, 60 minutes) (2 <sup>nd</sup> bolus, 120 minutes)	None
TGA (14 days)	amiodarone	5 mg/kg bolus x 2 over 60-90 minutes  5-10 mg/kg/day infusion x 3 days	Successfully AAI paced (1 <sup>st</sup> bolus, no resolution) (2 <sup>nd</sup> bolus, intermittent control over 3 days with titration of infusion)	Patient deceased from cardiopulmonary failure secondary to severe pulmonary hypertension present since birth. Unrelated to administration of amiodarone.
TOF (7 weeks)	sotalol	1-2 mg/kg bolus x 2 over 90 minutes	Successfully AAI paced (N/A- prophylactically given after self-resolving event associated with hypotension) (2 <sup>nd</sup> bolus, 90 minutes)	None
ASD/VSD (6 weeks)	amiodarone	5 mg/kg bolus x1 over 60 minutes  5 mg/kg/day infusion x < 1 day	Successfully AAI paced ( 1 <sup>st</sup> bolus- Intermittent quick bursts without complete resolution)	Hypotension requiring vasopressin during infusion. Developed ventricular tachycardia on POD #1 requiring change from amiodarone to lidocaine.

# Conclusions

- Prolonged ICU length of stay with amiodarone\*\*
- Low incidence of JET at our institution
- Consent rate: 56%

\*\*Limitations: insufficient power to draw any concrete conclusions regarding the safety or efficacy of Sotalol.

# Future Directions

- Approximately 20 patients over the next 12-month time period

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# Questions

