Management of supraventricular tachycardia in children

BS. HÀ NGỌC PHƯƠNG ANH

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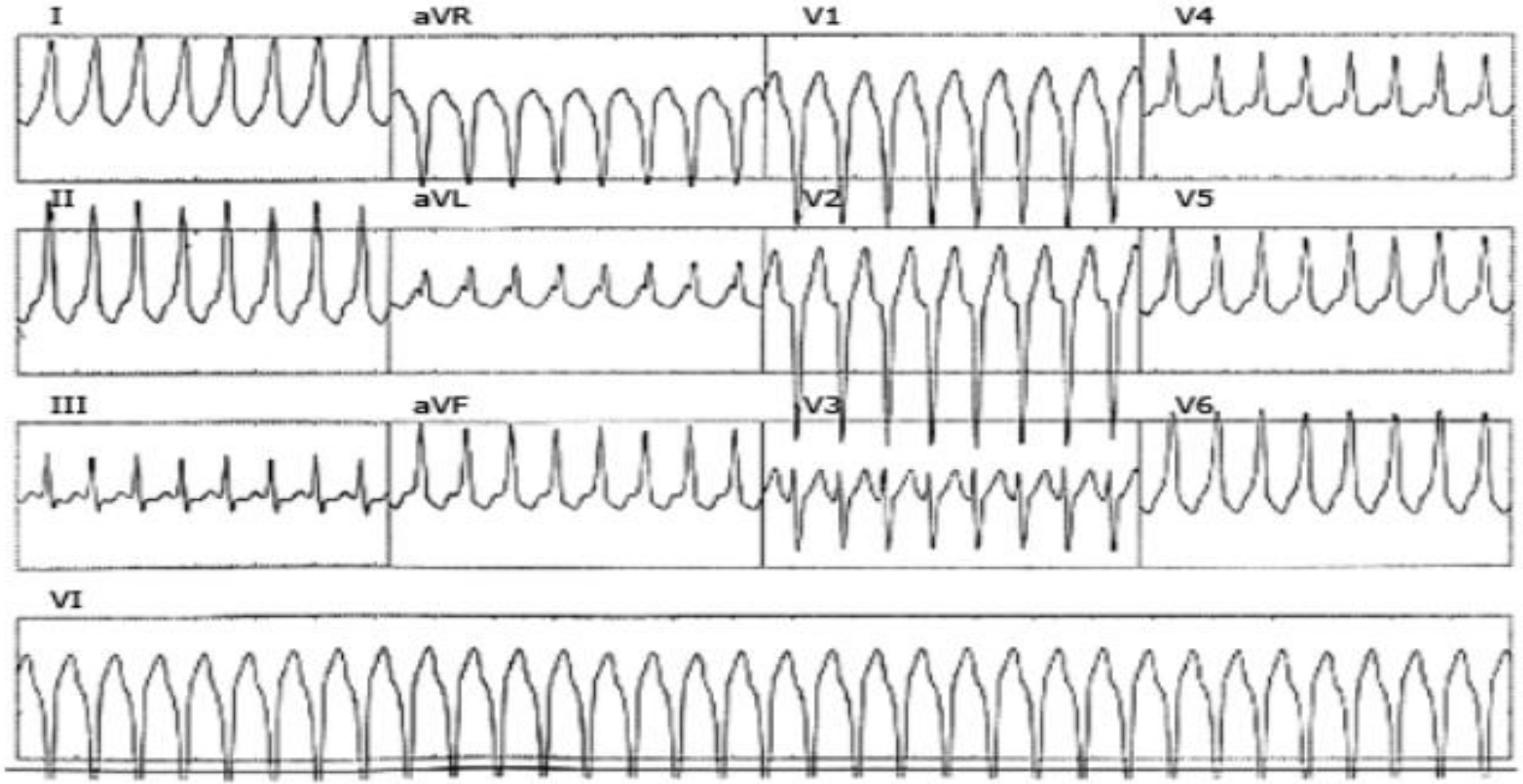
Overview

- Supraventricular tachycardia (SVT) can be defined as an abnormally rapid heart rhythm originating above the ventricles, often (but not always) with a narrow QRS complex.
- 2 most common forms of SVT in children are:
  - Atrioventricular reentrant tachycardia (AVRT)
  - Atrioventricular nodal reentrant tachycardia (AVNRT)
- SVT is the most common rhythm disturbance in children (0.1 – 0.4% in general pediatric population, 7% among children with CHD).
- Majority of SVT patients have structurally normal hearts.

Diagnosis

- Heart rate
  - Infants: 220 – 280 bpm
  - Children and adolescents: 180 – 240 bpm
- Heart failure
- Syncope

Diagnosis



Management

Acute management	• To terminate the arrhythmia
Chronic therapy	• To prevent recurrence

Hemodynamically unstable

Cardioversion: 0.5 – 2 J/kg

Hemodynamically stable

- Vagal maneuvers: ice and cold water over the face for 15 – 30 seconds (successful in 30 – 60% of cases)
- Valsalva maneuver
- Carotid massage and orbital pressure should not be performed in children

First – line therapy

- Adenosine
- Initial dose is 0.1mg/kg (IV), dose is doubled if no response within 2 minutes, maximum dose of 0.25 – 0.35 mg/kg or 12mg.
- Cautions with adenosine:
  - Contraindicated in patients with preexisting second- or third – degree heart block or sinus node disease
  - In WPW syndrome, adenosine can precipitate atrial fibrillation that can degenerate into ventricular fibrillation
  - Bronchospasm

SVT refractory to adenosine

- Procainamide: acts by slowing conduction within the myocardium itself, rather than by blocking reentry at the AV node. As a result, procainamide may be used safely in patients with WPW syndrome without the risk of provoking accessory pathway conduction. Loading dose is 10 – 15 mg/kg, followed by a continuous infusion starting at 20 µg/kg per minute.
- Amiodarone: prolongs the refractory period of the AV node. Bolus 5 mg/kg over 20 to 60 minutes, if no response, bolus dose up to 15 mg/kg, if response, followed by continuous infusion of 10 – 15 mg/kg per day.

SVT refractory to adenosine

PEDIATRIC CARDIOLOGY

Pediatric Use of Intravenous Amiodarone: Efficacy and Safety in Critically Ill Patients From a Multicenter Protocol

JAMES C. PERRY, MD, FACC, ARNOLD L. FENRICH, MD,* J. EDWARD HULSE, MD,†
JOHN K. TRIEDMAN, MD,‡ RICHARD A. FRIEDMAN, MD, FACC,* JOHN J. LAMBERTI, MD, FACC

San Diego, California; Houston, Texas; Atlanta, Georgia; and Boston, Massachusetts

SVT refractory to adenosine

Intravenous Amiodarone for Incessant Tachyarrhythmias in Children

A Randomized, Double-Blind, Antiarrhythmic Drug Trial

J. Philip Saul, MD; William A. Scott, MD; Stephen Brown, MD; Pablo Marantz, MD; Valeria Acevedo, MD; Susan P. Etheridge, MD; James C. Perry, MD; John K. Triedman, MD; Susan W. Burriss, BSN, MS; Paul Cargo, RN; Jay Graepel, PhD; Eeva-Kaarina Koskelo, PhD; Rebecca Wang, MD; for the Intravenous Amiodarone Pediatric Investigators

SVT refractory to adenosine

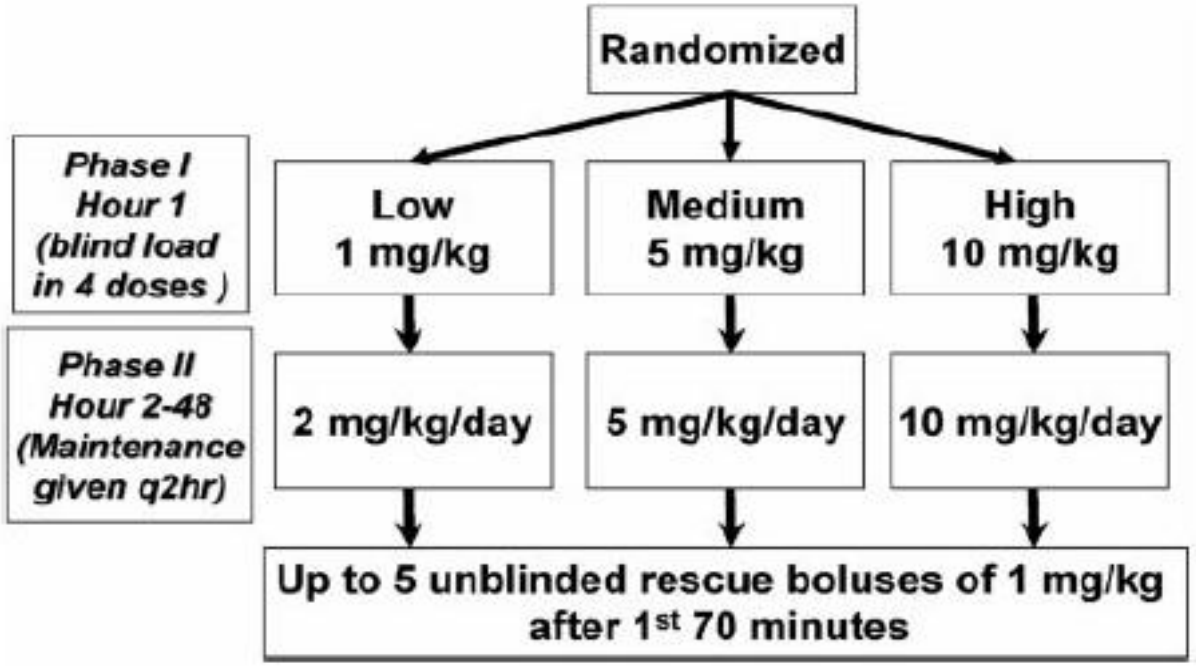
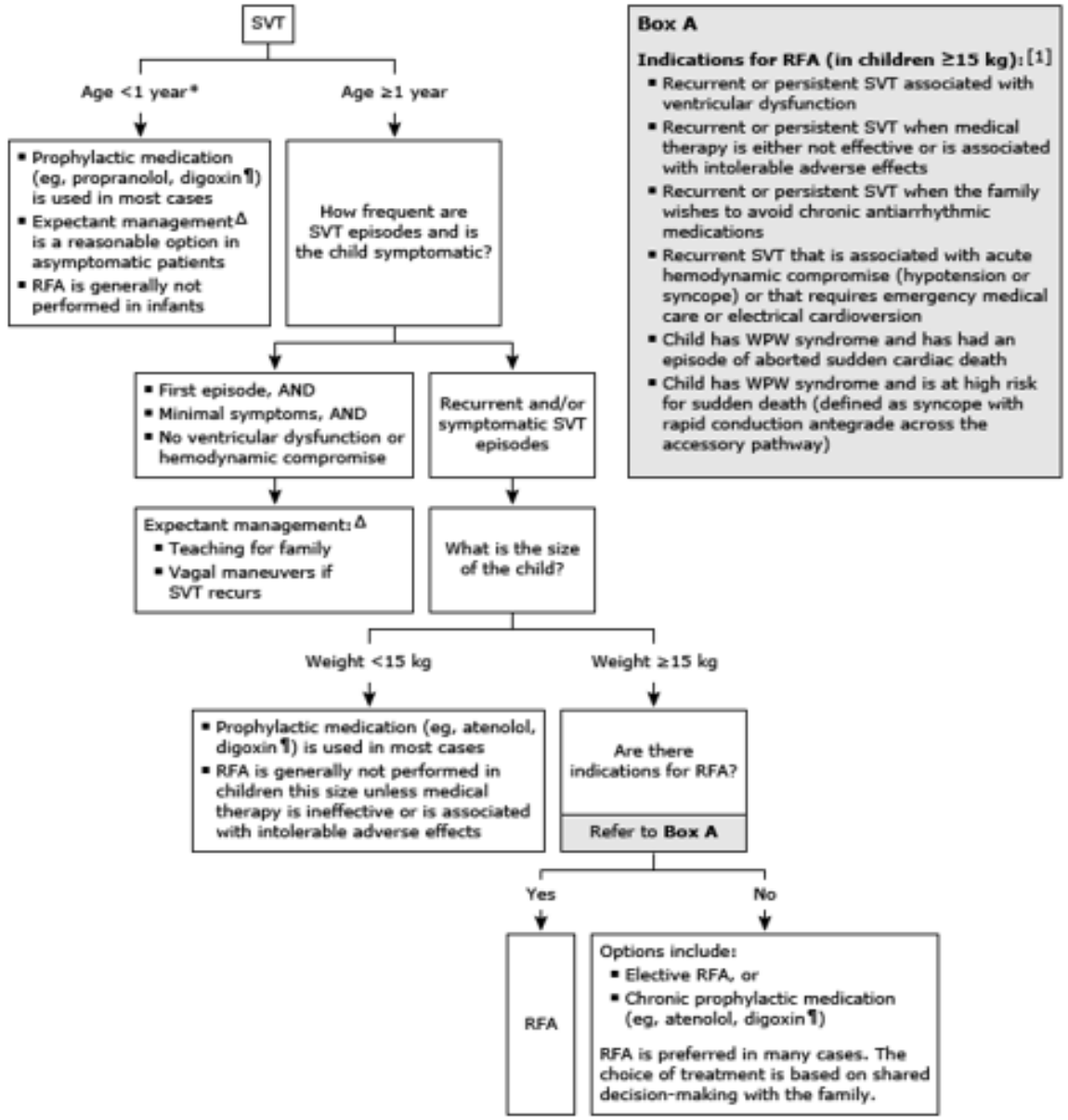


Figure 1. Overall study design. Study drug administration was divided into loading and maintenance phases.

Chronic therapy

Overview of the chronic management of supraventricular tachycardia in children



First – line agents

- Beta blocker: propranolol 2- 4 mg/kg per day orally divided into 4 doses

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ORIGINAL ARTICLES

Efficacy and Safety of High-Dose Propranolol for the Management of Infant Supraventricular Tachyarrhythmias

Andrea L. Barton, PharmD[1], Brady S. Moffett, PharmD, MPH[1,2], Santiago O. Valdes, MD[2], Christina Miyake, MD[2], and Jeffrey J. Kim, MD[2]

Circulation
Arrhythmia and Electrophysiology

American Heart Association.

The Study of Antiarrhythmic Medications in Infancy (SAMIS): A Multicenter, Randomized Controlled Trial Comparing the Efficacy and Safety of Digoxin Versus Propranolol for Prophylaxis of Supraventricular Tachycardia in Infants

Shubhayan Sanatani, James E. Potts, John H. Reed, J. Philip Saul, Elizabeth A. Stephenson, Karen A. Gibbs, Charles C. Anderson, Andrew S. Mackie, Pamela S. Ro, Svjetlana Tisma-Dupanovic, Ronald J. Kanter, Anjan S. Batra, Anne Fournier, Andrew D. Blaufox, Harinder R. Singh, Bertrand A. Ross, Kenny K. Wong, Yaniv Bar-Cohen, Brian W. McCrindle and Susan P. Etheridge

Table 2. Recurrent SVT

	Digoxin (n=32), n (%)	Propranolol (n=39), n (%)	*P* Value
Recurrent SVT			
0–5 d, discontinued study drug	2 (6)	5 (13)	0.14
On study drug >5 d, requiring medical therapy	4 (12)	7 (18)	0.53
On study drug >5 d, self-limited	5 (16)	1 (3)	0.02
SVT reported at 12 mo*	4 (13)	4 (10)	0.55

SVT indicates supraventricular tachycardia.
The median (range) or the number (percentage) is reported.
*SVT reported at the 12-mo follow-up visit by patients who previously met a study end point.

First – line agents

DIGOXIN

Poor response

- Amiodarone
- Flecainide
- Sotalol

Poor response

Intravenous Amiodarone Used Alone or in Combination With Digoxin for Life-Threatening Supraventricular Tachyarrhythmia in Neonates and Small Infants

Embiya Dilber, MD, Mehmet Mutlu, MD,* Beril Dilber, MD,* Yakup Aslan, MD,* Yusuf Gedik, MD,* and Alpay Çeliker, MD†*

Radiofrequency ablation

Radiofrequency Catheter Ablation in Children with Supraventricular Tachycardias: Intermediate Term Follow Up Results

MM. Hafez[1], MM. Abu-Elkheir[1], M. Shokier[2], HF. Al-Marsafawy[1], HM. Abo-Haded[1] and M. Abo El-Maa

[1]Pediatric Cardiology Unit, Department of Pediatrics, Faculty of Medicine, Mansoura University, Mansoura, Egypt. [2]Genetic Unit, Department of Pediatrics, Faculty of Medicine, Mansoura University, Mansoura, Egypt. [3]Department of Cardiology, Faculty of Medicine, Ain-Shams University, Cairo, Egypt.

Conclusions

- SVT is the most common rhythm disturbance in children.
- Two major issue will be addressed: acute management and chronic therapy.
- Adenosine (1C)
- Beta blockers (2C)

Thank for your attention