

ARRHYTHMIA THERAPY [Peds-030](#)

The evidence on emergency treatment of arrhythmias was reviewed and the only change was the addition of procainamide as possible therapy for refractory supraventricular tachycardia (SVT).

Unstable VT

Consensus on Science

There is insufficient evidence to support or refute the efficacy of electric therapy over drug therapy or the superiority of any drug for the emergency treatment of unstable VT in the pediatric age group. In 2 LOE 5 adult case series,^{312,313} early electric cardioversion was effective for treatment of unstable VT.

In 4 small LOE 4 pediatric case series^{298,299,314,315} amiodarone was effective in the management of VT. One prospective randomized multicenter safety and efficacy LOE 2 trial evaluating amiodarone for the treatment of pediatric tachyarrhythmias³¹⁶ found that 71% of children treated with amiodarone experienced cardiovascular side effects. Both efficacy and adverse events were dose-related.

Treatment Recommendations

It is reasonable to use synchronized electric cardioversion as the preferred first therapy for pediatric VT with hypotension or evidence of poor perfusion. If drug therapy is used to treat unstable VT, amiodarone may be a reasonable choice, with careful hemodynamic monitoring performed during its slow delivery.

Drugs for Supraventricular Tachycardia [Peds-031](#)

Consensus on Science

Twenty-two LOE 4 studies in infants and children^{317,-,338} demonstrated the effectiveness of adenosine for the treatment of hemodynamically stable or unstable SVT. One LOE 4 study³³⁹ and 4 larger LOE 5 studies involving teenagers and adults^{340,-,343} also demonstrated the efficacy of adenosine, although frequent but transient side effects were reported.

One LOE 2 study³⁴⁴ showed highly successful (approximately 90%) treatment of SVT in infants and children using adenosine or verapamil and superiority of these drugs to digitalis (61% to 71%). One LOE 5 randomized prospective adult study³⁴⁵ and 1 LOE 5 meta-analysis, primarily involving adults but including some children,³⁴⁶ demonstrated the effectiveness of verapamil and adenosine in treating SVT and highlighted the cost-effectiveness of verapamil over adenosine.

One LOE 4 randomized, prospective study³¹⁶ and 15 LOE 4 small case series and observational studies in infants and children^{298,299,314,315,347,-,357} showed that amiodarone was effective in the treatment of supraventricular tachyarrhythmias. Generalization to pediatric SVT treatment with amiodarone may be limited, however, since most of these studies in children involved postoperative junctional tachycardia.

Rare but significant side effects have been reported in association with rapid administration of amiodarone. Bradycardia and hypotension were reported in 1 prospective LOE 4 study,³¹⁶

cardiovascular collapse was reported in 2 LOE 5 case reports,^{358,359} and polymorphic VT was reported in 1 small LOE 4 case series.³⁶⁰ Other LOE 5 case reports describe late side effects of pulmonary toxicity³⁵⁹ and hypothyroidism.³⁶²

In 1 LOE 2 pediatric comparison control study³⁶³ procainamide had a significantly higher success rate and an equal incidence of adverse effects when compared with amiodarone for treating refractory SVT. In 5 LOE 4 observational studies^{364,-,368} and 5 LOE 5 case reports^{369,-,373} procainamide effectively suppressed or slowed the rate in children with SVT. A wide variety of arrhythmias were studied, including ectopic atrial tachycardia, atrial flutter, and orthodromic reciprocating tachycardia.

In LOE 5 studies in children,³⁷⁴ adults,^{375,376} and animals,³⁷⁷ hypotension from procainamide infusion resulted from vasodilation and not decreased myocardial contractility. Initial observational LOE 4 reports^{378,-,380} and 1 LOE 4 case series³⁸¹ described successful treatment of pediatric SVT with verapamil. However, multiple small LOE 4 case series^{344,382} and LOE 5 case reports^{383,384} documented severe hypotension, bradycardia, and heart block causing hemodynamic collapse and death following IV administration of verapamil for SVT in infants. Two small LOE 4 pediatric case series^{385,386} described esmolol and dexmedetomidine in the treatment of SVT.

Treatment Recommendations

For infants and children with SVT with a palpable pulse, adenosine should be considered the preferred medication. Verapamil may be considered as alternative therapy in older children but should not be routinely used in infants. Procainamide or amiodarone given by a slow IV infusion with careful hemodynamic monitoring may be considered for refractory SVT.