An endogenous nucleoside with antiarrhythmic activity. Slows conduction through the AV node. It can interrupt the reentry pathways through the AV node and restore NSR in Patients with acute PSVT including that associated with WPW syndrome. It decreases peripheral resistance and arterial pressure. The systemic hemodynamic effects are minimal and transient. The electrophysiologic effects of adenosine are not blocked by atropine, which indicates a lack of vagal mediation. Adenosine does not convert atrial flutter, atrial fibrillation or ventricular fibrillation or ventricular tachycardia to a normal sinus rhythm with the rare exception of Adenosine sensitive ventricular tachycardia. A modest slowing of ventricular response may occur with atrial flutter or fibrillation.

**Pharmacokinetics:**

- **Onset of action:** <20 seconds
- **Peak effect:** 20-30 seconds
- **Duration of action:** variable

**Interaction / toxicity:**

- Prolonged bradycardia in pts w/ toxic concentration of calcium channel blockers;
- Antagonized competitively by methylxanthines (e.g. theophylline, caffeine).
- Potentiated by blockers of nucleoside transport (e.g. dipyridamole).
- Increase heart rate with nicotine.
- Higher degrees of heart block in the presence of carbamazepine

**Guidelines and precautions:**

Do not confuse this drug with adenosine phosphate, which is used as adjunctive therapy in the treatment of complications associated with varicose veins.

Due to the rapid metabolism it is imperative to administer the dose rapidly over 2 to 3 seconds. If given at a slower rate a reflex tachycardia may occur as a result of systemic vasodilation. Negative chronotropic, dromotropic effects are seen only with rapid administration.

Adenosine may produce a short lasting 1<sup>st</sup>, 2<sup>nd</sup>, or 3<sup>rd</sup> degree heart block. Do not give additional doses if patients develop high-level heart block.

It is not effective in patients receiving methylxanthines. Which can completely block the electrophysiologic effects of adenosine.

Use with caution in patients capable of rapid AV conduction. Atrial fibrillation or flutter has been observed in patients receiving adenosine

Reduce dosage in heart transplant patients. Donor sinus and AV nodes may have increased response to adenosine compared with recipient nodes or control subjects.

Significantly lowered doses of adenosine should be administered in patients receiving dipyridamole initial doses should not exceed 1 mg.

Use with caution in-patient with asthma it may produce bronchoconstriction.

ECG monitoring is essential to determine conversion to normal sinus rhythm or AV block to detect new arrythmias. Adenosine is contraindicated in pts w 2<sup>nd</sup> or 3<sup>rd</sup> degree AV block or sick sinus syndrome except where a pacemaker has been placed.

**Uses:**
Treatment of acute paroxysmal supraventricular tachycardia:

Differentiation of supraventricular tachycardia w/ intraventricular aberrancy from ventricular tachycardia:

Unmasking of surface ECG delta waves in pts w/ concealed accessory pathways.

afterload reduction in low output states; controlled hypotension during cerebral or abdominal aortic aneurysm surgery; pharmacologic stress testing e.g. thallium in coronary artery disease.

Treatment of PSVT

Adult:

- Rapid IV bolus 6-12 mg may repeat 1-2 minutes X2 doses if necessary.
- Single doses > 12mg are not recommended.
- Lower doses 3mg may be more effective when administered via central vein or into the right atrium.
- Dose should be followed quickly by a 20ml rapid saline flush.

Children:

- 0.1 mg/kg by rapid IV bolus. If tachycardia is not abolished in 1-2 minutes Increase dose by increments of 0.05-0.1 mg/kg every 2 minutes to a maximum dose of 0.35 mg/kg IV. Do not exceed 12 mg per dose. Dose should be followed by rapid saline flush.

Neonates:

- 0.05 mg/kg by rapid IV bolus. If tachycardia is not abolished in 1-2 minutes increase dose by increments of 0.05 mg/kg q 2 minutes to a max dose of 0.25 mg/kg IV do not exceed 12 mg per dose.

Controlled hypotension 40-500 microgram/kg/min titrate to desired endpoint.

Elimination is by cellular uptake and metabolism (deamination amd phosphorylation)

Packaging and storage: Store between 15 and 30 °C (59 and 86 °F), unless otherwise specified by manufacturer. Do not refrigerate. Protect from freezing. Crystallization may occur if adenosine injection is refrigerated. If that occurs, the crystals may be dissolved by warming the injection to room temperature. The solution must be clear before use.

Stability: contains no preservatives, any unused portion should be discarded.

References