Adenosine (Adenocard)

Adenosine is a medication that is a naturally occurring nucleotide in the body. It works by blocking cyclic-AMP (CAMP) induced calcium influx into cardiac myocytes. It is used in tachyarrhythmias to delay the PR interval and slow a patient’s heart rate to a normal sinus rhythm. It is given for supraventricular tachyarrhythmias after other efforts like vagal maneuvers to slow the heart rate have failed. It is given in a characteristic single 6 mg IV rapid bolus followed by two more 12 mg IV rapid boluses if the rate fails to convert to a normal rhythm. The onset of the medication is typically seconds and resolves in about 10 seconds. Any side effects typically resolve within 1 minute of administration.

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Mechanism

Slows AV Conduction
Slowed AViator Snail-Conductor
This medication slows AV conduction from the SA node through the AV node, which abolishes tachyarrhythmias. It does this by essentially acting as a short term calcium channel blocker inside the AV node that is induced by cyclic AMP (CAMP). This leads to a prolonged PR interval on the ECG.

Indications

Supraventricular Tachycardia (Paroxysmal)
Super-V-Tac
Adenosine is indicated for specific types of tachyarrhythmias that originate above the AV node or that use the AV node as re-entry, such as PSVT (paroxysmal supraventricular tachycardia). Atrial fibrillation, atrial flutter, and ventricular arrhythmias are not terminated by adenosine because they do not typically involve the AV node as part of the re-entrant circuit.

Side Effects

Bradycardia
Snail-heart
It is not uncommon for patients to experience a brief (10 second) episode of bradycardia or even brief asystole. This is self-limiting and they typically return to a heart rate of a normal range quickly as this medication increases the PR interval and induces an AV block.

Flushing
Flashlight to Flushed-face
Transient flushing is possible as this medication causes brief small vessel vasodilation. In some patients they may experience a brief episode of hypotension, dizziness or palpitations.

Dyspnea
Disc-P-lungs
Most commonly a few seconds after administration, patients will feel a moment of breathlessness or dyspnea sometimes described as if they had just been hit in the chest. This is because adenosine can induce a brief bronchoconstriction.

Considerations

Rapid IV Push
Rapid-rabbit IV Pushing
This medication is given in a rapid IV push, followed by a saline flush. It is given in this way because its half life is only a few seconds in duration. To maximize the effects of the medication it should be administered in an IV as close to the heart as possible.

Caffeine and Theophylline Decrease Effectiveness

Down-arrow Coffee and Tee-off-feline

Remember that caffeine increases your heart rate. Patients who consume large amounts of caffeine or take the medication theophylline require larger doses of adenosine to reach therapeutic effects. This is because they are methylxanthines and they block the receptors for adenosine on the heart.

Dipyridamole May Intensify Effects

Diaper-riddler with Up-arrow

Dipyridamole (Persantine) is an antiplatelet medication that blocks the uptake and metabolism of this medication, and may intensify its effects, especially side effects. Patients taking this medication may experience more serious side effects due to an interaction that intensifies the effects.