Amiodarone

Amiodarone is a class III antiarrhythmic (potassium channel blocker), which decreases SA and AV node conduction. It is also a notable inhibitor of the cytochrome P450 complex. It is indicated for supraventricular tachycardias in the context of heart failure as well as ventricular tachycardias after CPR, defibrillation, and epinephrine are unsuccessful according to the ACLS algorithm. Amiodarone has several side effects including hepatotoxicity, pulmonary fibrosis, bradycardia, heart block, thyroid dysfunction, bluish-gray skin deposits, and corneal deposits.



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Mechanisms

Class III Antiarrhythmic (K+ Channel Blocker)

(3) Tree Ant-tie-arrhythmia-drummer (Bananas Channel Blocked)

Amiodarone is a class III antiarrhythmic, along with ibutilide, dofetilide, sotalol, and dronedarone. Class III antiarrhythmic drugs work by slowing repolarization via potassium channel blockade.

Decreases SA and AV Node Conduction

Down-arrow Silo-nose and AViator-Nose Conductor

Amiodarone decreases sinoatrial (SA) node automaticity and atrioventricular (AV) node conduction velocity (via calcium channel and beta-receptor blockade). This prolongs the refractory period (via potassium and sodium channel blockade) and inhibits ectopic pacemaker automaticity.

Inhibits Cytochrome P450

Inhibiting-chains on Side-toe-chrome Pea-450 rocket

Amiodarone inhibits metabolism through various cytochrome P450 pathways, including CYP2D6, -3A4, and -2C9. Cytochrome P450 enzymes are essential for metabolizing some medications. If this enzyme is inhibited, the concentration of those medications in the blood will increase, potentially leading to toxicity.

Indications

Supraventricular Tachycardia with Heart Failure

Super-V-Tac and Dead Heart

Amiodarone can be used to treat supraventricular tachycardia (SVT) e.g. atrial fibrillation in the context of heart failure. It is effective in hemodynamically unstable patients and patients with congestive heart failure with decreased left ventricular ejection fraction, which may be untreatable with other rhythm-control medications.

Ventricular Tachycardia

Vent Tac-heart-card

Intravenous amiodarone is effective in treating ventricular tachyarrhythmias. These includes ventricular tachycardia, pulseless ventricular fibrillation and ventricular tachycardia which is refractory to cardiopulmonary resuscitation (CPR), defibrillation, and epinephrine administration.

Side Effects

Hepatotoxicity

Liver with Toxic-green-glow

Hepatotoxicity is characterized by the increase of hepatic enzyme levels (e.g. AST, ALT) and is often asymptomatic. Reduction and/or discontinuation of the dosage can be considered if the elevation exceeds double or three times normal.

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Pulmonary Fibrosis

Fiber-ball hitting Lungs

Pulmonary fibrosis can be a side effect of amiodarone in 5-7% of patients. It can manifest with hypoxemia, dyspnea, and exertional desaturation.

Bradycardia

Snail-heart

Bradycardia can occur in 2-4% of patients being treated with amiodarone. It occurs due to the mechanism of amiodarone i.e. decreasing SA node automaticity and AV node conduction velocity.

Heart Block

Heart Block

Heart block can occur with intravenous amiodarone administration. Amiodarone is contraindicated in second- or third-degree heart block patients who do not have a pacemaker.

Thyroid Disorders

Thigh-droid

Amiodarone contains an iodine component (40% iodine by weight), which has a similar structure to thyroxine and affects the thyroid gland. Hypothyroidism (2% cases) or hyperthyroidism (6% cases) can occur. If a new arrhythmia is found in a patient being treated with amiodarone, hyperthyroidism should be suspected.

Blue/Gray Skin Deposits

Blue Gray Skin

Dermatologic side effects can occur with amiodarone administration. Blue-gray skin deposits ("smurf-skin") can be seen in close to 9% of patients. It is usually seen in exposed skin. Another finding is photosensitivity (10% cases) which can be prevented by Sun barrier creams or protective clothing.

Corneal Deposits

Corn-eyes Fillled

Corneal deposits often occur in patients (up to 90% cases) using amiodarone. It can be seen by slit-lamp examination. Once amiodarone is in the blood, it may start to be secreted by the lacrimal glands and then uptaken by corneal epithelium. Patients may complain of visual halos or blurred vision.

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