



SYTEMATIC STUDY ON Amiodarone (Cordarone) DRUG

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ABSTRACT

Amiodarone is a medication that belongs to a class of drugs called Antiarrhythmics. It is primarily used to treat certain types of irregular heart rhythms or arrhythmias, including ventricular fibrillation and ventricular tachycardia. It is also used to prevent the recurrence of atrial fibrillation or atrial flutter.

KEYWORDS: Antidysrhythmic Drug, Pharmacodynamics, Indications, Pharmacokinetics, Available forms, Contraindication, Drug Interactions, Nursing Process.

INRODUCTION

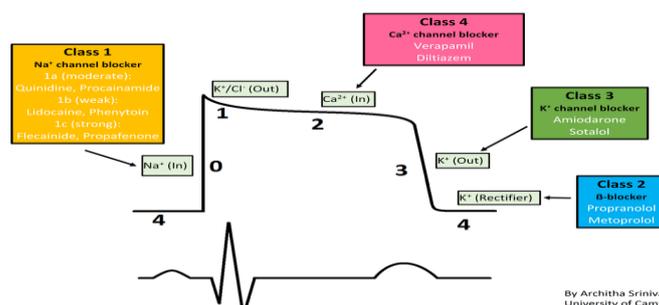
Amiodarone is known as an anti- arrhythmic drug. It works by blocking certain electrical signals in the heart that can cause an irregular heartbeat. Amiodarone is available under the following different brand names: **Pacerone, Cordarone, and Nexterone.**

Class

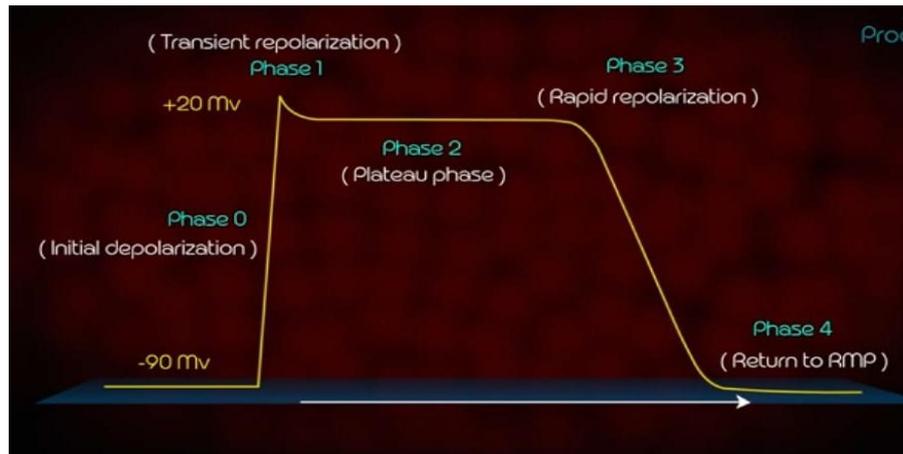
Potassium channel blocker (**Antidysrhythmic Drug Class III**)

Antidysrhythmic Drug Classes

Drugs Affecting the Cardiac Action Potential



Normal physiology of phases of Action Potential of Heart muscles

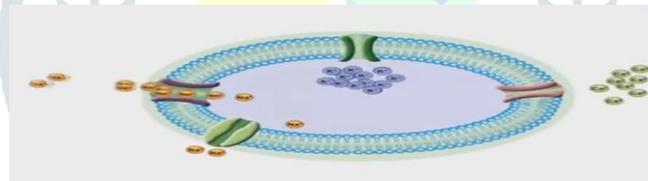


Depolarization- it is change within a cell during which the cell undergoes a shift in electric charge distribution, resulting in less negative charge inside the cell.

Repolarization- it refers to the change in membrane potential that returns it to a negative value just after the depolarization phase of action potential.

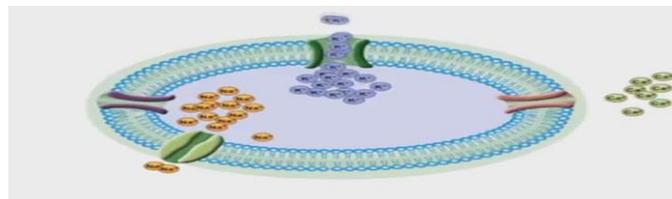
Phase 0-

- Sodium gates open, sodium rushes into the cell.
- Once the inside of the cell becomes so positive it creates an electrical response
- The rapid increase causes the cell to fire



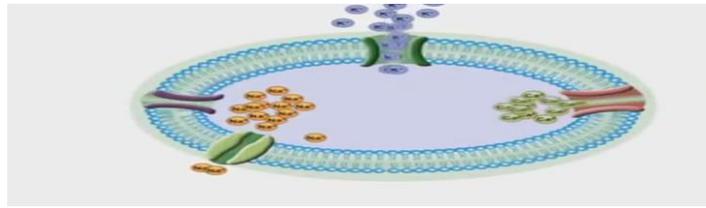
Phase 1-

- When cell is at its peak positive charge, negative chloride enters the cell and slows the influx of sodium and some potassium goes out of cell.



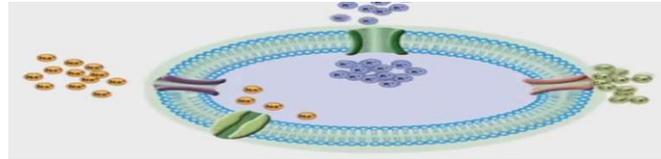
Phase2-

- Fast gates of sodium close, calcium enters the cell and to balance it potassium goes out of cell.
- Calcium is needed in the cell for the myocardium to physically contract.
- The closing of gates and no movement of sodium allows for this plateau.



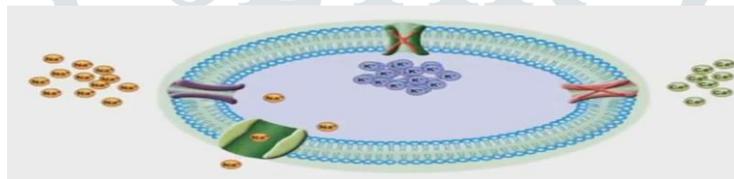
Phase 3-

- Potassium channels open to repolarise the cell makes inside of the cell more negative (repolarise)



Phase 4-

- Resting period, when the sodium and potassium pump begins to move sodium out of the cell, and potassium in gradually.



Normal ECG to study the importance of drug in it

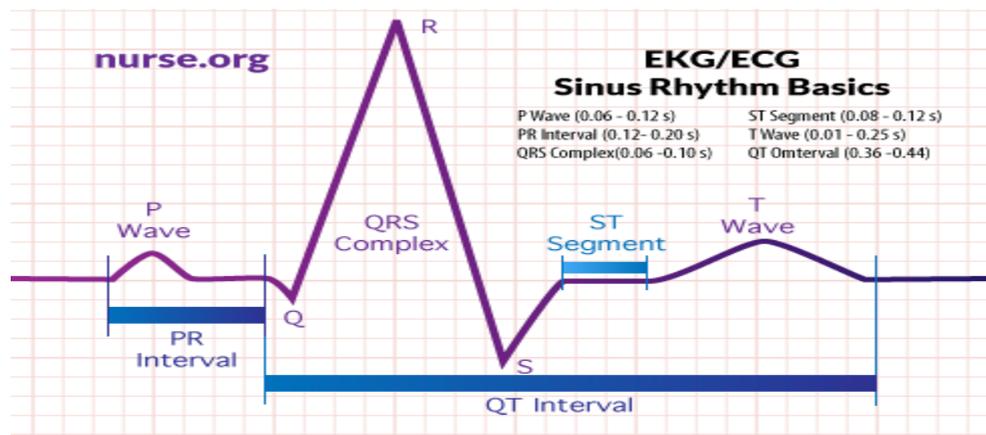
P wave – It indicates atrial depolarization. The P wave occurs when sinoatrial node, creates an action potential that depolarizes the atria.

QRS complex -A combination of the Q wave, R wave and S wave, the “QRS complex” represents ventricular depolarization.

T wave – It occurs after the QRS complex and is a result of ventricular repolarization.

QT interval - it is the time from the beginning of the QRS complex, representing ventricular depolarization, to the end of the T wave, resulting from ventricular repolarization.

PR Interval-The PR interval is the time from the onset of the P wave to the **start of the QRS complex**. It reflects conduction through the AV node.



Pharmacodynamics

- Blocks potassium channels in **phase 3** of the action potential
- Delays **repolarization** of fast action potential; prolong action potential
- Prolongs **QT** interval
- Decreases heart rate (*negative chronotropic*)
- Decreases contractility (*negative inotropic*)

Indications:

- **Pulseless ventricular fibrillation or ventricular tachycardia** (ACLS 1st line choice for IV antidysrhythmic agent) -Pulseless VT and VF is the emergency condition in which there is ventricular contraction occurs so rapidly that the heart has no time to refill, which results in a pulse that can't be detected. Tissues no longer receive adequate blood flow in individuals suffering with these conditions. And in VF the ventricular walls prevents from pumping, as it causes a rapid quivering, and this motion doesn't synchronize with atrial contractions.

VENTRICULAR FIBRILLATION



Ventricular Tachycardia



- **Unstable ventricular tachycardia-** An **unstable tachycardia** exists when cardiac output is reduced to the point of causing serious signs and symptoms. Serious signs and symptoms commonly seen with **unstable tachycardia** are: chest pain, signs of shock, SOA (short of air), altered mental status, weakness, fatigue, and syncope.
- Has been indicated in the past for **supraventricular tachycardias** but has been moved down due to risks of toxicity - It's a broad term that includes many forms of heart rhythm problems (heart arrhythmias) that originate above the ventricles (supraventricular) in the atria or AV node.
- Atrial fibrillation (oral doses)- Atrial fibrillation is the most common type of **heart arrhythmia** (irregular heartbeat) that can interrupt the normal flow of blood. This interruption means the conditions puts you at risk of blood clots and stroke. With AFib, the two upper chambers of your heart (atria) are affected. This disrupts blood flow to the ventricles or the lower chambers, and then throughout the rest of your body.



Pharmacokinetics:

- **Onset:** 2 hours (IV); 2-3 days (orally)
- **Peak:** 3-7 hours
- **Half-Life:** 25 – 110 days (generally 58 days) THIS IS A VERY LONG HALF LIFE—which increases the risk for toxicity

Normal level of Amiodrone in blood

- 0.5-2.0 mcg/mL: Therapeutic concentration
- >2.5 mcg/mL: Toxic concentration

Signs of Toxicity:

- **Pulmonary toxicity:** (2-17%) hypersensitivity pneumonitis, pulmonary fibrosis (dyspnea, cough, chest pain)
- **Cardiotoxicity:** sinus bradycardia, AV blocks, torsades de pointes, heart failure
- Hepatitis, thyroid dysfunction

Available forms

Injectable solution

- 50 mg/mL

- 150 mg/100mL
- 360 mg/200mL

Tablet

- 100 mg
- 200 mg
- 400 mg

Some brand names

- Cordarone
- Nexterone
- pacerone

Dosages & Routes:

- **PO:** 800-1600 mg daily (loading); 100 – 400 mg daily (maintenance)
- **IV bolus:** 300 mg IV or IO in 20-30 ml D5W; 2nd dose of 150 mg may be given in 3-5 minutes

Administration

In General Ventricular Arrhythmias

Oral

- Load: 800-1600 mg orally once/day for 1-3 weeks until response; once adequate arrhythmia control achieved, reduce dose to 600-800 mg/day for 1 month; THEN reduce to maintenance dose
- Maintenance dose: 400 mg orally once/day

Intravenous (IV)

- 150 mg over first 10 min (15mg/min), followed by 360 mg over next 6 hours (1 mg/min), Then 540 mg over remaining 18 hours (0.5 mg/min), for a total of 1000 mg over 24 hours before administering maintenance infusion
- Maintenance: 0.5 mg/min for a total 720 mg/24hr at a concentration of 1-6 mg/mL (360 mg/200mL), or 1.8 mg/mL amiodrone at rate of 278 mL/min
- Duration of therapy: May continue to administer 0.5 mg/min for 2-3 weeks regardless of patient's age, renal function or ventricular function

In Pulseless Ventricular Tachycardia or Ventricular Fibrillation

- 5 mg/kg intravenous/intraosseus (IV/IO) rapid bolus; not to exceed 300 mg/dose; may repeat twice to maximum 15 mg/kg during acute treatment

In Supraventricular tachycardia

- Infants/children/adolescents: 5 mg/kg intravenous (IV) over 1 hour initially; follow with 5 mg/kg/day for 47 hours

- Maintenance: 10-20 mg/kg/day for 7-10 days; follow with 3-20 mg/kg/day

The Possible Side Effects of Drug

- Wheezing, cough, chest pain, cough with bloody mucus, fever;
- A new or a worsening irregular heartbeat pattern (fast, slow, or pounding heartbeats);
- A light-headed feeling, like you might pass out;
- Blurred vision, seeing halos around lights (your eyes may be more sensitive to light);
- Liver problems--nausea, vomiting, stomach pain (upper right side), tiredness, dark urine, jaundice (yellowing of the skin or eyes);
- Nerve problems--loss of coordination, muscle weakness, uncontrolled muscle movement, or a prickly feeling in your hands or lower legs;
- Signs of overactive thyroid--weight loss, thinning hair, feeling hot, increased sweating, tremors, feeling nervous or irritable, irregular menstrual periods, swelling in your neck (goiter); or
- Signs of underactive thyroid--weight gain, tiredness, depression, trouble concentrating, feeling cold.

Common side effects may include:

- Nausea, vomiting, loss of appetite; or
- Constipation.

Contraindication

- It is contraindicated in patients with known hypersensitivity to any of its components of including iodine
- In patients with cardiogenic shock, marked sinus bradycardia
- Second- or third-degree AV block unless a functioning pacemaker is available.

Drug Interactions:

1. Amiodarone increases serum levels of quinidine, procainamide, phenytoin, digoxin, diltiazem, warfarin, cyclosporine, lovastatin, simvastatin, & atorvastatin;
2. Amiodarone serum levels are increased by grapefruit and inhibitors of CYP3A4 enzyme;
3. Amiodarone serum levels are decreased by cholestyramine, St. John's wart, rifampin;
4. Risk for severe dysrhythmia increases with diuretics which deplete potassium or magnesium;
5. Severe cardiac impairment (bradycardia or heart failure) can occur if combined with beta blocker or calcium channel blocker.

Nursing Process

Assessment:

- Before the therapy, assess the patient's vital signs and put more focus on the cardiac activity. For patients with cardiac device implants, check its condition and if it works properly before during and after administration.
- Monitor also the pulmonary, liver and thyroid function tests as it may infer with the expected results.

- Watch out for adverse drug interactions such as: peripheral neuropathy, abnormal gait, ataxia, dizziness, headache, fatigue. Bradycardia can occur followed with hypotension and eventual sinus arrest. Photosensitivity is an expected adverse reaction.

Nursing Diagnoses

- Decreased cardiac output related to ventricular arrhythmia
- Risk for injury related to adverse reactions of the drug

Planning and Implementation:

- Close monitoring is an ongoing process all throughout the therapy. An updated data is a must.
- For oral dosages, each dose should be taken with meals since it is a gastric irritant.
- Encourage the patient to verbalize any discomfort since this drug may have several adverse reactions.
- On the beginning of the therapy, IV infusion should be monitored well since it may affect the kidney's normal functioning resulting to hepatocellular necrosis and acute renal failure.
- Coordinate with other health care personnel such as in obtaining pulmonary, liver and renal function tests. ECG monitoring should also be done thus reading the ECG tracing can be an edge at this time.

Evaluation

1. The patient's cardiac status has been stabilized.
2. There are no adverse reactions noted.
3. The patient understands what he or she has gone through in order to prevent recurrent arrhythmia.

Patient teaching

- Follow the instructions on the label of this medicine
- Do not stop taking this medicine unless directed by your doctor/specialist
- You may require liver and thyroid function tests (approx. every 6 months) so discuss with doctor/specialist
- Contact your doctor/ specialist or seek medical attention if side effects are severe or ongoing.
- Advise patients to avoid consumption of grapefruit juice during treatment with this drug.
- Instruct patients to avoid sun exposure and use sun-barrier creams or protective clothing
- Inform patient if this drug is used during pregnancy or if someone becomes pregnant while taking this drug, then it may cause potential harm to the fetus.

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