Beta Blockers

Beta blockers, also known as beta-adrenergic antagonists, work by blocking the beta receptors in the heart resulting in a reduction of the heart rate, force of contraction, and velocity of impulse conduction through the AV node. There are two classes of beta-blockers: non-selective blockers (which block beta-1 and beta-2 receptors) and selective beta-1 blockers (cardio-selective beta-blockers). Beta-blockers can be used for a variety of conditions: hypertension, heart failure, angina, irregular heart rhythm, glaucoma, and migraines.



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"-olol" suffix
Lolly
Beta-blockers can be identified by having the “-OLOL” suffix at the end of the generic name of a medication. Ex. Atenolol (Tenormin) and Metoprolol (Lopressor).

Mechanism

Decreases Heart Rate and Contractility
Down-arrow Heart-timer and Flexing
By blocking the effect of epinephrine, there is a decrease in the heart rate and myocardial contraction, resulting in a reduction of the cardiac output.

Decreases Peripheral Vascular Resistance
Down-arrow Peripheral Vessel Resistance-band
Vasodilatation occurs from the medication acting on beta-1 and beta-2 receptors that inhibits the effect of epinephrine and norepinephrine has on the system. By inhibiting normal sympathetic effect vasoconstriction is restricted.

Decreases Renin Release
Down-arrow Wrench Released
Beta-blockers block the release of renin by the kidneys. This interferes with the RAAS, which ultimately decreases angiotensin II and aldosterone in the system. This increases sodium and water loss resulting in a decrease in arterial pressure.

Indications

Hypertension
Hiker-BP
When beta-1 receptors are blocked by beta-blockers there is a decrease in heart rate and contractility. When beta-2 receptors are blocked renin production decreases, which interferes with the RAAS. This mechanism prevents vasoconstriction and decreases arterial pressure by pulling sodium and water out of the system.

Heart Failure
Dead Heart
In recent years three beta-blockers that have shown to be effective in treating heart failure: Carvedilol (Coreg), Bisoprolol (Zebeta), and Metoprolol (Lopressor). These beta-blockers have shown to improve LV ejection fraction and slow the progression of heart failure. However, the dosage should remain low because decrease in contractility occurs with higher doses.

Angina Pectoris
Angel with Pectorals
Angina Pectoris is also known as “stable angina.” This type of chest pain is due to an increase in oxygen demand from the heart and being unable to get adequate oxygenated blood to the needed area. This type of chest pain can be caused from exertion, emotional stress, smoking, or other factors.

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Beta-blockers should not be given to patient with prinzmetal angina, which is chest pain that occurs at rest.

Contraindications

Asthma and Heart Block Patients

Caution-tape Asthma-inhaler and Heart Block

Non-selective beta-blockers act on beta-2 receptors, which cause bronchoconstriction that can result in a life threatening asthma exacerbation in patients that have a history of asthma. If possible patient with asthma should not be given beta-blockers.Beta-blockers can be used to treat excessive electrical activity in the atrial nodes. Heart blocks are caused from a decrease in electrical excitability, and it is for this reason that beta-blockers should not be used in patients that have heart blocks.

Nursing Considerations

Assess Blood Pressure and Heart Rate

Assessing BP-cuff and Heart-timer

Prior to administration, the nurse should check the BP and HR. If the patient’s heart rate or blood pressure is too low, medication may need to be stopped. Always confirm with provider on medication parameters.

Masking Signs of Hypoglycemia

Masked Hippo-glue-bottle

Because this medication blocks normal signs of hypoglycemia such as diaphoresis or tachycardia, diabetic patients should be cautioned to monitor their blood glucose regularly.

Do Not Stop Abruptly

Can't Stop Cold-turkey

This medication should not be discontinued abruptly. Stopping beta-blockers abruptly after long-term use can cause angina and dysrhythmias. Patients should be tapered gradually over 2 weeks.

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