Beta-1 Agonists

β_1 agonists are medications used because of their sympathomimetic activity. Dobutamine is a pure β_1 agonist, which is used to treat heart failure and cardiogenic shock, as it increases heart rate and contractility. It is used as a pharmacological stress test agent to help diagnose ischemic heart disease. Dobutamine, however, should not be used regularly in ischemic heart disease as it increases myocardial oxygen demand. Isoproterenol is a β_1 agonist, which also has β_2 adrenergic activity. It increases cardiac inotropy, chronotropy, and dromotropy (conduction speed through the AV node), which allows it to be helpful in treating bradyarrhythmias. This drug is also indicated to treat torsades de pointes, while being combined with magnesium and cardiac pacing. Note that isoproterenol only treats torsades de pointes which stems from an **acquired** long QT syndrome. Because of its combined βactivity, this drug will increase systolic blood pressure, but decrease diastolic pressure (β_2 vasodilation). The β_2 activity in isoproterenol allows it to be used for asthma treatment, though rarely.

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Dobutamine

Dough-Buddha

Dobutamine is primarily a β_1 adrenergic agonist, and thus, acts more selectively upon the heart. It is used for heart failure and cardiogenic shock, to increase cardiac inotropy and chronotropy. Dobutamine can't be used for ischemic heart disease because it increases myocardial oxygen demand.

Heart Failure

Dead Heart

Dobutamine is a β_1 agonist used to treat acute and reversible heart failure, such as cardiogenic shock, due to its positive inotropic action. It can also be used in CHF to increase contractility.

Cardiac Stress Test

Stressed Heart

Dobutamine is often used in hospital settings as a pharmacological stress testing agent, to help identify coronary artery disease.

Isoproterenol

Ice-pro-tear

Isoproterenol is a β_1 agonist which also has action on β_2 receptors. This medication increases cardiac inotropy and chronotropy, as well as dromotropy. For this reason, isoproterenol is used in cases of bradycardia and torsades de pointes (only when it is from an acquired long QT syndrome). Rarely, isoproterenol is used for asthma, as its β_2 activity dilates bronchial airways.

Bradyarrhythmias

Snail-heart with Broken Arrythmia-drum

This drug's β_1 effects allow it to be helpful in treating bradycardia. However, this drug can worsen ischemia because it increases myocardial oxygen demand.

Torsades de Pointes

Tortoise with Points

This medication is usually combined with overdrive pacing and magnesium when treating torsades de pointes. Keep in mind that isoproterenol is only used in **acquired** cases long of QT syndrome, which leads to torsades de pointes.

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