Beta-1 Agonists

β₁ agonists are medications used because of their sympathomimetic activity. Dobutamine is a pure β₁ 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 β₁ agonist, which also has β₂ 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 β activity, this drug will increase systolic blood pressure, but decrease diastolic pressure (β₂ vasodilation). The β₂ activity in isoproterenol allows it to be used for asthma treatment, though rarely.



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Dobutamine
Dough-Buddha
Dobutamine is primarily a ?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 β₁ 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 β₁ agonist which also has action on β₂ 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 β₂ activity dilates bronchial airways.

Bradyarrhythmias
Snail-heart with Broken Arrythmia-drum
This drug's β₁ 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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