

CARDIOLOGY

DRUGS RAID- SYMPATHOMIMETICS

Adrenaline

Mechanism	<ul style="list-style-type: none">• Direct action at α & β adrenergic receptors
Effect	<ul style="list-style-type: none">• <u>At low dose β effects predominate</u> → Positive inotropy & chronotropy, coronary blood flow \therefore \uparrow O₂ demand & CO• <u>At high doses α1 effects predominate</u> → Vasoconstriction• At pulmonary β receptors → Bronchodilatation• Increases glycolysis & gluconeogenesis in the liver → \uparrow blood glucose• Increases pain threshold
Use	<ul style="list-style-type: none">• Cardiac arrest- IV bolus• Circulatory collapse- IV infusion• Anaphylaxis- IM bolus• Upper airway obstruction- Nebulised

Noradrenaline "NORAD"

Mechanism	<ul style="list-style-type: none">• Direct action at $\alpha > \beta$ adrenergic receptors
Effect	<ul style="list-style-type: none">• α1 stimulation causes potent vasoconstriction<ul style="list-style-type: none">○ This causes increased systemic vascular resistance & venous return → \uparrow BP• Undesired effects include:<ul style="list-style-type: none">○ Increased myocardial O₂ demand○ The increased blood pressure will cause a reflex bradycardia → lower cardiac output○ In pregnant females causes smooth muscle contraction → \downarrow uterine blood flow, this could cause foetal asphyxia○ It also reduces blood flow to abdominal organ & peripheral tissues
Use	<ul style="list-style-type: none">• Hypotension resistant to volume expansion e.g. septic shock

Ephedrine

Mechanism	<ul style="list-style-type: none">• Indirect α & β adrenergic action by increasing noradrenaline action
Effect	<ul style="list-style-type: none">• Dual receptor actions → combined positive inotropy, chronotropy & vasoconstriction
Use	<ul style="list-style-type: none">• Often given peripherally as temporising measure until central access obtained• Useful in obstetric patients• Used to prevent hypotension during spinal anaesthesia

Metaraminol

Mechanism	<ul style="list-style-type: none">• Direct & indirect action mainly at α adrenergic receptors
Effect	<ul style="list-style-type: none">• Causes vasoconstriction• Similar to noradrenaline, but effects last longer
Use	<ul style="list-style-type: none">• Often given peripherally as temporising measure until central access obtained• In ED useful for hypotension during rapid sequence intubation

Dobutamine

Mechanism	<ul style="list-style-type: none">• Direct action on $\beta_1 > \beta_2$ adrenergic receptors of the heart
Effect	<ul style="list-style-type: none">• $\beta_1 \rightarrow$ Positive inotropy & chronotropy (& increased O₂ demand)• $\beta_2 \rightarrow$ some smooth muscle relaxation \rightarrow vasodilatation
Use	<ul style="list-style-type: none">• Low cardiac output states<ul style="list-style-type: none">○ In the ED this is often cardiogenic shock e.g. caused by Myocardial Infarction○ Also used in cardiac surgery

Dopamine

Mechanism	<ul style="list-style-type: none">• Acts directly & indirectly via α & β adrenergic receptors & dopamine receptors
Effect	<ul style="list-style-type: none">• At low doses β_1 predominates \rightarrow Positive inotropy & chronotropy, coronary blood flow (& O₂ demand)• High doses α predominates \rightarrow Vasoconstriction causing increased SVR & venous return• δ action causes vasodilatation \rightarrow increased blood flow of splanchnic circulation (Can also cause nausea & vomiting)
Use	<ul style="list-style-type: none">• Cardiogenic shock & cardiac surgery