TrueVue

Navigating Haemodynamics

see your way to safety

How inotropes and vasoactive drugs affect blood flow and pressure

Only oesophageal Doppler monitoring (ODM) can track these changes accurately

This document summarises the effects that may be seen on central blood flow and/or pressure when some common haemodynamic drugs are given. **Note:** patients may respond differently and this is only a guide. A breakdown of the main adrenoreceptors only related to haemodynamics and their actions are listed in the following tables.

Table 1. General details of alpha and beta adrenergic and dopaminergic receptors.

Type	Tissue	Actions
Alpha$_1$ (α_1)	Most vascular smooth muscle.	Constriction
	Heart.	Some increase force of contraction (inotropy).
Alpha$_2$ (α_2)	Vascular adrenergic nerve terminals.	Inhibition of sympathetic activity. Has central and peripheral effects - BP ↑or↓.
Beta$_1$ (β_1)	Heart.	Increase rate (chronotropy) and force of contraction.
Beta$_2$ (β_2)	Bronchi, uterine and vascular smooth muscle.	Relaxation - causes dilation.
Dopamine (DA$_1$)	Vascular beds of brain, splanchnic organs, kidneys and coronary arteries.	Increases peripheral resistance (vasoconstriction) but can vasodilate renal and gut circulation. Can also increase vascular resistance systemically.

Table 2. Common haemodynamic drug actions on adrenorecptors.

Receptor	Alpha 1	Beta 1	Beta 2	DA1
Metaraminol	+++	+	0	0
Adrenaline (epinephrine)	+/++	++	+	0
Noradrenaline (norepinephrine)	+++	+	+	0
Phenylephrine	++	0	0	0
Dobutamine	+	++	+/++	0
Dopamine	++	+	0	+++
Dopexamine	0	+	+++	++
Ephedrine	++	++	0	0

Table 3. Potential usual effects of common haemodynamic drugs on central flow and blood pressure.

Consider carefully how these drugs will generally affect ***central blood*** flow and ***blood pressure*** as displayed in real-time on the ODM+

Drug	FTc (Flow Time corrected)	PV (Peak Velocity)	HR (Heart Rate)	SV (Stroke Volume)	CO (Cardiac Output)	BP (Blood Pressure)
Metaraminol	↓	↓	↓	↓	↓	↑
Adrenaline (Epinephrine) low dose (no definition for low or high dose - is patient specific)	↔	↑	↑	↑	↑	↓ ↑ OR ↔
Adrenaline (Epinephrine) high dose (no definition for low or high dose - is patient specific)	↓	↑	↑	↑	↑	↑
Noradrenaline (Norepinephrine)	↓	↓	↓ OR occasionally ↑	↓	↓	↑
Phenylephrine	↓	↓	↓	↓	↓	↑
Dobutamine	↑	↑	↑	↑	↑	↓ ↑ OR ↔
Dopamine (low dose 1-5 mcg/kg/min)	↔	↑	↔	↑	↑	↔
Dopamine (medium dose 5-10 mcg/kg/min)	↔ OR ↓	↓	↑	↑	↑	↓ ↑ OR ↔
Dopamine (high dose >10 mcg/kg/min)	↓	↓	↑ OR ↓	↑ OR ↓	↓ ↑ OR ↔	↑
Dopexamine	↑	↑	↑	↑	↑	↓ OR ↔

Summary

- This is a very complex subject and haemodynamic drugs can have more than one effect (and may act differently in different patients), so if only BP is measured, the impact on flow will be overlooked.
- Metaraminol (and noradrenaline to some extent), when used to treat a falling BP, will also cause a fall in blood flow as the BP increases. In some instances this could make the patient's haemodynamics worse, so for example consider optimising fluid, before commencing vasoactive drugs, in a hypovolaemic patient or consider any existing cardiac issues. **https://www.deltexmedical.com/news/does-blood-pressure-deliver-the-full-picture/)**
- Devices that utilise blood pressure to 'derive' blood flow using Pulse Pressure Waveform Algorithms (PPWA) have been shown to give false readings when these drugs are given. PPWA algorithms report a rise in blood flow with the associated rise in blood pressure, which is incorrect and potentially dangerous.
- The TrueVue Doppler is the only device that measures both blood flow and pressure simultaneously allowing these drugs to be given safely and precisely.

For more details on the effects of inotropes & vasoactive drugs, contact clinical@deltexmedical.com for further information.

Deltex Medical Limited

Terminus Road | Chichester | PO19 8TX | United Kingdom

Enquiries.....+44 **(0)1243 774837**

Email.....**sales@deltexmedical.com**

Online.....**www.deltexmedical.com**

Deltex

see what we see

Social Media....**Follow us**

Deltex App.....**Available from** Search Deltex

eLearning.....**deltexmedical.education/en**

9051-6303 Issue 1.01. CO1460 Registered in England & Wales Company No: 1691369

Job No: 030-DM2018