Inotropes

Which, How and Why?

Andy Haynes

Receptors

Alpha

- Alpha 1
- Alpha 2

Beta

- Beta 1
- Beta 2
- Beta 3

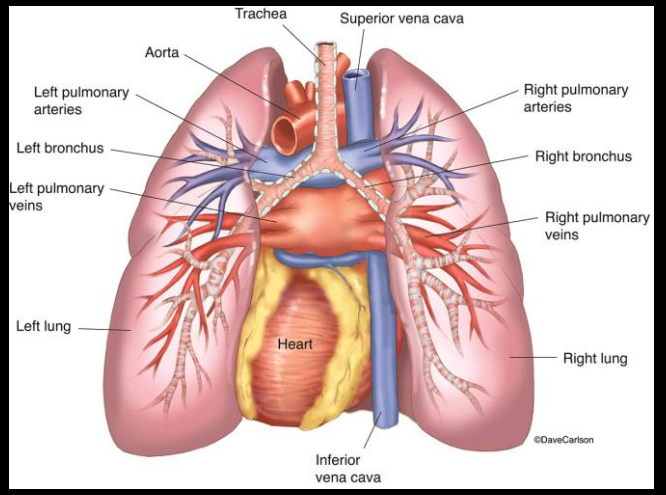
Receptors

Alpha

- Alpha 1
- Alpha 2

Beta

- Beta 1
- Beta 2
- Beta 3



Receptors

Alpha

- Alpha 1 — Smooth muscle constriction
- Alpha 2 — Mixed – mostly inhibit A1

Beta

- Beta 1 — Chronotrope / Inotrope
- Beta 2 — Smooth muscle relaxation
- Beta 3 — Fat breakdown

Receptors

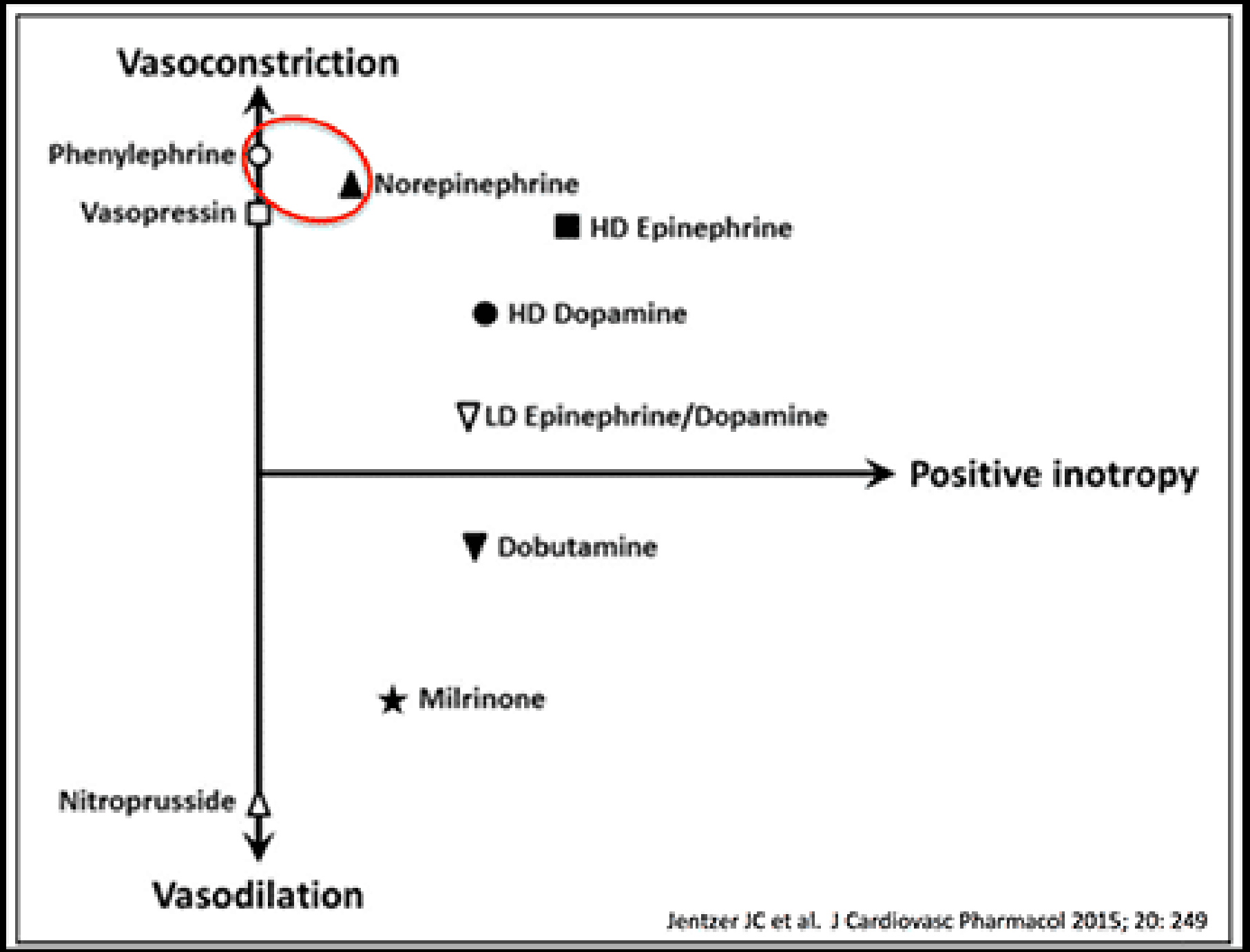
Calcium Sensitisers

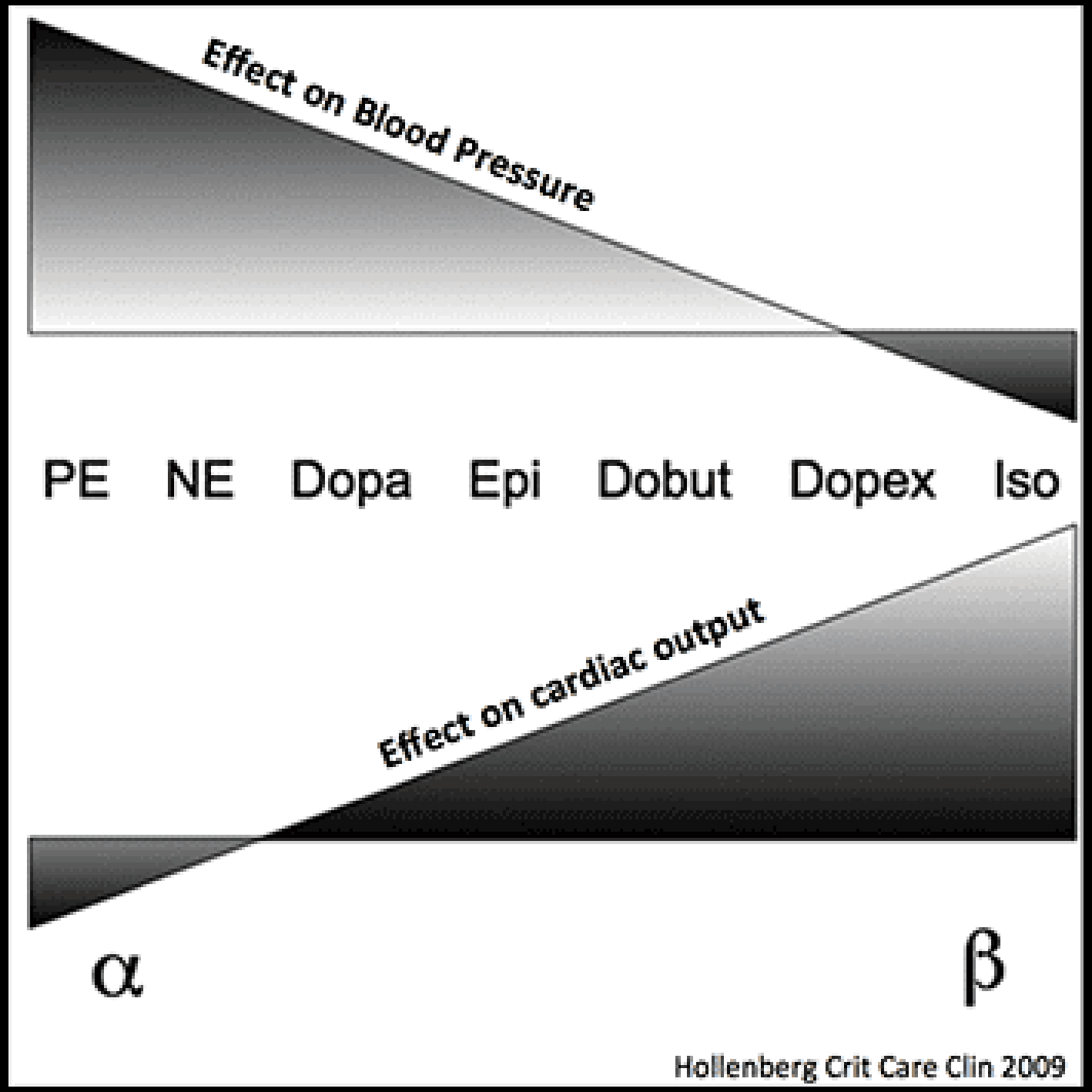
Levosimendan Chronotrope / Inotrope & vasodillator

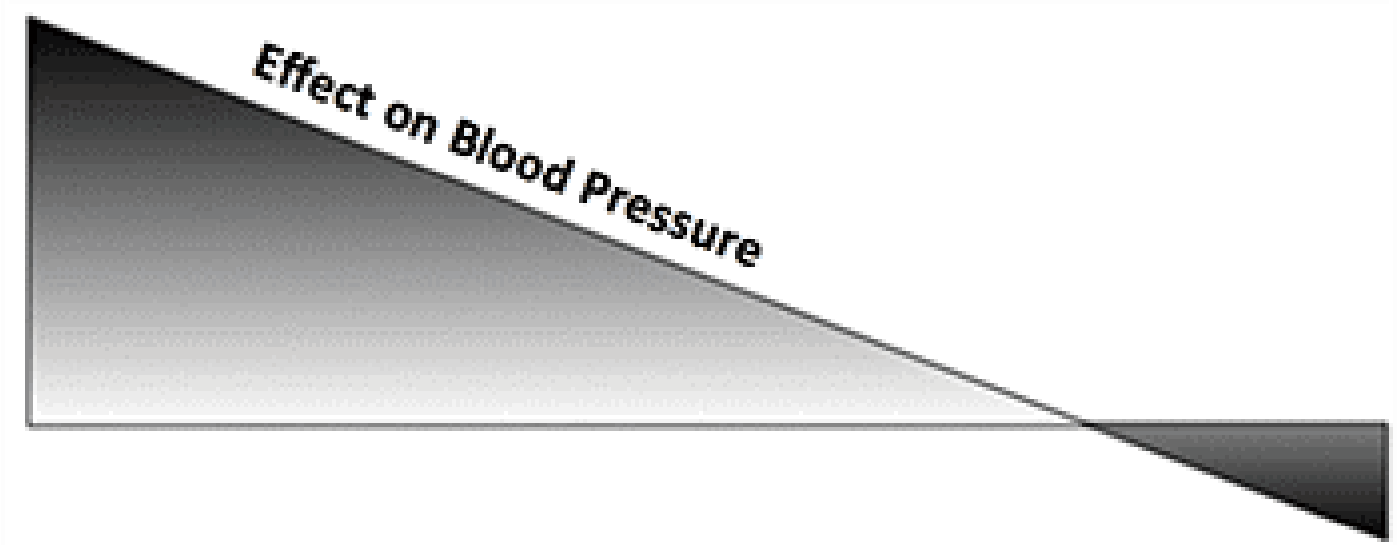
cAMP PDE-3 Inhibitor

Milrinone Inotrope & vasodilator (esp pulm)

	alpha1 (α_1R)	alpha2 (α_2R)	beta1 (β_1R)	beta2 (β_2R)	Dopamine ($DA_{1\text{-}5}$R)
	Vasoconstriction Inotropy		Inotropy Dromotropy Chronotropy	Inotropy Bronchodilation Vasodilation	Natriuresis Splanchnic vasodilation
Adrenaline	++	+	++++	+++	
Noradrenaline	++++	+	++	+	
Phenylephrine and Metaraminol	++++	+			
Ephedrine			++++		
Dopamine	>10 µg/kg/min		5–10 µg/kg/min	5–10 µg/kg/min	<2 µg/kg/min
Dobutamine	+		++++	++	
Isoprenaline			++++	+++	

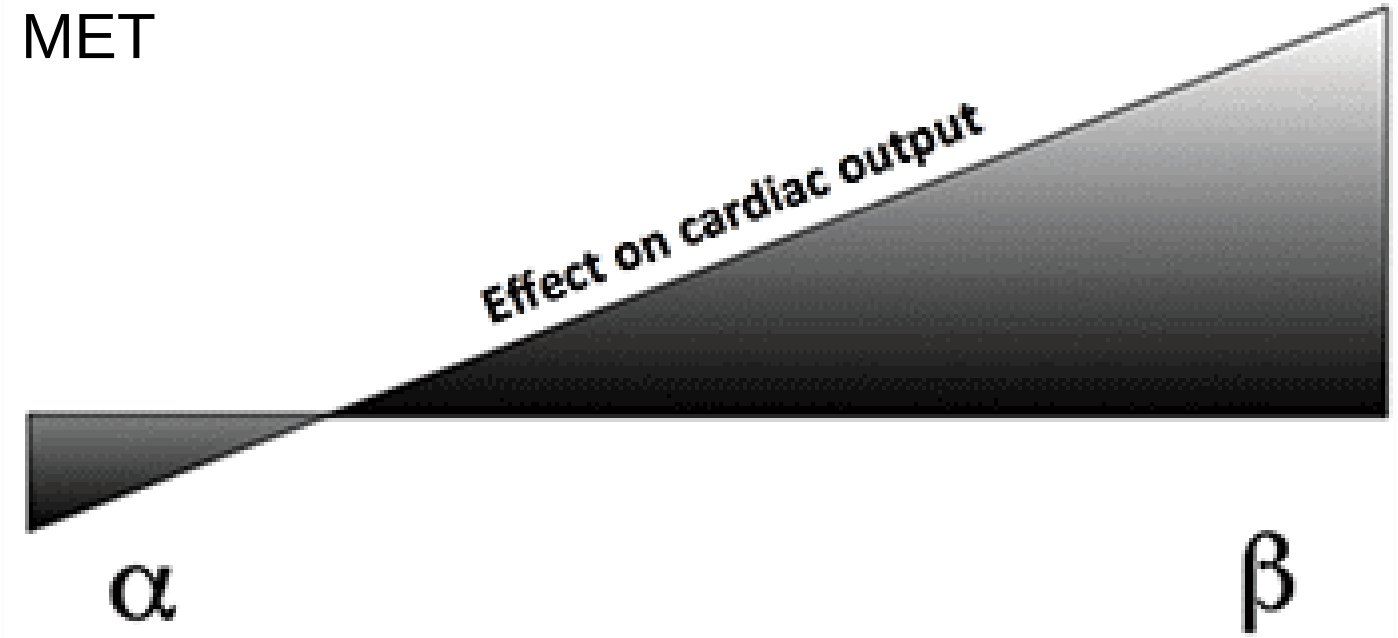

Vasoconstriction
Phenylephrine
Norepinephrine
Vasopressin
HD Epinephrine
HD Dopamine
LD Epinephrine/Dopamine
Positive inotropy
Dobutamine
Milrinone
Nitroprusside
Vasodilation
Jentzer JC et al. J Cardiovasc Pharmacol 2015; 20: 249


Effect on Blood Pressure
PE NE Dopa Epi Dobut Dopex Iso
Effect on cardiac output
α
β
Hollenberg Crit Care Clin 2009



VASO PE NE ~~Dopa~~ Epi Dobut ~~Dopex~~ Iso MIL

MET



Hollenberg Crit Care Clin 2009