

This station will explore your knowledge of the pharmacology and physiology of noradrenaline. Discuss the pharmacologic effects of noradrenaline on the human heart in-vivo. This viva explored the candidates' knowledge in relation to the following points

Pharmacology of noradrenaline

Pressure-Volume Loop of the cardiac cycle

Mark on the Pressure-Volume Loop the changes you would expect for an adult patient infused noradrenaline at 10 mcg/min.

Explain the consequences of a noradrenaline infusion on myocardial oxygen consumption, work and efficiency.

Dobutamine infusion of 5 mcg/kg/min and affect the Pressure-Volume Loop

Examination feedback: This viva tested knowledge related to cardiac cycle, P-V loop, inotropes and most importantly a candidates ability to integrate those topics and then discuss them. Generally candidates knowledge in describing the basic P-V loop were sound, but were weaker in explaining how the P-V loop changed with changes in physiology and pharmacological intervention. Candidates were expected to generate discussions relating to the impact in changes to afterload, pre load and contractility as well as concept of potential energy as it elated to the P-V loop.

### “Describe the pharmacology of noradrenaline”

is a naturally occurring catecholamine  
pharmacodynamics

acts on alpha 1 and 2 receptors and beta 1-3 receptors with a higher affinity for alpha effects - peripheral vasoconstriction, increased BP, possible reflex bradycardia (with associated decrease in CO, increase MVO<sub>2</sub> and decreased hepatic and renal blood flow.

pharmacokinetics

doses 8-12 mcg/minute up titrated

doesn't cross the BBB

metabolised by MAO (oxidisation) and COMT (methylation)

half life is around 2 minutes,

excretion in the urine as inactive metabolites

### “Please draw the pressure volume loop of the cardiac cycle”

Cardiac cycle events

valve openings and closings

A = MV opening,

B = MV closes

C = Aortic Valve opens

D = Aortic Valve closes

isovolaemic contraction and relaxation,

systolic blood ejection and diastolic ventricle filling

Measurable values

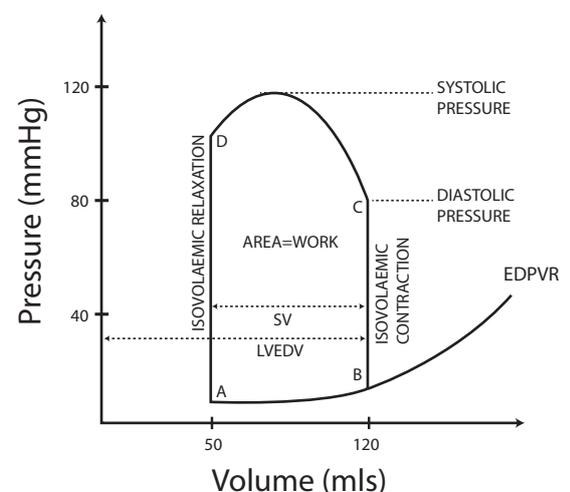
the diastolic and systolic pressures,

the stroke volume (SV)

left ventricular end diastolic volume (LVEDV)

the area of the loop represents external work

ejection fraction = SV/LVEDV



Surrogate markers

preload surrogate marker is the LVEDV point on the abscissa (x-axis) r

afterload is the angle formed between the preload and D

contractility is the angle formed by the End Systolic Pressure Volume Relationship ESPVR.

elastance relates to the end diastolic pressure volume relationship EDPVR,

compliance may be inferred (1/elastance)