

MANAGEMENT OF PERI-OPERATIVE HYPOTENSION

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ARTERIAL BLOOD PRESSURE PHYSIOLOGY

- ⊙ $BP = \text{Cardiac Output (CO)} \times \text{Total Peripheral Resistance (TPR, aka SVR)}$
- ⊙ $CO = \text{Heart Rate (HR)} \times \text{Stroke Volume (SV)}$
- ⊙ SV made up of:
Preload/Afterload/Contractility
- ⊙ Mean Arterial Pressure (MAP) =
 $[SAP - DAP / 3] - DAP$

METHODS TO OBTAIN BLOOD PRESSURE

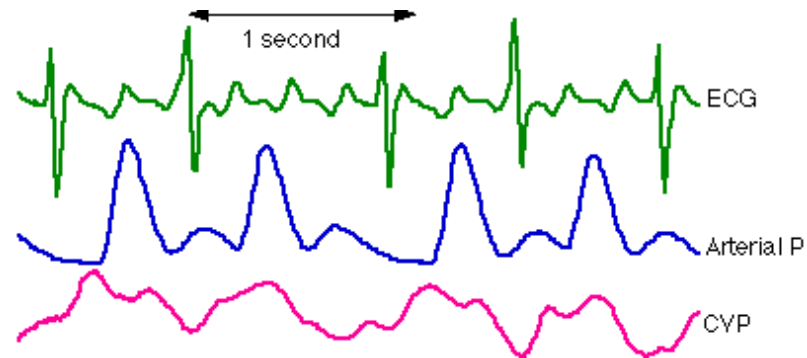
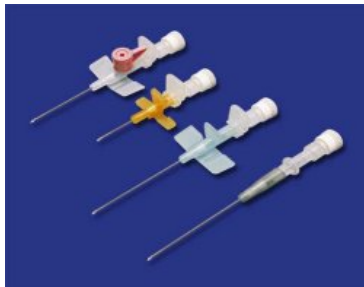
○ Doppler



Oscillometric



○ Direct measurement



ADRENERGIC RECEPTOR REVIEW

Receptor	Location in body	Agonist activity
Alpha- 1 (α -1)	Smooth muscle	Contraction of smooth muscle
Alpha- 2 (α -2)	Smooth muscle, neurotransmitters	Contraction of smooth muscle, central inhibition of norepinephrine
Beta- 1 (β -1)	Myocytes	Inotropy (\uparrow contractility) + Chronotropy (\uparrow heart rate)
Beta- 2 (β -2)	Smooth muscle	Smooth muscle relaxation, vasodilation

VASOACTIVE DRUGS

Drug	Route	Primary Receptor(s)	Agonist/Antagonist	Clinical effects	Side effects
Dopamine	Constant Rate Infusion	Low dose- Dopaminergic Middle dose- Beta High dose-Alpha	Agonist	↑ renal blood flow , ↑ Inotropy & HR, ↑ TPR	Arrhythmias, Tachycardia, Hypertension
Dobutamine	Constant Rate Infusion	Beta-1	Agonist	↑ Inotropy +/- HR	Arrhythmias, Tachycardia, Hypertension, Bradycardia?
Norepinephrine	Constant Rate Infusion	Alpha-1, Beta 1	Agonist	↑ Inotropy & HR , ↑ TPR,	
Phenylephrine	Constant Rate Infusion	Alpha-1	Agonist	↑ TPR	Potent Vasoconstrictor
Ephedrine	Bolus Injection	Alpha-1 Beta-1	Agonist	↑ TPR, ↑ Inotropy + HR	Arrhythmias, Tachyphlaxis
Vasopressin	Constant Rate Infusion	V1	Agonist	↑ TPR	Potent Vasoconstrictor

CALCULATING CONSTANT RATE INFUSIONS (CRI'S)

- ◉ **Information needed to calculate a CRI:**

- Patient weight
- Dose
- Amount of fluids
- Concentration of medication

- ◉ **Standard CRI (in a fluid bag)**

- 2mg/kg/day Reglan added to 1 liter Norm-R run at 40mL/hour
- Patient weighs 10kg
- $2\text{mg}/24\text{ hours} * 10\text{ kg} = 0.83\text{mg Reglan/hr}$
- Fluids last 25 hours ($1000\text{ml}/40 = 25$)
- $0.83\text{ Reglan} * 25 = 20.75\text{mg/L}$

- ◉ **Alternate CRI**

- $5\text{ug/kg/min} = 1\text{ml/hr}$
- Patient weights 10 kg
- Dopamine = 40mg/mL
- $5 * 10 * 60 = 3000\text{ug}$ or 3mg/hr
- $3/40 = .075\text{mL Dopamine PER mL solution}$
- SO: If using a 35mL syringe: $35 * .075 = 2.6\text{ mL Dopamine}$ to 32.4 mL D5W