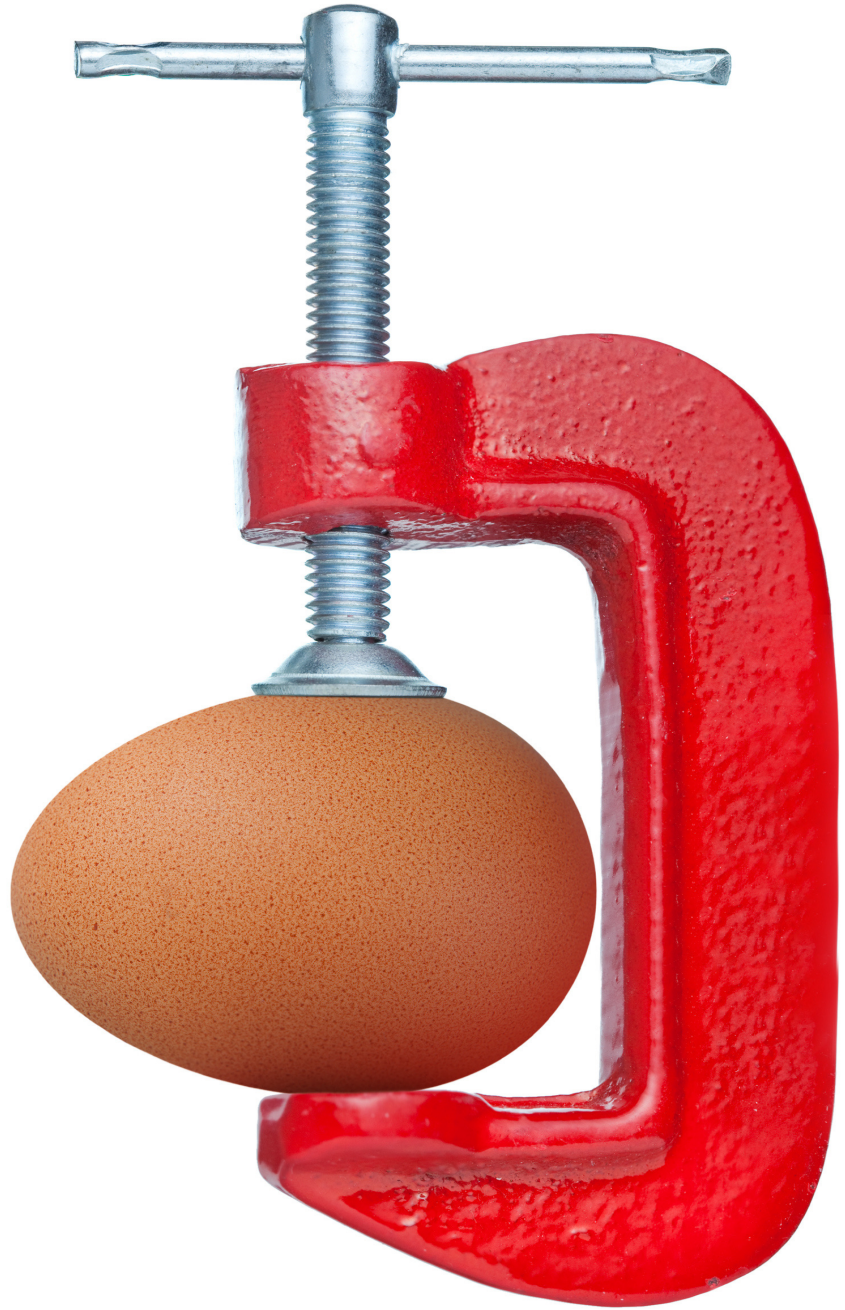
# Pressors & Vasoactives



# Why Start Vasoactives?

# When to Start Vasoactives?

# Which Vasoactive to Start?

# Why Start Vasoactives?

## When to Start Vasoactives?

## Which Vasoactive to Start?

IS MY PATIENT HYPOTENSIVE?

IS MY PATIENT HYPOPERFUSING?

Blood pressure is one variable that determines tissue perfusion... but not the only one!

There is no single test, metric or score that can be used to definitively identify shock

(Sorry...)

Even if a magic number existed...

It still wouldn't tell you WHY your patient is hypoperfusing!

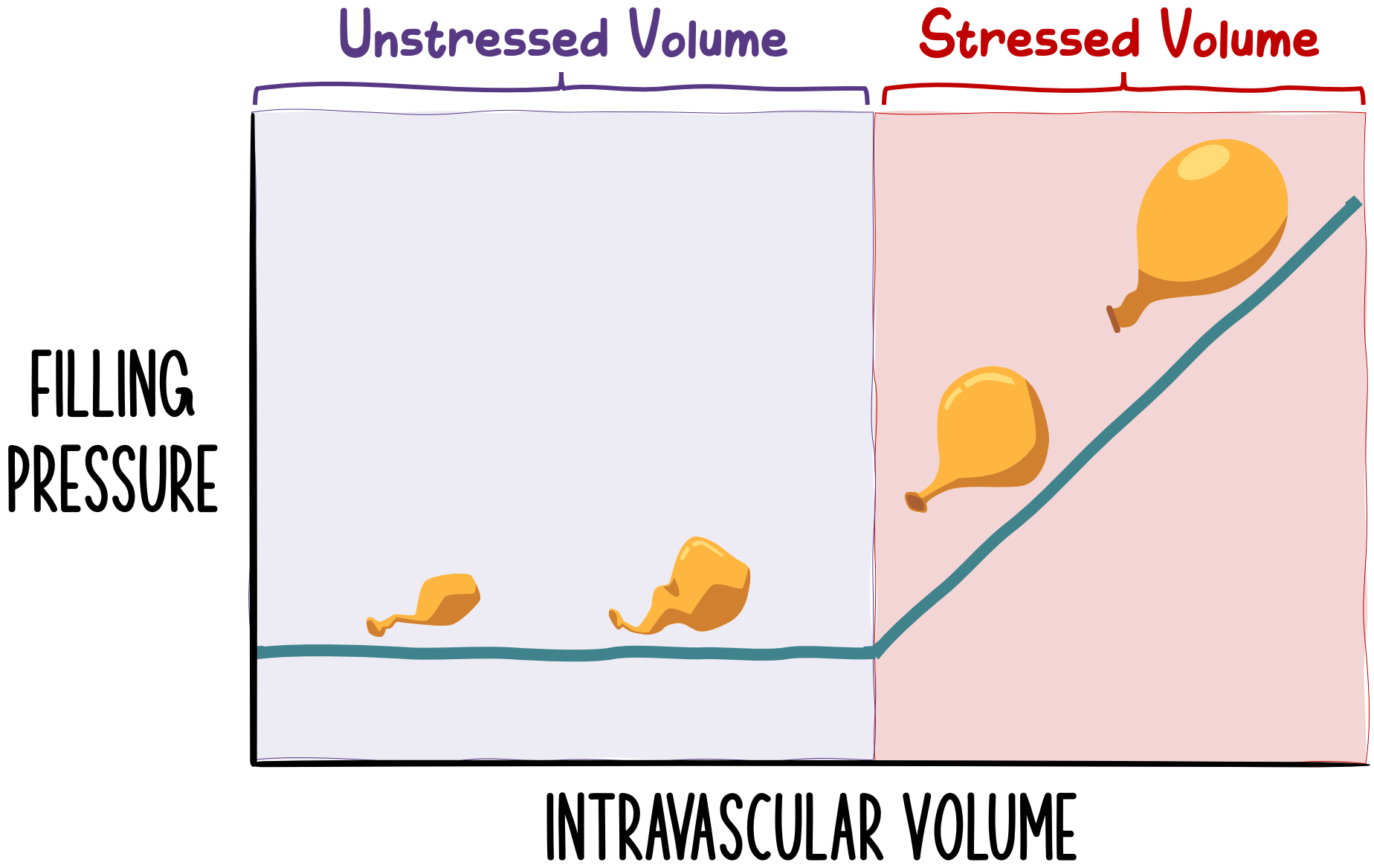
Why Start Vasoactives?

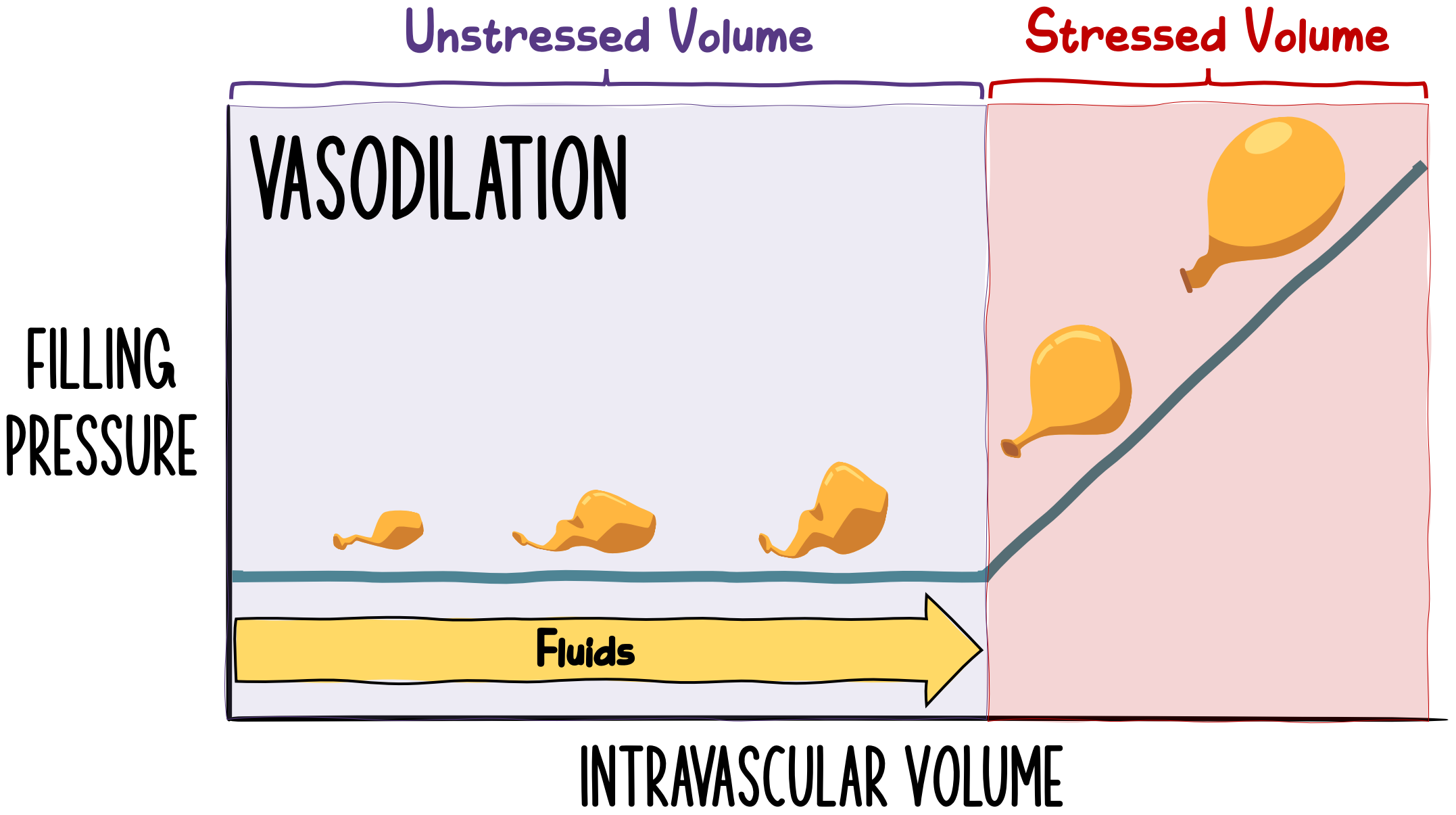
# When to Start Vasoactives?

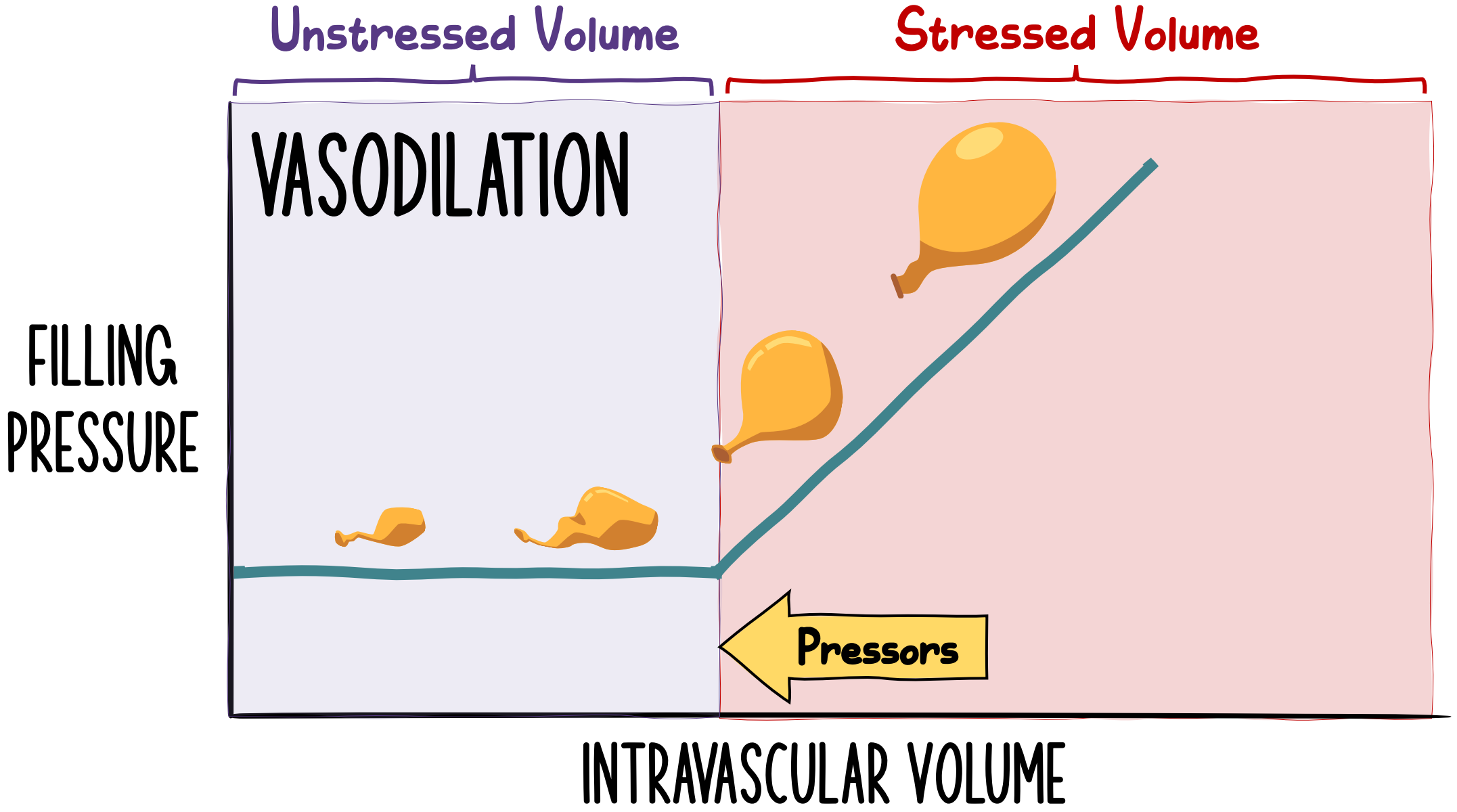
Which Vasoactive to Start?

# Incentive Structures Encourage Fluids Over Vasopressors

1. You don't have to put in central line
2. You don't have to call the ICU
3. You don't get angry emails


Unstressed Volume
Stressed Volume
FILLING PRESSURE
INTRAVASCULAR VOLUME


Unstressed Volume
Stressed Volume
VASODILATION
FILLING PRESSURE
Fluids
INTRAVASCULAR VOLUME


Unstressed Volume
Stressed Volume
VASODILATION
FILLING PRESSURE
Pressors
INTRAVASCULAR VOLUME

The NEW ENGLAND JOURNAL of MEDICINE

Shapiro et al NEJM 2023;388(6):499-510

# Early Restrictive or Liberal Fluid Management for Sepsis-Induced Hypotension

Multicenter RCT of 1563 patients with septic shock

"Fluid liberal" vs "Fluid restrictive" strategy

No differences whatsoever between the groups in terms of outcomes

ATS Journals

Permpikul et al. Am J Respir Crit Care Med 2019;199(9):1097-1105

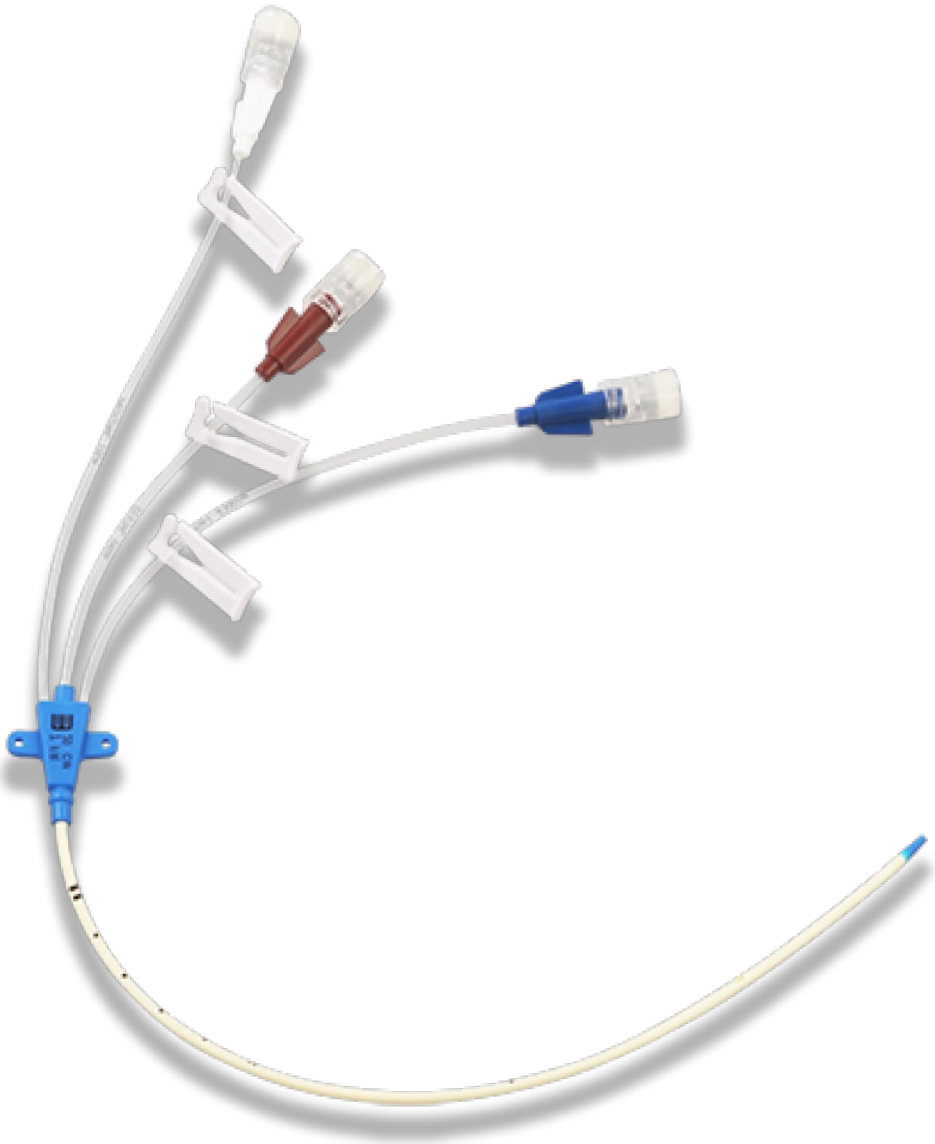
# Early Use of Norepinephrine in Septic Shock Resuscitation (CENSER)

Single center RCT of 310 patients with septic shock

Randomized to early low-dose norepi at fixed rate vs placebo

No mortality difference, but early norepi associated with more rapid control of shock & decreased incidence of pulmonary edema

# Buying Time



# But I Don't Have a Central Line Yet!

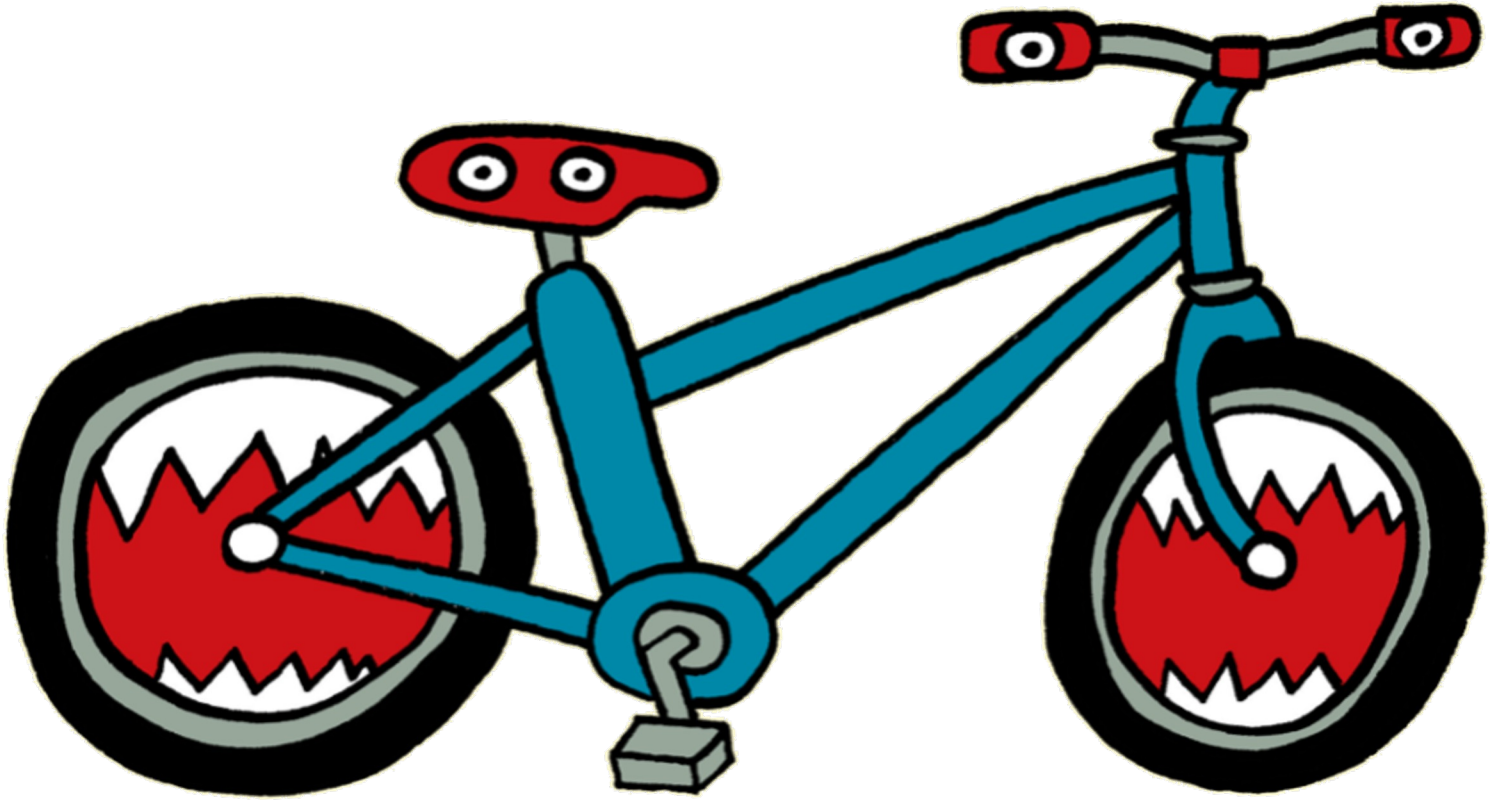
CRITICAL CARE

Owen et al. Critical Care 2021;25(146)

Adverse events associated with administration of vasopressor medications through a peripheral intravenous catheter: a systematic review and meta-analysis

Metanalysis of 11 studies including >16,000 patients

Incidence proportion of adverse events associated with peripheral vasopressor administration was 1.8%



# VICIOUS CYCLE

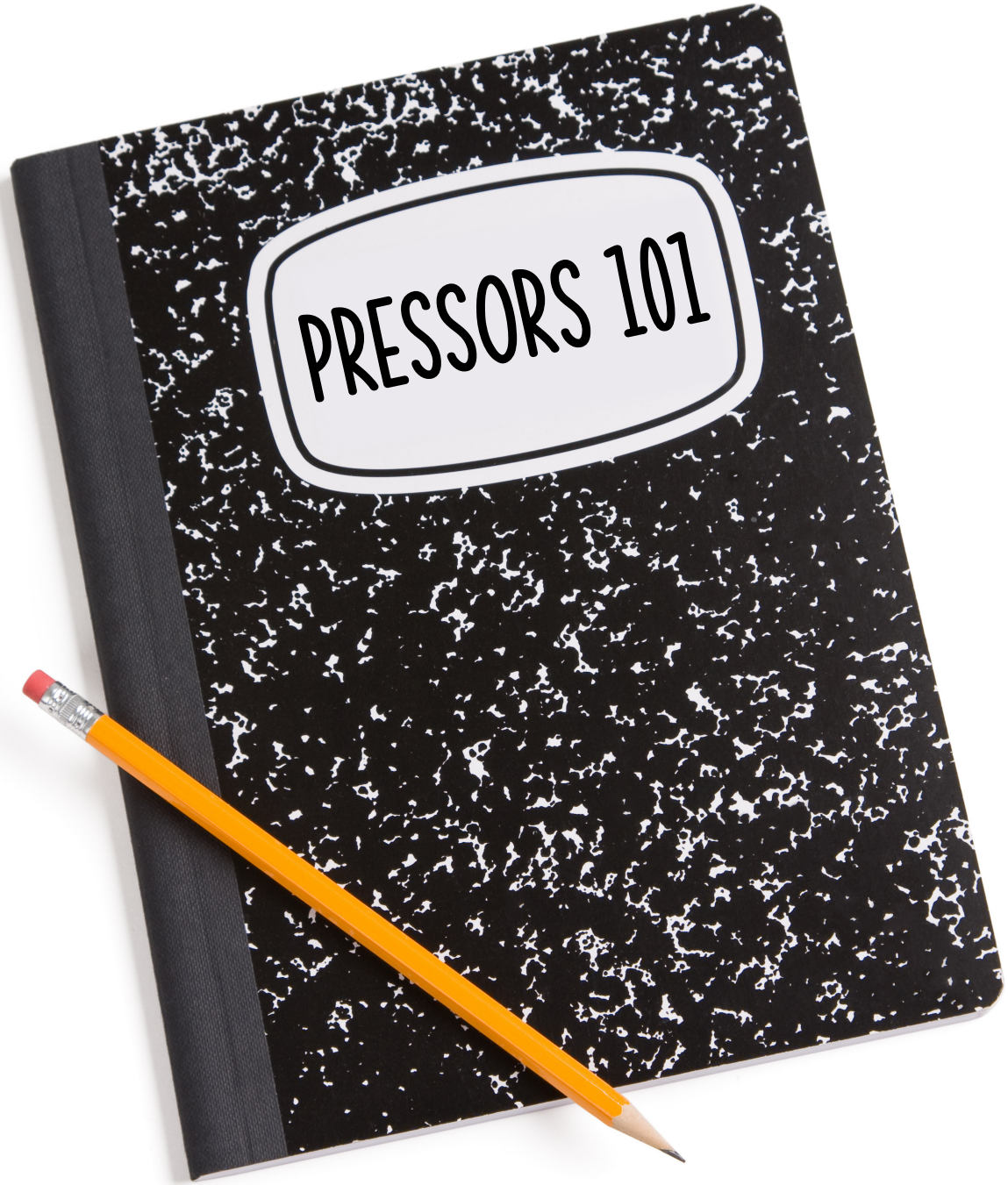
# Cardiorenal Syndrome

# You Break It, You Buy It

# Why Start Vasoactives?

# When to Start Vasoactives?

# Which Vasoactive to Start?




# Norepinephrine

Not always the best answer, but rarely the wrong answer.

The End.

# A BRIEF HISTORY OF PRESSORS IN CARDIOGENIC SHOCK

**Dopamine kills people!**

De Backer et al. NEJM 2010;362(9):779-89

**Norepi + dobuatmine better than epi?**

Levy et al. Crit Care Med 2011;39(3):450-55.

**Norepi better than epi after acute MI?**

Levy et al. J Am Coll Cardiol 2018;72(2):173-82

**It's Official: Norepi 1st line for cardiogenic shock!**

**Milrinone wins vs dobutamine for adverse events!**

Lewis et al. J Cardiovasc Pharmacol Ther 2019;24(2):130-38

**Metanalysis: Milrinone the one to rule them all?**

Liao et al. J Healthc Eng. 2020; 8862256

**Nevermind. dobutamine and milrinone are tied in RCT**

Mathew et al. NEJM 2021;385(6):516-25

**Wait. now norepi kills people?!?**

Lu et al. ESC Heart Fail 2022;9(3):1875-33

CURRENT OPINION

Hu & Mathew. Curr Opin Crit Care 2022;28(4):419-425

# Inotrope and vasopressor use in cardiogenic shock: what, when and why?

"Review of the current literature fails to show significant mortality benefit with any specific vasopressor or inotropic in cardiogenic shock patients... At this time, inotrope selection should be guided by physician experience, availability, cost, and, most importantly, individual patients' response to therapy"

CHEST

Squara et al. Chest 2019;156(2):392-401

# Reconsidering Vasopressors for Cardiogenic Shock: Everything Should Be Made as Simple as Possible, but Not Simpler

"The considerable interpatient differences regarding the initial cause of cardiogenic shock and subsequent consequences on both macro- and microcirculation argue for a dynamic, step-by-step, personalized therapeutic strategy"

# PRESSORS 201

Most <u>important</u> pressor properties

Arrhythmogenic?

Pulmonary vascular resistance?

| VASOCONSTRICTION | | INOTROPY + VASOCONSTRICTION | | INOTROPY + VASODILATION | |
|---|---|---|---|---|---|
| Adrenergic | Phenylephrine  | Adrenergic | Norepinephrine  | Adrenergic | Dobutamine  |
| Vasopressin 1+2 | Vasopressin  | Adrenergic | Epinephrine  | PDE3 Inhibitor | Milrinone  |
| AT1 + RAAS | Angiotensin II  | Adrenergic | Dopamine  | Ca Sensitizer | Levosimendan  |

1. What's my patient's underlying shock physiology?

2. How can I modify that physiology to improve tissue perfusion?

- Systemic vasoconstriction
- Systemic vasodilation
- Increase inotropy
- Pulmonary vasodilation

3. What are the major side effects I'm concerned about in this patient?

- Tachydysrhythmia
- Systemic vasoplegia
- Increase pulmonary pressures
- Mesenteric vasoconstriction

4. What agent or COMBINATION of agents will best achieve #2-3?

# Approach To Vasoactive Selection