Choice of Inotropes: do they make a difference?

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Mafraq Hospital

Thank You

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Chair Emergency Department

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Master in Quality and Safety in Health Care Management

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Co –Founder EMA Mini Medical School

Consultant Emergency Medicine

Mafraq Hospital

Consultant ICU

Mafraq Hospital

Master in Organ Donation and Transplant Management

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Disclosure

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Beginning with the end in mind…

Choice of Inotropes: do they make a difference?

1- What is Inotropes?

2- How Inotropes Work?

3- How and why do People Die?

4- Choice of Inotropes: do they make a difference?

What is Inotropes?

- Vasopressors = / ≠ Inotropes
- **Vasopressors:** are agents that often act to increase mean arterial pressure by systemic vasoconstriction
- **Inotropes:** primarily act to increase cardiac output through a combination of inotropy, chronotropy and afterload reduction.

How Vasopressors/Inotropes work?

- **Vasopressors:**

Pure α agonist

- **Vasopressors+Inotrope:**

α and β agonist

- **Inotropes:**

Pure β agonist

α and β agonist

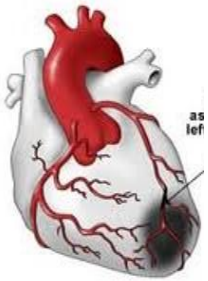
Phosphodiesterase inhibitor

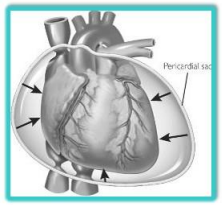
Physiology of Vasopressors and Inotropes

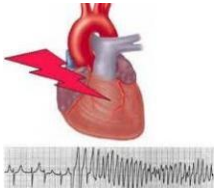
	Activity				
	Vasculature- vasoconstriction (inc SVR)		Heart- contractility (increase CO)		Vasodilation renal, mesenteric, cerebral, coronary vasculature and potentiates NE release
Agent	Alpha-1	Alpha-2	Beta-1	Beta-2	Dopamine
Norepinephrine	+++	+++	+++	+/++	0
Epinephrine	++++	++++	++++	+++	0
Dobutamine	+	+	++++	++	0
Phenylephrine	++/+++	+	?	0	0
Dopamine Low dose Medium dose High dose	 0 + ++++	 0 ? ?	 + ++++ +++	 0 + ++	 ++++ ++ ++

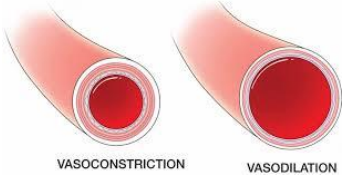
How and Why People Die?

- Death is preceded by sever Shock
- Shock = Death
- Types Shock:









Pump

- Inotrope
- Volume
- Electricity

Pipes

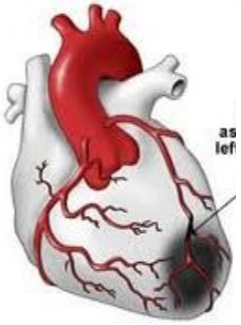
- Vasopressor

Fuel

- Volume

Choice of Inotropes: do they make a difference?

Cardiogenic Shock



- **Norepinephrine** is the drug

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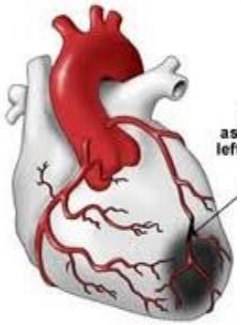
Comparison of Dopamine and Norepinephrine in the Treatment of Shock

Daniel De Backer, M.D., Ph.D., Patrick Biston, M.D., Jacques Devriendt, M.D., Christian Madl, M.D., Didier Chochrad, M.D., Cesar Aldecoa, M.D., Alexandre Brasseur, M.D., Pierre Defrance, M.D., Philippe Gottignies, M.D., and Jean-Louis Vincent, M.D., Ph.D., for the SOAP II Investigators*

800 patients in each arm
150 cardiogenic shock patient in each arm
Mortality is higher with DOPAMINE in Cardiogenic shock
More arrhythmia with Dopamine

Choice of Inotropes: do they make a difference?

Cardiogenic Shock

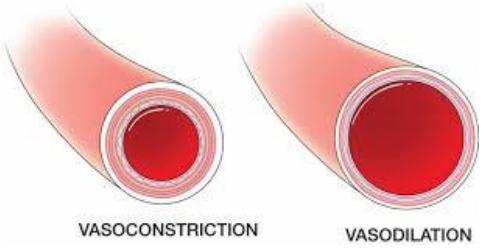


- **Norepinephrine** is the drug
- If inotropy needed then Add **Dobutamine** , Epinephrine can be used too

No strong evidence though commonly being used
Dopamine shows more risk of arrhythmia

Choice of Inotropes: do they make a difference?

Distributive Shock



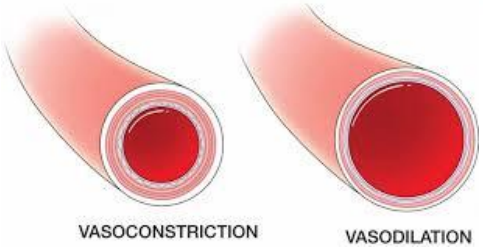
Sepsis

Anaphylaxis

Neurogenic

Choice of Inotropes: do they make a difference?

Sepsis



- Distributive initially then becomes cardiogenic as well
- **Norepinephrine** is the drug

2012

Dopamine versus norepinephrine in the treatment of septic shock: A meta-analysis*

Daniel De Backer, MD, PhD; Cesar Aldecoa, MD; Hassane Njimi, MSc, PhD; Jean-Louis Vincent, MD, PhD, FCCM

Mortality Benefit with nore-epinephrine
Dysrhythmia with Dopamine

Choice of Inotropes: do they make a difference?

Sepsis

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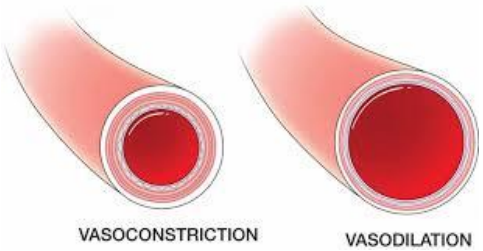
- **Norepinephrine** is the drug



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Vasopressin versus Norepinephrine Infusion in Patients with Septic Shock

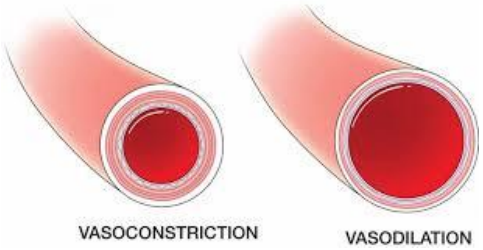
James A. Russell, M.D., Keith R. Walley, M.D., Joel Singer, Ph.D., Anthony C. Gordon, M.B., B.S., M.D., Paul C. Hébert, M.D., D. James Cooper, B.M., B.S., M.D., Cheryl L. Holmes, M.D., Sangeeta Mehta, M.D., John T. Granton, M.D., Michelle M. Storms, B.Sc.N., Deborah J. Cook, M.D., Jeffrey J. Presneill, M.B., B.S., Ph.D., and Dieter Ayers, M.Sc., for the VASST Investigators*

Vasopressin use in septic shock is conditional

Not a drug needed in ED

Choice of Inotropes: do they make a difference?

Sepsis



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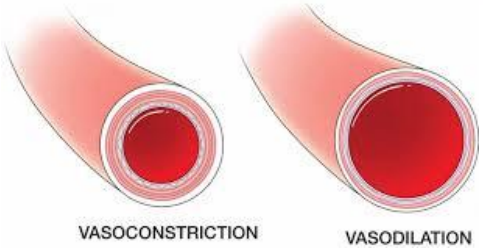
51. Seguin P, Bellissant E, Le Tulzo Y, et al. Effects of epinephrine compared with the combination of dobutamine and norepinephrine on gastric perfusion in septic shock. *Clin Pharma and Therapeutics* 2002;71(5):381-8.
52. Levy B, Bollaert PE, Charpentier C, et al. Comparison of norepinephrine and dobutamine to epinephrine for hemodynamics, lactate metabolism, and gastric tonometric variables in septic shock: a prospective, randomized study. *Intensive Care Med* 1997;23(3):282-7.
53. Annane D, Vignon P, Renault A, et al. Norepinephrine plus dobutamine versus epinephrine alone for management of septic shock: A randomised trial. *Lancet* 2007;370(9588):676-84.

Improves MAP
No difference in mortality
Rise in Lactate and PH

Choice of Inotropes: do they make a difference?

Sepsis



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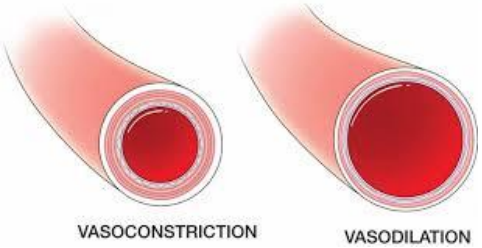
Improves MAP
No difference in mortality
Rise in Lactate and PH

Choice of Inotropes: do they make a difference?

Neurogenic

- Vasoconstrictor + Fluid likely needed

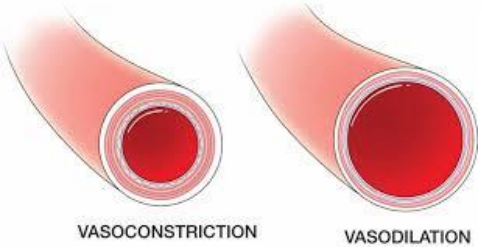


No evidence
You Decide

Choice of Inotropes: do they make a difference?

Anaphylactic

- Epinephrine



Animal Models: nore-epinephrine, vasopressin and phenylephrine is effective too

Choice of Inotropes: do they make a difference?

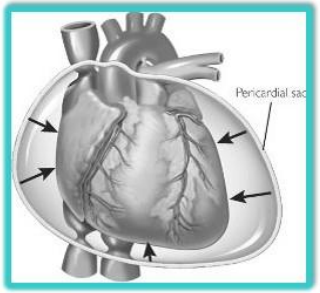
Hypovolemic Shock

- Routine use of vasopressor in hypovolemic shock is not recommended

You lost Fluid, fill with fluid

Choice of Inotropes: do they make a difference?

Obstructive Shock



- Routine use of vasopressor in Obstructive shock is conditional

Definitive Treatment needed

Choice of Inotropes: do they make a difference?

Undifferentiated Shock

- **Nore- epinephrine**

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Nore-epinephrine

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Nore Epinephrine

Nore Epinephrine

Nore Epinephrine

"Simplicity is the Ultimate Form of Sophistication"

@Ayesha_almemari