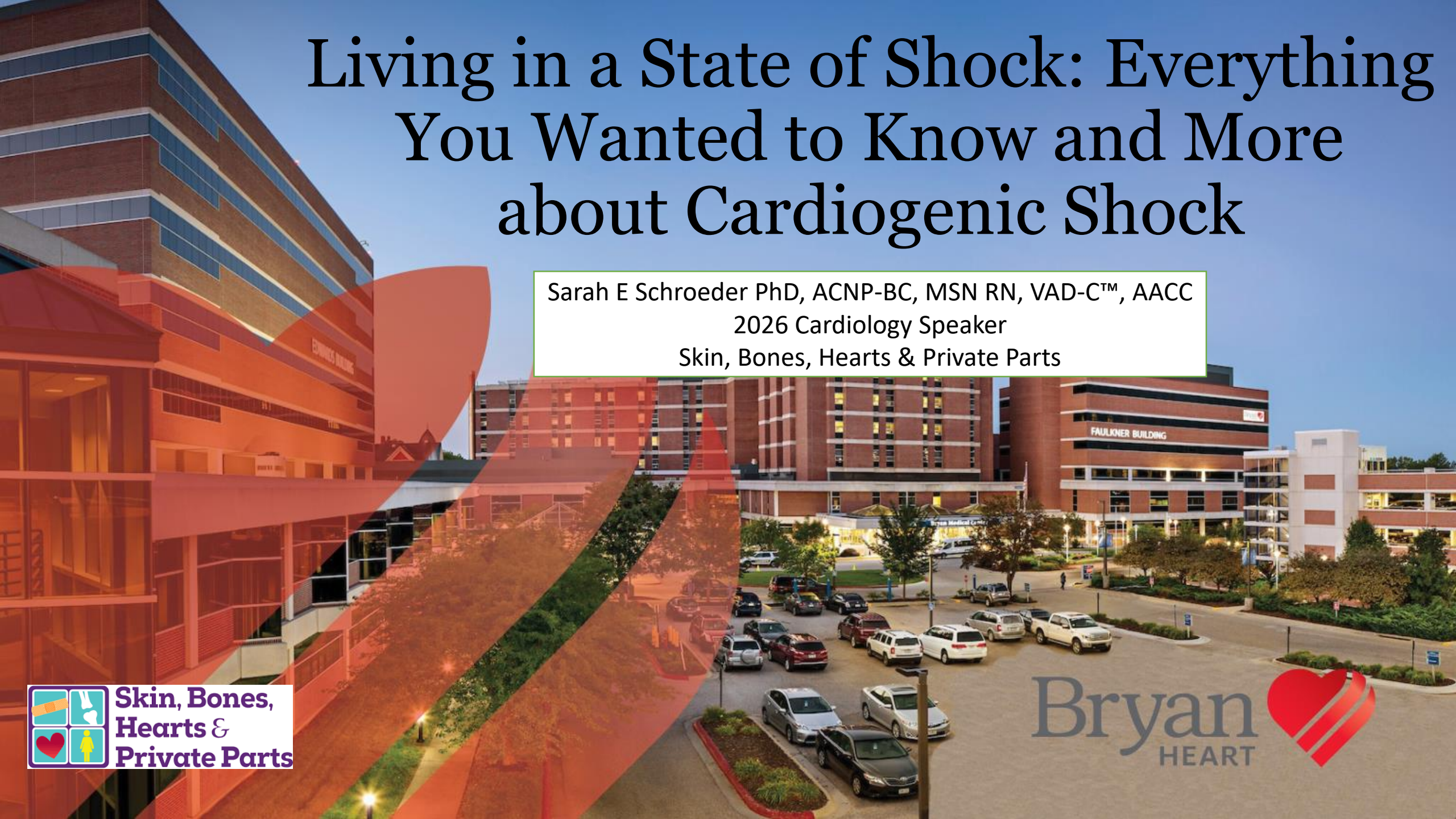
Living in a State of Shock: Everything You Wanted to Know and More about Cardiogenic Shock

Sarah E Schroeder PhD, ACNP-BC, MSN RN, VAD-C™, AACC
2026 Cardiology Speaker
Skin, Bones, Hearts & Private Parts



Disclosures

- Investigator-Driven Research Grant, Abbott Labs, 2023-2026
- VAD Coordinator Professional Development Grant, ICCAC, 2024-2026

I will occasionally discuss patient scenarios – any pictures directly of patients are displayed following consent and will be noted

Skin, Bones, Hearts & Private Parts

I have a paid subscription to Vecteezy

Bryan HEART

Objectives

- What is Cardiogenic Shock?
- Why Distinguishing Shock Matters
- Stages of Shock and Clinical Presentation
- Useful Devices in Cardiogenic Shock
- Medications Used to Treat Cardiogenic Shock
- Case Study Discussions
  - Acute MI
  - True Cardiogenic Shock secondary to depressed EF
  - Myocarditis
- Final PEARLS on Cardiogenic Shock

Skin, Bones, Hearts & Private Parts

Bryan HEART

What is Cardiogenic Shock?

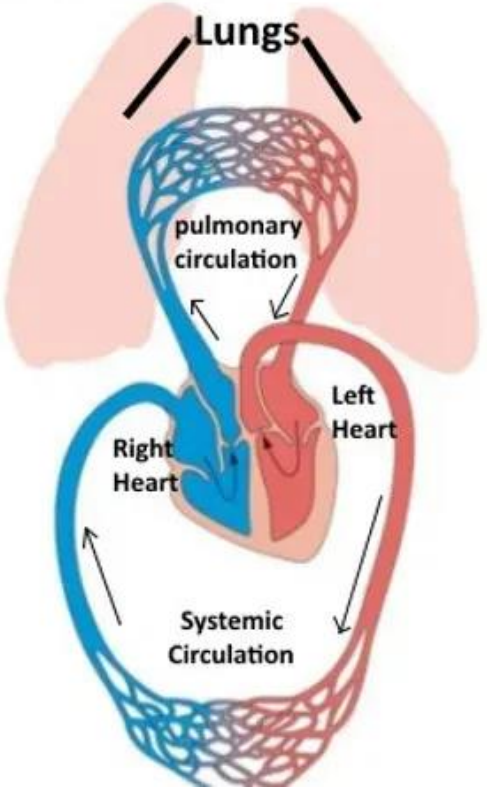
Cardiogenic Shock

as defined in the SHOCK trial

1. Persistent hypotension (SBP < 90 mmHg or MAP 30 mmHg below baseline)
2. Cardiac Index < 1.8 L/min/m^2 without support (< 2.2 L/min/m^2 with support)
3. Adequate or elevated filling pressure (LVEDP > 18 mmHg, RVEDP > 10 mmHg)

Cardiogenic Shock

- Cardiac Output
  - reduced
- PCWP
  - Increased
- CVP/RAP
  - increased
- Blood Pressure
  - Low
- Systemic Vascular Resistance
  - Increased

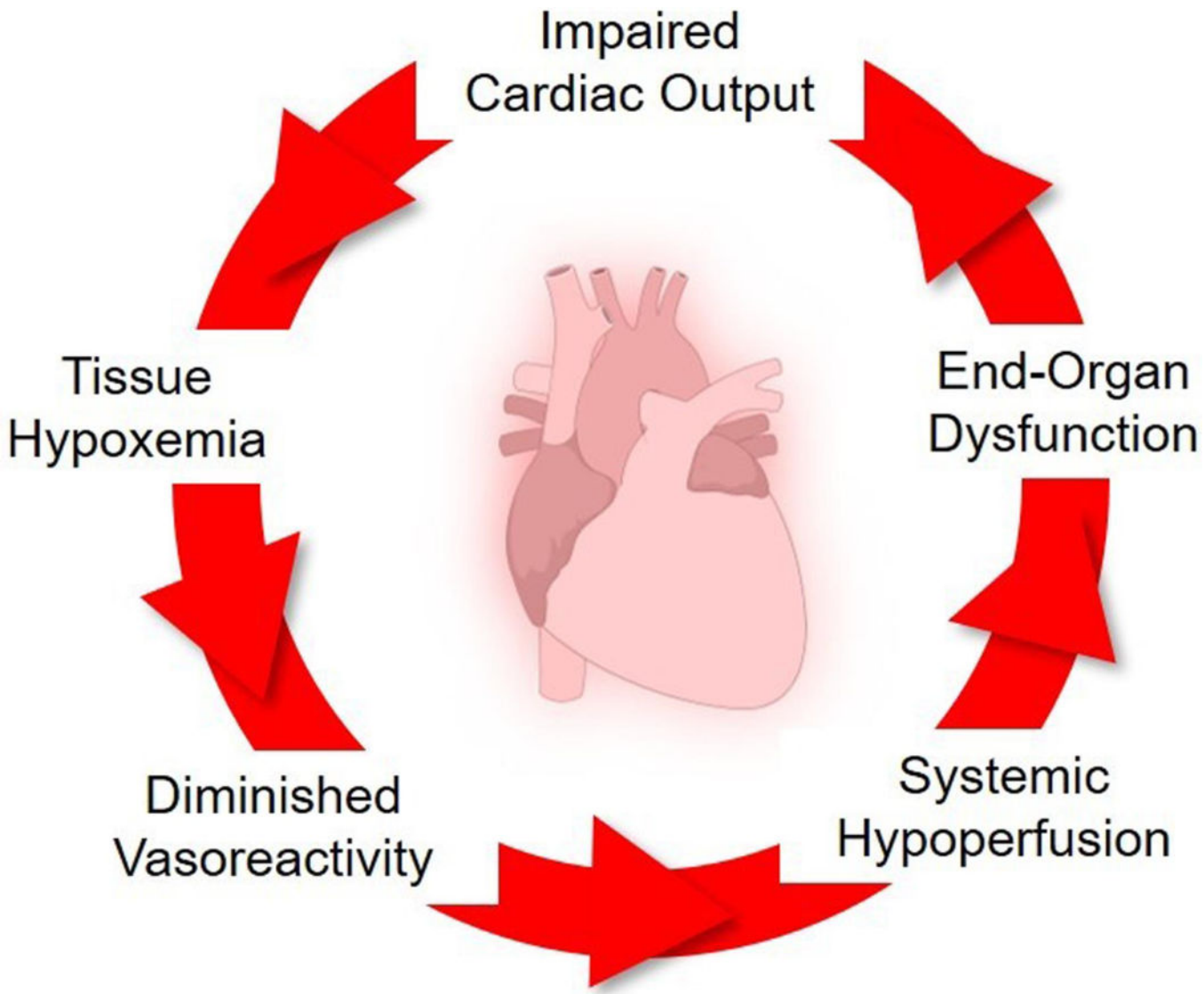


Cardiogenic Shock | Heartplace | Cardiovascular Disease Specialists & Cardiac Electrophysiologists located in Allen, Fort Worth, Arlington, Dallas, Plano, Corsicana, Garland, Glen Rose, Bedford, Burleson, Irving, Mansfield, Richardson, North Richland Hills, Granbury, Red Oak, Southlake, Frisco, Mesquite, Greenville, McKinney and Midlothian, TX

Skin, Bones, Hearts & Private Parts

Bryan HEART

Cardiogenic Shock… A Bit More Specific…

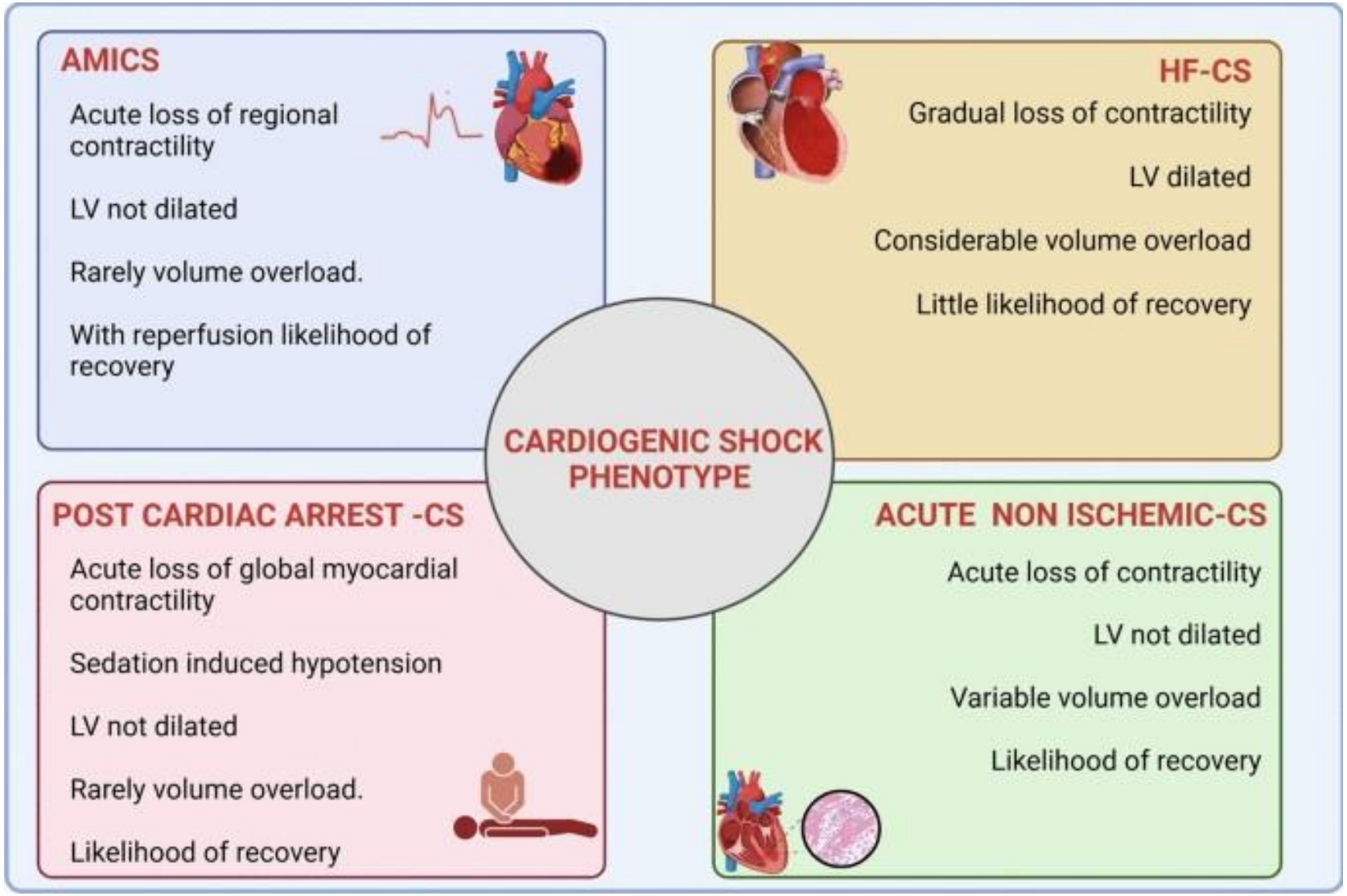


Life-Threatening Condition

Systolic BP < 90mmHg
(Myocardial Dysfunction)

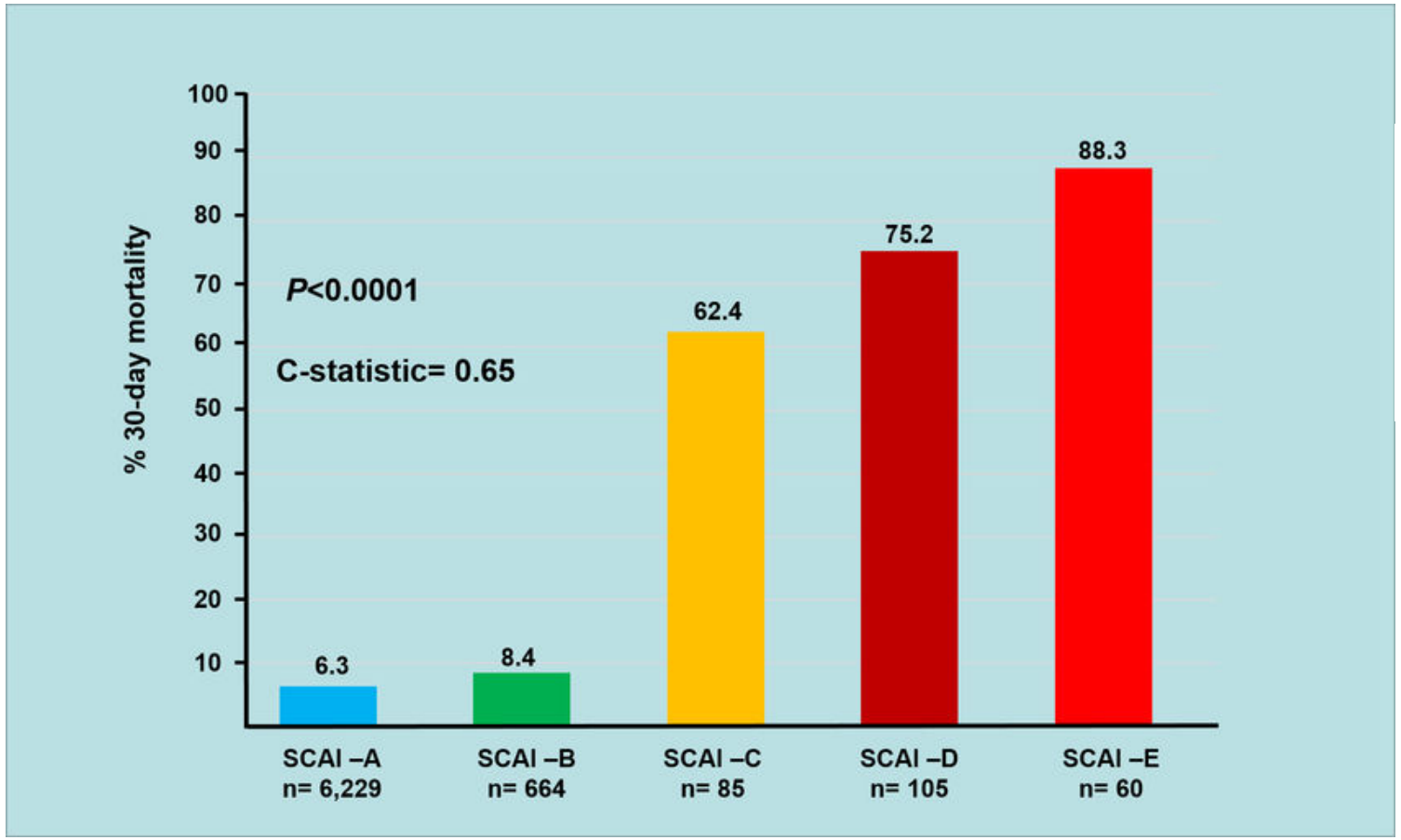
Decreased End Organ
Function

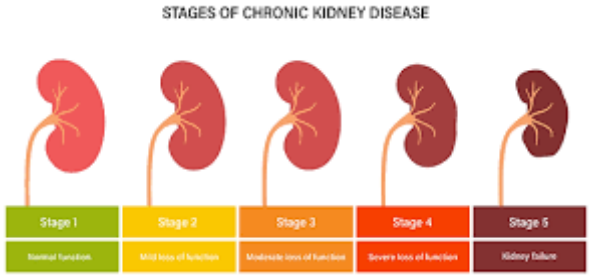
Bryan HEART



Cardiogenic shock: diagnosis, phenotyping and management | Intensive Care Medicine

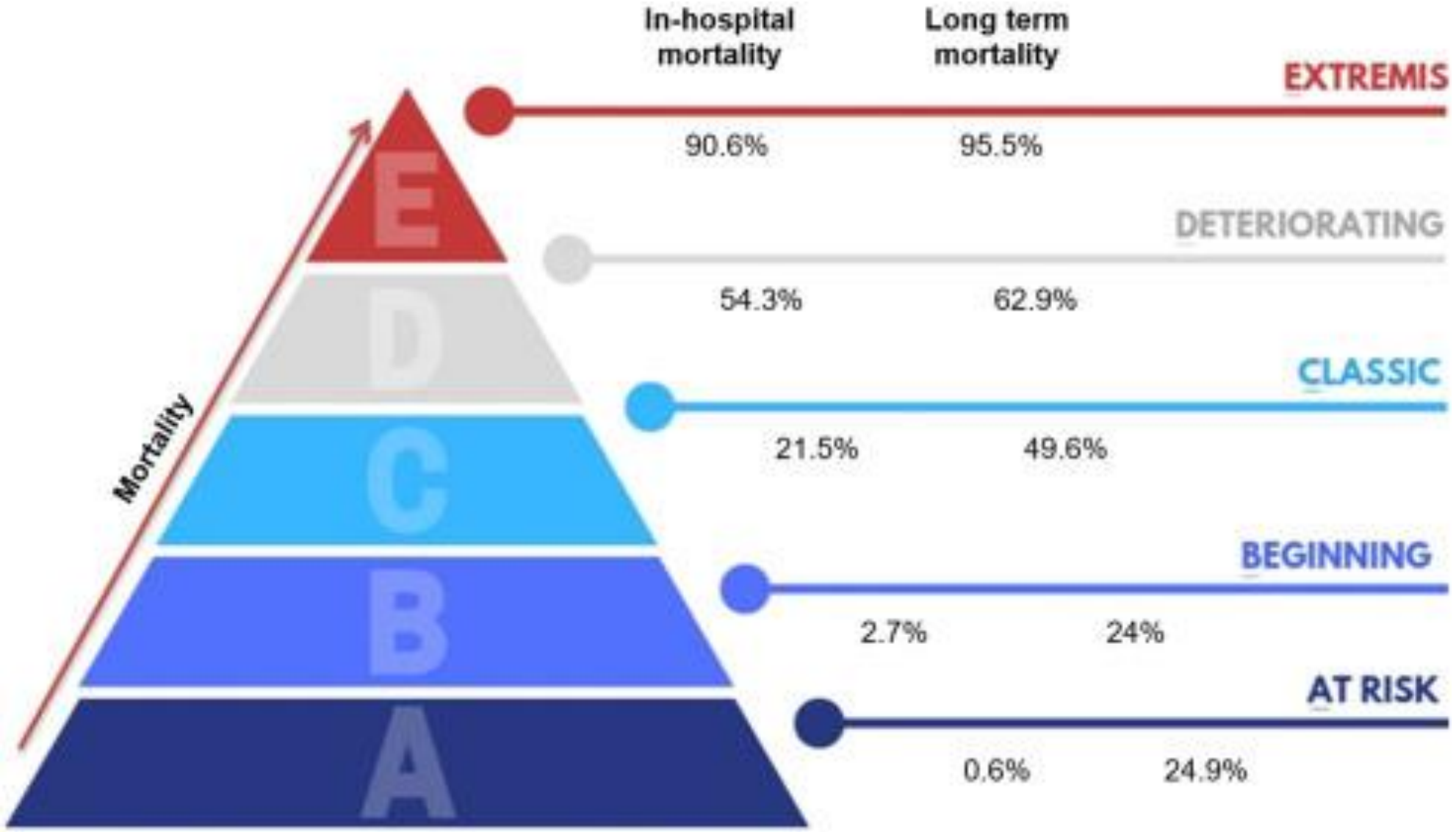
Why Distinguishing Shock Matters





Skin, Bones, Hearts & Private Parts

Bryan HEART



SCAI Criteria

Skin, Bones, Hearts & Private Parts

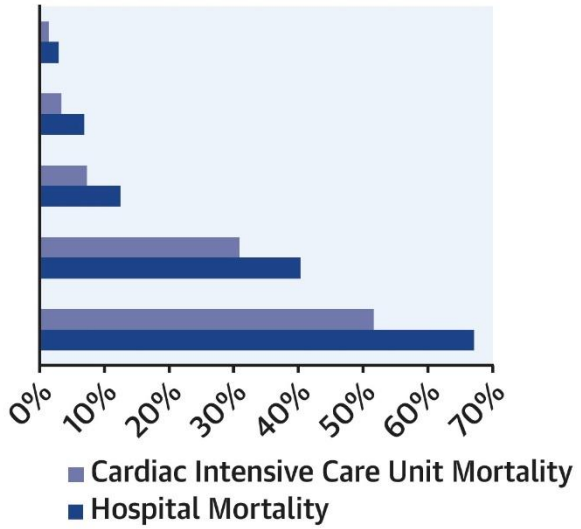
Bryan HEART

Stages of Shock and Clinical Presentation

CENTRAL ILLUSTRATION: Definitions of SCAI Shock Stages A Through E, With Associated Cardiac Intensive Care Unit and Hospital Mortality in Each SCAI Shock Stage

Cardiogenic Shock Stage	Study Definition
Stage A ("At risk")	Neither hypotension/tachycardia nor hypoperfusion
Stage B ("Beginning")	Hypotension/tachycardia WITHOUT hypoperfusion
Stage C ("Classic")	Hypoperfusion WITHOUT deterioration
Stage D ("Deteriorating)"	Hypoperfusion WITH deterioration NOT refractory shock
Stage E ("Extremis")	Hypoperfusion WITH deterioration AND refractory shock

Observed Mortality in Overall Cohort



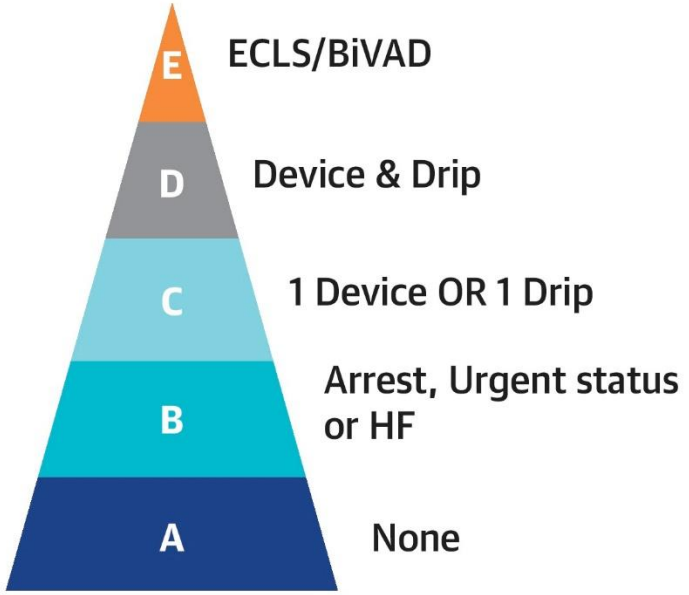
Jentzer, J.C. et al. J Am Coll Cardiol. 2019;74(17):2117-28.

Skin, Bones, Hearts & Private Parts

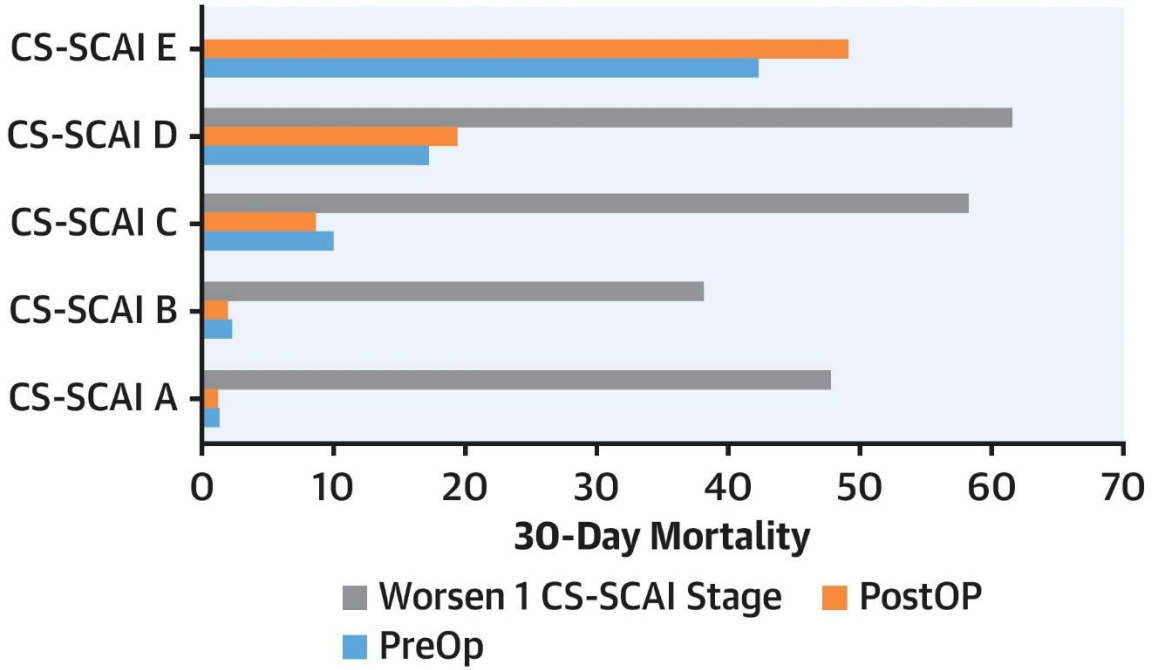
Bryan HEART

CENTRAL ILLUSTRATION: CS-SCAI Construct and 30-Day Mortality Including the Effect of Worsening Stage

CS-SCAI Definition



CS-SCAI Stage and 30-Day Mortality

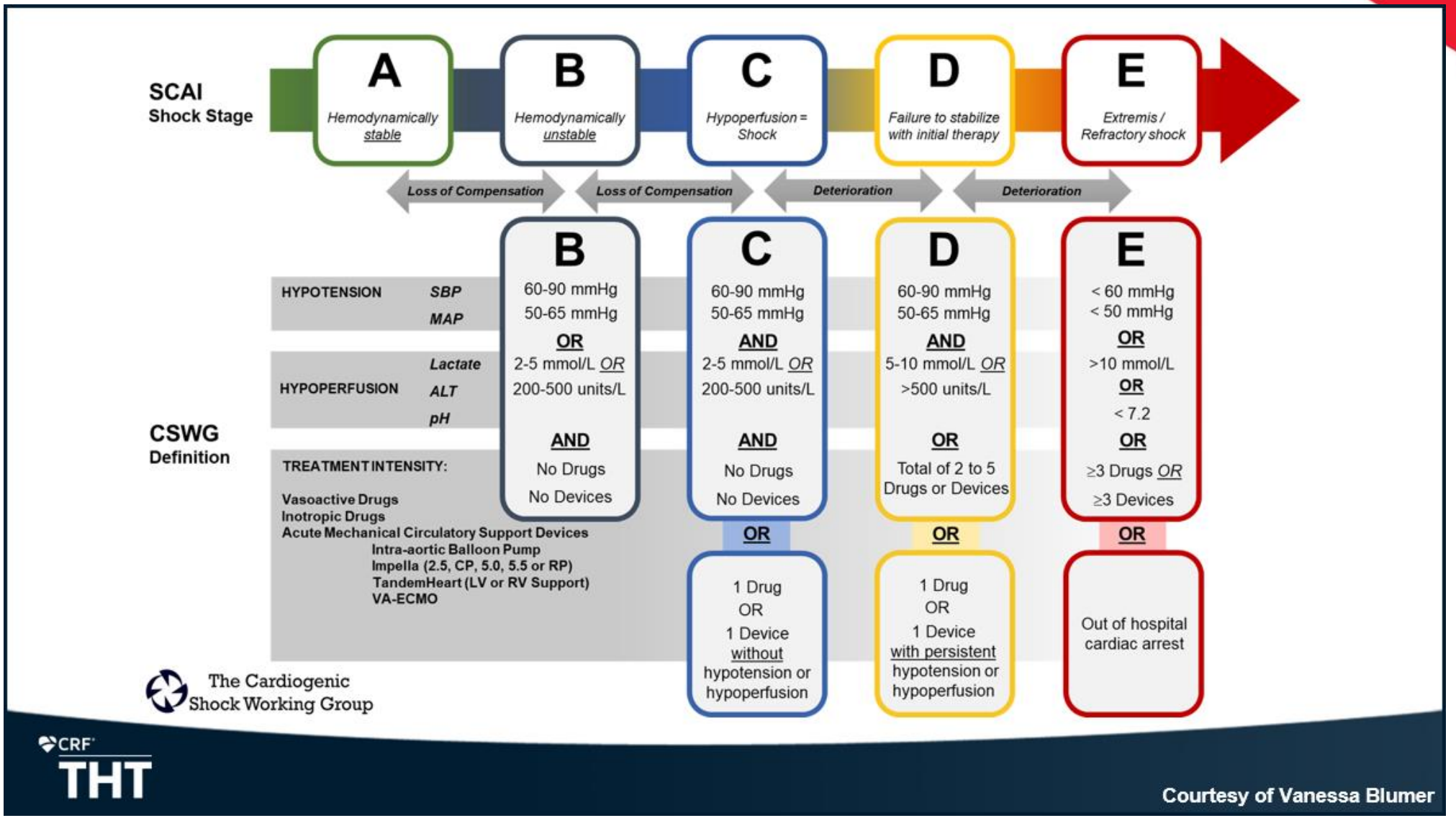


Brozzi N, et al. JACC Adv. 2025;4(8):101975.

Skin, Bones, Hearts & Private Parts

[Shock Stages in Cardiac Surgical Patients: Implications for Post-Cardiotomy Shock and Mortality | JACC: Advances]

Bryan HEART

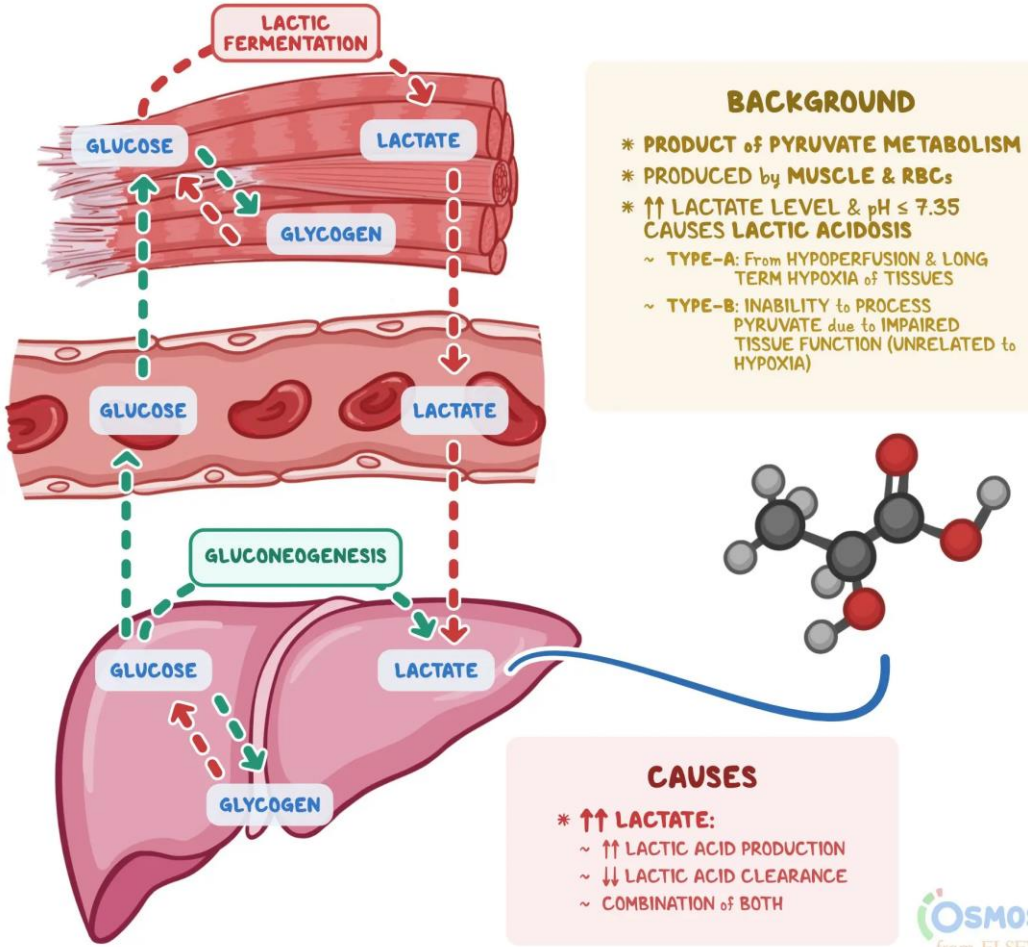


Skin, Bones, Hearts & Private Parts

Bryan HEART

[Cardiogenic Shock's Origins, Progression Tightly Tied to Mortality | tctmd.com]

Function of the Lactate



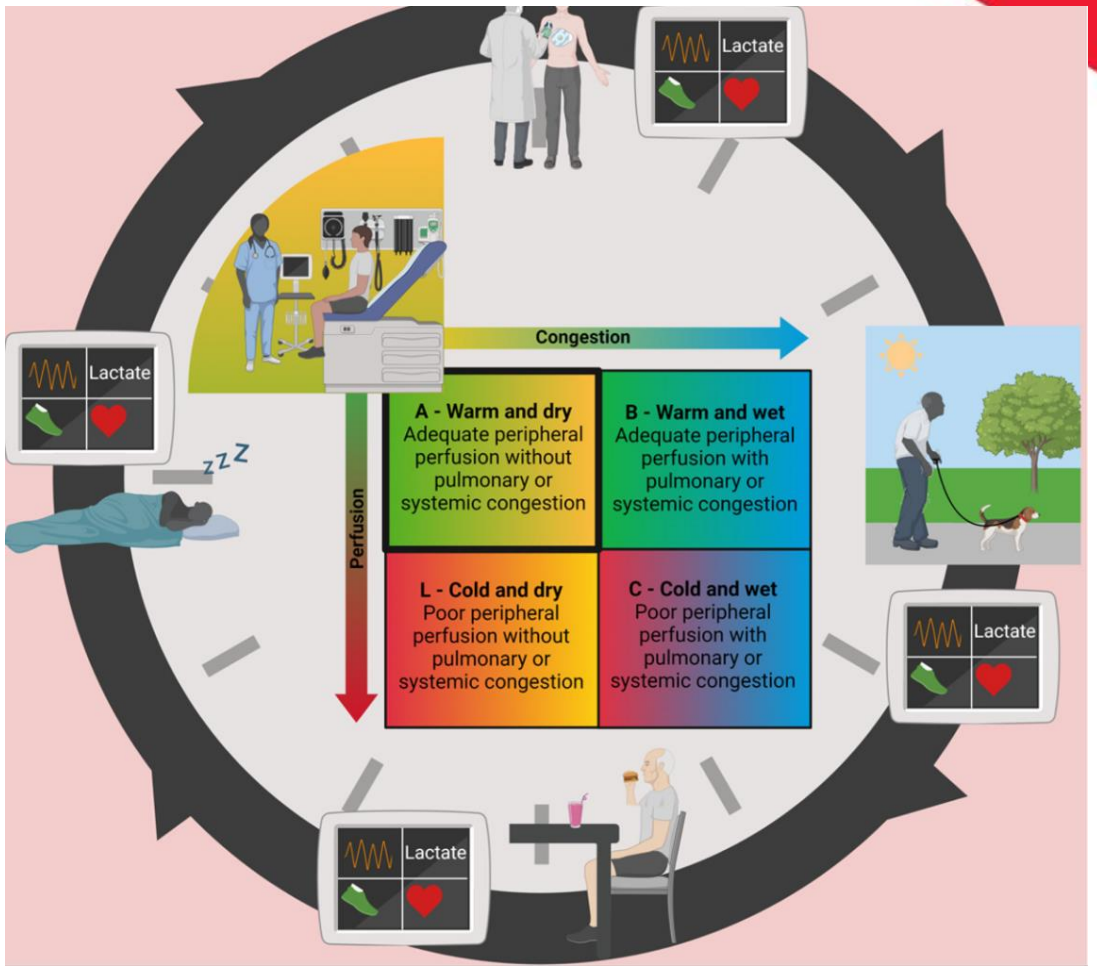
BACKGROUND

* PRODUCT of PYRUVATE METABOLISM
* PRODUCED by MUSCLE & RBCs
* ↑↑ LACTATE LEVEL & pH ≤ 7.35 CAUSES LACTIC ACIDOSIS
  - TYPE-A: From HYPOPERFUSION & LONG TERM HYPOXIA of TISSUES
  - TYPE-B: INABILITY to PROCESS PYRUVATE due to IMPAIRED TISSUE FUNCTION (UNRELATED to HYPOXIA)

CAUSES

* ↑↑ LACTATE:
  - ↑↑ LACTIC ACID PRODUCTION
  - ↓↓ LACTIC ACID CLEARANCE
  - COMBINATION of BOTH

OSMOSIS from ELSEVIER



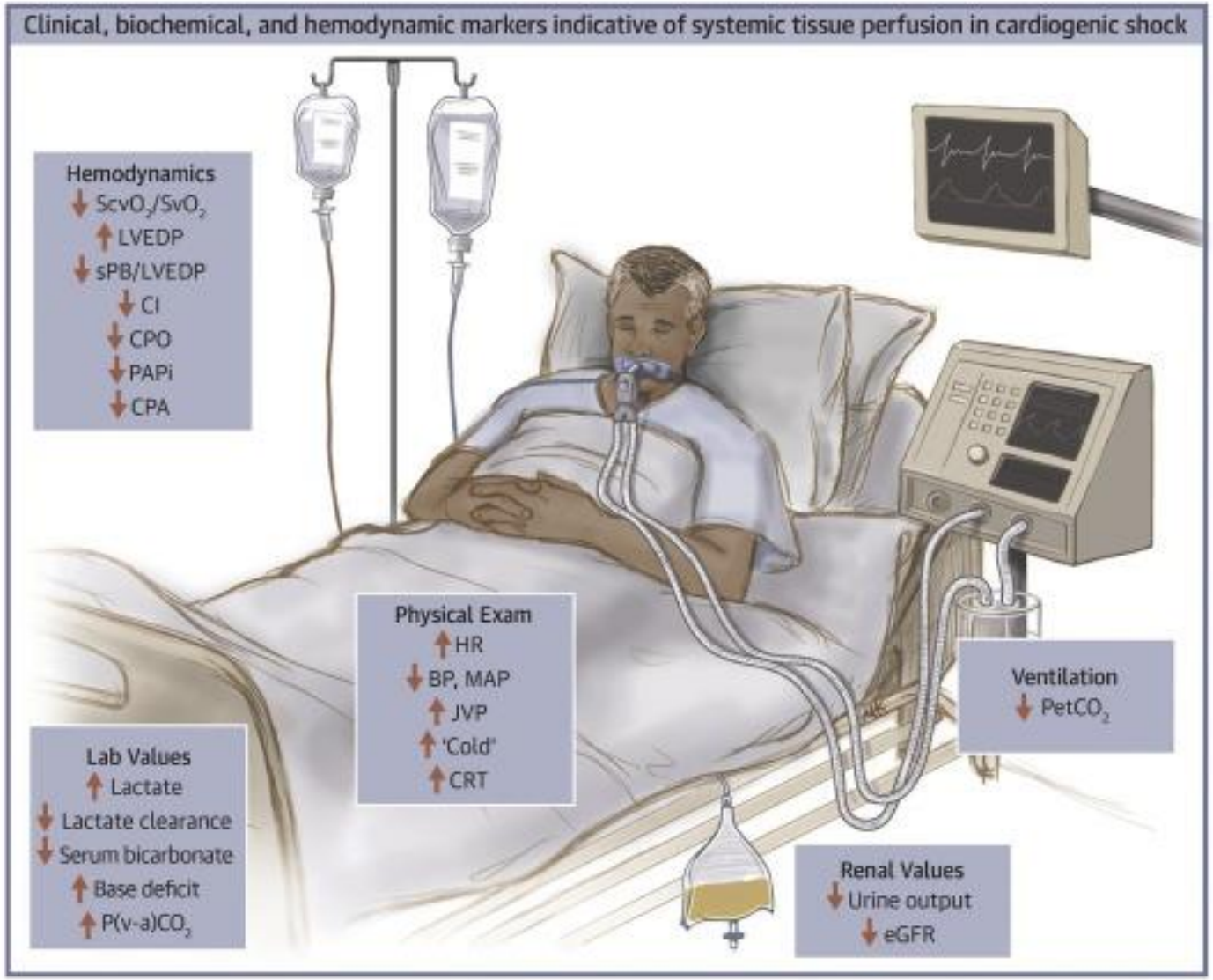
Skin, Bones, Hearts & Private Parts

Bryan HEART

Lactic Acid: What Is It, What Increases It, and More | Osmosis

https://doi.org/10.1016/j.cardfail.2025.01.011

CENTRAL ILLUSTRATION: Clinical, Biochemical, and Hemodynamic Variables



Mathew R, et al. JACC Adv. 2022;1(2):100034.

Lactate

BP/HR

Urine Output

Bryan HEART

Useful Devices in Cardiogenic Shock

- Add in Impella CP and 5.5, Impella RP Flex, IABP, ECMO

Medications Used to Treat Cardiogenic Shock

- Talk about Inotropes, Vasopressors
- Fluids etc…

Case Study Discussions: Acute Myocardial Infarction

Skin, Bones, Hearts & Private Parts

Bryan HEART

Case Study Discussions: True Depressed Ejection Fraction

Skin, Bones, Hearts & Private Parts

Bryan HEART

Case Study Discussions: Myocarditis

Skin, Bones, Hearts & Private Parts

Bryan HEART

Final PEARLS…

Questions?

@sarsch79

Sarah E Schroeder

sarah.schroeder@bryanheart.com

402-937-3595

Skin, Bones, Hearts & Private Parts

Bryan HEART

References

Skin, Bones, Hearts & Private Parts

Bryan HEART