

## Title: Vasoplegia and the Role of Angiotensin II

### Presenters:

Jean Kim, PharmD  
PGY-1 Pharmacy Resident  
UPMC Presbyterian

Jelena Lakic, PharmD  
PGY-1 Pharmacy Resident  
UPMC Presbyterian

Date: 11/1/2023

### Learning Objectives:

1. Define vasoplegia in the setting of sepsis and post-cardiotomy shock
2. Discuss the current vasoplegia treatment management approach
3. Identify the appropriateness and place in therapy of Angiotensin II

### Abstract:

Vasoplegia is a widely recognized hemodynamic challenge seen in different clinical settings, commonly in sepsis and post-cardiotomy shock. Treatment typically involves fluids, norepinephrine, and other vasopressors and non-catecholamine agents; however, there is no standardized approach to the management of vasoplegia, including refractory vasoplegia for patients nonresponsive to initial therapies.<sup>1</sup>

Distributive shock is characterized by normal or high cardiac output with low systemic vascular resistance which manifests as low blood pressure. Hypotension is the defined hemodynamic compromise seen in distributive shocks and is associated with high morbidity and mortality. Therefore, treatment aims to restore blood pressure in attempts to maintain adequate vital organ perfusion. Angiotensin II is an endogenous hormone that increases aldosterone release, causes vasoconstriction, increases blood pressure, and thus may play a role in the management of vasoplegia in sepsis.<sup>2</sup>

Post-cardiotomy shock, a complex and life-threatening condition is characterized by severe hemodynamic instability following cardiac surgery. This condition can complicate the surgery recovery process and pose a significant risk to patients.<sup>3</sup> Post cardiotomy vasoplegia can be triggered by a number of factors and effective management involves a tailored approach that may include the use of vasopressor medications. Due to the increase in blood pressure that Angiotensin II provides through vasoconstriction, it is thought that it may also play a role in the management of post-cardiotomy vasoplegia.<sup>4</sup>

This presentation will assess the potential role of angiotensin II, administration and dosing regimens, risk vs. benefit, controversies, limitations, and cost/formulary considerations.

#### References:

1. Ortoleva JP, Cobey FC. A Systematic Approach to the Treatment of Vasoplegia Based on Recent Advances in Pharmacotherapy. *J Cardiothorac Vasc Anesth.* 2019 May;33(5):1310-1314.
2. Levy B, Fritz C, Tahon E, Jacquot A, Auchet T, Kimmoun A. Vasoplegia treatments: the past, the present, and the future. *Crit Care.* 2018 Feb 27;22(1):52.
3. Ltaief Z, Ben-Hamouda N, Rancati V, Gunga Z, Marcucci C, Kirsch M, Liaudet L. Vasoplegic Syndrome after Cardiopulmonary Bypass in Cardiovascular Surgery: Pathophysiology and Management in Critical Care. *Journal of Clinical Medicine.* 2022; 11(21):6407.
4. Ortoleva J, Shapeton A, Vanneman M, Dalia AA. Vasoplegia During Cardiopulmonary Bypass: Current Literature and Rescue Therapy Options. *J Cardiothorac Vasc Anesth.* 2020;34(10):2766-2775.

#### Audience Response Questions:

1. Which of the following rescue therapies is correctly matched to its major side effect/disadvantage?
  - a. Hydroxycobalamin: hemolytic anemia
  - b. Methylene blue: pulmonary vasoconstriction
  - c. Thiamine: extreme hypertension
  - d. Angiotensin II: bronchodilation
2. Which of the following clinical manifestations is often associated with post-cardiotomy vasoplegia following cardiac surgery?
  - a. Elevated blood pressure and tachycardia
  - b. Bradycardia and high cardiac output
  - c. Hypotension unresponsive to vasopressors and low systemic vascular resistance
  - d. Fluid retention despite adequate diuresis
3. Which of the following factors should be considered when determining the suitability of a patient for angiotensin II therapy in the management of post-cardiotomy vasoplegia?
  - a. Age and gender of the patient
  - b. Surgical procedure performed
  - c. Blood type and coagulation profile
  - d. Presence of pre-existing conditions