# DRAFT: THE SYMPATHETIC INNERVATION OF THE HEART

Title: The Sympathetic Innervation of the Heart – a Clinical Review

Authors: Anish Shah, MD; Amit Shah, MD, MSCR; Puja Mehta, MD; Marc Thames, MD

Affiliations: Emory University School of Medicine, Atlanta, Georgia

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# INTRODUCTION

What are the key concepts of SNS in regulating the heart in physiological and pathophysiological states?

* The SNS gives the heart the ability to increase output to handle demands. It’s the mechanism for modifying the internal environment to match the needs of the external environment.
* ANS abnormalities are bidirectional, in that sympathetic nerve activity (SNA) leads to pathophysiology, but changes in cardiac function can lead to changes in SNA.

## Purpose

## Objectives

# RELEVANT CARDIAC ANATOMY

## Historical Understanding of Sympathetic Cardiac Innervation

## The Neurocardiac Axis

# NORMAL CARDIOVASCULAR RESPONSES AND SYMPATHETIC NERVE ACTIVITY

## Sympathovagal Interaction and Local Neurotransmitters

## Coronary Perfusion

## Cardiac Reflexes

# PATHOPHYSIOLOGICAL CARDIOVASCULAR RESPONSES AND SYMPATHETIC NERVE ACTIVITY

## Ventricular Fibrillation

## Myocardial Ischemia and Infarction

## Catecholamine Excess

## Cardiac Denervation

# MANAGEMENT OF SYMPATHETIC NERVOUS SYSTEM AND THE HEART

## Surgical Interventions

## Neurohormonal Blockade

# CONCLUSION

The sympathetic outflow to the heart has important implications both acutely and chronically. The most drastic effect of SNS pathology is the triggering of ventricular fibrillation, and understanding the anatomical considerations leads to an understanding of pathogenesis and treatment strategies (i.e. epicardial scar ablation, stellate ganglion blocks, etcetera). Understanding the innervation of the coronary arteries and cardiomyocytes helps to explain the effect of local neurotransmitters both in the acute setting of ischemia or infarction and also the pathogenesis of cardiomyopathies. This review serves to contextualize the sympathetic nervous system to a clinical audience, allowing a better and more nuanced understanding of the importance of this branch of the autonomic nervous system in cardiac pathology.

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