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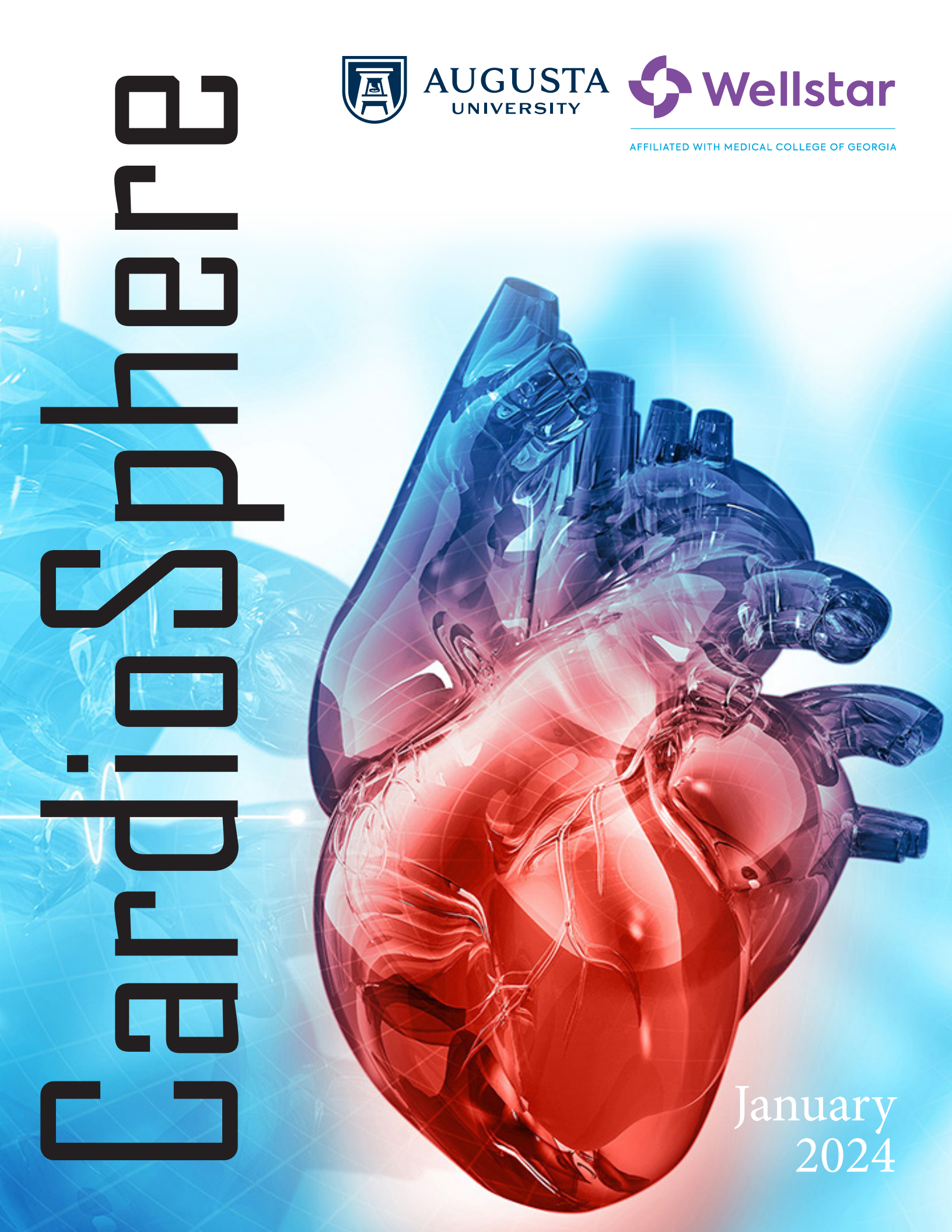


January
2024

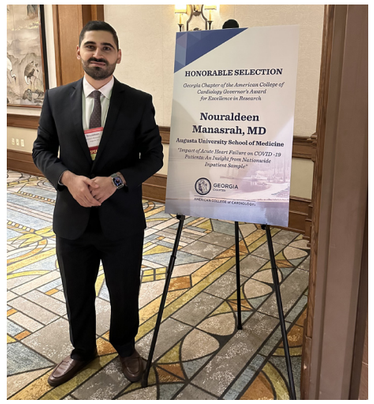
Honors and Awards

Our Fellows at GA ACC 2023

Wellstar MCG Health Cardiology Fellowship had a great weekend at Georgia ACC. Drs. Phong Nguyen, Amr Essa, and Jared Mullins received the top three scores state-wide in the Jeopardy competition, resulting in a clean sweep for Wellstar MCG. All three fellows will be representing the state of Georgia at ACC24 Scientific Sessions in Atlanta. Dr. Ragheb Harb won the Dr. Robert M Norem Award for Excellence in Biomedical Research (First Place, Basic Science Research), and Dr. Nouraldeen Manasrah won the GA ACC Governors Award for Excellence in Research (First Place, Clinical Research). Again, this represents a clean sweep for Wellstar MCG Health. We are extremely proud of our Fellowship program that has excelled under the leadership of Drs. Wael AlJaroudi and Evan Hiner.

Jared Mullins, DO PGY-6
Phong Nguyen, DO PGY-6
Dr. Pascha Schafer
Amr Essa, MBCHB PGY-6

Phong Nguyen, DO PGY-6
Amr Essa, MBCHB PGY-6
Jared Mullins, DO PGY-6



Nouraldeen Manasrah, MD
PGY4

Winner of the Georgia Chapter of the ACC Governor's Award for Excellence in Research.

Research Highlights

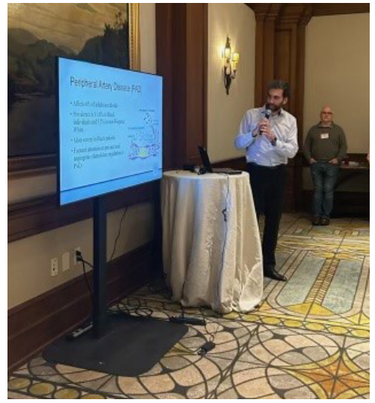
Racial Discrepancy in Peripheral Artery Disease: A Novel Approach

The prevalence of peripheral artery disease (PAD) is 11.6% in Black individuals and 5.5% in non-Hispanic White individuals. This discrepancy persists even after adjustment for traditional risk factors.

Impaired angiogenesis plays a major role in the progression of PAD. Many pro-angiogenic chemokines are modulated by binding to the Duffy antigen receptor for chemokines (DARC), a non-signaling receptor expressed primarily on red blood cells (RBCs). African Americans exhibit increased incidence and severity of PAD, and interestingly around 70% of individuals of African descent do not express DARC on their erythrocytes.

At the vascular biology center at MCG, we were able to selectively delete the DARC gene in the hematopoietic cells in mice (DARCHKO). These mice, along with control wild type mice underwent left femoral artery distal and proximal ligation, and excision. DARCHKO mice exhibited reduced blood flow recovery and capillary formation compared to control mice, in conjunction with increased inflammation, necrosis, and fibrosis in the ischemic limb muscles. Furthermore, levels of CCL-11, a pro-angiogenic strongly DARC-bound chemokine, were significantly reduced in the plasma and the ischemic muscle tissues of DARCHKO mice compared to control mice. CCL-11 serum level strongly correlated with capillary formation in ischemic hindlimb muscles.

These findings may be relevant to ethnic differences in susceptibility to PAD and suggest that therapies directed towards increasing CCL-11 may be beneficial in African Americans with PAD.

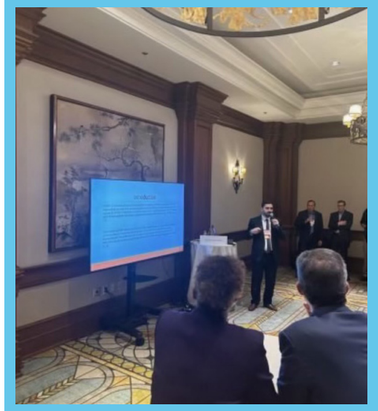


Ragheb Harb, MD
PGY4

Impact of Acute Heart Failure on COVID-19 Patients: An Insight from Nationwide Inpatient Sample

This study utilized the Nationwide Inpatient Sample (NIS) dataset to examine COVID-19 patients aged 18 and above who were hospitalized in 2020. The patients were categorized into two groups based on the presence of acute heart failure (HF). Out of 1,666,960 COVID-19 patients, 156,755 (9.4%) had concurrent acute HF.

Following propensity score matching, those with acute HF exhibited more adverse in-hospital outcomes such as myocardial infarction (MI), cardiogenic shock, and cardiac arrest. Additionally, this group experienced higher mortality rates, particularly among white males in the northeastern region. Moreover, patients with acute HF had longer hospital stays and incurred higher costs of care.



Nouraldeen Manasrah, MD
PGY4

Clinical Spotlight

Extracorporeal Cardiopulmonary Resuscitation: MCG Experience with an Advanced Resuscitation Modality

Musa A. Sharkawi, MBBCh

Introduction: Rates of survival with functional recovery for both in-hospital and out-of-hospital cardiac arrest are notably low. Attempts at improving cardiac arrest outcomes have increasingly included extracorporeal techniques to re-establish circulation. Extracorporeal cardiopulmonary resuscitation (ECPR) is emerging as a modality to improve prognosis by augmenting perfusion to vital end-organs by utilizing extracorporeal membrane oxygenation (ECMO) during conventional CPR and stabilizing the patient for interventions aimed at reversing the etiology of the arrest. Implementing this treatment modality requires a substantial investment in resources, labor and expertise, and hence, careful patient selection is critical to ensure optimal outcomes. As part of a busy ECMO program, we have extended the use of this technology to an area that only a small number of centers in the world have attempted - to perform ECMO while patients are undergoing active CPR. Two cases are illustrated herein describing our experience with this technique.

Figure 1: Resuscitation team inserting ECMO Cannulas in a patient undergoing chest compressions by the LUCAS device. (adapted from Slack et al2).

Case 1: A 42-year-old male with a history of hypertension and smoking, presented extremely ill with severe shortness of breath and tachypnea. He had 7 days of fevers, upper respiratory tract infection symptoms, and diarrhea. In the emergency department, his heart rate was 150 bpm in atrial flutter, respiratory rate 36, with a blood pressure of 80's/60's. On exam the patient was somnolent, tachypneic and cold to touch. Point of care labs revealed pH 7.01 and a lactic acid of 16. Bedside echo revealed LVEF of 5% and severely hypokinetic right ventricle. The patient was intubated and soon after suffered from cardiac arrest. The patient achieved spontaneous circulation after 5 minutes of CPR. He then suffered from a recurrent cardiac arrest and could not be transported to the cardiac catheterization laboratory due to his instability.

We elected to emergently institute ECPR by placing the patient on VA-ECMO in the ED. The patient was then transferred to the cardiac cath lab for placement of an Impella CP device to unload the left ventricle, followed by placement of antegrade limb perfusion catheter to prevent limb ischemia. The patient was then managed in the CVICU and treated for possible viral myocarditis with pulse dose steroids. He woke up and was following commands on post-op day 1. VA-ECMO decannulation was performed on post-op day 6, followed by Impella CP removal on post-op day 7. The patient was discharged after 2 weeks and is doing well at 10 months' follow-up, with improvement of LV function and return to full baseline functional capacity.

Case 2: A 32-year-old woman who presented with possible unknown drug overdose suffered from a witnessed, out of hospital, cardiac arrest requiring defibrillation. Upon presentation to the hospital, she was intubated and suffered from recurrent VF arrests. She required more than 11 defibrillations for recurrent VF despite antiarrhythmic therapies. We elected to place the patient on VA-ECMO at bedside while intermittently undergoing CPR and defibrillation for recurrent VF. She was then taken to the cardiac cath lab where an antegrade limb perfusion catheter was placed, and an intra-aortic balloon pump was also placed for left ventricular unloading. Overall, she required more than 50 defibrillations for recurrent VF. VA-ECMO was decannulated on post-op day 3 and IABP was removed on post-op day 4. The patient was discharged to a facility on post-op day 8.

Discussion: ECMO is best seen as a bridge for a reversible insult that's otherwise refractory to conventional management. ECMO has been used in neonates and adults across a wide range of illness from respiratory failure to cardiac arrest. Traditionally, the decision-making process and placement of the patient on ECMO has occurred in hospital ICUs or operating rooms. But as ECMO devices become cheaper, smaller and more portable, this previously scarce resource is becoming more widely available in nontraditional settings, such as the Emergency Department.

There are two types of ECMO: VV (veno-venous) and VA (veno-arterial), which refer to the source and target of blood flow between the two large-bore catheters and the pump. Most often, the cannulas are inserted into the femoral vessels. In VA-ECMO, deoxygenated venous blood from the right atrium is drained via one cannula and passed through a membrane oxygenator, which serves to oxygenate the blood and remove carbon dioxide, after which the now normally arterialized blood is pumped back into the proximal aorta under pressure via a return cannula to complete the circuit. VA-ECMO is required for severe cardiac failure and hemodynamic collapse with or without concomitant respiratory failure. By bypassing the entire cardiopulmonary system, the heart is allowed time to recover from an insult while systemic perfusion and oxygenation to the whole body are maintained. This type of ECMO has been used to support patients with refractory cardiac arrest, as in both cases. Closed chest compressions produce inadequate blood flow to sustain vital organs for an extended period of time, in most cases providing as little as 5.5% of mean aortic blood flow. As a method of circulating blood during cardiac arrest, ECPR can achieve physiologic levels of blood flow while the heart is stopped. Although progress has been made in the survival of patients with cardiac arrest in recent years through attention to high-performance CPR and early defibrillation, many victims, even young ones with potentially reversible conditions still fail to respond to excellent ACLS care. ECPR may extend OHCA survival in the future to these victims. Although evidence for ECPR is limited to case series, published studies suggest a neurologically intact survival benefit for select patients with OHCA when compared to historical controls. Despite the excitement in this modality, a critical factor for successful outcomes continues to be early, effective CPR, early selection of qualified cases and rapid placement on the pump.

Conclusions: As illustrated by the two cases presented here, ECPR is a promising area of advanced resuscitation science that can be used in the treatment of in and out of hospital cardiac arrest. Although ECPR is an exciting rescue therapy, outcomes will only be optimal in systems that provide high-quality and minimally interrupted chest compressions in all cases, including those that go on to require ECPR. Through a strong collaboration between the Divisions of Cardiovascular Medicine and Cardiothoracic Surgery, Wellstar MCG Medical Center is at the forefront of providing such unique and advanced care in the region.

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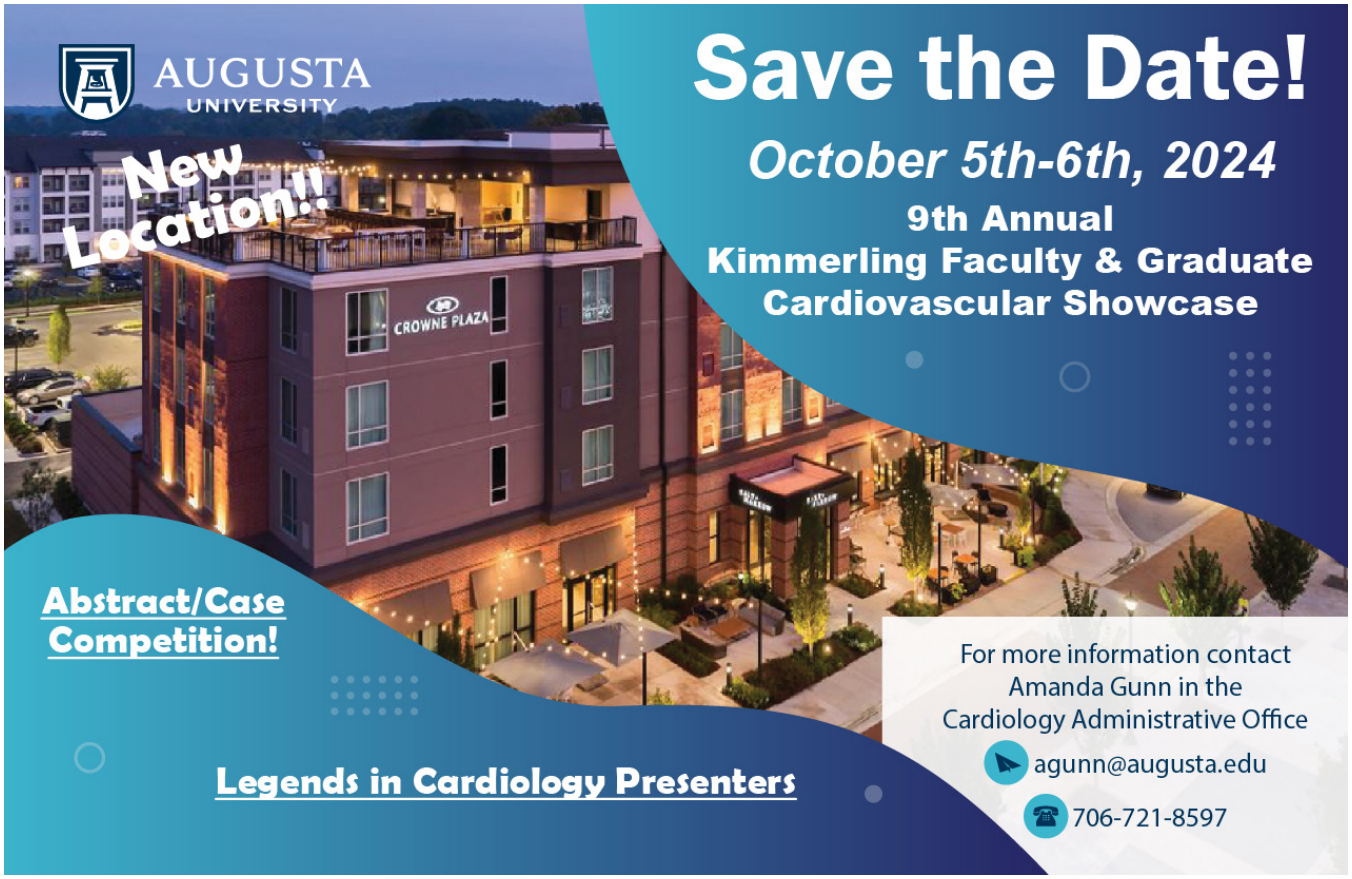

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