

## **Block 4, October 14, 2014**

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### **Scenario:**

A 55 yo M presents to the Emergency department with multiple episodes of left-sided chest pain that is non-radiating and sometimes worsened by exertion. He has had 3 severe episodes in the last 24 hours that last approximately 5 min each. They have all occurred at rest. ECG done at triage is negative for any acute ST or T wave abnormalities when compared to prior EKGs. Troponin is not detected. He denies history of heart disease or any other known medical problem. He is not on any medication. He had a stress test 5 years ago that was negative. You call the on-call cardiologist who asks that a CTCA be performed and if the test is negative the patient be discharged home. Is this the appropriate test? Is there evidence showing that in this population of patients, a negative CTCA excludes an active cardiac process that would require further testing?

### **Introduction:**

Chest pain is one of the top 10 most common emergency department chief complaints. For patients who are high risk for heart disease or for whom the electrocardiogram and biomarkers are telling of a ischemic cardiac event, the pathway of treatment is clear. Our challenge as emergency physicians arises from those patients with low to intermediate risk for ischemic heart disease with negative initial studies. The majority of these patients has a non-cardiac cause of their chest pain and can be safely discharge home.

Unfortunately, there is a small subset of patients for whom ischemic cardiac disease is the cause of their chest pain and an even smaller subset that will die from an MI or its complications. CTCA is an imaging modality being used in these patients as a tool to help predict ischemic heart disease and to predict which patients will be safe for discharge home. The articles we reviewed in journal club gave us a look at the evidence available today on the use of CTCA and its potential benefits for use in patients with acute chest pain.

Article 1: CT Angiography for Safe Discharge of Patients with Possible Acute Coronary Syndromes, Litt, H.I., et al, N Engl J Med 366(15):1393, April 12, 2012.

This article was a randomized controlled trial that evaluated ED use of the CTCA in patients with low to intermediate risk as a method to rule out ischemic disease. Patients were stratified as low/intermediate risk using the TIMI risk score and either underwent CTCA or treated with the standard of care. The primary outcome was safe discharge without documented heart disease or cardiac death 30 days after presentation. The results showed that those undergoing CTCA had increased likelihood of being discharged from the ED and there were no adverse events in this group in 30 days. But there were many questions raised during our discussion of this article. There appeared to be a conflict of interest as one of the authors was a consultant for an imaging company. The rate of heart disease in the study was lower than in the general population making its generalization difficult. The mean time to discharge difference between the two groups was only 6 hours which is probably not time or financially significant for most patients. There was also the fact that the results from the CTCA often lead to further, often not indicated studies.

Article 2: Coronary Computed Tomography Angiography for Early Triage of Patients with Acute Chest Pain, Hoffmann, U., et al, J Am Coll Card 53(18):1642, May 5, 2009

This study was an observational cohort study of similar patients who present with acute chest pain. All patients had a CTCA performed, although this did not factor into the care they received. The follow up on the patients was 6 months, which was one of the primary end points in addition to the presence of ACS during initial hospitalization. Although the study showed CTCA had a good negative predictive value for ACS of 100%, CTCA did miss one patient who went on to have ACS who potentially would have been discharged home if this study was used as intended, as a screening tool. The study center where this was performed used the CTCA frequently and had radiologists who were comfortable with reading the imaging study, which could potentially limit its reproduction in another setting.

Article 3: Comparison of the 2006 and 2010 Cardiac CT Appropriateness Criteria in a Real-World Setting, Mazimba, S., et al, J Am Coll Rad 9(9):630, September 2012

This study was a retrospective study done at our mothership hospital. While it did not breakdown the settings when CTCA was performed, it did speak to the appropriateness of the study. The authors took the 2006 guidelines for CTCA and evaluated the appropriateness of each CT study done from Nov. 2006-July 2008. They then used the 2010 guideline to assess the same studies. What they found was that while the number of inappropriate studies essentially stayed the same, the number of appropriate uses of the study increased using the 2010 guideline. This study to me, speaks to the fact that many physicians do not know the guidelines for ordering the test and if used in the wrong patient population could be detrimental.

**Bottom Line:**

Although CTCA is a new and evolving tool for evaluating patients with acute chest pain, it is important to understand the guidelines for use and the limitations for any study. This should not substitute a seasoned physician's history and physical examination as well as gestalt in determining the disposition of a patient. In consultation with a cardiologist and with the right follow up, CTCA may be the appropriate next step, but it must be understood that a positive study may open Pandora's Box of inappropriate studies which may be more harmful to your patient, especially those in the low risk category.