

Journal Club Synopsis  
Block 9, February 2014  
Discussion Leader: Nate Kinder  
Host: Dr. Pickett

### **“Which post-arrest patients without STEMI should be emergently referred for PCI?”**

#### **Clinical Scenario:**

You are working a shift at the new and improved ED, when EMS calls and says that they are bringing you a 65 year old male who is status post arrest. Bystanders at the scene reported that the patient was shoveling snow when he suddenly gripped his chest and collapsed. Bystander CPR was in progress when EMS arrived. When EMS arrived patient was in ventricular fibrillation. After defibrillation and one round of epinephrine with high quality CPR, the patient had return of spontaneous circulation. Patient is now intubated and on a dopamine drip. EKG is transmitted which shows non-specific ST-T wave changes but no evidence of STEMI. ETA is about 10 minutes. Great, now what! This sounds like a classic case for an MI, but without EKG changes can I convince cardiology to take this guy to the cath lab? If only I had some literature to guide my next steps...

#### **Article 1**

Larsen MJ, Ravkilde J, et al. Acute Coronary Angiography in patients resuscitated from out-of-hospital cardiac arrest-A systematic review and meta analysis. *Resuscitation*. 2012 Dec;83:1427-1433.

This article was a meta-analysis performed by physicians in Denmark. A literary search of peer-reviewed articles in the English language revealed 32 articles that met the search criteria. Of note, only 7 articles were found to show an increased survival rate with those undergoing early cardiac catheterization after ROSC. Significant coronary stenosis was found in 59-71% of patients in these articles. 36-69% of patients showed signs of acute Myocardial infarction. When PCI was performed, there was an odds ratio of 2.78 for survival. This led the authors to conclude, “In patients without obvious non-cardiac etiology, acute coronary angiography should be strongly considered irrespective of EKG findings due to a high prevalence of coronary artery disease.” Discussion about this article revealed that most of the studies included were observational studies and that there is no randomized control trial on this subject. This could lead to significant selection bias. Also, there was a significant amount of heterogeneity between the studies with  $I^2$  of 74%. This once again, calls into question the validity of any conclusions from this study alone. Overall, we concluded that this meta-analysis shows a potential survival benefit but fails to help us identify who those patients are who would benefit from cardiac catheterization without STEMI after ROSC.

#### **Article 2**

Hollenbeck RD, McPherson JA, et al. Early Cardiac catheterization is associated with improved survival in comatose survivors of cardiac arrest without STEMI. *Resuscitation*. 2014 Jan;85:88-95

This article was a retrospective observational study performed in the U.S. using a large cardiac arrest data bank. This study only included those with dysrhythmia of Vfib or Vtach of which a total of 269 patients were identified. This study specifically looked at benefit of early cardiac catheterization (any time during initial hypothermia protocol) versus late cardiac catheterization (defined as any time after hypothermia or no cath at all). Primary outcome was survival to hospital discharge and one of the secondary goals was neurological function at hospital discharge. This study boasts a 65% survival rate

with early cardiac catheterization versus 48% survival rate with late/no catheterization. At first glance, these numbers appear impressive. A closer look reveals that only 26.2% of all patients in this study had acute coronary occlusion during PCI; meaning that many patients underwent an unnecessary procedure. Another interesting finding was that there was no statistical difference in survival with successful versus unsuccessful PCI in those who went to the cath lab early. This suggests that the survival difference may be secondary to other therapeutic measures or simply the intensive care that these patients receive as opposed to actually benefiting from PCI. Once again, we decided that a RCT should be performed to validate the suggested findings of this study.

### **Article 3**

Dumas F, Cariou A, et al. Immediate percutaneous coronary intervention is associated with better survival after out-of-hospital cardiac arrest: insights from the PROCAT (Parisian Region Out of hospital Cardiac Arrest) registry. *Circ Cardiovasc Interv.* 2010 Jun 1;3(3):200-7.

This is a retrospective look at a very large prospective French database on out of hospital cardiac arrest. In the Parisian system, it is standard of care to perform cardiac catheterization on all patients presenting to the hospital with ROSC after cardiac arrest. Of the 301 patients included in this study without STEMI, 78 (26%) had a successful PCI. The survival benefit was 47% in those who had a successful cath versus 31% in those who did not. One down side to the study is that long term neurological function was not studied. As discussed at Journal Club, it is important to note that the Parisian medical system is set up very differently than what we are used to in the United States. Each ambulance that responds to cardiac arrest in the field has at least one physician in the ambulance. This plays a major role in selection bias in those who actually present to the hospital. For instance, the PROCAT registry has approximately 3,000 out-of-hospital cardiac arrest in its database. About 1,000 cardiac arrests were pronounced by the physician upon arrival to the scene. Another 1,000 arrests were initiated in the field but terminated after further attempts were deemed futile. This means that the approximately 1,000 patients that presented to the hospital have a significantly increased chance of survival compared to the cardiac arrests that we typically see in our hospitals. The consensus about this article was that some patients without STEMI could benefit from emergent PCI, but the question that still remains is "Who?"

### **Synopsis:**

Based on the above articles and discussion during Journal Club, it appears that there is a subset of patients without STEMI and other obvious non-cardiac cause of arrest who could benefit from emergent PCI. The question that all of these studies failed to answer was, "Who is that patient?" We briefly discussed another article that was not included in the reading list that tried to address that question based on EKG findings. This article was able to show 100% sensitivity and an increased specificity when determined who could benefit from emergent PCI, but 39 patients (93%) of those who were positive by EKG criteria yet had no angiographically identifiable acute MI underwent an unnecessary procedure. We determined that this requires a large amount of resources and would not be possible in our healthcare system in the U.S. unless we had complete support from interventional cardiology. Based on the above articles, the evidence does not appear to be sufficient to support immediate change. The consensus was that in order to clearly prove benefit, a large randomized controlled trial should be conducted. As of now, there is no such study that exists. We also concluded that based on the above articles, we would continue to call the cardiologists in patients with ROSC after apparent cardiac cause.

### **Bottom Line:**

There is a subset of patients with ROSC after cardiac arrest who would benefit from emergent PCI. The difficulty is deciding who those patients are. It is reasonable to call cardiology in patients who you feel

could benefit from cardiac cath even without evidence of STEMI. Ultimately further research, including a Randomized Control Trial, needs to be conducted before instituting system wide change.