The Mystery of Chest Pain

Our new Chest Pain Center provides answers and rapid treatment for concerned patients.

Also in this issue...
Integrated Care
Beyond Door-to-Balloon

Please visit our web site: www.MCG.edu/cvmed
Welcome to the Cardiovascular News of Excellence

Welcome to the first edition of the Cardiovascular News of Excellence of 2010. In this issue we focus on our Chest Pain Center. Mike Cunico, R.N., our cardiac catheterization laboratory charge nurse, writes about our own experiences with reducing door-to-balloon times for patients with ST-elevation MIs. Bruce Janiak, M.D., Medical Director of the Chest Pain Center, writes about the integration of the MCG Cath lab, Emergency Department and local EMS to form the backbone of our accredited Chest Pain Center. Although door-to-balloon time reductions are important for the management of acute MIs, the proper caring of these patients is not always that simple. Deepak Kapoor, M.D., our Cath Lab Director, will illustrate other factors one might need to consider as he discusses “beyond door-to-balloon times.”

As always we welcome your suggestions and cardiovascular questions. Please contact us at: cvnews@mcg.edu.

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Adult Echo Lab Fully Accredited
The Intersocietal Commission for the Accreditation of Echocardiography Laboratories recently reaccredited the MCGHealth Adult Echo-cardiography Lab for maintaining the national standards for quality in Adult Transthoracic, Stress and Transesophageal Echocardiography. The MCGHealth Echo Lab is the only one in the area that is ICAEL-accredited in all three diagnostic areas.

Ibebuogu Wins Award
Congratulations to Uzoma Ibebuogu, MD, for his first place award in the research poster competition at the Georgia ACC Annual Scientific Sessions. This meeting was conducted in November at Lake Oconee, between all ACGME-accredited pediatric and adult cardiology programs in the state. This project was a culmination of three and a half years of research, resulting in an American Medical Association Seed Grant in the process.

After graduation in 2010, Dr. Ibebuogu will join the prestigious Cedars Sinai UCLA program for the two-year Interventional Cardiology Program. We are proud of Dr. Ibebuogu for his accomplishments, and of our Cardiology Fellowship Program, which continues to place 100% of its graduates in prestigious sub-sub-specialty training in programs throughout the country.
Door-to-Balloon (D2B) is the name of an industry-wide, life-saving initiative. It was initially intended for the patient who presents to an emergency department with an ST Elevation Myocardial Infarction (STEMI) or a newly diagnosed Left Bundle Branch Block (LBBB). D2B is a measured time span. The “clock” starts when a patient presents with chest pain if he is found to have a new LBBB or ST elevations in two or more ECG leads. The “clock” stops when a culprit lesion has been identified and treated (balloon time).

A person in either of the previously mentioned conditions is in serious jeopardy. Studies have taught us that the sooner we treat these emergencies, the better the outcome is for the patient. In the case of a STEMI, we know that the myocardium (heart muscle) has suffered an insult, meaning more specifically that the artery supplying an area of the heart is no longer carrying the oxygen rich blood to the tissue. The faster we diagnose and treat this condition, the faster we can reintroduce blood supply to the dying heart muscle, saving the heart from further damage. The maxim is “time is muscle”.

To implement this initiative, a series of meetings took place between Cardiology and Emergency Medicine personnel. Physicians and staff alike met to brainstorm potential ways to beat the clock. A series of matrices were drawn up that allowed us to assess each and every step that a patient experiences, from triage in the emergency department to revascularization in the catheterization lab. These “door-to-balloon” matrices, included steps like: “Chest pain complaint to ECG” and “STEMI confirmed to Cath Lab Activated” or “Arrival in Lab to Balloon Time”.

After analyzing each of these matrices, further brainstorming allowed us to determine ways to shorten the time frames of many of the steps, combine some of the steps, and even shift responsibilities from one department to another. For instance, the Emergency Department staff now uses the on-call cath team’s travel time to obtain informed consent and prep the patient for the procedure.

Every change made in the name of speed was analyzed to make certain that we were not sacrificing patient safety. Each of these adjustments helped the two departments focus on a single outcome as a team, and thus shaved minutes off of each step from door to balloon.

A significant result of these collaborative efforts has been our national certification as a Chest Pain Center. We were the first facility in the CSRA to achieve this certification. In order to obtain this certification we had to meet the stringent requirements of the Society of Chest Pain Centers. To maintain the certification, we will need to show continued improvement in our performance.

The result of the meetings, analysis, and the transformation of our process has been a major improvement in our door-to-balloon times. At the outset of this multidisciplinary performance improvement project, our average D2B exceeded 120 minutes. Currently our average D2B is significantly less then 90 minutes. In a recent quarter, over 90% of our STEMI patients were revascularized in less then 90 minutes! Rather than remain content with our current performance, we are striving for even better door-to-balloon times in order to better care for our patients.
MCG Health, Inc. has been awarded certification by the Society of Chest Pain Centers based on our ability to meet its standards for a center of excellence, demonstrating a rapid and accurate evaluation of patients with chest pain. Swift assessment of chest pain patients and early identification of myocardial infarction (heart attack) are only two of our strengths. Perhaps more importantly, we have succeeded in coordinating multidisciplinary care of patients with chest pain, from the onset of the pain to definitive treatment in the cardiac catheterization laboratory. This integrated approach involves not only the specialties of emergency medicine and cardiology, but also a close association and positive working relationship with local emergency medical services.

Patients with heart-related chest pain need prompt, definitive therapy, because “time is muscle”. The longer you wait to treat a heart attack, the more muscle that is lost and the more disability the patient may experience, perhaps even death. Most studies indicate that it is very important for a patient to arrive in the heart catheterization suite within 90 minutes of arrival at the emergency department (and ideally within 90 minutes of the onset of their chest pain).

We have achieved success in overcoming this time constraint, by integrating the three medical services typically involved in chest pain treatment. These services are: emergency medical services (EMS), emergency medicine, and interventional cardiology. These three entities meet regularly at the Medical College of Georgia to review cases and to seek ways to improve care for our patients.

EMS is encouraged to follow through with patients, even into the catheterization procedure, for observational purposes. We have instituted training programs for emergency medical personnel to instruct them in identification of the electrocardiographic criteria for acute ST segment elevation of myocardial infarction (the type of heart attack that requires urgent heart catheterization). As we are now all members of the same team caring for patients with chest pain, we have authorized the emergency medical services personnel to initiate a call for our catheterization team based on their evaluation in the field. This innovation markedly shortens the time it takes the patient to get to the catheterization laboratory especially when the catheterization team is on-call but not within the hospital. Analysis of results so far in this one-year old project has shown marked reduction in “door-to-balloon” time (the time it takes to get the patient from initial diagnosis to the catheterization laboratory).

Should the patient come directly to the emergency department, emergency personnel have been trained to react promptly to the patient with chest pain by performing electrocardiogram within 5 to 7 minutes of the patient’s arrival. These electrocardiograms are then taken immediately to the emergency attending on duty and should an ST segment elevation myocardial infarction (heart attack) be recognized, the catheterization team is alerted even before the patient is formally evaluated. The excellent staff of attending emergency physicians in the emergency department have an incredibly high degree of accuracy in their ability to rapidly interpret electrocardiograms and expeditiously administer medical treatment pending arrival of the catheterization team.

The emergency department team helps to prepare the patient for the catheterization laboratory while the catheterization team is on the way to the hospital.

Finally, the third service involved is cardiology. The smooth transition and collegial rapport between cardiology and emergency medicine is truly something that I have never experienced professionally in the last forty years of emergency medicine practice. The cardiologists here at MCG are to be commended for their openness and willingness to delegate responsibility for the initial evaluation to emergency medicine and EMS personnel.

The integrated approach to the care of chest pain, instituted by MCG Health Chest Pain Center, is a cooperative environment that has resulted in more rapid treatment of cardiac emergencies. When “time is muscle,” it is important to have the infrastructure and training in place to deliver the quickest response. Our patients can expect that fast response from the local EMS personnel, our skilled emergency physicians, and our expert interventionalists, which means that they can also expect better outcomes.
We are drowning in information and starving for knowledge.
- Rutherford Rogers

**Acute MI**

Acute myocardial infarction is most commonly caused by rupture of a lipid-rich, inflamed plaque. Platelets, and the clotting cascade in general, result in superimposed thrombosis and coronary occlusion. From this pathophysiologic insight, the two most commonly applied therapies against evolving myocardial infarction have arisen: fibrinolytic therapy and primary angioplasty. For years a vigorous debate raged as to which therapy was best, leading to extensive studies across the world. The collective wisdom culled from these investigations, is that primary angioplasty results in fewer strokes, repeat MIs, and deaths than does pharmacological reperfusion. As a result, primary angioplasty became accepted as the preferred reperfusion modality, if it could be done in a timely fashion by experienced operators.

**Door to Balloon time (D2B)**

The survival benefit of angioplasty is compromised when delays to interventional treatment become excessive. Consequently, the principle taught to every medical student and increasingly broadcast to the general public is that “time is muscle” (and by implication life). Door-to-balloon time has emerged as the key parameter to measure and compare the quality of care for patients with AMI.

**Beyond D2B time**

Our current D2B performance is indeed a source of satisfaction and pride. I give particular credit to initiatives undertaken by the MCG emergency department, complemented by the well-honed skills and professionalism of our cardiac catheterization team. There are characteristics, beyond D2B, that also differentiate MCG from other cardiac centers in care for patients with AMI that are not as tangible, but are nonetheless crucial:

**High operator volume/ caseload:**

- Best outcomes have been proven to be associated with physicians performing over 75 of these percutaneous interventions (PCI’s) in a year. MCG has a dedicated high-volume physician on call for coronary emergencies, which makes us unique in the CSRA.

**Use of specialized devices in addition to angioplasty:**

- We have learned that performing only basic angioplasty to open the blocked artery may not suffice for many patients with AMI, particularly if there is significant blockage or if there is diffuse underlying narrowing of the vessel. The former situation is fraught with significant risk of down-
stream migration of clot fragments, damaging the heart muscle; the latter milieu prevents optimal lesion containment. Both lead to adverse long term outcomes.

The tools at our disposal include:

- Thrombus aspiration – We employ both manual catheter and mechanical suction system (AngioJet®) to prevent clot embolization. This improves immediate results as well as reduces long-term mortality.

- Distal clot protection – Placement of a filter (Filter-Wire EZ™) distal to the blockage to trap and remove debris, which would otherwise obstruct circulation to heart muscle downstream.

- Coronary ultrasound – Traditional diagnostics can sometimes miss certain types of blockages. Intra-vascular ultrasound (IVUS) accurately measures an artery and tells about the nature of any blockages in order to precisely craft treatment.

Devices to support circulation in critically ill patients

- Intra-Aortic Balloon Pump – This device is placed in the aorta to improve blood flow to the heart and other organ systems

- IMPELLA device – This capability makes MCG cardiac catheterization unique in the CSRA. This powerful tool is a motorized pump placed inside heart (without open surgery), supporting heart function in high-risk patients as they recover.