Conversations in Cardiology: Should We Wait for Labs Before Taking the STEMI Patient Directly to the Cath Suite?

Compiled by Morton J. Kern, MD, from conversations with Steven R. Bailey, MD, University of Texas Health Sciences Center at San Antonio, San Antonio, Texas; James Blankenship, MD, Geisinger Cardiovascular Center for Clinical Research, Harrisburg, Pennsylvania; Kirk N. Garratt, MD, Christiana Care, Wilmington, Delaware; Mitchell W. Krucoff, MD, Duke University, Raleigh, North Carolina; Jeffrey Moses, MD, Columbia University, New York City, New York; Gregg W. Stone, MD, Columbia University, New York City, New York; Bonnie Weiner, MD, University of Massachusetts, Worchester, Massachusetts; Barry Uretsky, MD, University of Arkansas, Little Rock, Arkansas; Peter Ver Lee, MD, Bangor, Maine; Fred Welt, MD, Salt Lake City, Utah.

Routine Labs Before Cath?

While it may appear to be a simple issue, the need to know critical lab values and review a chest x-ray before bringing the patient to the cath lab is the standard of care for elective procedures. Does this standard apply to the ST-elevation myocardial infarction (STEMI) patient? Just such a question on the care of the STEMI patient going to the cath lab was raised by Dr. Steve Bailey from the University of Texas, San Antonio, Texas, who asked our group of cath lab experts, "In the San Antonio community, point of care (POC) labs are not done. Several recent cases that have not had pre-procedure labs but had K+ >6 meq, NA <120 meq (not in the setting of shock), etc., when labs finally returned. These patients had poor outcomes. I have been told that "no one does labs prior to primary PCI". It seems to be an important management decision.

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Mort Kern, Long Beach, California: For the STEMI patient, routine labs are often drawn, but more often, are not back by time patient is taken up to the cath lab. Only critically abnormal electrolytes, creatinine/BUN, Hgb, and/or platelets might deter a STEMI from going to the lab, if such abnormalities were known. Ideally, the best care would include knowing all the lab-critical values and other pertinent imaging findings, but this approach must be balanced against the need to achieve a short door-to-balloon time. I think both the community and university hospitals draw labs, but no one waits for them in the STEMI patient. For elective cases going to the cath lab, there is no excuse not to have current labs available to ensure patient safety.

Gregg W. Stone, New York City, New York: In all the randomized trials we have led over 3 decades, we have always drawn the labs in the emergency department (ED), but then emergently taken the patient to the lab and performed percutaneous coronary intervention (PCI) as soon as possible. The labs are rarely back before the PCI and given the strong relationship between door-to-balloon time, myocardial salvage, and survival, this seems prudent. Rarely do the labs come back with life-threatening values, but if they do, at least then you are managing them in a patient without ongoing myonecrosis. We have never noted a pattern of this practice being harmful.

On a related note, we used to get chest x-rays before the cath lab. Now, in the case of a definite STEMI, we defer the chest x-ray until post PCI. All that being said, if you suspect something else is going on (e.g. shock with highly unstable arrhythmias and/or non-specific electrocardiogram [ECG] changes, or ECG changes suggesting hyper- or hypokalemia, medical stabilization (including waiting for the lab values and chest x-ray) may be prudent.

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Bonnie Weiner, Worchester, Massachusetts: I agree with Gregg. Generally labs are drawn and are sometimes (but not always) called into the lab when the case is starting, but this does not delay proceeding. If contrast volume becomes an issue during the case, staff either calls the lab or gets renal function studies online. It is important to use clinical judgement, rather just act in a knee-jerk reaction to STEMI. If there is a suspicion that something else is going on, we will delay the procedure to allow for clarity and appropriate decisions as a mandatory practice.

Jim Blankenship, Harrisburg, Pennsylvania: Many of our STEMIs come directly from the field with no

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stop in an ED. We routinely draw an i-Stat (Abbott) creatinine when we get access.

Barry Uretsky, Little Rock, Arkansas: Our practice is to draw labs and take the patient to the cath lab. By the time we are ready to intervene, the labs are usually back. Occasionally, finding renal dysfunction does influence decision-making, so we try to be sure that creatinine is known as soon as feasible. I think the lab values come from the central laboratory and not POC.

Mitchell W. Krucoff, Raleigh, North Carolina: We draw labs, if not done previously, with transport and send them to the lab stat, but do not delay the STEMI intervention as benefit/risk favors PCI. Renal function, electrolyte, or coagulopathy, even pregnancy, in the setting of acute STEMI should not produce delay. Think about it — when would you NOT reperfuse?

If the diagnosis is in doubt, e.g., field arrest with recurrent ventricular tachycardia, neurologic deficit (possible cerebrovascular accident), hypoxemia (possible pulmonary embolism), the whole issue of what comes first is a different conversation about benefit/risk.

Fred Welt, Salt Lake City, Utah: In our emergency room, we draw i-Stat creatinine, K+, and troponin (although I'm not sure why this is necessary), and have the results within about 10 minutes. The lab draw doesn't stop us from transferring to the cath lab, but usually we have the results as we are getting access.

Peter Ver Lee, Bangor, Maine: At our center, no chest x-ray is done for either for STEMI or regular cases. Labs are done with i-Stat. I also try to do a quick scan with a SonoSite Echo probe. It's the same machine we use for groin access, but has a cardiac probe. I am getting to be quite a good echo tech. It takes a minute — just the basics: left ventricular function, presence of effusion, mitral regurgitation or aortic stenosis.

Bonnie Weiner, Worchester, Massachusetts: We don't do routine chest x-ray prior to elective caths anymore either.

Jeffrey Moses, New York City, New York: We reviewed the utility of chest x-rays 20 years ago and found virtually no instance of a change in plan or approach, and dropped them.

Kirk Garratt, Wilmington, Delaware: Like the majority of my colleagues, we draw labs in the ED, move the patient to cath, and finish up PCI about the time labs get back. No POC testing in the ED, although we do POC Hgb and electrolytes in the lab if there is a concern. The process changes if there is out-of-hospital arrest (OHA) or a suspected/known medical issue that increases the risk of cath; in these cases, we wait for critical labs to return before taking the patient to cath. I'm sure we slow down care unnecessarily for a few, but we avoid disaster in those who have a good reason not to go to cath. I suspect everybody does this.

Over the past couple years, we have embraced direct-to-cath (no ED care) and are having a great experience with it, but it does raise a concern from the past, when we first felt pressure to cath faster. We have to watch out for mistakes linked to the speed of care, which could impact of the overall quality of care. So far, though, a 90-second eyeballing of the patient as he/she arrives to the hospital has worked pretty well, and last quarter, using the direct-to-cath process, we shaved an average of 16 minutes off our door-to-balloon time. Obviously, there is no ED testing of any type in these cases.

Sam Butman, Green Valley, Arizona: At the University (of Arizona) in the past, and currently at our small community hospital, when a patient presents to the ED directly, labs are ALWAYS drawn before going urgently to the cath lab. I cannot imagine a reason not to, since antithrombin is being given and an IV is being placed, etc., so access is actually simultaneous. When patient goes directly to cath lab (bypassing the ED), occurring about 50% of the time, the labs are obtained after the sheath or IV is placed; again, with no time lost.

Regarding the chest x-ray and getting a portable film; yes, we do it if the cath lab staff is on the way in, but never if patient goes directly to cardiac cath lab. Lastly, I have delayed very rarely when suspicion of pulmonary embolism, dissection, etc., warrants an alternative to an immediate cath.

The STEMI Box

Mort Kern, Long Beach, California: Several years ago at the University of California-Irvine, we initiated a "STEMI Box" containing critical materials for the STEMI patient's preparation needs to reduce door-to-balloon time (See CLD Editor's Corner, March 2010, "The STEMI Box — Shorten D2B and Cath Lab Prep in the Emergency Department").

For some centers, EMS can take the patient directly to the cath. This route requires correct interpretation of the ECG, which can be facilitated by transmission of the ECG to the physicians by phone (HIPAA-protected transmission, of course). A variable time interval of the door-to-balloon time may be the prep time while waiting for cath nurse arrival. Some team members may be 30-45 minutes away. To address patient cath lab preparation in the ED, our lab developed a STEMI box (a large plastic box, like a fishing tackle box) that contains: 1) important forms (e.g., consent and family education booklets); and 2) supplies, including a cath lab gown, two long IV extension tubings, translucent ECG leads (x10), and translucent defibrillator pads. The cath lab restocks the STEMI box each time it is used and keeps it ready in the ED.

In years past, a prolonged ED evaluation held up of transfer to the cath lab until ED nurses completed their notes and other chores. This delay prompted process changes that dramatically shortened the time in the ED. We instituted a "no-hold" for STEMI patients in the ED for any reason, once the cath lab was ready. In addition, giving the STEMI box to the ED nurses also shortened the transfer by having the right paperwork at hand, and having the IV lines and ECGs plus defibrillator patches ready to go.

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The Bottom Line

The approach to the STEMI patient to shorten the time to reperfusion has matured over the last decade's wisdom on the management and outcomes of STEMI patients. From our conversation above, several major points emerge across all of our colleagues' practices sites. These include that the STEMI patient: 1) when feasible (and the system is set up correctly), can go directly to cath lab; 2) laboratory chemistry values may or may not be drawn in the ED, but should never delay the patient's transfer to the lab unless the diagnosis of STEMI is in doubt; and 3) no chest x-ray is done (unless there is some other unavoidable delay) before taking the patient to the cath lab. Finally, although no one addressed the issue, the transradial approach to STEMI reduces bleeding complications and produces better outcomes.[1-3]

I hope this brief discussion helps us to maintain the best practices for our STEMI patients as we go into 2019. ■

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First Prize for Cardiology Titles at 2018 British Medical Awards Goes to Book by Drs. Kern, Lim, & Sorajja

The Interventional Cardiac Catheterization Handbook, 4th edition, by Morton J. Kern, MD, MSCAI, FAHA, FACC, Michael J. Lim, MD, and Paul Sorajja, MD, was awarded first prize for Cardiology titles at the 2018 British Medical Awards (BMA) ceremony. The BMA medical book awards takes place annually to recognize outstanding contributions to medical literature. The BMA notes, "Our judging panel awards books for their applicability to audience, production quality, and originality."

Cath Lab Digest congratulates Dr. Kern, Dr. Lim, and Dr. Sorajja on this well-deserved honor.