Coronary CTA in Cocaine Chest Pain: Be Careful What You Wish

Christian A. Tomaszewski, MD

Editor-in-Chief, *Journal of Medical Toxicology*

Think of how easy it could be. A 46-year-old patient arrives with substernal chest pain for 1 hour that resolves after aspirin and oxygen treatment in the emergency department. The ECG shows some specific flattening of T waves laterally; of course, an old one is unavailable. You dig deeper—yes he did do some cocaine last night. Two hours later you discharge him with a clean bill of health after the CT angiogram shows the patient to have clean coronaries.

In this issue of *Journal of Medical Toxicology*, Walsh et al show that obtaining coronary computerized tomography angiography in selected ED patients is a safe efficacious screening strategy. In a reasonable collection of 59 patients, using a relatively simple test, 6 patients were discovered to have coronary artery disease. This allowed the remainder to be discharged with no myocardial infarction or death within the subsequent 30 days.

Before we kneejerk and turn to this test in every case of cocaine chest pain, there are some limitations in applying this study to our daily practice. Besides being essentially a convenience sample, ultimately the treating doctor picked the patients to receive the procedure (no clear absolute entry criteria) with limitations based on time of day and week. It is important to realize that these were low-risk patients with TIMI risk score of 0–2 (85% were less than 2). No one with ECG changes suggestive of ischemia was entered; 79% had normal or nondiagnostic ECGs. On the other hand, the mean age was 46 years, which would be more worrisome for coronary artery disease.

The current recommendation for cocaine-related chest pain is a 9-hr observation period with serial cardiac enzymes (McCord 08). This current study is more attractive in that the authors suggest that the CT angiography allows rapid discharge of these low-risk patients. Besides the fact that one cannot guarantee that the patients were not entered into this study that normally would have been discharged immediately as low-risk for cardiac chest pain, there does not appear to be rapidity in the series. If you preferentially exclude those patients (30/59) that were admitted to the observation unit, the median length of stay was almost 8 hours. This is not an impressive improvement over the 9-hr recommendation. And I am sure that the bias toward daytime, week-day hours further improved the length of stay for these patients.

Then there are the risks of adopting this procedure, which the authors honestly point out. Although they claim that such a procedure based on non-cocaine chest pain cases saves money, it is hard to believe that this will translate into a group that is low-risk for CAD. In fact, in this study, the number needed to test is surprisingly low. Although 6 patients were found to have CAD, only 1 patient had sufficient CAD that required medical management; none required invasive intervention. Therefore, the number needed to treat (NNT) to find 1 case of clinically significant CAD was 59. This suggests a gross overuse of this test, perhaps even entry of patients that are so low risk that they do not even require observation with serial enzymes. The test is not less costly if it is applied to a larger population that normally would be discharged without an extensive diagnostic workup.

Another concern now rearing its ugly head in the literature, both scientific and popular lay press, is the risk of cancer, which the authors attempt to address. Einstein's group found that the radiation doses to women ranged 42–91 mSv to the lungs, and 50–80 mSv to the breasts (Einstein, 07). This would correspond to a lifetime risk of cancer from 1 in 143 for a 20-year-old woman to a low of 1 in 3261 for an 80-year-old man. But with the use of simulated ECG controlled tube current modulation, this can be further reduced. Therefore, more favorable recent data shows that the effective radiation dose with coronary CT angiogram can be reduced to 12 mSv (Hausleiter, 08). This compares to 10 mSv for abd/pelvic CT and 5 mSv for invasive coronary angiography. Although the radiation is a real risk, it appears to be low. The caution would be repeated CTs, especially in younger female patients, which were actually a minority in the Walsh study published here.

As an emergency physician, I welcome any procedure that is accurate and improves flow in my department. Studies in non-cocaine chest pain suggest that this procedure may actually save money overall (Chang, 08). We know that many hours tied up in an ED bed decreases patient satisfaction, slows flow, increases waiting times and the number of those left without being seen, clogs hospitals, and ultimately results in loss of income. The diagnostic intervention advocated in this paper may be the ultimate answer if these patients truly require definitive testing

prior to discharge. Remember, however, that most patients with cocaine chest pain have a favorable outcome with a myocardial infarction rate within 1 month at less than 2% in one series, with all cases being nonfatal and associated with continued cocaine use (Weber, 03).

Before we adopt this as standard of care, we need more studies. The easiest would be a larger trial with higher-risk patients. We need to know the long-term implications of a negative study. Just how negative does it have to be to avoid repeating the same study a year or two later, thereby avoiding repetitive radiation exposures? Finally, we really need a randomized trial comparing CT angiogram to serial enzymes for cocaine chest pain. It would definitely need to include not only the obvious outcomes, i.e. 30-day morbidity and mortality, but also cost and patient time flow. Finally, to be fair, there needs to be a comparison to shorter rule-out protocols. With the advent of the concept of delta troponin, comparable low-risk patients as seen in this study potentially could be ruled out with serial cardiac markers separated by 2 hours or less. And with the advent of bedside troponins (Singer, 01), there may be more efficient methods to quickly and safely screen a population with such a low risk of clinically significant coronary artery disease.

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