A Practice That Only Performs PCI for Acute MI?

Sameer Mehta, MD, FACC, MBA, tells us why and how he implemented such a change in his practice.

How did the current nature of your practice come to be?

I have been in interventional cardiology practice for the last 22 years. For the last 10 years, I have become one of the first, and possibly only, interventional cardiologist who strictly treats ST-elevation myocardial intervention (STEMI). During these last 10 years, I have greatly reduced the number of elective procedures that I perform. This was a very deliberate decision that was made after fully understanding the demands of performing door-to-balloon interventions and the fulfillment this procedure brings.

I was also fortunate that, because I practice pure interventional cardiology, I was able to seamlessly make this transition. However, this transformation did mandate major changes in my own personal life, and it affected my life in ways that were more intense than I could have ever imagined. It removed the semblance of any life pattern: sleep patterns being the first casualty, as 61% of my STEMI procedures occur between 1:00 to 5:00 AM. To illustrate, I'm on call today, and for the next 16 days! With more predictable prehospital alerts and fewer false alarms, some of the pressure to sprint to the hospital has been eased, although I am constantly trying to open the infarcted artery sooner and sooner. A STEMI interventionist is constantly running on a treadmill whose speed is controlled by his or her own conscience.

During the last 10 years of living the life of a STEMI interventionist, I can state with great satisfaction that it has never taken me more than 2 minutes (24 hours a day) to be out of the house and into the car, en route to performing another of these amazing procedures. I am of the firm belief that a mandated door-to-balloon STEMI intervention is easily the best utilization of PCI. It has given me a chance to save lives night after night, and that is exceptionally gratifying.

When I started my present pursuit of door-to-balloon STEMI interventions, it took me the first 3 or 4 years to master the STEMI "procedure" (I define a STEMI intervention as consisting of the STEMI "process" and the STEMI "procedure"). The "procedure" deals with a patient on the table in the cardiovascular laboratory, and it should focus on achieving a STEMI procedural result that is as good as an elective procedure. It involves an urgent identification of the culprit lesion, the compulsive management of the thrombus, and enhancing myocardial perfusion grade with liberal doses of intracoronary vasodilators.

In my first 100 STEMI interventions, it took 31 minutes from the time I cannulated the groin to the time I finished the procedure—I call this the *procedure time.* It is a drill that I could personally control and monitor. Clearly, the procedure time differs from the door-to-balloon time, which is determined by the performance of the entire team, the efficiency of the hospital, and the efficiency of the emergency medical services. Gradually, with standardization of my techniques, and by improving my efficiency, the procedure times kept decreasing, and they are now down to a mean of 11 minutes.

The SINCERE database[1] now includes 1,044 STEMI interventions that I have personally performed with a mean door-to-balloon time of 67 minutes, a procedural success rate of 95%, and a procedure time of 11 minutes. Clearly, there are subsets of patients who do not do as well. Foremost of these are patients who present late or those with cardiogenic shock.

The critical aspects of STEMI intervention have become apparent to me, and these have guided my career. It was evident that each procedure saved a life but that it required great speed and skill. More importantly, I began to realize that I was a relatively small and often less significant component of a STEMI exercise. In more recent years, my research has expanded more on improving the STEMI process, on

deconstructing the STEMI chaos, and introducing this work in several countries. It also enabled me to author two textbooks on STEMI interventions: the first volume deals with improving procedural outcomes, and the second details global enhancements in both the process and the procedure.

To achieve excellent acute and long-term outcomes in STEMI interventions, it is critical that there is teamwork between the patient, emergency medical services, emergency department, and CVL staff. Once you comprehend this approach, you realize that the interventional cardiologist is just one of the many components that comprise a STEMI crew whose teamwork and interaction lead to a successful intervention. More recently, I have been involved in helping to create population-based STEMI programs in several countries that allow expert teams to manage both the process and the procedure.

What led you to decide to limit your practice specifically to PCI for acute MI only, as opposed to what your peers are doing in the specialty right now?

I was one of the early physicians to explore whether primary PCI could be performed with a mandated total balloon time. The more procedures I did, I came to realize that this is not something that can be performed as a part-time endeavor within your clinical interests—on average, an interventional cardiologist is performing between 10 and 15 STEMI interventions each year. I think this number is too low. I believe that a STEMI intervention has two particular requirements: technical expertise and immediate availability. I wanted to use my own personal testimony to validate the need for an entirely new specialty of a STEMI interventionist that required dedicated physicians who can be immediately available.

Having said that, I can also caution that it is extremely difficult living this life. There is the additional challenge of having your income be substantially reduced due to a large number of patients who do not have insurance. Although you are reimbursed for some patients and some hospitals provide for covering the call, there will be a significant reduction in income from that of an interventional cardiologist. There have been some recent undertones that door-to-balloon times should be increased to 120 minutes, as this would greatly reduce the demands on the cardiologist and on the team.

What changes were necessary to make this adjustment in your practice with regard to staff and procedures?

It required that I completely dismantle my office and be 100% available to respond to a STEMI alert. The methodology is that I used to take calls at one of the six hospitals in south Florida, 1 week at a time. Currently, I have limited that to three hospitals. I have greatly reduced my expenses by having a research office and employing a single office manager; billing has been outsourced, and I personally fund my extensive research operation that includes six research fellows.

How has this change affected the volume of your practice?

The number of procedures I average each year has been anywhere between 180 to 210 STEMI interventions. Approximately 10% to 20% of my practice is elective work, which comes from three sources: the STEMI patients requiring a second elective staged procedure, requests from a network of physicians who have known me for more than 20 years, and some referred international patients.

Is it correct to say that your procedural outcomes have a 95% overall success rate?

That is correct, and that is no different than what most physicians can easily achieve. Most STEMI interventions are not too technically difficult per se. You need to be very fast and remain vigilant, as STEMI lesions invariably contain thrombus that requires a well-defined strategy for management. If you adopt standardized techniques (I have trained the staff to pull out my preferred STEMI hardware based on the culprit lesion), are efficient, and foster teamwork, most door-to-balloon interventions can be reliably performed within mandated times and with excellent outcomes. I have learned that door-to-balloon times are simply the low-hanging fruit in STEMI interventions—the greater challenges are patient education and legislation.

How has this change affected your referrals?

In my practice, I am asked to take calls by individual hospitals, and because most patients present with STEMI, I am now dealing less with referrals. Of course, when you are in practice for a long period of time, you develop a referral network. Based on my availability, I do accept elective procedures from this loyal referral base.

However, at the moment, I am fairly saturated with STEMI work, and there is not much need to expand. Presently, a fair amount of my work is international, where I am assisting individual hospitals, communities, cities, and even countries by helping them to create their STEMI systems of care. Most of this work is taking place in Brazil, Russia, India, China, Puerto Rico, Hong Kong, Thailand, and Chile.

With such a large international component to your efforts, do you think that this system is something that is applicable to practices in the United States, or is it of a limited scope in nature?

I suspect it is limited, and only time will tell if there should be dedicated physicians or facilities that perform STEMI interventions. I remain very privileged in leading a very innovative practice and feel very gratified from saving hundreds of lives with primary PCI. It has also been a fantastic opportunity to train hundreds of physicians in STEMI intervention.

I must emphasize that the need to expand this work overseas has been based on some amazing facts and statistics that are important to understand. First of all, I remain convinced that the United States has reached a position of eminence in the amazing work that has been done in STEMI interventions. I would most of all like to acknowledge the fantastic work of the American College of Cardiology and of Mission Lifeline led by Dr. Alice Jacobs. Seven or 8 years ago, only 4% of hospitals could claim a door-to-balloon time of < 90 minutes. Now, 91% of the hospitals in the United States are able to perform STEMI interventions with door-to-balloon times of < 90 minutes. This is an astounding fact, and it is a pity that we do not talk much about it. This contributes to saving the lives of thousands of patients and preventing disability, which probably saves hundreds of millions of dollars.

The second fact is that most developing nations are far behind in AMI care, and they are not benefiting from this remarkable procedure. You must realize that primary PCI is a relatively simple "procedure" globally—it's just that the "process" is severely deficient in poorer countries. American cardiologists can educate their peers in developing countries. That is precisely the intent of my STEMI meeting, LUMEN Global, which is acting as a catalyst for this transformative change. I am quite convinced that STEMI care in developing countries will progress in a phased fashion and that these countries will initially transition from thrombolytic therapy to pharmacoinvasive management. Then, as their ambulance systems develop, they will progress to performing door-to-balloon interventions. This is a very difficult and slow process that involves deep cultural change. Yet, my work has convinced me that it is possible to inspire a very broad group of stakeholders who will galvanize their resources and initiate STEMI programs.

Is the long-term goal of this kind of major structural change to bring to these less-advantaged countries the same type of system that exists in the United States?

Absolutely, but it will take a long time. Interventionists in developing countries will learn from the amazing progress in the United States and Europe and from the tremendous work of Mission Lifeline and the Stent for Life Program. In Europe, the ambulance system is very well structured, even better than in the United States, but that is also because the nations are small. A second notable difference is that in Europe, as a result of both their advanced ambulance system and better patient education, the majority of patients (almost 100%) with heart attacks are transported to the hospital via ambulance. In the United States, that number is lower; we are struggling with about 50% to 60% of patients who are self-transporting to the hospital. The majority of patients with acute MI do not die in the hospital—they die en route to the hospital—often, while transporting themselves.

Three challenges in primary PCI still remain in our country: delayed presentation, self-transportation, and legislative hurdles that do not guarantee transportation of the AMI patient to a STEMI center. I think that some modifications will occur in the present practice of STEMI interventions in the United States. There may be large institutions that could perform a great number of dedicated STEMI interventions, and patients will be taken there preferentially. Having said this, it is also a moot point that the smaller hospitals that perform PCI will also be of great use because they expand the reach of care to those who need it.

What advice would you offer to those who are considering implementing such a change in their practice?

I think this is an endeavor that will require much more effort than that of a few individuals, such as myself. Despite recognizing the need for a STEMI interventionist, I am also aware of the tremendous demands of such a career. I remain astounded by the progress that we have made, and for me personally, the privilege to have saved hundreds of lives with STEMI interventions has been worth all the sacrifice. Where every cardiologist can help is in educating the patients. ■

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1. Mehta S. Textbook of STEMI Interventions. 2nd ed. Malvern, PA: HMP Communications, LLC; 2010.

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