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Journal

Catheterization and Cardiovascular Interventions, 75(7)

ISSN

1522-1946

Author

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Publication Date

2010-06-01

DOI

10.1002/ccd.22627

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Peer reviewed

Editorial Comment

Impact of 24 Hour in-Hospital Interventional Cardiology Team on Timeliness of Reperfusion for STEMI: The Challenge of “24-7 On-Call” for Treatment of STEMI

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The accompanying article by Allaqaband and Jan [1] describes their experience with having an interventional cardiology team on-call in the hospital 24 hr a day, 7 days a week to decrease the response time for patients with an acute ST Elevation Myocardial Infarction (STEMI).

Their results are impressive and serve as a challenge to the rest of the interventional cardiology community, in fact to the entire hospital emergency care system in this country, to replicate their results. But, before we sign on the dotted line, I think it is important to weigh the downsides of this approach versus the apparent benefits. Although the reported improvement in overall survival is important, it has to be compared to the added expense of keeping an on-call team of staff and physicians in the hospital overnight as well as on weekends. I'm concerned about potential physician burnout and the extra burden on hospital systems, especially as reimbursement continues to be compromised.

In their study, 790 consecutive STEMI patients were treated sequentially. There were 297 in the on-call from home group (called the “pre 24-7” group) versus 493 in the post 24-7 group. The pre 24-7 patients were treated between January 1, 2002 and March 31, 2004. The “24-7” program began on April 1, 2004 and the evaluation stopped June 30, 2008, so there was ~1 STEMI for every 3 days of being on call. The biggest difference in these time periods was the initiation of drug eluting stents during acute MIs which were used in 48% of the post 24-7 group and only in 11.5% of the pre-24-7 group ($P < 0.001$); however this should theoretically only affect restenosis and their MACE

results, since mortality is not significantly different between BMS and DES.

The improvement in door to balloon time was impressive in the post 24-7 group: 58% of people had their artery opened up under 60 min versus only 7% in the pre 24-7 group, $P < 0.001$. There was no difference in D2B time (55 min) during regular hours or off-hours (weekends or nights) with the 24-7 protocol group, whereas it was 95 min during regular hours and 106 min during off-hours before the 24-7 protocol was initiated. The latest NCDR average is that a D2B time of <90 min is achieved in only 58% of patients. The 24-7 protocol achieved a D2B <90 min in 89% of patients. Before they went to the 24-7 system, they were achieving a door to balloon time <90 min in only 40% of STEMI patients

The in-hospital cardiovascular mortality was higher in the pre-24-7 group: 5.7% versus 3%, odds ratio 1.94, $P = 0.048$. MACE was higher in the pre-24-7 group: 24% versus 16%, odds ratio 1.66, $P = 0.009$; and one year overall mortality was higher in the pre-24-7 group 12.8% versus 8.1%, hazard ratio 1.17, $P = 0.044$

It is important to keep in mind that this was an analysis of patients treated in a sequential manner and not a randomized clinical trial comparing the two on-call methods. There are some important differences between the baseline characteristics of these two groups. There were more patients with heart failure and bypass surgery in the pre-24-7 group and there were more current smokers and patients with dyslipidemia in the post 24-7 group. This raises caution about accepting this data from two periods in time, when compared to a simultaneous randomized clinical trial. For example, a recent review of 10 STEMI networks revealed that for 2000 patients who had activation of the cath lab based on prehospital ECGs, the D2B time was <90 min for 86% of these patients, and was <60

Conflict of interest: Nothing to report.

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Received 20 April 2010; Revision accepted 23 April 2010

DOI 10.1002/ccd.22627

Published online 24 May 2010 in Wiley InterScience (www.interscience.wiley.com).

min for 50% of the patients [2]. This suggests that there have been dramatic improvements over this time period and that similar results might be achievable with prehospital activation of the cath lab when compared with the 24-7 in hospital call for a cath lab team. The counter balancing concern for prehospital cath lab activation, is the rate of false positive activations. The group at Harbor General Hospital reported a 40% false positive activation rate when the cath lab was called in by out of hospital ECG determination but only a 10% rate when the cath lab was activated by the emergency room [3]. However this increase in accuracy also increases the delay of response for true STEMIs.

It is impressive to see this demonstration of enthusiasm and a conscientious approach to improving care, but perhaps this is asking too much of our medical system. On the other hand, the burden of false positive activation is diminished by this approach. Since the physician and staff are already in the hospital, they don't have to drive to the hospital in the middle of the night only to find out that the computer interpretation of the electrocardiogram was incorrect. Of course, they still have to wake up and come to the emergency room from the on-call room to make that determination. However, once in the emergency room, they assumed primary care for the patient and determined whether or not the patient should be brought to the catheterization laboratory. There is some benefit of having cardiologists make this determination rather than emergency room physicians, without wasting time waiting for the cardiologists to come into the hospital. The technology is already here to get a paramedic pre-hospital ECG to a cardiologist at home. All we need is

the desire and money to do this. I would rather see hospital administrations spending money on digital transmission of ECGs than asking cardiologists to sleep over in a luxurious hospital on-call room.

Interventional cardiologists sometimes tend to act with a bit of bravado, and so are attracted to the sacrifice and associated recognition that comes along with things like being on-call in the hospital 24-7. Maybe I am getting too old for interventional cardiology procedures, or perhaps I am just less flexible with my time. But I worry about the increased cost not only financially, but in terms of exhaustion for the interventionalists of the future. But then, I worry about lots of things for interventionalists, like excessive radiation and increases in brain tumors and leukemia... but that is a subject for another editorial.

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