Treatment delay in ST elevation myocardial infarction care in a community hospital – a cautionary tale

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In this issue of *The Canadian Journal of Cardiology*, Janda and Tan (pages e382-e384) (1) analyze the door-to-reperfusion time of ST elevation myocardial infarction (STEMI) patients presenting to the Chilliwack General Hospital (Chilliwack, British Columbia) over a two-year period. The Chilliwack General Hospital is a community hospital 83 km away from the nearest cardiac catheterization centre. The report by Janda and Tan illustrates two important findings regarding door-to-reperfusion time. First, when an emergency department physician is the only person involved in the decision-making process, door-to-fibrinolysis times of less than 30 min are often achieved. This finding underlines the importance of clear and straightforward standardized hospital-specific STEMI protocols that can be implemented by the emergency department physician. Complex or obscure presentations will delay reperfusion therapy from time to time. Nonetheless, emergency physicians should be able to rapidly identify and treat the majority of STEMI patients.

The second important finding of the study by Janda and Tan is that transfer to the regional centre for primary percutaneous coronary intervention (PCI) was never achieved within the guideline-recommended (2) door-to-balloon time of less than 90 min. This finding is neither new nor surprising. This is a cautionary message for other Canadian hospitals in a similar setting. The most recent report from a United States registry indicated that a door-to-balloon time within the recommended time of less than 90 min was achieved in less than 9% of interhospital transfers for primary PCI (3). The door-to-balloon time in this registry was more than 2 h for 72% of transferred patients. It may be argued that the establishment of strong regionalized networks and protocols will optimize timeliness of PCI, and this will eliminate dismally poor transfer times between hospitals. However, again, caution is advised for regional centres with such aspirations and strategies. Four such programs recently reported their experiences (4-7). Uniformly, the median door-to-balloon times for transferred patients are greater than 90 min in these organized regional networks. These programs used standardized protocols, comprehensive feedback, quality assurance plans and integrated systems for patient transfer. That is not to say that integrated protocols and networks within regions are not helpful. Transfer from a referring hospital to regional PCI hospitals in close proximity might be associated with more acceptable door-to-balloon times (4), although in many instances, this is not the case.

Identification of STEMI in the prehospital setting has been shown to substantially reduce the time to reperfusion by allowing for either direct transport to a PCI centre or prehospital fibrinolysis (8). However, as pointed out by Janda and Tan, approximately 50% of STEMI patients present directly to the emergency department of a non-PCI hospital. Further work is required to educate the public to call 911 for any symptoms that may represent a heart attack.

At non-PCI centres where there is a low likelihood that primary PCI can be performed within the recommended timeline, STEMI patients should receive fibrinolytic therapy if no contraindications are present. This should include patients in cardiogenic shock before transfer for urgent PCI (9). Emergent transfer for primary PCI is best reserved for patients with contraindications to fibrinolytic therapy (2).

When the emergency physician decides to administer timely fibrinolytic therapy, the question then becomes, how should the patient be managed? Both American College of Cardiology/American Heart Association (ACC/AHA) and European Society of Cardiology guidelines (2,10) generally recommend transfer for urgent PCI for patients with ongoing ischemia following fibrinolytic therapy or recurrent ischemia following successful fibrinolytic therapy. What then, is recommended for STEMI patients with apparently successful fibrinolysis? Here lies a significant divergence between North American and European guidelines. The 2004 ACC/AHA guidelines (2) provide an equivocal recommendation (class IIb) for routine coronary angiography and PCI following apparently successful fibrinolytic therapy for STEMI. Alternatively, the European Society of Cardiology guidelines (10) more strongly recommend (class IIa) coronary angiography following successful fibrinolytic therapy within 3 h to 24 h. The reluctance to recommend routine coronary angiography and PCI after apparently successful fibrinolytic therapy is predominantly based on data from older studies (11). To add confusion to this matter, a number of recent randomized studies of 'facilitated PCI' (12,13) raised caution when PCI was performed with little delay following fibrinolytic therapy because of excessive mortality and bleeding rates. Alternatively, a recent meta-analysis (11) of five contemporary randomized controlled trials investigating an early invasive strategy following fibrinolytic therapy (pharmacoinvasive strategy) versus ischemia-guided management shed new light on this issue. Two of these five trials were performed in Canada (14,15). A pharmacoinvasive strategy appears to be associated with significant reductions in mortality and reinfarction compared with ischemia-guided management. Now, a third Canadian trial (Trial of Routine ANgioplasty and Stenting After Fibrinolysis to Enhance Reperfusion in Acute Myocardial Infarction [TRANSFER-AMI]) (16), the largest study of a pharmacoinvasive strategy to date, was recently published. This trial found a significant 36% relative reduction in the incidence of death, reinfarction, recurrent ischemia, congestive heart failure or cardiogenic shock at 30 days with a pharmacoinvasive strategy of PCI within 6 h after fibrinolytic therapy. Similar findings were also observed in the Combined Abciximab Reteplase Stent Study in Acute Myocardial Infarction (CARESS-in-AMI) study (17), in which the composite of death, reinfarction and refractory ischemia was reduced by 59% at 30 days by a pharmacoinvasive strategy. Neither of these trials found excess major bleeding with a pharmacoinvasive strategy. The results of these newer trials will no doubt be incorporated into the next update of the ACC/AHA guidelines.

Following fibrinolytic therapy at non-PCI hospitals, patients with STEMI have little to gain by remaining far removed from a cardiac catheterization laboratory. Failure of fibrinolysis will likely occur in approximately 20% of these patients (18) and they will require urgent transfer for rescue PCI (2). Of the remaining patients, approximately 5% will develop later signs of recurrent infarction and approximately 4% will have recurrent ischemia leading to urgent revascularization (19). A 'drip and ship' policy of routine urgent transfer (less than 6 h after fibrinolysis) for a pharmacoinvasive strategy would provide these

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patients with the combined advantage of guideline-based early fibrinolytic therapy followed by evidence-based timely revascularization as appropriate.

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