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Improvement in Revascularization Time After Creation of a Coronary Catheterization Laboratory at a Public Hospital

T ime to revascularization is a major predictor of outcomes during the treatment of ST-segment elevation myocardial infarction (STEMI).1 As such, a door-to-balloon (DTB) time of less than 90 minutes is an important quality standard. Among nearly 5000 acute care hospitals in the United States, fewer than 25% have percutaneous coronary intervention (PCI) facilities, resulting in a significant proportion of patients with STEMI being transferred for PCI.2 Despite targeted efforts nationally, these institutions rarely achieve revascularization standards.3 In addition, public hospitals charged with serving as regional default health care facilities for the uninsured may disproportionately struggle to meet guidelines when transferring for PCI. Revascularization data for these institutions, however, are lacking from the current literature.3-6 In the present study, we determined DTB times for patients with STEMI presenting to a public hospital previously reliant on transferring for PCI and examined whether creation of a 24-hour cardiac catheterization laboratory (CCL) improved revascularization times.

Methods. San Francisco General Hospital (SFGH) is a public tertiary care hospital serving as the region’s only level 1 trauma center. Before October 2008, SFGH operated a single CCL without 24-hour PCI services and transferred patients with STEMI to 4 PCI facilities within a 5-mile (8-km) radius. A protocol was established that involved emergency physicians initiating transfer to the PCI facilities and an on-site coordinator arranging for transportation and direct admission. Prehospital electrocardiographs (ECGs) were not obtainable, and thrombolytic agents were reserved for when no PCI centers were available. After October 2008, SFGH created an on-site 24-hour PCI facility with emergency physicians responsible for activation of the CCL.

We enrolled consecutive patients between April 2005 and October 2008 with a clinical diagnosis of STEMI, successful transfer for angiography, and available data for all time intervals. Patients revascularized at SFGH after October 2008 required similar criteria and were consecutively enrolled until equaling the number of transfer patients. Data were collected retrospectively from hospital medical charts using a standardized set of data definitions. Univariate analyses were performed using the Fisher exact test for categorical data and unpaired t tests for continuous data. The Wilcoxon rank sum test was used for time comparisons that were skewed. All tests were 2-tailed, and P < .05 was considered significant.

Results. Patients were primarily male (79%), with a mean (SD) age of 57 (11) years. Transfer patients had an increased prevalence of diabetes (40% vs 17%; P = .03) and a lower rate of family history of cardiac disease (24% vs 52%; P = .01). Otherwise, there were no significant differences in age, sex, cardiac risk factors, and illicit drug use between groups (P > .05 for all comparisons). More than 90% of both groups had insurance at enrollment. Patients also presented similarly in regards to chief complaint and location of ST-segment elevations on ECG. Two transfer patients received thrombolytic agents and both required rescue PCI.

All patients received angiograms and similar propor-

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tions of transfer and nontransfer patients received PCI (67% and 81%; P = .21). Median time intervals are shown in the Figure. For transfer patients, median door-to-catheterization (DTC) and DTB times were 184 minutes (interquartile range [IQR], 155-231 minutes) and 200 minutes (IQR, 166-242 minutes), respectively, with no patients revascularized in less than 90 minutes. With the 24-hour PCI facility, median DTC and DTB times decreased to 50 minutes (IQR, 34-89 minutes) and 84 minutes (IQR, 68-113 minutes), respectively, with 65% revascularized in less than 90 minutes (P < .001 for both compared with transfers). Off-hours revascularization
times, defined as between the weekday hours of 7 PM and 7 AM and all weekend hours, did not differ significantly when compared with normal workday hours for both patient groups. More than 90% survived to hospital discharge with no significant difference between groups.

Comment. The present study demonstrates that patients transferred from a public institution for urgent PCI did not achieve national revascularization benchmarks despite the close proximity to PCI-capable facilities and institution of a transfer protocol. The longest delay during the transfer process occurred between initial presentation and departure. Creation of a CCL successfully improved median DTB times to less than 90 minutes, and currently, nearly 90% of patients with STEMI are revascularized in less than 90 minutes. Owing to the lack of published data from national STEMI registries, we are unable to determine whether the magnitude of delay observed in our study is unique to our institution or an issue for public hospitals at large. Further investigation is needed to establish if other public hospitals are similarly struggling to achieve revascularization guidelines and require targeted strategies for improvement.

Limitations of this study include a small study population, lack of cost-effectiveness data, and the retrospective nature of data collection. In addition, at the time of creation of our CCL, thrombolysis was not the preferred method for revascularization. Contemporary research on thrombolytic therapy has since demonstrated similar mortality rates to PCI among patients with STEMI experiencing prolonged transfer times and could be considered by public institutions without the financial means of maintaining a PCI facility.

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COMMENTS AND OPINIONS

The Clinical Utility of Prognostic Indices: The Proof of the Pudding Is in the Eating

In addition to the study by Siontis et al1 that explored the clinical utility of prognostic indices, we would like to highlight the questionable state of prognostic index reporting for chronic obstructive pulmo-