Comparison of Reperfusion Times in Patients Transferred for Primary Angioplasty for ST-Elevation Myocardial Infarction: Prior to and After Instituting a Regional MI Alert Protocol

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is invasive and does involve increased risk and costs and cannot function as a screening test. Myocardial perfusion imaging (MPI) may serve as a "gatekeeper" to coronary angiography, risk-stratifying patients to medical therapy or invasive evaluation. Methods: We reviewed retrospectively the coronary angiography studies of patients in our institution from January 1, 2001 to December 31, 2003. We then reviewed the MPI studies of those patients who had such studies prior to undergoing coronary angiography and determined whether MPI accurately predicted the significant coronary lesions. For the purposes of this study, a significant coronary lesion was defined as stenosis of 50% or greater. Patients with previous coronary artery bypass surgery were excluded. Results: Over the study period, 5578 coronary angiograms were performed at our institution. Of these, 1685 were interpreted as normal. In this group 322 underwent MPI, results showed 308 abnormal MPI scans and 14 normal scans. There were 3893 angiograms that demonstrated significant coronary disease. In this group, 467 underwent MPI. Of these, 403 scans accurately predicted the significant coronary lesions whereas 64 did not. Conclusion: The results of our study indicate that, although MPI was accurate in the majority of cases, there remained a significant number of instances where MPI did not correlate with the coronary angiographic studies. This was especially true in the false-positive cases, which increased the normal coronary angiogram rate at our institution. We propose several methods to improve the accuracy of MPI, including the use of attenuation correction and prone imaging when indicated, combining exercise with pharmacologic stress testing when possible and ongoing prospective review of our MPI studies to assess the impact of these methods.

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Assessing Continuous Quality Improvement Knowledge in the Cardiac Cath Lab: Results from the ACC-CathKIT™ Evaluation and Monitoring Program

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ACC-CathKIT ™ is a web-based resource designed to help cath labs improve systems, processes, and patient outcomes. A portion of CathKIT is devoted to continuous quality improvement (CQI) methods and their practical application to the cath lab. As part of the internal evaluation and monitoring of CathKIT, we determined if participants' CQI knowledge improved after implementing CathKIT. Participants' knowledge about the principles of CQI methodology was evaluated by a CQI Knowledge Test. The test consisted of 50 multiple choice, true-false, and open-ended questions in a case-study format based the content of CathKIT. The test was administered to cath lab staff at baseline, before using CathKIT, and repeated midway through the program and again after the participants completed the CathKIT program. There were 11 test sites with several individuals completing the program at each site. Participants' previous CQI training also was assessed. The baseline test score (mean $\pm$ standard deviation) was 26.19$\pm$4.56 (n=62). The test scores were higher for both the first post-test (28.44$\pm$4.57, n=32, p$\leq$0.05) and the second post-test (29.83$\pm$5.45, n=24, p$\leq$0.05) compared with the baseline score. Scores of the two post-tests were not significantly different. Prior formal CQI training was reported by less than 40% (23 of 62) of participants. Baseline scores demonstrate a positive effect (t=4.64) for participants with prior CQI training. The mean test for those with prior training (29.22$\pm$4.16, n=23) was higher ($p< 0.0001$) compared with those with no prior training (24.41$\pm$3.81, n=39). Post-test scores for those with prior training were unchanged (test 1: 29.91$\pm$4.18; test 2: 30.33$\pm$3.97) compared with the baseline score. Post-test scores for those without prior training improved significantly (test 1: 27.67$\pm$4.67; test 2: 29.53$\pm$6.29) compared with their baseline score of 24.41$\pm$3.81 resulting in no difference in post-test scores among those with and without prior CQI training. Thus, the ACC-CathKIT™ program effectively improves CQI knowledge particularly for clinicians with no prior formal CQI training.

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Quality Improvement for the Treatment of Acute Myocardial Infarction: Results over 8 Years for 2600 Patients

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Background: Much effort has been directed towards improving the evidence based care for the treatment of acute myocardial infarction (MI). We decided in 1995 to embark on a long term program to improve this care in our hospital. Methods: In 1996 we began auditing the use of proven therapies for the treatment of MI, and also reperfusion within 90 minutes, hospital stay, and inpatient mortality. The weekly cath conference was used on a long term basis as the primary teaching tool by repetitively discussing current guidelines and updating our ongoing results. A cardiac nurse coordinator audited inpatient charts on a random basis and facilitated appropriate care. Retrospective audits on all acute MI charts was performed by the hospital quality assurance division. Results: Use of therapies for eligible patients in 1996 was aspirin-95%, beta blockers-82%, ACE inhibitors-75%, lipid reduction therapy-61%, smoking termination therapy-47%, and referral to cardiac rehabilitation-55%. For the final year of 2003 all interventions were $>$ 95% . Acute reperfusion in 1996 occurred in 98% of eligible patients and has continued at that level through 2003. Median door to balloon times fell from 92 to 62 minutes during the day and from 129 to 95 minutes at night. Inpatient mortality for all MIs for the first 2 years fell from 10.2% (n=648) to 6.7% (n=953) for the last 2 years, and mortality excluding ER arrests and no code status was 4.7% and 3.2% respectively. Median hospital stay over the entire period remained at 3.4 days (excludes surgical patients). Conclusions: Relatively simple use of cath conferences with persistant reminders over extended time coupled with random inpatient audits has resulted in remarkable compliance over the last 8 years with low hospital mortality.

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Background: The benefits of prompt primary percutaneous intervention (PCI) over thrombolysis as a reperfusion strategy for patients with acute ST-elevation myocardial infarction (STEMI) have been well established. However, the ability to achieve the rapid transfer of STEMI patients presenting to hospitals without PCI capabilities has not been well studied. Our objective was to compare reperfusion times (ED door to balloon) for patients with STEMI presenting to a hospital without PCI capabilities before and after institution of a "Regional MI Alert" protocol. Methods: We performed a retrospective chart review of consecutive patients with STEMI diagnosed on arrival to the ED at a community hospital, who were then transferred to a tertiary care hospital with PCI capabilities, approximately 30 miles away. A "Regional MI Alert" protocol was jointly developed between the two hospitals to expedite transfer of STEMI patients for emergency PCI. This protocol included coordinated communications for air or ambulance transport, physician and cath lab notification, and treatment algorithms for aspirin, heparin, beta blockers and glycoprotein IIb/IIIa inhibitors. We evaluated all patients in the year prior to, and in the first 6 months following protocol implementation. Mean and median times to reperfusion (minutes) were compared using the group T-test and Mann-Whitney U test. Results: Comparison of 18 patients in calendar year 2003 admitted with STEMI and transferred for PCI (pre-protocol) with 16 patients in the first 6 months of 2004 following implementation of the protocol demonstrated significant improvements in median door to balloon times, from 164 to106 (35.5% reduction, $p < 0.001$) and mean times, from 292 +/- 297 to 112 +/- 24, (61.5% reduction, $p = 0.04$). There was one death in the pre-protocol and none in the post-protocol group (p = ns). Conclusion: In patients who present with STEMI to hospitals without PCI capabilities, primary PCI may still be the preferred reperfusion strategy, if it can be performed in a timely fashion. Our study demonstrates that implementation of an organized "Regional MI Alert" protocol to facilitate transfer of STEMI patients for primary PCI can successfully be performed and achieve significant improvements in door to balloon times.

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Sustained Improvements in Adherence to AMI Guidelines After a National, Controlled, and Quality Registry Supported Quality Improvement Project: Preliminary Results

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Background: The Swedish QUICC project was a national controlled trial where 19 hospitals were subjects to a quality improvement (QI) collaborative during 18 months (Nov 2002 - April 2004), with another 19 hospitals included as controls. The aim was to improve the adherence rate to national AMI guidelines. The national quality registry, RIKS-HIA, was utilized for generation of local performance feedback. For the five quality indicators used (ACE-inhibitors, lipid-lowering therapy, clopidogrel, heparin or low-molecular weight heparin, use of coronary angiography), significant improvements relative to baseline were achieved for all five. Compared to the controls, the improvements were substantially and significantly higher for all indicators but one (lipid-lowering therapy). ***Objective:*** To evaluate if the QI strategies implemented during the intervention period would lead to sustained levels of improvement. ***Methods:*** After the initial measurement period of 12 months (M1, May 2003 - April 2004), the support to the QI intervention hospitals were withdrawn. After a consolidation phase of three months, a re-measurement period of another three months ensued (M2, August - October 2004). Results from all hospitals were extracted from the RIKS-HIA registry, and due to a lag in the self-reporting of the hospitals the results so far are only preliminary. ***Results:*** From M1 to M2, the control group improved significantly in three of five indicators, while the improvements at the QI intervention hospitals were sustained. The absolute adherence rates in the QI intervention group during M2 were still higher in all parameters, and significantly so in three of those (see table). ***Conclusions:*** Even though the control group accomplished a catch up in some parameters, the adherence rates remained higher in the QI intervention hospitals. These preliminary results indicate that assimilation of QI strategies into the care processes leads to sustained improvements.

	Control (18 hospitals)			QI-intervention (19 hospitals)			
Quality Indicator	M1 %	M2 %	p-value M1 - M2	M1 %	M2 %	**p-value M1 - M2**	p-value M2, ctrl vs interv
ACE-Inhibitor	63,0	66,8	NS	75,5	78,1	NS	0,015
Lipid-lowering	83,4	83,3	NS	91,9	94,4	NS	0,002
Clopidogrel	53,0	64,9	0,007	73,4	76,9	NS	0,027
Heparin/LMWH	70,6	82,0	<0,001	82,5	82,4	NS	NS
Coronary angiogr.	52,6	64,7	0,032	70,9	66,2	NS	NS

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Improvements in Care for Acute Myocardial Infarction Using Get With The Guidelines℠ in a Large Academic Medical Center

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Background: *Get With The Guidelines℠ CAD* (GWTG) is an AHA-sponsored and -supported program for improving physician compliance with recommended strategies for secondary