Heart WATCH

SUMMER 2011

A Physician Newsletter Produced by the Texas Heart Institute

Texas Heart® Institute

at St. Luke's Episcopal Hospital

Texas Heart Institute Is Participating in a Multicenter Clinical Trial of the Impella 2.5 System

Abstract: Physicians at THI at St. Luke's are participating in a multicenter trial to determine whether the Impella 2.5 can minimize infarct size after percutaneous coronary intervention for STEMI.

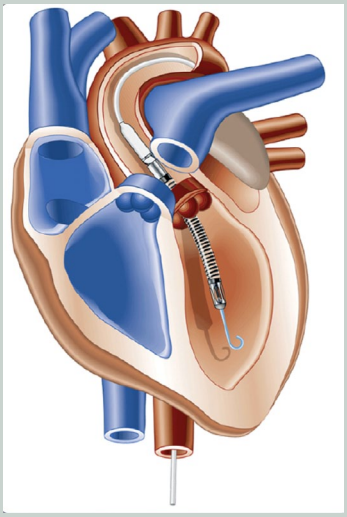
Coronary disease is the most common heart disease and is the leading cause of death for Americans. One potential consequence of coronary disease is ST-elevation myocardial infarction (STEMI), a particularly deadly form of heart attack that causes extensive myocardial damage.

The leading treatment for STEMI is rapid percutaneous coronary intervention (PCI), in which endovascular techniques are used to revascularize occluded coronary arteries. Of course, like all treatments for STEMI, PCI only prevents further infarction; it does not compensate for the damage already done to the myocardium.

To address this problem, physicians at the Texas Heart Institute at St. Luke's Episcopal Hospital (THI at St. Luke's) are participating in a multicenter clinical trial, Minimizing Infarct Size with IMPELLA 2.5 System Following PCI for Acute Myocardial Infarction: A Prospective Feasibility Study (MINI-AMI), coordinated by physicians at Columbia Presbyterian Medical Center in New York City. The study's goal is to determine whether temporary support with the Impella 2.5 System (Abiomed, Inc., Danvers, MA) can reduce infarct size in patients who have undergone primary PCI for STEMI. The physicians leading the trial at THI at St. Luke's are Andrew Civitello, MD, an interventional and heart failure cardiologist; Guilherme Silva, MD, Assistant Medical Director of THI's Stem Cell Center; and Scott Sherron, MD, an interventional cardiologist.

"After a patient undergoes PCI for STEMI, the Impella 2.5 will be used to augment the heart's pumping function for 24 hours," says Dr. Civitello. "This may allow the heart to rest and recover."

Currently the world's smallest heart pump, the Impella 2.5 is inserted percutaneously through the femoral artery and is threaded up the aorta and into the heart. By pulling blood through an inlet in the left ventricle and expelling it into the ascending aorta, the device temporarily assists the heart, increasing cardiac output by up to 2.5 L/min. In June 2008, the Impella 2.5 received 510K clearance from the US Food and Drug Administration (FDA) for use in patients for up to 6 hours for partial circulatory support, and the FDA conditionally approved its testing in the MINI-AMI trial in December 2010.



Drawing of an Impella 2.5 in place inside the heart. (Figure courtesy of Abiomed, Inc.)

Up to 50 patients will enroll in the trial at THI at St. Luke's, Columbia Presbyterian, and as many as 3 other sites, if necessary. These patients will have acute anterior or large inferior STEMI, and they will undergo emergent primary PCI of 1 culprit lesion in 1 major native epicardial coronary vessel within 5 hours of symptom onset. To be included in the study, the patient must undergo a successful PCI that produces a TIMI flow grade of 3 in the culprit artery. Once this success has been confirmed, each patient will be randomly assigned to receive either Impella support or standard post-PCI care.

"We hypothesize that the Impella 2.5 System will reduce infarct size in PCI patients because the Impella unloads the left ventricle," Dr. Silva says. "Cardiac magnetic resonance imaging will be used to compare infarct size in the hearts of the Impella recipients and the control patients."

The primary efficacy endpoint will be the ratio of the final extent of infarction to the area of myocardium at risk 3 to 5 days after the infarction. The primary safety endpoint will be a composite of mortality, reinfarction, stroke or transient ischemic attack, and major vascular complication at 30 days or at discharge, whichever is longer.

"Patients undergoing PCI are ideal recipients of the Impella device because the device can be inserted during the same procedure and through the same incision used for the PCI," says Dr. Civitello. "We think the cardiac support these patients receive will not only lessen the size of the infarct but also reduce left ventricular remodeling after primary PCI." ●

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Texas Heart Institute at St. Luke's Episcopal Hospital Is Ranked Among the Nation's Top 10 Heart Centers for the 21st Consecutive Year

In *U.S. News & World Report*'s Best Hospital Rankings for 2011/2012, the Texas Heart Institute at St. Luke's Episcopal Hospital (THI at St. Luke's) was ranked #4 among the top 10 cardiology and heart surgery centers in the United States, just as it was in 2010. This marks the 21st consecutive year that THI has ranked among the top 10 US heart centers. Additionally, THI at St. Luke's is the only heart center in Houston and the entire Southwest to be listed among the top 10 by *U.S. News & World Report*. The annual rankings are intended to help patients or referring physicians find hospitals with the highest levels of skill in diagnosing and treating complex medical conditions. *U.S. News & World Report* bases these rankings on factors such as death rate, patient safety, and hospital reputation. This year, *U.S. News & World Report* evaluated data from 4,825 hospitals, of which only 150 (fewer than 3%) met the criteria for being among the best in 1 or more specialties.

FOCUS-HF Trial Shows Cell Therapy Is Safe and Benefits Patients With Ischemic Heart Failure

Abstract: Transendocardial injection of autologous bone marrow mononuclear cells improves symptoms, quality of life, and possibly perfusion in patients with ischemic heart failure.

Researchers at the Stem Cell Center at the Texas Heart Institute at St. Luke's Episcopal Hospital (THI at St. Luke's) are dedicated to the study of stem cell therapy in patients with heart disease. In an early collaborative study between physicians at THI at St. Luke's and physicians at Hospital Procardiaco in Brazil (See *Heart Watch*, Summer 2002 and Spring 2003; texasheart.org/heartwatch), stem cell therapy with autologous bone marrow mononuclear cells (ABMMNCs) improved myocardial perfusion and exercise capacity in a small number of patients with chronic ischemic heart failure up to 12 months after cell injection. This initial effort led THI at St. Luke's to receive approval by the Food and Drug Administration to conduct the first randomized clinical trial of ABMMNCs in ischemic heart failure in the United States: First Bone Marrow Mononuclear Cell United States Study in Heart Failure (FOCUS-HF).

Led by Emerson C. Perin, MD, PhD, Director of Clinical Research for Cardiovascular Medicine and Medical Director of the Stem Cell Center at THI at St. Luke's, and James T. Willerson, MD, President and Medical Director of THI at St. Luke's, the FOCUS-HF trial included 20 cell-treated and 10 control patients who had chronic ischemic heart failure and no treatment options. The primary end point of the trial was safety, and the secondary end point was efficacy, which was assessed by maximal myocardial oxygen consumption (MVO_2), adenosine single photon emission computed tomography (SPECT), 2-dimensional Doppler echocardiography, and quality-of-life scores (Minnesota Living with Heart Failure questionnaire and the Short Form 36 [SF-36]). They also prospectively assessed BMMNC function and characterized patients' BMMNCs by flow cytometry and colony-forming unit and proliferative assays. Their findings were recently published in the *American Heart Journal* (2011;161:1078-87).

The researchers showed that the transendocardial delivery of ABMMNCs was safe, with no major adverse events (perforation or arrhythmias). In the cell-treated patients, Canadian Cardiovascular Society angina scores improved significantly (P=0.001), but New York Heart Association functional class was not affected. Quality-of-life scores did not improve for the control patients, but they improved significantly at 6 months for cell-treated patients (P=0.009, Minnesota Living with Heart Failure questionnaire; P=0.002, physical component of the SF-36). In addition, SPECT data suggested a trend toward improved perfusion in cell-treated patients.

> *"In addition to assessing safety and efficacy, the FOCUS-HF trial was unique in that we characterized the patients' bone marrow cells, because the functional capacity of cells may play an important role in autologous therapy."*
>
> *—Emerson C. Perin, MD, PhD*

"In addition to assessing safety and efficacy, the FOCUS-HF trial was unique in that we characterized the patients' bone marrow cells, because the functional capacity of cells may play an important role in autologous therapy," says Dr. Perin. "We found that the function of BMMNCs was impaired in our patients. Furthermore, when we stratified the cell function results by patient age, younger patients [≤60 years] had significantly higher numbers of functional mesenchymal progenitor cells [P=0.04] than older patients. Interestingly, MVO_2 increased significantly in younger cell-treated patients when compared with similarly aged control patients [P=0.04]."

Both ischemic heart disease and age can affect cell function. Clonogenic assays in the FOCUS-HF trial showed reduced activity in both the hematopoietic and mesenchymal compartments. These findings could affect efficacy end points in the study. Future studies are necessary to understand the importance of cell function to outcome in autologous cell therapy.

"The results from FOCUS-HF provide further evidence that transendocardial injection of ABMMNCs is safe in patients with ischemic heart failure," says Dr. Willerson. "Our findings suggest that cell therapy relieves symptoms, improves quality of life, and may have beneficial effects on myocardial perfusion. In addition, our results address the role of cell function in autologous therapy, which may be an important factor in implementing cell therapy in cardiac medicine." ●

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Postoperative B-Type Natriuretic Peptide Levels Predict Decreased Longer-term Physical Function After CABG

Abstract: Elevated peak postoperative plasma B-type natriuretic peptide concentrations are independently associated with worse longer-term physical function after coronary artery bypass graft surgery.

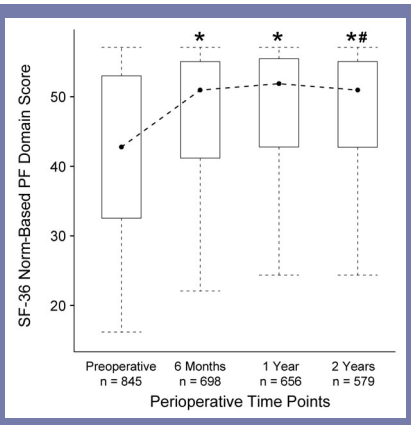
Elevated plasma B-type natriuretic peptide (BNP) concentrations in the early postoperative period after coronary artery bypass grafting (CABG) are significantly associated with more frequent in-hospital adverse cardiac events, longer hospital stays, and an increased incidence of major adverse cardiac events and all-cause mortality after discharge home. However, it is unknown whether increased postoperative levels of BNP predict reduced physical function after CABG.

Researchers at Harvard Medical School and the Texas Heart Institute at St. Luke's Episcopal Hospital (THI at St. Luke's) recently collaborated on a prospective cohort study of 845 patients who underwent CABG with the aid of cardiopulmonary bypass. The study was conducted at Brigham and Women's Hospital in Boston and at THI at St. Luke's (*Anesthesiology* 2011;114:807-16). The researchers sought to determine whether elevated peak postoperative plasma BNP concentrations are associated with significantly lower scores on the Short Form-36 (SF-36) Health Survey physical function domain 6 months to 2 years after the patient undergoes CABG.

"We hypothesized that the association between elevated BNP and lower SF-36 domain scores would remain significant, even after we adjusted for the preoperative physical function domain score and other clinical risk factors," says Charles D. Collard, MD, Chief of the Division of Cardiovascular Anesthesiology at THI at St. Luke's, Professor of Anesthesiology at Baylor College of Medicine, and a coauthor of the study.

The researchers found that elevated peak postoperative BNP concentrations are independently associated with worse longer-term physical function after CABG. The peak postoperative BNP level was significantly associated with postoperative physical function (effect estimate for $\log_{10}$ peak BNP, –7.66 physical function score points; 95% CI, –9.68 to –5.64; $P \leq 0.0001$).

The researchers also assessed the value of peak postoperative BNP concentrations for predicting postoperative physical function scores after adjusting for demographic characteristics, such as age (≥65 years), sex, institution, and ethnicity, and other clinical predictors, including preoperative physical function score, obesity (body mass index >30 kg/m^2), greater than 30-pack per year history of smoking, postoperative ventricular dysfunction, diabetes mellitus, and preoperative diuretic use. After multivariable adjustments, the peak postoperative BNP remained independently associated with postoperative physical function (effect estimate for $\log_{10}$ peak BNP, –3.06 physical function score points; 95% CI, –5.15 to –0.97; P=0.004). When the researchers added age (≥65 years) to the multivariable model, the interaction term was not statistically significant (P=0.49), suggesting that age does not significantly affect the association between elevated peak postoperative BNP and decreased postoperative physical function.



Preoperative and 6-month, 1-year, and 2-year postoperative Short Form (SF)-36 norm-based physical function domain scores for 845 patients who underwent primary CABG. The lower and upper borders of the box plots represent the 25th and 75th percentile values, and the ends of the upper and lower whiskers represent the 10th and 90th percentile values. The dashed line connects the median values for preoperative and follow-up points. *Significantly higher than preoperative baseline (P<0.0001). #Significantly lower than previous postoperative point (P=0.0001). (Reprinted from *Anesthesiology* 2011;114:807-16, with permission.)

The researchers' finding that elevated postoperative BNP predicts lower postoperative physical function is further strengthened by their secondary finding that elevated peak postoperative BNP independently predicts lower postoperative role physical (RP) domain scores, which are meant to reflect the extent to which health problems interfere with respondents' ability to perform their usual physical tasks. Increased peak postoperative BNP remained a significant predictor of lower postoperative RP domain scores after adjustment for demographic characteristics and clinical predictors, including the preoperative RP domain score, obesity, myocardial infarction within 2 weeks of surgery, greater than 30-pack per year history of smoking, and preoperative diuretic use (effect estimate, –2.72; 95% CI, –4.93 to –0.52; P=0.02).

"With CABG surgery being performed in an increasingly older patient population, health-related quality of life after CABG is more relevant than ever," says Dr. Collard. "Because elevated peak postoperative BNP concentrations can predict significantly lower SF-36 physical function assessments up to 2 years after surgery, we can identify cardiac surgery patients at risk of lower postoperative physical function. This enables us to initiate promptly the necessary postoperative measures that can improve the quality of life after surgery, including cardiac rehabilitation programs and appropriate medical therapy." ●

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Is Vitamin D Deficiency a Risk Factor for Acute Coronary Syndromes?

Abstract: A multicenter study found that plasma vitamin D levels did not differ between patients with acute coronary syndromes and control subjects but were low overall, especially in minorities and women.

Vitamin D regulates mineral ions in the body, and its deficiency is usually associated with bone demineralization diseases, such as rickets and osteomalacia. However, recent evidence suggests a diverse biologic role for the active metabolite of vitamin D, 25 dihydroxyvitamin D [25(OH)D3], including antiangiogenic and antiproliferative effects. Moreover, vitamin D deficiency has been recently associated with an increased risk of several diseases, including cardiovascular disorders. Ironically, despite the new revelations of the broad importance of vitamin D, vitamin D deficiency rates in the United States have increased, with reports indicating that levels are below normal in 77% of the US population.

Because of the reported link between vitamin D deficiency and an increased risk of cardiovascular events, James T. Willerson, MD, Ali J. Marian, MD, and their colleagues conducted a study to test the hypothesis that plasma levels of 25(OH)D3 are lower in patients with acute coronary syndrome (ACS) than in those without ACS. Dr. Willerson is President and Medical Director of THI at St. Luke's, and Dr. Marian is a member of the Adult Cardiology staff at THI at St. Luke's and the George and Mary Josephine Hamman Foundation Distinguished Professor in Cardiovascular Research at The Brown Foundation Institute of Molecular Medicine at The University of Texas Health Science Center at Houston. Because vitamin D levels are heritable, the investigators also examined the association between 25(OH)D3 levels and 11 common genetic variants known as single-nucleotide polymorphisms (SNPs) located on 7 genes involved in vitamin D synthesis or metabolism. The results were recently published in the *European Journal of Clinical Investigation* (2011; Epub ahead of print).

The study group comprised 433 participants: 224 patients with ACS who participated in a larger study of ACS and 209 control subjects without acute cardiovascular disease who were recruited from outpatient clinics in Houston (from the TexGen genetic registry study).

"We found no difference in the plasma levels of vitamin D between the ACS and the control groups," says Dr. Willerson. "However, vitamin D levels were low in the overall population. In fact, 40% of the study cohort had levels below 20 ng/mL (the level recently endorsed by the Institute of Medicine), and most participants had levels below 30 ng/mL. Vitamin D levels were significantly lower among minorities, women, and individuals with diabetes."

> *"Vitamin D levels were significantly lower among minorities, women, and individuals with diabetes."*
>
> *—James T. Willerson, MD*

The lack of a difference in vitamin D levels between the 2 groups in this study contrasts with the results of large epidemiologic studies that have associated vitamin D deficiency with an increased risk of cardiovascular disease.

"Our study was relatively small, and there were significant differences between the 2 groups; the ACS group had more men and older people than the control group, as would be expected in ACS patients," explains Dr. Marian. "In addition, the medications differed between the 2 groups, and we lacked data on vitamin D and calcium supplementation. All of these issues could have affected the results."

The genotype analysis indicated that 2 of the 11 SNPs studied were independent determinants of plasma vitamin D levels. In addition, the researchers identified other independent predictors of vitamin D levels, including sex, age, ethnicity, and body mass index.

"Our genetic analysis should be considered preliminary until the results are confirmed in independent populations," explains Dr. Marian. "We studied only a few common SNPs, and uncommon or rare alleles could have a significant effect on vitamin D levels. The determination of vitamin D levels involves complex, nonlinear interactions, further supporting the provisional nature of our findings. Larger studies are necessary to compensate for the effects of potential confounding variables and to examine more conclusively the potential role of vitamin D in the risk of ACS." ●

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THI Physicians Investigating New Percutaneous Valve System in Nationwide Trial

Currently, approximately 300,000 Americans suffer from aortic stenosis, a progressive narrowing of the aortic valve that currently requires open heart surgery for repair. Many elderly patients with the condition are considered too high-risk to undergo the operation. For this reason, members of both the Professional Staff of the Texas Heart Institute at St. Luke's Episcopal Hospital and the faculty of Baylor College of Medicine are participating in a clinical trial to test a new percutaneous aortic valve repair system that may provide a nonsurgical, minimally invasive alternative to open heart surgery for patients with severe aortic stenosis. Drs. Biswajit Kar and Joseph Coselli are examining the use of the Medtronic CoreValve System for valve replacement, which the Food and Drug Administration has approved for investigational use in the US. Using this system, the physicians insert a prosthetic porcine pericardial tissue valve percutaneously with the use of a catheter through the femoral artery. The trial, which began in December 2010, is expected to enroll more than 1300 patients at 40 test centers nationwide. Physicians involved in the trial hope that the percutaneous valve system can be used to treat patients previously deemed too ill for surgical intervention. If this technique proves successful in this patient population, a subsequent trial may test the device in moderate-risk patients with aortic stenosis. Clinicians seeking more information about the trial are encouraged to call 832-355-9301.

Dr. Coselli has served as a consultant and an instructor for Medtronic.

Aortic Arch Replacement Using the Y-Graft Technique Compares Favorably With Traditional Approaches

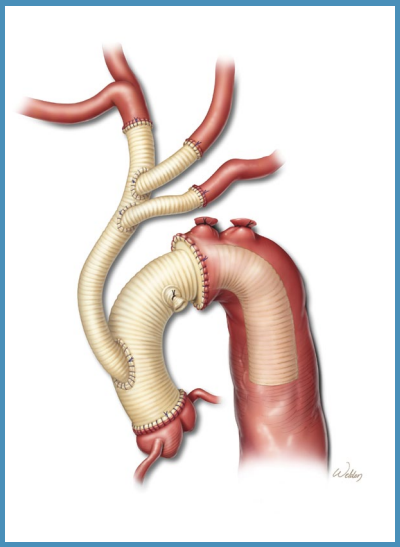
Abstract: Early favorable results show that the Y-graft technique enables effective delivery of antegrade cerebral perfusion and incurs only a low risk of neurologic sequelae.

Aortic arch surgery is among the most technically challenging cardiovascular operations. Because of the inherent risk of cerebral damage and atheroembolism and, consequently, the considerable risk of perioperative death during aortic arch surgery, alternative techniques have been developed to simplify arch reconstruction and reduce embolization and stroke risk. One such technique is the trifurcated graft technique, wherein surgeons use a double Y-graft to connect brachiocephalic branches to the main aortic graft. The procedure incorporates axillary cannulation, hypothermic circulatory arrest, and antegrade cerebral perfusion (ACP), all of which are advocated as strategies for preventing ischemic complications.

Scott A. LeMaire, MD, a cardiovascular surgeon at the Texas Heart Institute at St. Luke's Episcopal Hospital (THI at St. Luke's) and Professor and Director of Research in the Division of Cardiothoracic Surgery at Baylor College of Medicine, and Joseph S. Coselli, MD, Chief of Adult Cardiac Surgery at THI at St. Luke's and Professor and Cullen Foundation Endowed Chair in the Division of Cardiothoracic Surgery at Baylor College of Medicine, began using the Y-graft technique in December 2006. They recently published the results of their retrospective study of early outcomes of aortic arch replacement using variations of the single or double Y-graft technique (*Ann Thorac Surg* 2011;91:700-8).

"We began using the Y-graft technique because of its apparent advantages over the traditional island technique for complex aortic arch reoperations and because of the outstanding results that surgeons at other institutions were achieving," says Dr. LeMaire. "As we gained experience, we developed variations of the technique for total arch replacement, and we, too, are achieving successful outcomes."

Between December 2006 and May 2009, 55 patients underwent aortic arch replacement by the Y-graft technique—34 (62%) of the patients had a concomitant ascending aortic dissection, and 33 (60%) had a previous sternotomy. Cardiopulmonary bypass was established through axillary cannulation in 52 patients (95%). Hypothermic circulatory arrest with selective ACP was used for all procedures.



Drawing of an aorta in which the arch has been replaced with a collared elephant trunk and double Y-graft.

No in-hospital deaths occurred, but there was one 30-day death (2%) in a patient who had undergone an elephant trunk procedure and developed pericardial effusion and cardiac tamponade. Three patients (5%) had strokes. Actuarial 1- and 2-year survival rates were 80.0% ± 5.4% and 77.6% ± 5.7%, respectively. Of the 46 patients who underwent elephant trunk repair, 31 (67%) later underwent second-stage repairs, 5 (16%) of which were endovascular stent-graft placements.

"The Y-graft technique is especially useful in elephant trunk repair," says Dr. LeMaire. "We have previously reported an operative mortality of 12% and a stroke incidence of 5% in 148 elephant trunk procedures performed by using traditional techniques. When we used the Y-graft technique, stroke incidence was 4% in the 46 patients who had first-stage elephant trunk repairs, with 1 early death in this group."

The Y-graft technique has several key features that make it an attractive technique for arch repair. First, when combined with axillary artery cannulation, the approach to reattaching the brachiocephalic arteries allows almost continuous ACP without direct arch vessel cannulation. Because of the reliable delivery of ACP, complex repairs can be performed at significantly higher temperatures than would be possible in traditional repairs. Second, the Y-graft technique does not require the island suture line, which can become a source of bleeding that is difficult to control. Third, this technique allows distal aortic anastomosis at a more proximal location, so the suture line is easier to access and visualize; this approach, combined with the use of the collared graft, may decrease anastomotic tension, especially in patients with a large aneurysm of the distal aortic arch.

"One of the appealing features of the Y-graft is that it can be quickly customized in terms of graft size and configuration to suit various anatomic situations," says Dr. Coselli. "Our early results using the Y-graft technique for aortic arch replacement compare favorably with those of traditional approaches. Using this technique, we can effectively deliver ACP during complex procedures, with a low rate of neurologic sequelae. We believe the Y-graft technique and its variations represent a real advance in aortic arch replacement." ●

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Combining Electrocardiography and Angiography Findings Sheds New Light on Acute ST Elevation Myocardial Infarction

Abstract: The electrocardiographic changes associated with anteroseptal ST elevation myocardial infarction can represent 2 completely different patterns of myocardial injury.

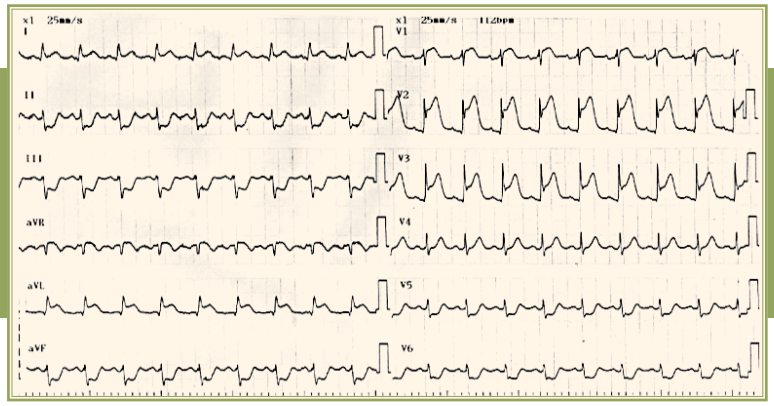
Acute anterior ST elevation myocardial infarction (A-STEMI) damages the cardiac muscle in the anterior wall of the heart, necessitating immediate treatment with thrombolytic drugs or with endovascular or surgical intervention to reperfuse the coronary arteries. Electrocardiography (ECG) is used to diagnose A-STEMI and to determine the extent of the myocardial damage. Two major patterns are recognized based on the electrocardiographic presentation: anteroseptal STEMI (AS-STEMI) (ST elevation limited to leads V1-V3), in which the damage is thought to be confined to the basal, mid-anterior, and septal walls of the heart, and extensive A-STEMI (EA-STEMI) (ST elevation extending to leads V5-V6), which is thought to cover the same areas but to extend farther, both toward the apex and distally.

"No study has shown that the pattern of injury on ECG correlates with the anatomic pattern of injury in patients with AS-STEMI," says Yochai Birnbaum, MD, a cardiologist at the Texas Heart Institute at St. Luke's Episcopal Hospital (St. Luke's) and Medical Director of the Baylor Cardiology Consult Service at St. Luke's. "Instead, cardiologists have come up with 2 opposing hypotheses to explain this ECG pattern. The first is that the AS-STEMI pattern represents infarction that spares the cardiac apex because the distal segments have an alternative blood supply, such as a short left anterior descending coronary artery [LAD] or large diagonal or obtuse marginal branches. The second hypothesis is that the AS-STEMI pattern represents a large area of infarction that results from proximal occlusion of a long, wrapping LAD, but because this area is roughly symmetrical, the changes in electrical activity on each side mask those on the opposite side, making the damage appear less extensive than it is on the standard electrocardiogram."

To test these opposing hypotheses, Dr. Birnbaum and colleagues compared ECG and coronary angiographic findings obtained from 97 patients before they underwent emergency percutaneous or surgical coronary revascularization for A-STEMI. All patients were treated at either St. Luke's or the Michael E. DeBakey Veterans Affairs Medical Center in Houston. The results were recently published in *The American Journal of Cardiology* (2011;107:827-32).

The investigators examined the relationship between ECG readings and the site of coronary artery occlusion, the shape of the LAD, and the presence or absence of large side branches of the coronary arteries. The results showed that patients with the ECG pattern of AS-STEMI were more likely than those with the EA-STEMI pattern to have an alternative blood supply via coronary artery branches that reached the cardiac apex and to have both proximal LAD occlusion and either a short LAD or more than 1 large side branch. These findings are consistent with the hypothesis that AS-STEMI represents a small area of infarction that spares the cardiac apex. However, patients with the AS-STEMI pattern were also more likely to have a long LAD with proximal occlusion before the first septal branch, which is consistent with the hypothesis that the AS-STEMI pattern may occasionally represent a larger, roughly symmetrical area of infarction.

"Essentially, our results supported both hypotheses," Dr. Birnbaum says. "The AS-STEMI pattern on ECG can be associated with infarction that is confined to the basal and mid portions of the anterior wall, or it can represent extensive infarction expanding from the basal anterior to the distal inferior and apical segments. This is because the ST elevation recorded by each ECG lead results from ischemia-related changes in the heart's electrical activity at various locations, both proximal and distal to the lead, which in turn are affected by substantial individual variation in the coronary vasculature. That said, per American Heart Association and American College of Cardiology guidelines, ECG readings that indicate A-STEMI warrant immediate intervention to reperfuse the heart, regardless of the injury pattern they represent." ●



A typical electrocardiogram from a patient with anteroseptal ST elevation myocardial infarction (AS-STEMI). ST elevation occurs in leads V1-V3, but not in leads V4-V6.

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Calendar of Events

Texas Heart Institute Continuing Medical Education Symposia

7th Annual St. Luke's Episcopal Hospital Diabetes Symposium Diabetes for Primary Care in 2011

Texas Heart Institute
August 27, 2011 • Houston, Texas
Program Directors: Glenn Cummingham, MD, and Mandeep Bajaj, MD
www.texasheart.org/cme

2nd Annual Symposium on Risk, Diagnosis and Treatment of Cardiovascular Disease in Women

The Center for Women's Heart and Vascular Health
Texas Heart Institute
October 1, 2011 • Houston, Texas
Program Director: Stephanie Coulter, MD
www.texasheart.org/cme

For information about Texas Heart Institute CME activities, please e-mail cme@heart.thi.tmc.edu or call 713-218-2200. To view or complete selected online CME courses (certificates are available online), please visit www.cme.texasheart.org. New courses are added regularly.

Selected Upcoming Local, National, and International Meetings

International Academy of Cardiology 16th World Congress on Heart Disease

Annual Scientific Sessions 2011
July 23–26, 2011 • Vancouver, British Columbia, Canada
www.cardiologyonline.com

American Society of Nuclear Cardiology 16th Annual Scientific Session

September 8–11, 2011 • Denver, Colorado
www.asnc.org

Heart Failure Society of America 15th Annual Scientific Meeting

September 18–21, 2011 • Boston, Massachusetts
www.hfsa.org

American College of Surgeons 97th Annual Clinical Congress

October 23–27, 2011 • San Francisco, California
www.facs.org

American Heart Association 2011 Scientific Sessions

November 12–16, 2011 • Orlando, Florida
www.scientificsessions.org

BEST HOSPITALS U.S.News NATIONAL CARDIOLOGY & HEART SURGERY 2011-12

For 21 consecutive years, the Texas Heart Institute at St. Luke's Episcopal Hospital has been ranked among the top 10 heart centers in the United States by *U.S. News & World Report*'s annual guide to "America's Best Hospitals."