HeartWATCH

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A Newsletter Produced by the Texas Heart Institute

Texas Heart® Institute

at St. Luke's Episcopal Hospital

The Beginning of the Seasonal Academic Rotation Does Not Affect Cardiac Surgical Outcomes

Abstract: The influx of new or junior residents in July, also known as the July effect, does not affect risk-adjusted cardiac surgical outcomes.

The mechanism that underlies seasonal variation in mortality rates is probably related to many factors. In academic healthcare centers, where the cyclic rotation of trainee doctors occurs at the beginning of the academic year in July, the influx of new or junior residents leads to a higher degree of inexperience among frontline caregivers. For this reason, the medical community has wondered whether this academic seasonality, or so-called July effect, could influence cardiac surgical outcomes.

To determine whether the July effect has any impact on cardiac surgical outcomes, researchers at the Michael E. DeBakey Veterans Affairs Medical Center (MEDVAMC) and the Texas Heart Institute at St. Luke's Episcopal Hospital (THI at SLEH) collaborated on a study of 1673 cardiac surgical procedures performed at the MEDVAMC during a 10-year period (*Am J Surg* 2008;[e-pub ahead of print]).

"The MEDVAMC is one of Baylor College of Medicine's primary teaching hospitals," says Faisal Bakaeen, MD, an assistant professor in the Department of Cardiothoracic Surgery at Baylor College of Medicine and a cardiothoracic surgery staff member at both MEDVAMC and THI at SLEH. "Throughout the academic year, 2 cardiothoracic residents at a time rotate at the MEDVAMC. A first-year resident and a chief resident work together in 4-month blocks, beginning July 1. Because first-year residents typically have little or no cardiac surgical experience before their residency, staff surgeons directly supervise the residents to ensure optimal patient care. Operative responsibility is delegated to residents according to their surgical ability."

The researchers found that the type and extent of surgical procedures performed in the early (July and August) and late (September through June) parts of the academic year were similar: approximately 75% involved coronary artery bypass grafting. However, the earlier part of the year involved slightly longer cardiopulmonary bypass and operative times. The unadjusted operative mortality rates were 1.2% earlier in the year and 3.5% later in the year (P=0.06). When multivariable logistic regression was performed to control for confounding variables, the time of the academic year was not significantly associated with mortality (odds ratio, 0.28; 95% CI, 0.07-1.19; P=0.09).

> *"Academic centers have the unique challenge of training residents without compromising patient safety."*

In addition, there were few differences in the incidence of major tracked complications. Overall unadjusted postoperative morbidity rates were 12.8% for the early part and 15.4% for the later part of the academic year (P=0.3).

"The systems of care used in cardiac surgery are rigorous and sophisticated because of the complexity of the procedures," says Joseph S. Coselli, MD, chief of Adult Cardiac Surgery at THI at SLEH and associate director of the Thoracic Surgery Residency Program at THI and Baylor College of Medicine. "Our findings do not support the existence of the July effect. In fact, there is a trend toward reduced operative morbidity and mortality during July and August. This should lessen any concerns about the quality of cardiac surgical care during those months."

The researchers also found that fewer operations were performed during July than during any other month except December. This fact may be indicative of increased cautiousness during the early part of the academic year. The July slowdown may also reflect a decline in surgical volume because of summer vacations and staff changeover.

"Academic centers have the unique challenge of training residents without compromising patient safety," says Dr. Bakaeen. "In cardiothoracic surgery, hands-on training and experience are critical for trainees as they follow the steep learning curve this discipline requires. The key to good outcomes is close supervision by senior and auxiliary staff members to offset the inexperience of new residents and to 'July proof' the process of care." ●

For more information:

Dr. Faisal Bakaeen

713.794.7892

Dr. Joseph S. Coselli

832.355.9910

Texas Heart Institute at St. Luke's Episcopal Hospital Is Ranked Among Nation's Top 10 Heart Centers

For the 18th consecutive year, *U.S. News & World Report*'s annual guide to "America's Best Hospitals" has ranked the Texas Heart Institute at St. Luke's Episcopal Hospital (THI at SLEH) among the top 10 heart centers in the United States. "Since its founding 45 years ago, our institution has maintained a strong commitment to excellence in research, education, and patient care. To receive this honor consistently since the inception of 'America's Best Hospitals' is extremely gratifying," says Denton A. Cooley, MD, founder, president emeritus, and surgeon-in-chief of THI, and chief of Cardiovascular Surgery at SLEH. The Texas Heart Institute at SLEH is the only heart center in the Southwest to be listed among the top 10 in its category by this survey.

Texas Heart Institute Cardiologist Is the First Physician in the United States to Implant a Pacemaker Antibiotic Envelope

Abstract: A Texas Heart Institute cardiologist has become the first physician to implant a pacemaker antibiotic envelope in a US patient.

Each year, in the United States alone, more than 400,000 cardiac rhythm management devices (CRMDs) are implanted to treat cardiac arrhythmias. These devices include pacemakers and implantable cardioverter defibrillators (ICDs). Between 1996 and 2003, the number of new CRMD implantations increased by 49%; concurrently, the number of hospitalizations for CRMD infection increased 3.1-fold, to 5.82% for pacemakers and 3.71% for ICDs (*J Am Coll Cardiol* 2006;48:590-1; *Heart Rhythm* 2006;3:S7-S8).

Infection generally occurs within the first 10 days after CRMD placement and affects replacement devices more often than initial implants. The complication often necessitates removal and replacement of the device and the intracardiac leads. In patients in whom an infection develops, in-hospital mortality is more than doubled; the highest mortality rates are seen in elderly patients and those with renal disease. Moreover, the financial burden of treating the infection is extremely high.

To prevent CRMD infections, researchers recently created an antibacterial mesh envelope (AIGISRX™ Anti-Bacterial Envelope; TyRx Pharma, Inc., Monmouth Junction, NJ) designed to fit around a pacemaker or ICD (*see Figure*). The envelope consists of knitted polypropylene filaments coated with a proprietary resorbable polymer, which elutes rifampin and minocycline for up to 10 days. These agents help protect against most organisms responsible for CRMD-related infection. In January 2008, the US Food and Drug Administration approved the antibacterial envelope for commercial use.

On May 12, 2008, Ali Massumi, MD, an interventional cardiologist at the Texas Heart Institute (THI) at St. Luke's Episcopal Hospital (SLEH), became the first physician in the United States to implant the antibacterial envelope clinically. Dr. Massumi directs the Center for Cardiac Arrhythmias and Electrophysiology at SLEH and is a clinical professor of Medicine at Baylor College of Medicine. The patient was a 72-year-old man whose 7-year-old pacemaker had failed. Dr. Massumi removed the old pacemaker and implanted a new one that he had covered with the antibiotic envelope. The patient was discharged from the hospital several hours later.

Pacemaker antibiotic envelope.

"Replacement generators (batteries) are placed in an area that does not have a lot of blood vessels, so systemic antibiotics may not reach that area," says Dr. Massumi. "The envelope provides antimicrobial protection, eliminating the need for systemic antibiotics. It also helps stabilize the device in the body."

"In addition, the envelope will reduce scar formation and simplify future device replacement," he continues. "Ordinarily, because of scarring, removal of infected pacemaker leads can be challenging. Our patient had a large amount of scar tissue around his previous pacemaker, and we had to remove that tissue before implanting the new device."

In the United States, infections develop in about 7% of high-risk patients after CRMD insertion or replacement. Medicare has begun to consider certain device-related infections preventable and unacceptable. As of October 1, 2008, it will stop reimbursing hospitals for treating some of these infections. Although CRMD infections are not yet on this list, they could be added in the future.

Dr. Massumi notes that the rate of device infection at THI at SLEH is only 1% to 2%, in sharp contrast to the national average. "Because higher rates of infection tend to occur at low-volume centers," he says, "physician experience is an important factor in prevention. At our institution, cardiologists have extensive experience with CRMDs. By being the first to implant a pacemaker antibiotic envelope, we have shown our continued commitment to providing the best possible care for our CRMD patients." ●

For more information:

Dr. Ali Massumi

713.529.5530

Contents

Researchers Test New Techniques for Faster Acquisition and Analysis of Cardiac Magnetic Resonance Images

Abstract: Texas Heart Institute researchers are investigating faster ways of acquiring and analyzing cardiac magnetic resonance images for assessing left ventricular function.

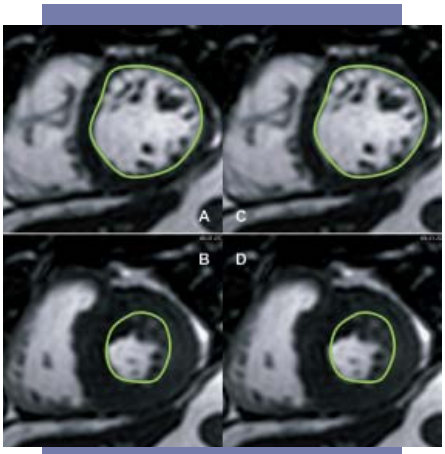
Cardiac magnetic resonance imaging (CMRI) is emerging as the gold standard for assessing left ventricular (LV) function. This technique has broad applications in the assessment of ischemic and nonischemic cardiomyopathy. Multiple studies have shown that CMRI yields reproducible results and is an ideal imaging tool for the longitudinal study of LV function. It is noninvasive, requires no ionizing radiation, and uses no potentially nephrotoxic contrast agents.

Standard CMRI assessment necessitates multiple breath-holds to obtain contiguous image slices that encompass the entire ventricle. Such breath-holds can lead to patient fatigue and potential slice misregistration. To overcome this challenge, researchers in the Cardiovascular Magnetic Resonance Imaging (CVMRI) Department of the Texas Heart Institute at St. Luke's Episcopal Hospital (THI at SLEH) are investigating new techniques for fast CMRI.

In previous studies, these researchers showed that fast gradient echo sequences (steady-state free precession [SSFP]) combined with parallel imaging (SENSitivity Encoding [SENSE]) reduces the imaging time by half. However, this approach still necessitates multiple breath-holds (*Radiology* 2005;235:1031-5). When a 3-dimensional (3D) approach is used instead of a multislice 2-dimensional (2D) technique, the imaging time can be further reduced (up to 82%) (*AJR* 2006;187:1235-9).

Recently, the same researchers investigated a new fast imaging technique called the "spatial frequency-temporal frequency broad-use linear acquisition speed-up technique" (KT BLAST), which can accelerate image acquisition by a factor of 5. This technique also offers spatial and temporal resolutions comparable to those provided by standard multislice 2D SSFP (*Magn Reson Imaging* 2008;26:727-38).

"By reducing the imaging time, the KT BLAST sequence can eliminate slice misregistration and improve patient comfort because fewer breath-holds are required," explains Benjamin Cheong, MD, of the CVMRI Department at THI at SLEH. "Furthermore, because the KT BLAST sequence yields 3D images, it is particularly suitable for evaluating congenital heart disease. By reformatting the standard 3D short-axis cine data, the examiner can assess the complex anatomy of these patients in any imaging plane."



Representative images of left ventricular contours, as determined manually in end-diastole (**A**) and end-systole (**B**) and automatically in end-diastole (**C**) and end-systole (**D**). (Courtesy of Amol Pednekar, PhD).

Having confirmed the value of 3D KT BLAST in fast imaging, Dr. Cheong and his team have also developed a computerized algorithm for analyzing LV function by means of CMRI (*Magn Reson Imaging* 2008;28:39-50). "Determining the LV ejection fraction manually depends on operator experience and can be time-consuming," clarifies Dr. Cheong. "An algorithm that automatically analyzes CMR images will reduce the postprocessing time."

The algorithm uses an automatic, data-driven, slice-by-slice, hybrid segmentation approach to delineate the myocardial endocardial contour (*see Figure*). Segmentation of the left ventricle is based on intensity features and topologic connectedness. The algorithm also uses dynamic programming to detect closed and smooth contours in polar coordinates. Dr. Cheong and his team have tested the algorithm in 64 persons (21 healthy volunteers and 43 patients).

"Our estimates of LV parameters closely agreed with those yielded by manual segmentation," says Dr. Cheong. "We hope that our algorithm will speed up computation and provide unbiased, accurate evaluation of LV function. However, further work is needed to enable the algorithm to automatically localize the left ventricle and to normalize data among subjects." ●

For more information:

Dr. Benjamin Cheong

832.355.4201

James T. Willerson, MD, Is Appointed President of THI

On August 1, 2008, James T. Willerson, MD, became president of the Texas Heart Institute at St. Luke's Episcopal Hospital (THI at SLEH). He succeeds Denton A. Cooley, MD, now president emeritus, who founded THI in 1962 and remains its surgeon-in-chief. Dr. Willerson is also the medical director and co-director of the Cullen Cardiovascular Research Laboratories at THI at SLEH and the former chief of Cardiology at SLEH. In addition, he is a professor of Medicine at Baylor College of Medicine. He is internationally renowned for his research in identifying vulnerable plaques that can lead to heart attacks or strokes and for his studies of the angiogenic and myogenic potential of stem cells for treating heart failure. Dr. Willerson was president of the University of Texas Health Science Center at Houston from 2001 to 2008 and holds the Edward Randall III Chair in the Department of Internal Medicine. He served as the editor-in-chief of *Circulation* for 11 years. He is a Distinguished Scientist of the American College of Cardiology, a Fellow in the Royal Society of Medicine (UK), and a member of the Institute of Medicine of the National Academies (USA). His many other honors include the Distinguished Service Award from the Council of Clinical Cardiology of the American Heart Association.

HeartMate II Left Ventricular Assist System Support Can Induce Remission of Heart Failure

Abstract: Seven patients supported by the HeartMate II Ventricular Assist System at THI at SLEH have recovered enough to allow device removal without heart transplantation.

For patients with severe heart failure (HF), heart transplantation is considered the definitive treatment. However, transplantation is limited by the scarcity of donor hearts, which has worsened during the past decade. In addition, although transplantation can be lifesaving and can even return patients to near-normal lives, transplanted hearts are prone to late failure, mainly because of transplant-graft atherosclerosis. Posttransplant survival is 50% to 60% at 10 years, 30% at 15 years, and 10% to 15% at 20 years. Thus, in HF patients less than 50 years old, cardiac transplantation actually makes premature death likely. Therefore, whenever possible, physicians who treat young HF patients should attempt to restore native heart function before considering transplantation.

"Left ventricular assist systems [LVASs] have been developed to support HF patients facing imminent death," says O. H. Frazier, MD, chief of Cardiopulmonary Transplantation and director of Cardiovascular Surgical Research at the Texas Heart Institute at St. Luke's Episcopal Hospital (THI at SLEH). "These devices can provide both temporary support to patients awaiting a heart transplant and long-term support to patients who are not transplant candidates. However, LVAS technology has not been used adequately for its initial purpose: to allow the acutely failed heart to rest and recover. This is surprising, given that resting the heart—by pharmacologic treatment, by limiting the patient's physical activity, or both—has long been the mainstay of medical treatment for HF."

The various available LVASs are surgically implanted to restore and maintain adequate perfusion of the body. The HeartMate II LVAS (Thoratec Corporation, Inc., Pleasanton, CA) is the first continuous flow LVAS to be approved by the US Food and Drug Administration for clinical use as a "bridge to transplant" in patients with advanced HF. This device uses an axial flow pump small enough to be implanted in adults of all sizes, as well as larger children. The battery and pump controller are wearable, so HeartMate II recipients can be discharged from the hospital and perform normal daily activities.

The first implant of the HeartMate II LVAS was at THI at SLEH in November 2003. To date, our center has implanted this device in 95 patients—more than any other center in the world.

At their own request, 7 of the younger patients (mean age, 24.9 years; range, 14-37 years) have been weaned from the LVAS. Each of them originally had advanced idiopathic cardiomyopathy and was given the LVAS as a lifesaving procedure.

After an average of 474 days (range, 254-761 days), these 7 patients had their devices successfully removed. In each case, the LVAS was explanted because the patient showed signs of HF remission, ie, the disappearance of symptoms. Before device explantation, the patients underwent a series of tests to show that their heart could function on its own. These tests included an echocardiographic examination during which the LVAS's pump speed was decreased, so that clinicians could determine whether the heart could adequately eject blood with minimal pump assistance.

All patients underwent a follow-up examination an average of 527 days (range, 174-763 days) after HeartMate II explantation. They have remained in HF remission and continued to perform normal activities.

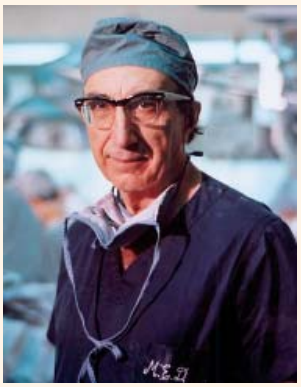
"We have known that LVAS unloading of the heart allows some degree of myocardial recovery," says Dr. Frazier. (See *Heart Watch*, Summer 2005, p. 6.) "The introduction of axial flow devices, with their low complication rate, long-term reliability, and ease of explantation, has created new opportunities to use LVAS support as meaningful therapy, with the goal of satisfactory recovery of native heart function. I believe that LVAS therapy should be considered for all heart transplant candidates under age 50, so that these patients' hearts can have a chance to regain satisfactory function." ●

For more information:

Dr. O. H. Frazier

832.355.3000

Michael E. DeBakey, MD, Dies at Age 99



On July 11, 2008, Michael E. DeBakey, MD, died suddenly at home, 2 months before his 100th birthday. Dr. DeBakey, chancellor emeritus of Baylor College of Medicine, was a driving force in the development of cardiovascular surgery. During his long and productive career, he performed more than 60,000 surgical operations and published more than 1,600 medical articles, chapters, and books. Dr. DeBakey's many accomplishments and medical firsts include pioneering aortic aneurysm surgery and the use of synthetic vascular grafts, inventing numerous surgical instruments, performing the first successful clinical left ventricular assist device (LVAD) implantation, and designing the MicroMed DeBakey VAD. He was also one of the first surgeons to perform coronary artery bypass graft surgery. His awards and honors are too numerous to list here. In 2000, Dr. DeBakey was declared a Living Legend by the Library of Congress, and in April 2008, he was presented the Congressional Gold Medal.

Preoperative B-Type Natriuretic Peptide Predicts Ventricular Dysfunction, Hospital Stay, and Mortality After CABG

Abstract: Preoperative B-type natriuretic peptide concentration is a novel independent predictor of in-hospital ventricular dysfunction, length of hospital stay, and mortality after coronary artery bypass surgery.

An elevated plasma B-type natriuretic peptide concentration (BNP) is predictive of intermediate- to long-term morbidity and mortality in ambulatory nonsurgical patients with congestive heart failure or acute coronary syndromes. In noncardiac surgical patients, an elevated preoperative BNP independently predicts a composite of in-hospital adverse cardiac events, including cardiac death. However, the value of elevated preoperative BNP as a predictor of adverse outcomes in cardiac surgical patients is less certain.

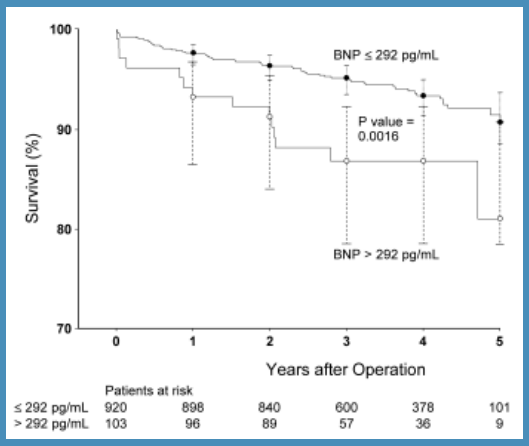
Researchers at Harvard Medical School and the Texas Heart Institute at St. Luke's Episcopal Hospital (THI at SLEH) recently collaborated on a prospective, longitudinal study of 1023 patients undergoing primary coronary artery bypass graft surgery (CABG) with the aid of cardiopulmonary bypass (CPB). This study was conducted at Brigham and Women's Hospital, in Boston, and THI at SLEH (*J Thorac Cardiovasc Surg* 2008;136:452-61). The researchers sought to determine whether the preoperative plasma BNP independently predicts in-hospital postoperative ventricular dysfunction, length of hospital stay, and 5-year mortality after primary CABG.

"Dr. Amanda Fox, a former THI fellow who is now a faculty member at Harvard, hypothesized that elevated preoperative BNP is an independent predictor of in-hospital postoperative ventricular dysfunction and longer-term, all-cause mortality in patients undergoing CABG, even after adjustment for other established predictors of perioperative risk," says Charles D. Collard, MD, professor, Baylor College of Medicine Division of Cardiovascular Anesthesiology at THI at SLEH and a coauthor of the study. "To our knowledge, this is the first study to investigate the benefit of adding these biomarker data to current cardiac surgery risk-stratification models."

The researchers found that patients with postoperative ventricular dysfunction (defined as the need either for 2 or more inotropic agents or for new intraaortic balloon pump or ventricular assist device support) had a higher BNP at all perioperative time points than did patients without ventricular dysfunction. In addition, the researchers found that preoperative BNP is an independent predictor of postoperative ventricular dysfunction (odds ratio, 1.92; 95% CI, 1.12-3.29), even after adjustment for patient demographics, medications, and other clinical predictors of postoperative ventricular dysfunction. Furthermore, adding preoperative BNP data to a multivariable model for predicting postoperative ventricular dysfunction improved the model's predictive ability.

The researchers also assessed the value of preoperative BNP for predicting the length of postoperative hospital stay and found that elevated preoperative BNP significantly increased the likelihood of a longer hospital stay (hazard ratio, 1.42; 95% CI, 1.18-1.72; P=0.0002), even after adjustment for demographic characteristics, institution, CPB time, and other preoperative variables. Again, adding preoperative BNP to a multivariable model for predicting the length of postoperative hospital stay improved the model's predictive ability.

With regard to the relationship of preoperative BNP to postoperative survival, the researchers found that the preoperative BNP was significantly higher in patients who died during the 5-year follow-up period than in those who survived (P=0.0003) (*see Figure*).



Kaplan-Meier survival curve for all patients up to 5 years after surgery, stratified by a preoperative B-type natriuretic peptide concentration (BNP) of >292 versus ≤292 pg/mL. Vertical bars indicate 95% confidence intervals for survival estimates for each year of postoperative follow-up. (*J Thorac Cardiovasc Surg* 2008;136:452-61).

"We determined that a preoperative BNP cutoff of >292 pg/mL is highly specific for postoperative ventricular dysfunction and 5-year mortality," says Dr. Collard. "The utility of this cutoff value for patients undergoing primary CABG is further supported by significantly decreased survival rates on Kaplan-Meier survival curves stratified by the 292-pg/mL cutoff."

"We believe that the preoperative BNP should be used in conjunction with other clinical predictors delineated in the multivariable models established for postoperative ventricular dysfunction, hospital stay, and mortality," he adds. "However, it is important that these results not be interpreted to mean that an elevated BNP predicts a poorer perioperative outcome in the absence of preoperative cardiovascular compromise. Rather, we believe that the preoperative BNP could be used to identify patients who have a marginal cardiovascular reserve despite ambiguous clinical symptoms." ●

For more information:

Dr. Charles D. Collard

832.355.2666

Defects in a Cytoskeletal Protein in Cardiomyocytes May Contribute to Heart Failure

Abstract: Intracellular changes in the cytoskeletal protein desmin may be a mechanism for the development of heart failure.

Complex molecular mechanisms underlie the pathogenesis of heart failure. A cascade of events involving numerous inflammatory mediators and cell proteins results in the programmed cell death (apoptosis) of cardiomyocytes. In turn, apoptosis leads to changes in the architecture of the heart and, ultimately, to a progressive decline in function. The list of contributors to this process has recently expanded to include desmin—an intermediate filament (IF) muscle protein that helps maintain the structural and mechanical integrity of cardiomyocytes during contraction. The intricate cytoskeletal system of cardiac muscle cells is composed, in part, of IF proteins.

Desmin, a major IF protein, forms a 3-dimensional scaffold that connects the contractile apparatus of the cell to the nucleus, plasma membrane, mitochondria, and other organelles. The function of desmin has come under scrutiny since the seminal finding that a dilated cardiomyopathy, characterized by extensive cell death, develops in desmin-deficient mice. Furthermore, like many other IF proteins, desmin has a specific cleavage site for caspases, the family of proteins responsible for apoptosis.

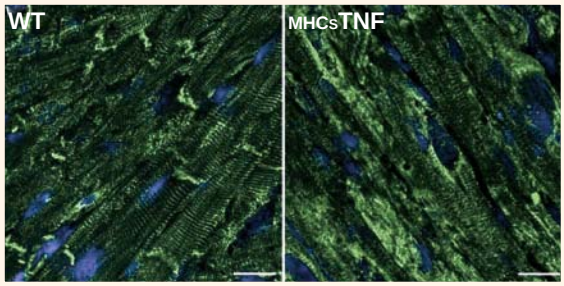
Douglas L. Mann, MD, chief of Cardiology at the Texas Heart Institute at St. Luke's Episcopal Hospital and director of the Winters Center for Heart Research at Baylor College of Medicine, is studying the role of desmin in the development of tumor necrosis factor (TNF)-induced cardiomyopathy. He has developed a transgenic mouse model of dilated cardiomyopathy associated with cardiac-restricted overexpression of TNF. This inflammatory mediator causes cardiomyocyte apoptosis and thinning of the left ventricular wall.

"TNF causes apoptosis of cardiac muscle cells, which leads to heart failure. One of the key events in apoptotic pathways is the collapse of the cell's cytoskeleton," explains Dr. Mann. "Desmin, a major cytoskeletal protein, is a target for caspase, an active effector apoptotic enzyme."

Dr. Mann's group has shown that the intracellular distribution of desmin is altered in mice with TNF-induced cardiomyopathy (*J Cell Biol* 2008;181:761-75). In normal cardiac cells, desmin usually surrounds a portion of the contractile apparatus and is abundant in the intercalated disks, which are the junction sites between cardiomyocytes. Overexpression of TNF in the heart leads to the loss of desmin from the intercalated disks and to the formation of desmin aggregates that disrupt the normal alignment of the myofibrils (*see Figure*).

The formation of desmin aggregates in TNF-exposed cardiomyocytes may contribute to myocardial degeneration. Dr. Mann's studies have shown that desmin aggregates colocalize with ubiquitin, a common protein involved in the degradation of proteins. In addition, the THI researchers found that the desmin aggregates included other cellular components such as mitochondria and vesicles, suggesting a defect in protein degradation. The aggregates may interfere with contraction or relaxation of the contractile apparatus of the cardiomyocyte, reducing cardiac function.

To examine whether apoptosis is the mechanism involved in the intracellular alterations in desmin, Dr. Mann's group created TNF-overexpressing transgenic mice that also express a form of desmin resistant to caspase-mediated cleavage. In these mice, desmin was maintained at the intercalated disks during TNF overexpression. Moreover, desmin aggregate formation and apoptosis were reduced, adverse cardiac remodeling was inhibited, and cardiac function was improved.



Confocal microscopy of the myocardium of wild type (WT) and TNF-overexpressing mice (MHCsTNF) labeled for desmin. TNF overexpression leads to desmin aggregation and loss from intercalated disks but not from Z disks of the contractile unit.

"Desmin may be a major player in TNF-induced heart failure," says Dr. Mann. "The cleavage of desmin may result in a loss of protective mechanisms or may facilitate cell death by contributing to mitochondrial collapse."

"Aggregate formation causes myocardiocyte disarray in cardiomyopathic mice, and reorganization of the intercalated disk affects contact sites beween cardiac muscle cells," he continues. "Desmin-induced disruptions of the cytoskeleton system may be a major cellular mechanism in the development of heart failure." ●

For more information:

Dr. Douglas L. Mann
713.798.0285

HeartWATCH

Editorial Office
832.355.6630

For physician referrals,
call 1.800.872.9355

Cover: Folk art from San Miguel de Allende donated by Martha Hyder for the Celebration of Hearts display in the Wallace D. Wilson Museum of the Texas Heart Institute at St. Luke's Episcopal Hospital —The Denton A. Cooley Building.

Calendar of Events

Texas Heart Institute Continuing Medical Education Symposia

Future Direction of Stem Cells in Cardiovascular Disease Satellite Symposium at American Heart Association Scientific Sessions
November 7, 2008 • New Orleans, Louisiana
Program Director: James T. Willerson, MD
For more information, visit cme.texasheart.org

Selected Upcoming Local, National, and International Meetings

American College of Surgeons 94th Annual Clinical Congress
October 12–16, 2008 • San Francisco, California

American Heart Association Scientific Sessions 2008
November 8–12, 2008 • New Orleans, Louisiana

Society of Thoracic Surgeons 45th Annual Meeting
January 26–28, 2009 • Fort Lauderdale, Florida

American College of Cardiology 57th Annual Scientific Sessions
March 29–31, 2009 • Orlando, Florida
Abstract submission ends: October 6, 2008

International Society for Heart and Lung Transplantation 29th Annual Meeting and Scientific Sessions
April 22–25, 2009 • Paris, France

American Surgical Association 129th Annual Meeting
April 23–25, 2009 • Indian Wells, California
Abstract submission ends: November 25, 2008

American Association for Thoracic Surgery 89th Annual Meeting
May 9–13, 2009 • Boston, Massachusetts
Abstract submission ends: October 6, 2008

For information about the Texas Heart Institute CME activities listed above, please e-mail cme@heart.thi.tmc.edu or call 832.355.2157. To view selected CME presentations and other physician resources online, visit cme.texasheart.org.

For 18 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."

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