HeartWATCH

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A Newsletter Produced by the Texas Heart Institute

Texas Heart® Institute

at St. Luke's Episcopal Hospital

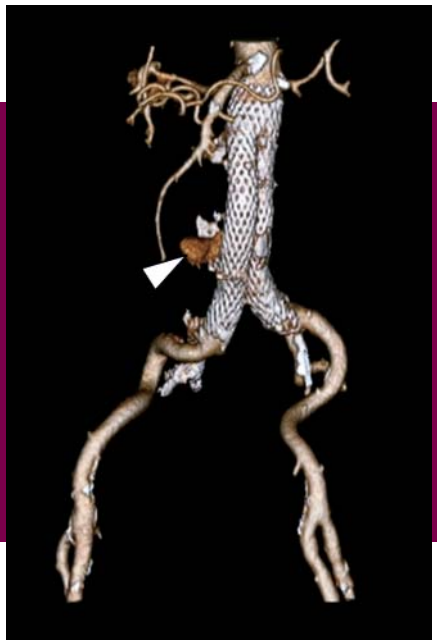
3D Volume Rendering of Images Improves the Planning of Surgical and Interventional Cardiovascular Procedures

Abstract: The 3D imaging laboratory at St. Luke's Episcopal Hospital, home of the Texas Heart Institute, is making surgical and endovascular procedures safer and more effective.

Many cardiac surgical and endovascular procedures require considerable advance planning because of the unique anatomic features of patients and their diseases. Imaging is often essential to the planning process, and the more detailed the image, the better.

For this reason, the Department of Radiology at St. Luke's Episcopal Hospital (SLEH), home of the Texas Heart Institute (THI), has set up a dedicated laboratory for processing 3-dimensional (3D) images acquired from multidetector computed tomography (MDCT) scans. The 3D laboratory is equipped with the latest software for postprocessing MDCT data with the Aquarius Workstation (TeraRecon, Inc, San Mateo, Calif). Few other such facilities at tertiary care centers in the United States are so equipped.

The 3D laboratory processes all MDCT data acquired at SLEH/THI, including coronary CT angiograms (CTAs), thoracoabdominal aortic studies, peripheral arterial studies, neurovascular studies, renal donor studies, and musculoskeletal studies.



Volume rendering of a CT angiogram from a patient who underwent endovascular stenting of an infrarenal abdominal aortic aneurysm. The bifurcating endostent is clearly shown, and a small endoleak is evident (arrowhead).

"One of the most valuable tasks that the 3D laboratory performs is processing images from patients with abdominal aortic aneurysms," says Benjamin Cheong, MD, director of Cardiovascular Magnetic Resonance Imaging in the Department of Radiology at SLEH/THI. "Many of these aneurysms can be repaired with endovascular stents, but some abdominal aortic aneurysms may involve the renal or mesenteric arteries or have anatomic features that make endovascular treatment difficult or impossible. The data from our laboratory provide the exact aortic dimensions, as well as 3D images of the aorta in various formats, to help interventional cardiologists decide whether and how endovascular techniques should be used to treat a particular aortic aneurysm. The 3D postprocessed images are also vital in the follow-up evaluation of patients after endostent placement" (*see Figure*).

The 3D laboratory also processes data from coronary CTAs. As William Wells, RT, the laboratory's lead technologist, explains, "We use the coronary CTA data to produce volume-rendered images, as well as thin maximum-intensity projections and curved multiplanar reformation images, of the coronary arteries, which referring physicians can review at their leisure. Also, we provide patients and their referring physicians with a detailed analysis of the coronary calcium score that is computed as part of the coronary CTA study in selected patients, because this score is a useful tool for risk stratification."

The CTA images also help cardiovascular surgeons at SLEH/THI plan certain types of operations.

"The 3D lab can use CTA data to precisely locate any calcified areas of the aorta," says Dr. Cheong, "enabling surgeons to avoid these areas whenever they have to cross-clamp the aorta. Also, the 3D images can clearly delineate important cardiac structures, such as the left internal mammary artery, and the distance from the right ventricular free wall to the sternum. Awareness of the location of these vital structures helps surgeons avoid damaging them during redo coronary bypass operations."

The 3D laboratory's postprocessed CTA images can also improve the planning of other operations. For example, when patients with late-stage heart failure need a ventricular assist device implanted, a preoperative thoracic CTA can be used to locate the left ventricular apex and other features of the heart so that, when possible, a keyhole incision can be used instead of a median sternotomy for placement of the device.

"By using the most sophisticated image-processing techniques, we can help physicians produce better interventional and surgical results, thereby providing better care to our patients at St. Luke's and THI," says Dr. Cheong. ●

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HeartMate II Left Ventricular Assist Device Can Provide Effective Hemodynamic Support as a Bridge to Transplant

Abstract: Small, reliable, and easy to implant, the HeartMate II Left Ventricular Assist System can improve the functional status and quality of life for patients awaiting heart transplantation.

According to the American Heart Association, nearly 5 million Americans currently have heart failure, and 550,000 new cases are diagnosed every year. To help combat this problem, several types of left ventricular assist systems (LVASs) have been developed during the past few decades to support the failing heart. Basically, these pumps are divided into pulsatile devices, which produce a pulsed blood flow, and continuous flow devices, which do not produce a pulse. Although traditionally used as bridges to heart transplantation, LVASs are now being evaluated as bridges to cardiac recovery and as destination therapy in selected patients.

The HeartMate II left ventricular assist device (Thoratec Corp, Pleasanton, Calif.) (*see Figure*) is a second-generation blood pump that has undergone extensive laboratory and clinical testing at the Texas Heart Institute at St. Luke's Episcopal Hospital (THI at SLEH). The first HeartMate II was implanted by O.H. Frazier, MD, director of Cardiovascular Surgical Research and chief of Cardiopulmonary Transplantation at THI at SLEH, in November 2003. The patient was a 17-year-old boy dying of heart failure, who is now alive and well after a successful heart transplant.

The HeartMate II is implanted below the patient's diaphragm with the outflow graft attached to the left ventricular apex and the inflow graft to the aorta. Essentially, the HeartMate II assumes the function of the weakened left ventricle by pumping oxygen-rich blood throughout the body. The pump's single moving part is an internal rotor with helical blades. Powered by an electromagnetic motor, the rotor spins on its axis around a central shaft and imparts kinetic energy to the blood.

The HeartMate II system controller monitors and regulates the pump's operation according to the patient's level of activity. The controller receives its power from rechargeable batteries worn in underarm holsters or a waist pack. In the event of low battery power or some other change in the pump's normal function, the system controller alerts the patient with flashing lights and an audible alarm.

The HeartMate II Left Ventricular Assist System is implanted in the chest to support the pumping function of the heart. An external, belt-worn system controller and battery are attached to the implanted pump via a thin, flexible, percutaneous cable.

"The HeartMate II provides many advantages over a pulsatile pump," explains O. H. Frazier, MD, director of Cardiovascular Surgical Research and chief of Cardiopulmonary Transplantation at THI at SLEH. "These advantages include its smaller size, simpler mechanical features, greater durability, less risk of infection, and reduced noise level. Whereas the older pulsatile pumps weigh about 3 pounds, the HeartMate II weighs 12 ounces and is about the size of a D-cell battery. Therefore, it is suitable even for patients with small body frames. Because of its wearability, patients can leave the hospital and resume most of their normal activities."

"Also, the pump's simple design averts mechanical problems associated with larger, pulsatile devices," continues Dr. Frazier. "Despite its smallness and simplicity, the HeartMate II has the same output capabilities as its pulsatile predecessors."

A recent multicenter clinical trial, in which THI at SLEH participated, found that the HeartMate II provides heart failure patients with effective hemodynamic support (*N Engl J Med* 2007;397:885-96). Of the 133 patients in the study, 84% improved from New York Heart Association functional class IV to class I or II after 3 months. At the same time, their quality of life significantly improved. After 6 months of using the device, 75% of the patients had a heart transplant, recovered their cardiac function, or became eligible for heart transplantation.

Despite its advantages, the HeartMate II is not without the risk of complications, which include postoperative bleeding, stroke, right-sided heart failure, and percutaneous-lead infection. However, some of the associated complications may be attributed to the advanced state of the patients' disease.

"By providing effective, long-term hemodynamic support, this pump can improve not only the functional status of patients but also their quality of life while they await a transplant," states Dr. Frazier. "Because of the device's simplicity, it could be ideal for use at lower-volume heart failure centers. At this time, the device is still investigational." ●

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Contents

Stem Cells From Adult Adipose Tissue Have Cardiovascular Myogenic Potential

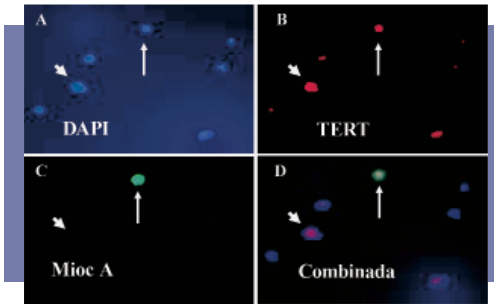
Abstract: A unique subpopulation of multipotent mesenchymal stem cells isolated from adult adipose tissue has cardiomyogenic potential and shares biologic features with embryonic stem cells.

A promising tissue source

of stem cells is emerging: fat. Abundantly available, easily accessible, and routinely discarded in the 400,000 liposuction procedures performed each year in the US, adipose tissue comprises a surprising array of cell types, including a stromal population of multipotent mesenchymal stem cells (MSCs). Adipose tissue–derived MSCs have recently been shown to differentiate in vitro into beating myogenic cells (*Circ Res* 2004;94:223-9). However, the cellular and molecular characteristics of these MSCs and the key events that commit them to a specific lineage are not well defined.

Using a novel, patent-pending technology, Yong-Jian Geng, MD, PhD, in collaboration with James T. Willerson, MD, has begun to isolate, grow, and characterize MSCs from the adipose stroma. Dr. Geng is director of the Heart Failure and Stem Cell Research Laboratory at the Texas Heart Institute at St. Luke's Episcopal Hospital (THI at SLEH) and professor of Medicine at The University of Texas Health Science Center (UTHSC) at Houston. Dr. Willerson is president-elect and medical director of THI at SLEH and president of UTHSC at Houston. Dr. Geng's group has recently reported that adipose tissue–derived MSCs share biologic characteristics, including proteins required for multipotency, with embryonic stem cells (Stem Cells 2007; epub). Specifically, these researchers identified a subpopulation of myogenic cells from the adipose stroma that expresses high levels of telomerase and myocardin A—two proteins involved in the proliferation and differentiation of stem cells (*see Figure*).

Telomerase, a nuclear enzyme, stabilizes chromosomes by relengthening telomeres (the repetitive DNA structures at the end of chromosomes), which usually shorten as the cell ages. Found in high levels in embryonic stem cells, telomerase has antisenescent properties that help preserve the immortality and chameleon-like differentiation capacity of the cells. Differentiated, mature cells in adults have low telomerase levels and short telomeres; with age, the cells lose their telomerase activity and eventually become senescent.



Confocal immunofluorescent microscopy showing coexpression of telomerase reverse transcriptase (TERT) and myocardin A (Myoc A). DAPI, 4,6-diamidino-2-phenylindole. (Reprinted from *Stem Cells* 2007;epub.)

"One of the main concerns about the therapeutic use of adult stem cells is their limited expression of telomerase. From animal fat tissue, however, we have isolated and identified muscle cell–generating MSCs that express telomerase at levels close to those seen in embryonic stem cells," says Dr. Geng. "Active expression of telomerase suggests that these cells are premature and undifferentiated, which are ideal biologic features for regenerative medicine."

In addition to expressing telomerase, the adipose tissue–derived MSCs identified by Dr. Geng's group expressed high levels of myocardin A, a nuclear protein that regulates the expression of genes involved in the maturation of stem cells into cardiomyogenic cells. Critical for cardiovascular myogenesis, myocardin A is abundant in the heart in its early stages of development but diminishes during cardiac maturation. In their study, Dr. Geng's group found that myocardin A, in a novel role, may increase the number and length of telomeres by promoting telomerase activity. Thus, myocardin A may help maintain the myogenic "stemness," or pluripotency, of these adipose tissue–derived MSCs. Furthermore, Dr. Geng's group showed that overexpression of the two proteins by gene delivery enhances their individual activities.

"These unique cells in the adipose stroma have self-renewal properties because of their telomerase expression and have cardiomyogenic potential because of their myocardin A expression. This dual phenotype indicates that the cells are premature progenitor cells that can differentiate into contractile cardiomyocytes in the heart," says Dr. Willerson. "We are exploring the vast potential of these adipose tissue–derived MSCs in animal models of infarction and ischemia, and we are also testing genetically modified cells for their clinical usefulness." ●

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THI Surgeons Featured in *The Mysterious Human Heart*

On October 15, 2007, a new PBS series, *The Mysterious Human Heart*, featured Drs. Denton A. Cooley and O. H. Frazier of THI at SLEH. Written by Tom Jennings for the award-winning David Grubin Productions, the 3-episode series followed patients with heart failure as they sought treatments that would help them return to their normal lives, and it showcased new medical and technological advances for treating heart failure. One patient featured in the series was 23-year-old Viktor Foldevi, who developed heart failure 2 years ago but was refused a heart transplant because of his history of drug abuse. Dr. Frazier implanted a HeartMate II left ventricular assist device to allow Viktor's heart time to recover. Viktor's heart failure resolved completely, allowing Viktor to avoid a transplant and lead a completely normal life. This series can be watched online at www.pbs.org/wnet/heart.

The Texas Adult Congenital Heart Center Offers Specialized Care for Patients With Congenital Heart Disease

Abstract: The Texas Adult Congenital Heart Center offers a dedicated, multidisciplinary program focused on patient care, research, and education.

Most children born with congenital heart disease now live to adulthood—a circumstance that has created a new cardiovascular specialty. In the United States, there are an estimated 1 million patients with adult congenital heart disease, and the number is growing every year. As a direct result, the US is experiencing a tremendous shortage of cardiac centers equipped to care for these special patients.

One of the few such centers, the Texas Adult Congenital Heart (TACH) Center, was formed to provide adult care for patients with congenital heart disease. As a joint effort between Baylor College of Medicine's (BCM) departments of Cardiology and Pediatrics, Texas Children's Hospital (TCH), and the Texas Heart Institute (THI) at St. Luke's Episcopal Hospital (SLEH), the TACH Center offers a smooth and safe transition from pediatric to adult care for adult congenital heart disease (ACHD) patients.

"Patients with ACHD experience other health issues that may complicate their congenital heart diagnosis. Patients with previous repairs and palliative operations may have long-term sequelae such as cyanosis, pulmonary hypertension, complex arrhythmias, and heart failure," says Wayne J. Franklin, MD, director of the TACH Center. "By offering our patients an approach that includes both their pediatric and adult specialists, we are creating a team that can care for these patients for the rest of their lives."

As children with congenital heart disease grow to adulthood, they face special problems that only physicians trained in ACHD can address. The TACH Center employs specialists who understand the uniqueness of these patients' diagnoses. The TACH Center offers a full spectrum of services: outpatient consultations; noninvasive imaging techniques, such as echocardiography, computed tomography, and magnetic resonance imaging; cardiac catheterization and intervention; and electrophysiology testing.

"Our multidisciplinary program focuses on the continuum of patient care, research, and education," explains Dr. Franklin. "Ours is 1 of only 2 centers in the country directed by an ACHD specialist trained both in pediatric and adult cardiology. Our dedicated staff includes 4 congenital heart surgeons and 4 cardiologists trained in ACHD, as well as cardiac anesthesiologists and a nurse coordinator. Additionally, we plan to have an ACHD cardiology fellowship training program in place by the summer of 2008."

An ACHD symposium will be held March 1, 2008, in the Denton A. Cooley Auditorium located at the Texas Heart Institute at St. Luke's Episcopal Hospital in Houston, Texas.

Patients receiving comprehensive ACHD care at the TACH Center benefit from the staff's extensive experience and research-based practice. For example, the Fontan revision operation for adult patients, which is performed by TACH Center surgeons, decreases supraventricular tachycardia and increases patients' energy and endurance. Through the TACH Center, patients can participate in clinical trials, such as the evaluation of a new bovine pericardial pulmonary valve (Carpentier-Edwards Perimount Pericardial Bioprosthesis; Edwards Lifesciences, Irvine, Calif) in adults who underwent childhood surgical repair of tetralogy of Fallot. Other ongoing research at the Center includes evaluation of biomarkers, such as troponin I and C-reactive protein, and a medication trial designed to measure treatment outcomes for systemic right ventricular dysfunction. Valve-sparing procedures for repairing aortic and mitral valve lesions resulting from ACHD are also being studied.

During its first year of operation, the TACH Center treated 370 patients. At 18 months, that number had risen to more than 500. Each week, the clinic sees about 25 patients, half of whom are new referrals from the US and abroad.

"Adult patients with congenital heart disease do not fit well in the world of pediatric cardiology, and adult cardiologists are rarely attuned to their special needs," says Charles D. Fraser, MD, chief of the Division of Congenital Heart Surgery and cardiac surgeon-in-charge at TCH, chief of Adult Congenital Heart Surgery at THI, and professor of Surgery and Pediatrics at BCM. "THI and TCH have a very long, productive relationship involving patients with congenital heart disease. This new program is a natural evolution of that longstanding relationship. At the TACH Center, we have put together a 'dream team' of specialists who understand these patients' unique challenges." ●

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Felt Plug Simplifies LVAD Explantation

Normally, explanting a left ventricular assist device (LVAD) requires extensive suturing to close the hole remaining in the left ventricular apex after the sewing ring for the LVAD's outflow graft is removed. However, O. H. Frazier, MD, William Cohn, MD, and their colleagues in the Division of Cardiopulmonary Transplantation at THI at SLEH may have found a faster, simpler way: leaving the sewing ring in place and closing it with a felt plug. As described in a recently published case report (*J Heart Lung Transpl* 2007;26:1209-11), the plug consists of 3-cm–wide Teflon felt strips that are rolled tightly into a cylinder (so as to fit snugly into the sewing ring) and are sutured together with 2-0 polypropylene to prevent unrolling. By using this plug instead of standard closure techniques, surgeons may reduce left ventricular muscle injury and operative time and better preserve apical geometry.

Reversion to a Fetal Metabolic Gene Profile May Protect the Stressed Heart

Abstract: Returning to the fetal gene program may be an adaptive response associated with survival rather than with the destruction of cardiac cells.

When stressed, the adult heart muscle orchestrates a panoply of responses designed to meet its energy needs and to support its function. Among these responses is reversion to the fetal gene program. Although usually perceived as a sign of decline in the failing heart, expression of fetal genes may instead be an adaptive mechanism of cell survival under stress (*Heart Fail Rev* 2007;12:331-43).

With respect to the physiologic environment, fetal and adult hearts differ vastly. In the relatively hypoxic uterus, the developing heart uses carbohydrates (glucose and lactate) to make ATP—the body's energy "currency." In contrast, fatty acids are the primary source of energy for the postnatal heart. Thus, at birth, the fetal heart undergoes a rapid metabolic transformation from oxidizing carbohydrates to oxidizing fatty acids. Accordingly, the expression of enzymes involved in energy substrate metabolism forms an "adult heart profile." In addition, the expression of cardiac isoforms of contractile proteins, such as the myosin heavy chain (MHC) sarcomeric proteins, dramatically changes at birth, probably because of differences in the mechanical performance of the postnatal heart.

"Despite the switch from fetal to adult gene programs at birth, the heart retains its ability to revert to the fetal mode of carbohydrate utilization under stress," says Heinrich Taegtmeyer, MD, DPhil, a research scientist at the Texas Heart Institute at St. Luke's Episcopal Hospital and co-director of the Division of Cardiology at The University of Texas Medical School at Houston. "As a metabolic omnivore, the heart has the ability to use the right substrate at the right time. This metabolic flexibility allows the heart, when stressed, to use the most energy-efficient fuel to maintain cardiac function and ensure survival."

Stressors such as hypertension and pressure overload, or even unloading of the heart, trigger metabolic remodeling responses that, in turn, initiate structural and functional remodeling. These changes are accompanied by a reversion to the fetal gene program. In the failing heart, the switch from fat to glucose metabolism leads to changes in the transcription of genes involved in energy metabolism, such as the glucose transporters GLUT1 and GLUT4. In studies of gene expression in fetal, nonfailing, and failing human hearts, Dr. Taegtmeyer and colleagues have shown that transcript levels of GLUT1, GLUT4, and other key metabolic genes decreased from normal adult levels to fetal levels in the failing heart (*Circulation* 2001;104:2923-31). Furthermore, these researchers found that the return to the fetal gene program in the failing heart occurs by downregulating adult genes rather than by upregulating fetal genes. This point is important in the development of stem cell therapies for strengthening the failing heart.

"As a metabolic omnivore, the heart has the ability to use the right substrate at the right time. This metabolic flexibility allows the heart, when stressed, to use the most energy-efficient fuel to maintain cardiac function and ensure survival."

Gene transcripts for several other molecules are similar in failing and fetal hearts. Because contraction and metabolism are closely linked, the expression of MHC proteins changes in the failing heart to maintain appropriate contractile force. MHC-α is downregulated in both the fetal and the failing heart, increasing the MHC-β/MHC-α ratio. Furthermore, levels of atrial natriuretic peptide, a cardiac hormone seen in high concentrations in the fetal circulation, approach embryonic concentrations in heart failure.

"The return of the stressed heart to the fetal gene program may initially be adaptive rather than destructive," says Dr. Taegtmeyer. "The metabolic switch from fat to glucose oxidation is the heart's attempt to maximize energy liberation and, therefore, heart function. However, the maladapted heart eventually loses this flexibility and succumbs to progressive dysfunction. Little is known about the transition from adaptation to maladaptation. Our next step is to define the molecular mechanisms involved in the downward spiral to cell death and organ failure, but for now, the chemistry of the heart is still shrouded in mystery." ●

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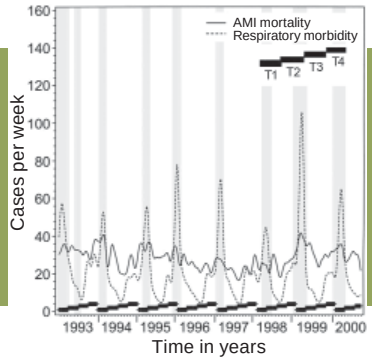
Dr. Willerson Receives Katz Prize

Columbia University Medical Center awarded one of its two 2007 Katz Prizes in Cardiovascular Research to James T. Willerson, MD, president-elect of the Texas Heart Institute at St. Luke's Episcopal Hospital and president of The University of Texas Health Science Center at Houston, for excellence in cardiovascular research and education. The prizes, each $100,000, are awarded to outstanding researchers in the field of cardiovascular medicine.

Autopsy Data Confirm that Influenza and Acute Respiratory Disease Increase Coronary-Related Deaths

Abstract: An 8-year autopsy study of 34,892 subjects has confirmed that influenza epidemics and acute respiratory disease are associated with an increase in coronary-related deaths.

During the past few years, increasing evidence has suggested that influenza and other upper respiratory infections can trigger an acute myocardial infarction (AMI). Indeed, the winter season, when influenza typically occurs, has long been associated with an excess of cardiovascular deaths. Although cold weather has sometimes been blamed for this excess mortality, influenza and acute respiratory disease (ARD) now appear to be more likely culprits.



Association between deaths due to acute myocardial infarction (AMI) and morbidity from acute respiratory disease (ARD) from 1993 to 2000. The continuous line depicts AMI mortality, and the dashed line indicates ARD morbidity. The gray columns indicate influenza epidemic periods. The thick black ladders at the bottom of each year's plot indicate the four calendar quarters of Q1, Q2, Q3, and Q4. (Reprinted from *Eur Heart J* 2007;28:1205-10).

At the Texas Heart Institute at St. Luke's Episcopal Hospital, senior research scientist Mohammad Madjid, MD, and his colleagues previously estimated that, solely by triggering AMIs, influenza results in up to 92,000 deaths annually in the United States (*Circulation* 2003;108:2730-6). They also found an association between influenza vaccination and a reduced risk of both fatal and nonfatal AMIs (*Circulation* 2000;102:3039-45). This association has been confirmed by other researchers. More recently, Dr. Madjid and his coworkers have found even stronger evidence that influenza and ARD lead to an increase in coronary deaths. This stronger evidence is based on 8 years of autopsy studies involving 34,892 subjects, aged 30 to 89 years.

The study began in 1993 and ended in 2000. It was performed in collaboration with researchers at the Influenza Research Institute and the St. Petersburg Medical Academy of Postgraduate Education in St. Petersburg, Russian Federation. This city was chosen because of its nearly 70% autopsy rate and its low rate of influenza vaccination, which allowed the researchers to observe the natural history of the disease.

"We plotted the weekly influenza and ARD rate against the mortality related to AMI and chronic ischemic heart disease (IHD)," says Dr. Madjid. "During the study period, 11,892 persons died of AMI, and 23,000 died of chronic IHD. Most of those who died were elderly, with a median age of 65 years for men and 75 years for women. Each year, the peak period of AMI and chronic IHD deaths correlated with peak influenza and ARD activity. This correlation did not vary with gender or age."

"Cardiovascular deaths tend to peak at the height of influenza or ARD activity, with a 2-week window on each side," continues Dr. Madjid. "The correlation then starts to taper off, becoming negligible in approximately 10 weeks. The weakest correlation occurs about 6 months after the peak period, when influenza and ARD are least common."

"Until now," Dr. Madjid explains, "most studies of influenza mortality have relied on death certificates, which are not always accurate for this purpose. When influenza is followed by a fatal AMI, the death is usually attributed to traditional risk factors, and influenza is not listed on the death certificate. Likewise, if the death certificate shows influenza or respiratory disease, an AMI may have been overlooked. Autopsy data are much more reliable, as they minimize any bias related to disease misclassification."

In the United States, influenza is an increasingly important cause of death, especially in the elderly, and many of these deaths may actually result from cardiovascular complications. Most likely, these complications are related to severe, acute inflammation, which weakens atherosclerotic plaques and causes them to rupture. On the basis of the data from THI researchers and other groups, the American Heart Association (AHA) and American College of Cardiology have recently recommended that cardiovascular patients receive an annual influenza vaccination. Nevertheless, many cardiologists overlook influenza's role in promoting cardiovascular death.

"In addition to receiving a flu shot," says Dr. Madjid, "cardiovascular patients and others at high risk should be given statins, beta blockers, aspirin, angiotensin-converting enzyme inhibitors, or other agents intended to stabilize plaque. In patients who contract influenza, the antiviral drug oseltamivir can reduce the risk of AMI and IHD. A new study by our group, reported at the recent AHA meeting, showed that use of oseltamivir after influenza reduces the risk of stroke and transient ischemic attack in susceptible subjects. These measures will be especially important in the event of a flu pandemic, which many experts believe is long overdue." ●

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Cover: Sculpture donated by classical pianist Van Cliburn 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

Cardiac Arrhythmia Symposium
February 16, 2008 • Houston, Texas
Program Director: Ali Massumi, MD

Adult Congenital Heart Disease Symposium
March 1, 2008 • Houston, Texas
Program Director: Wayne Franklin, MD

Eighth Texas Update in Cardiovascular Advancements
July 25–26, 2008 • Houston, Texas
Program Director: James T. Willerson, MD

Selected Upcoming National and International Meetings

Society of Thoracic Surgeons 44th Annual Meeting
January 28–30, 2008 • Fort Lauderdale, Florida

American College of Cardiology 57th Annual Scientific Sessions
March 28–April 1, 2008 • Chicago, Illinois

International Society for Heart and Lung Transplantation 28th Annual Meeting and Scientific Sessions
April 9–12, 2008 • Boston, Massachusetts

American Surgical Association 128th Annual Meeting
April 24–26, 2008 • New York, New York
Abstract submission ends: November 30, 2007

Society of Cardiovascular Anesthesiologists 30th Annual Meeting and Workshops
June 18–22, 2008 • Vancouver, British Columbia, Canada
Abstract submission ends: January 28, 2008

Western Thoracic Surgical Association 34th Annual Meeting
June 25–28, 2008 • Kona, Hawaii
Abstract submission ends: January 7, 2008

American Heart Association Scientific Sessions 2008
November 8–12, 2008 • New Orleans, Louisiana
Abstract submission: April 15–May 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 17 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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