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The Department of Thoracic and Cardiovascular Surgery is pleased to present our 9th edition of *Outcomes*. As you will see, the increasing effectiveness of pharmacologic and interventional therapies for treating coronary artery disease has meant a decline in the number of open operations for isolated coronary artery disease. However, the data also document our increasing dedication to treating valvular and aortic disease, end-stage cardiac and pulmonary failure, rhythm disturbances. Also, esophageal disorders, in addition to coronary artery disease. Furthermore, many patients have combinations of pathologies, and the therapeutic techniques used to treat these conditions have become more varied.

The availability of multiple therapeutic strategies is an advantage for patients, but the increased number of options can make choosing the optimal strategy more confusing for them and even for physicians. The principle that Cleveland Clinic was founded on in 1921—collaboration among physicians to choose the best therapeutic option for each patient—is the same principle that guides our practice today, and it becomes even more important with the passage of time and with the multidisciplinary nature of patient care. We continue to strive for proficiency in all areas and with all techniques so that we can both choose the right approach and carry it out effectively. We hope you will find this information interesting and useful, and we look forward to a continued collaboration with you so that, together, we can provide your patients with the best possible outcomes.



Bruce W. Lytle, M.D.
Chairman, Department of Thoracic
and Cardiovascular Surgery



Opening Fall 2008

THE NEW HEART OF CLEVELAND CLINIC

Construction of the new, one million square foot Heart and Vascular Institute is expected to be completed in 2008. The 10-story hospital tower and technology center will feature:

The Sydell and Arnold Miller Family Pavilion: The new gateway and main entrance to Cleveland Clinic, the Sydell and Arnold Miller Family Pavilion will feature outpatient diagnostic facilities, including 115 examination rooms and 170 physician offices. There also will be laboratories and other clinical facilities to support our many specialty areas.

Technology Building: Surgeons and cardiologists will carry out complex and highly technical procedures, and patients will receive around-the-clock intensive care. The Technology Building will feature:

- 16 cardiothoracic operating rooms
- 12 cardiac catheterization labs
- 8 electrophysiology labs
- combined catheterization, electrophysiology, surgery preparation, and recovery area
- a hospital unit for patients to recover from same-day procedures
- 4 specialized intensive care units, including a coronary intensive care unit, a heart failure intensive care unit, and two surgical intensive care units
- cardiac radiology and nuclear medicine facilities



Hospital Tower: Inpatient facilities will feature 288 hospital beds (most in private rooms), with a focus on amenities that promote our “healing hospitality” concept of patient care.

Fully Equipped Conference Center: Telemedicine, satellite video, and digital imaging capabilities will enable doctors from around the world to meet, confer, and share knowledge.

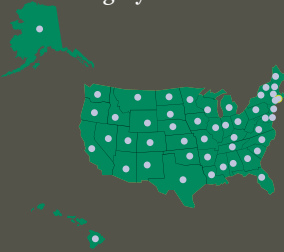


Overview



50 States

In 2006, patients from every state in the country came to Cleveland Clinic for their cardiothoracic surgery.



26 Countries

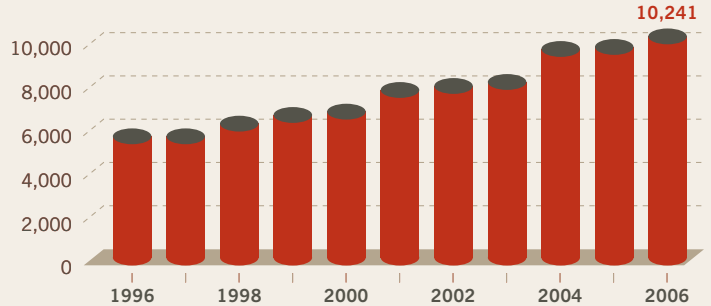
In 2006, patients from 26 different countries traveled to Cleveland Clinic for their cardiothoracic surgery.



SURGICAL VOLUME

The Department of Thoracic and Cardiovascular Surgery performs a high volume and variety of procedures. In 2006, the department and its affiliates performed 10,241 surgical procedures.

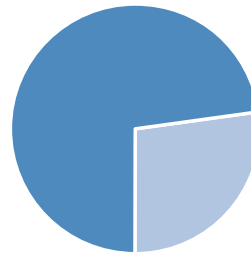
Improved clinical outcomes are demonstrably linked to centers with high surgical volumes.



DISTRIBUTION OF PRIMARY OPERATIONS AND REOPERATIONS

At Cleveland Clinic main campus, 3,439 cardiac procedures were performed for acquired heart disease. 27% of these were reoperations, which are generally more complex and entail greater risk than primary operations. Extensive experience with reoperations benefits patients and can ensure better outcomes.

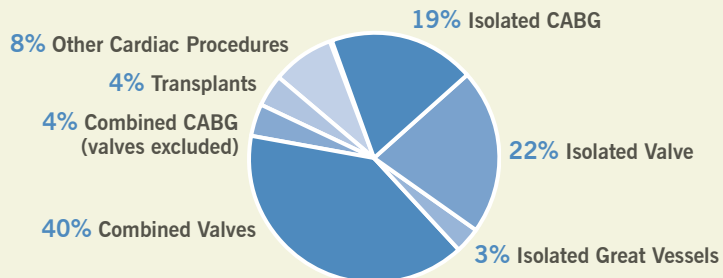
73% Primary Operations



27% Reoperations

DISTRIBUTION OF CARDIAC PROCEDURES

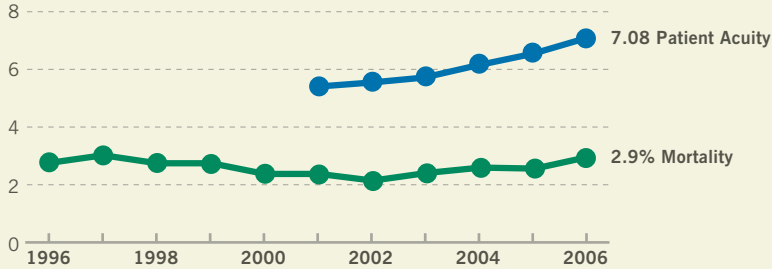
Cleveland Clinic also has one of the nation's largest experiences with a variety of cardiac procedures. Isolated valve and combined valve operations accounted for 62% of total cardiac surgical volume in 2006.



CABG: Coronary artery bypass grafting

HOSPITAL MORTALITY

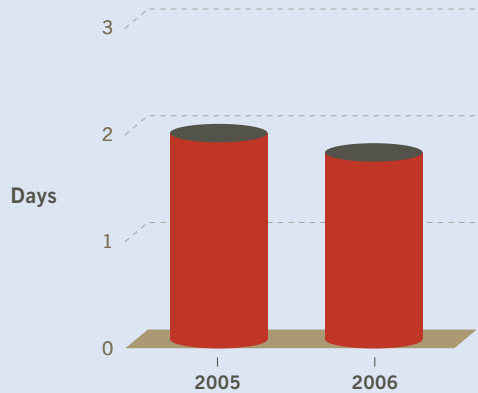
Hospital mortality for all cardiac surgical procedures in 2006 was only 2.9%, despite the increase in patient acuity.



SEVERITY-ADJUSTED LENGTH OF STAY

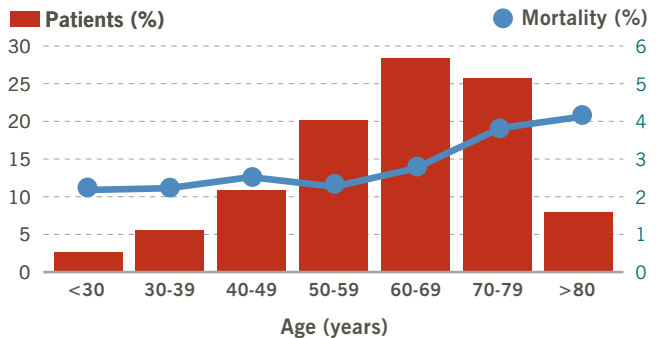
A team-based approach to managing patients postoperatively produces optimal clinical results and hospital efficiencies. In 2006, Cleveland Clinic achieved a 10% reduction in cardiac surgery length of stay, adjusted by severity indices.

Severity-adjusted length of stay adjusts for the severity of patients' underlying medical conditions.



AGE-RELATED OUTCOMES

Cleveland Clinic treats a large number of elderly patients. Advanced age and associated medical conditions are known risk factors that can adversely affect cardiac surgical outcome.



Coronary Disease

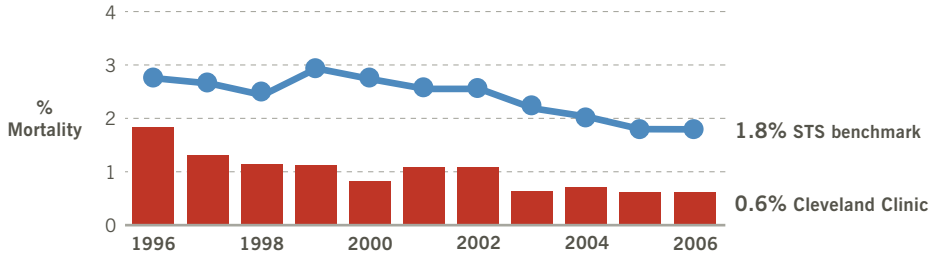


0%

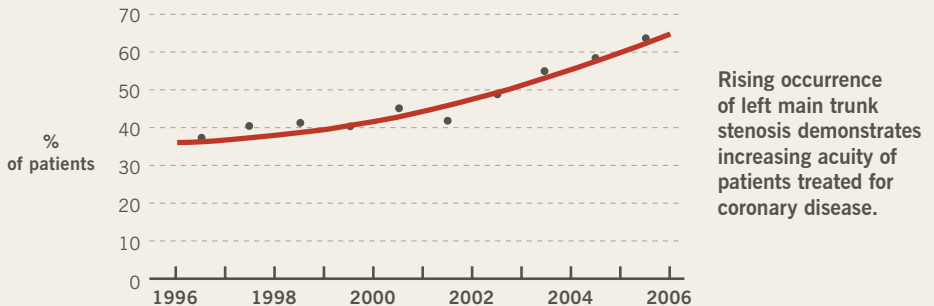
Mortality for reoperative CABG in 2006

PRIMARY ISOLATED CABG

Primary isolated CABG refers to a patient's first coronary artery bypass surgery when performed without any other procedure. In 2006, Cleveland Clinic surgeons performed 538 primary isolated CABG procedures. Mortality was 0.6%, well below the national benchmark established by The Society of Thoracic Surgeons' (STS) national database.

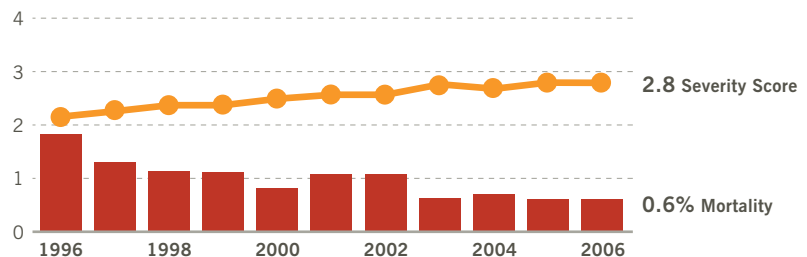


LEFT MAIN TRUNK STENOSIS



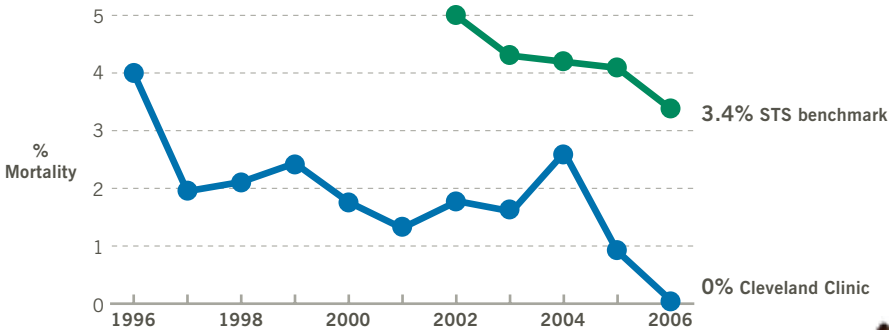
SEVERITY SCORE AND MORTALITY

Severity score is assigned before surgery based on the presence of patient conditions known to lead to complications and high risk of death after surgery. Cleveland Clinic performs a large volume of primary isolated CABG operations on high-risk patients with greater mean severity scores, yet mortality remains low.



REOPERATIVE MORTALITY

Isolated CABG reoperation is often associated with increased mortality. However, in 2006, mortality for this procedure at Cleveland Clinic was 0%.



Reoperative Coronary Bypass

Cardiac CT: Computed tomography images are used in planning the optimal approach to heart surgery in patients who have had a previous open-heart operation.



ARTERIAL GRAFTS

Arterial grafts are known for their excellent long-term patency and are the conduits of choice for coronary revascularization.

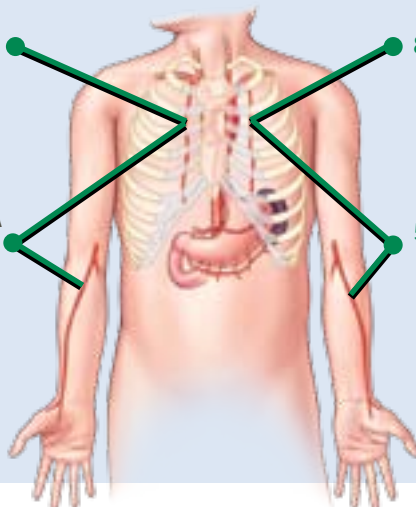
93% of patients undergoing isolated CABG at Cleveland Clinic received at least one internal thoracic artery (ITA) graft. Other arteries are also available for use as conduits, including the radial, gastroepiploic, and inferior epigastric arteries. Radial arteries are now the second most common arterial conduits used for CABG.

9% Bilateral ITA

84% Single ITA

2% Bilateral ITA + Radial

5% Single ITA + Radial



Valve Disease

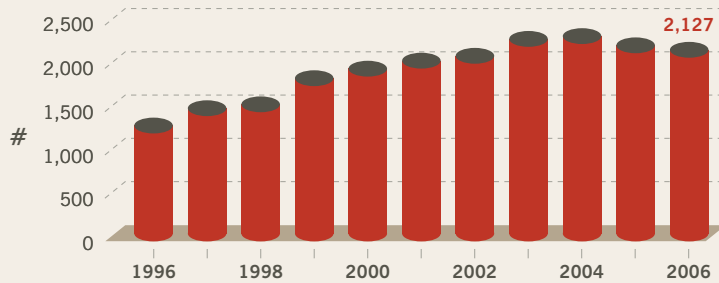


104

Valve operations performed for the treatment of endocarditis in 2006. 73 procedures were for native valve disease, 18 for prosthetic valve disease, and 13 for combined native and prosthetic valve disease.

VALVE PROCEDURE VOLUME

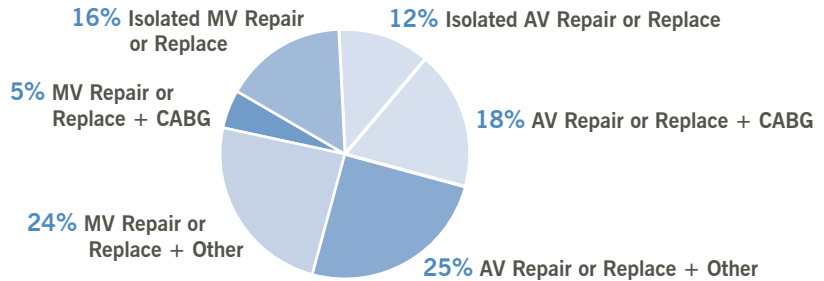
Cleveland Clinic continues to perform the largest number of valve procedures in the United States. In 2006, Cleveland Clinic surgeons performed 2,127 valve procedures—1,524 primary operations and 603 reoperations.



Despite increasing complexity of procedures, hospital mortality for primary valve operations was only 1.7% in 2006.

DISTRIBUTION OF PRIMARY VALVE PROCEDURES

Cleveland Clinic has broad surgical experience with complex valve procedures. 72% of patients undergoing primary valve operations also had other, concomitant procedures.



Key: AV=aortic valve; MV=mitral valve

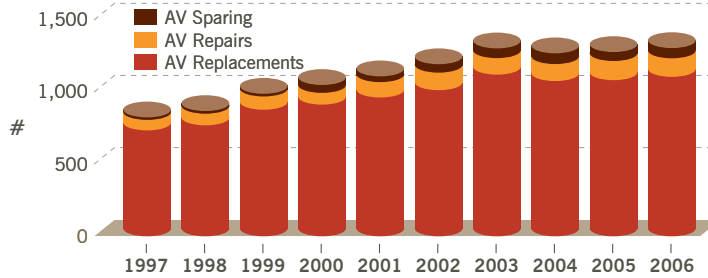


142

Number of modified David procedures performed at Cleveland Clinic. During a modified David operation, the aortic valve is spared by reimplanting it into a new tube conduit. With this type of repair, anticoagulation is not required.

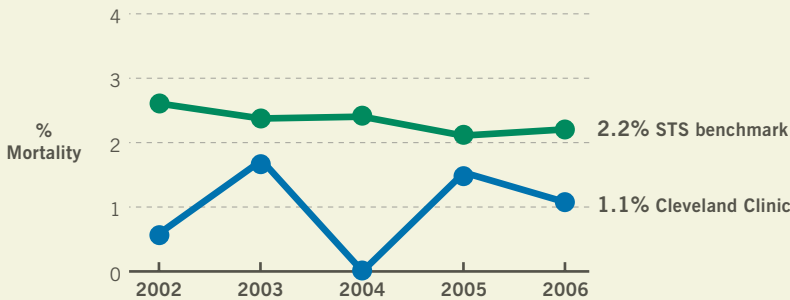
AORTIC VALVE PROCEDURES

In 2006, 89% of our aortic valve surgeries were valve replacements, and 11% were repairs.



PRIMARY ISOLATED AORTIC VALVE REPLACEMENT

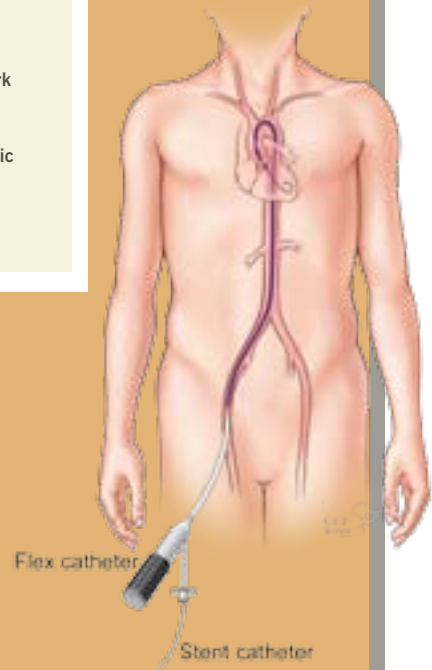
Mortality for primary isolated aortic valve replacement at Cleveland Clinic in 2006 was 1.1%. This is below The Society of Thoracic Surgeons' (STS) benchmark of 2.2%.



PERCUTANEOUS AORTIC VALVE REPLACEMENT

Cleveland Clinic is one of three centers nationwide designated by the U.S. FDA as a study site to evaluate percutaneous aortic valve replacement as a treatment for elderly patients with severe aortic valve stenosis. These patients are highly symptomatic but generally not surgical candidates because of multiple comorbidities. The procedure involves placing the valve via catheters rather than open incisions.

The multi-center trial included 55 patients, with a mortality of 7.2% and stroke occurrence of 9.0%. No deaths or strokes occurred at Cleveland Clinic.



Valve Disease



MITRAL VALVE REPAIR WITH ANNULOPLASTY RING

Cleveland Clinic research has shown that mitral valve repair is durable and has a long-term survival advantage compared with valve replacement.

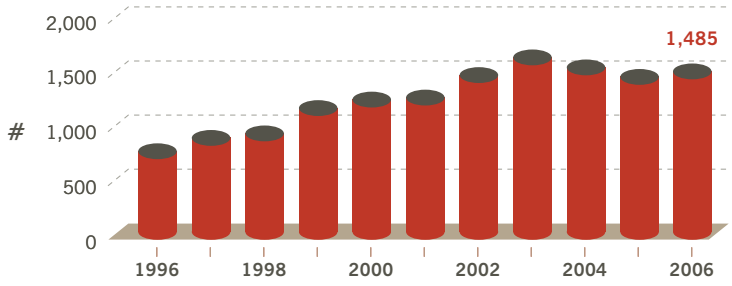
0% Mortality

Hospital mortality was 0% for primary isolated mitral valve repair in 2006.

11,035

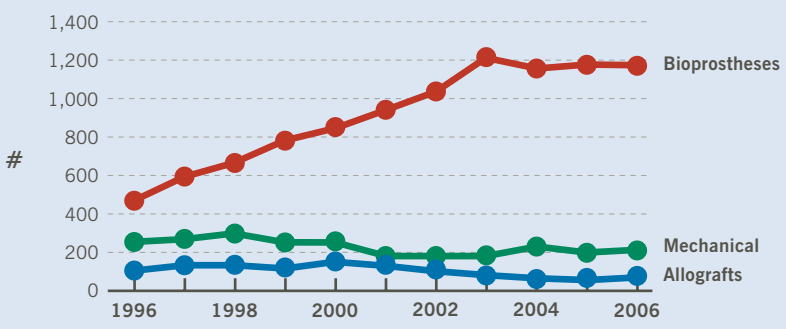
Number of mitral valve repairs performed for mitral regurgitation since Cleveland Clinic began performing the procedure.

COMBINED VALVE SURGERIES



Cleveland Clinic has vast experience with complex combined valve procedures, including multiple valve repair/replacement, valve repair/replacement with CABG, valve repair/replacement with aorta surgery, and valve repair/replacement with other cardiac procedures.

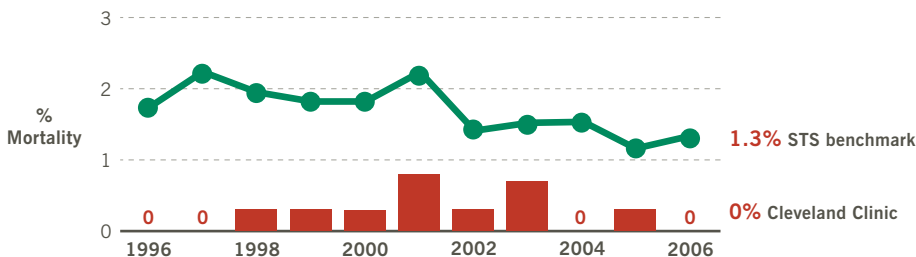
AORTIC & MITRAL VALVE PROSTHESES



Bioprostheses (tissue valves) have emerged as our prostheses of choice for both aortic and mitral valve replacement. These valves are durable and allow patients to avoid lifetime use of anticoagulants.

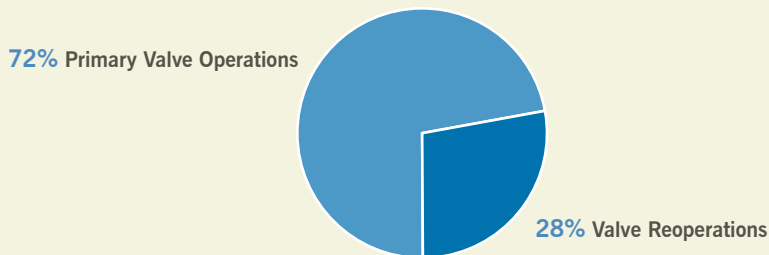
ISOLATED MITRAL VALVE REPAIR

In 2006, Cleveland Clinic performed 242 primary isolated mitral valve repairs. Mortality was 0%, well below The Society of Thoracic Surgeons' (STS) benchmark of 1.3%.



PRIMARY VALVE OPERATIONS VERSUS VALVE REOPERATIONS

Cleveland Clinic has expertise in complicated valve reoperations. In 2006, reoperations accounted for nearly one third of all valve operations.



Use of high-resolution imaging is quickly changing diagnostic strategies for structural cardiovascular disease.

Postoperative volume-rendered four-dimensional CT scans of aortic and mitral valve prostheses as an example of longitudinal monitoring of the integrity of heart valve prostheses. The patient, a 78-year-old man with rheumatic heart disease and severe left ventricular dysfunction, had a bileaflet mechanical aortic prosthesis (top) placed 29 years after mitral valve replacement with a ball-in-cage prosthesis (bottom).



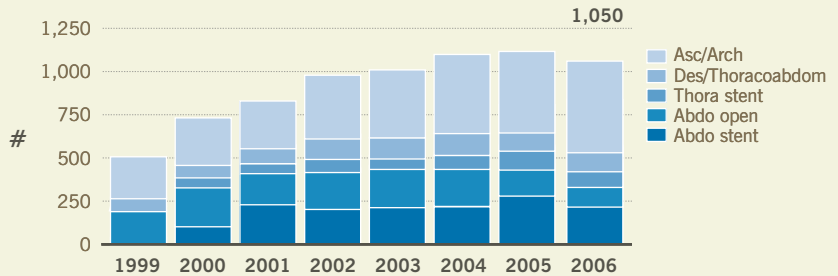
58

Number of repair procedures performed for acute aortic dissection at Cleveland Clinic in 2006. Mortality was 3.4%.



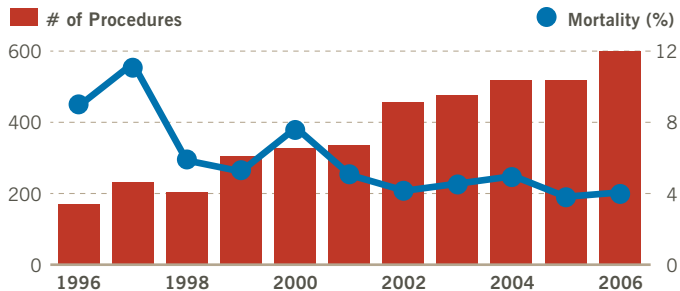
THORACIC AORTIC PROCEDURES

A variety of aortic procedures are performed at Cleveland Clinic. Ascending aorta, aortic arch, descending aorta, thoracoabdominal repairs, and thoracic aorta endovascular stent graft procedures are all performed by a multidisciplinary team.



OPEN GREAT VESSEL PROCEDURE MORTALITY

In 2006, mortality for open great vessel procedures remained low.



717 Number of thoracic aorta repairs performed at Cleveland Clinic in 2006

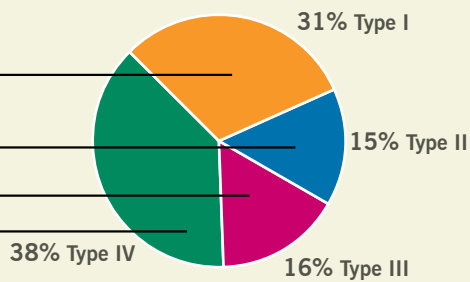
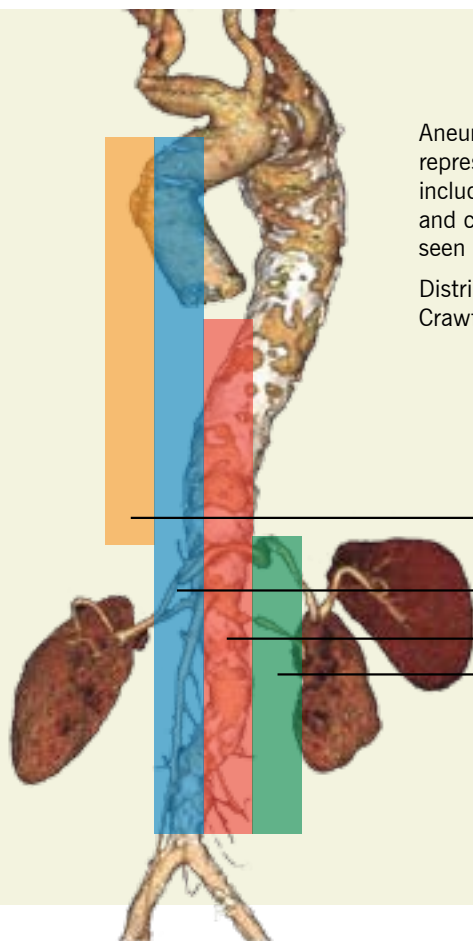
ENDOVASCULAR PROCEDURE

Cleveland Clinic surgeons are now able to treat some thoracic and thoracoabdominal aneurysms using innovative endovascular approaches. This image was taken 6 months after endovascular repair of a thoracoabdominal aneurysm involving branch grafts into the celiac, superior mesenteric, and both renal arteries.



Aneurysms that involve some or all of the visceral arteries represent the most challenging cases. Various etiologies, including degenerative aneurysms, chronic aortic dissections, and collagen vascular deficiency syndromes, are all commonly seen at Cleveland Clinic.

Distribution of the anatomic segments involved is depicted, by Crawford Classification, below.



Minimally Invasive

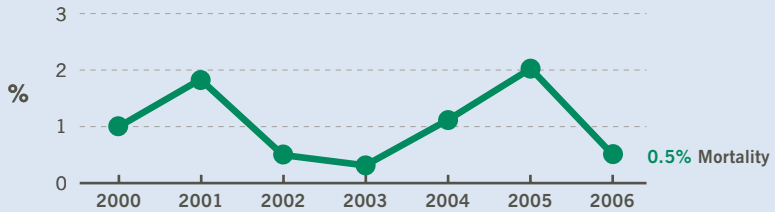


6,015

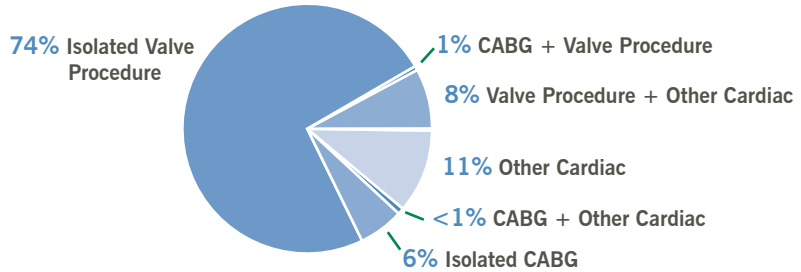
Number of minimally invasive cardiac surgeries performed by Cleveland Clinic heart surgeons since 1995

MINIMALLY INVASIVE SURGERY MORTALITY

In 2006, 401 minimally invasive cardiac surgical procedures were performed at Cleveland Clinic.



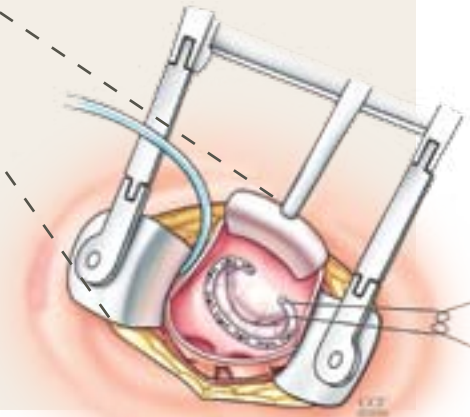
DISTRIBUTION OF MINIMALLY INVASIVE CARDIAC PROCEDURES: 1995-2006



65%

Percentage of isolated aortic valve replacements performed via a minimally invasive approach

MINIMALLY INVASIVE THORACOSCOPIC VIDEO-ASSISTED MITRAL/TRICUSPID VALVE PROCEDURE



Video-assisted mitral/tricuspid valve surgery is a minimally invasive technique enabling valve repair or replacement to be performed without sternotomy. Cleveland Clinic cardiac surgeons use this technique primarily on patients requiring mitral valve replacement, mitral valve repair for degenerative prolapse, or tricuspid valve repair.

Robotically Assisted Heart Surgery



Robotically assisted mitral valve repair represents a novel, minimally invasive approach in treatment of mitral regurgitation (leaky mitral valve). This approach allows performance of complex mitral valve repairs with the least amount of trauma to the patient. The operation is performed through a small incision on the right side of the chest, without the need for the division of the breast bone. This operation is suitable for all patients with mitral valve regurgitation.

A Virtuoso Performance

West Virginia resident Scott Beard was able to experience the advantages of robotically assisted surgery firsthand, as cardiac surgeon Tomislav Mihaljevic, M.D., used the procedure to repair his mitral valve.

Although Mr. Beard was asymptomatic, his condition was severe and required immediate surgery. All things considered, the timing was perfect. Mr. Beard, a concert pianist and university professor, scheduled his surgery during winter break, so he was able to return to work just as the new semester started. Within a week, he was back at the piano.



One concern was a much-anticipated performance at Carnegie Hall's Weill Recital Hall on February 15. But when Mr. Beard was able to perform just 6 weeks after surgery, he knew he would be ready for his Carnegie Hall debut.

Traditional Sternotomy



Minimally Invasive Right Thoracotomy



Minimally invasive surgery offers a better cosmetic outcome and can reduce blood loss, pain, trauma, chance of infection, and length of hospital stay.

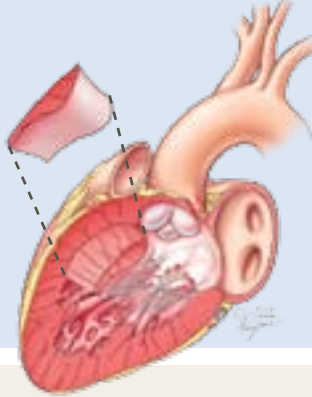
Cardiomyopathy



1,052

Number of septal myectomies performed at Cleveland Clinic since 1995. Cleveland Clinic is one the most experienced centers in the world for surgical treatment of hypertrophic obstructive cardiomyopathy.

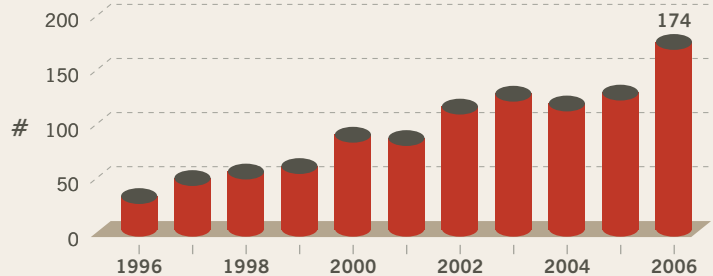
Hypertrophic obstructive cardiomyopathy (HOCM) is thickening of the lower chambers of the heart, especially of the septal tissue, which separates the right and left chambers. This condition may cause decreased blood flow from the heart to the aorta.



Septal myectomy: The surgeon removes a wedge of thickened septal tissue so that blood can flow more easily from the lower chamber to the aorta.

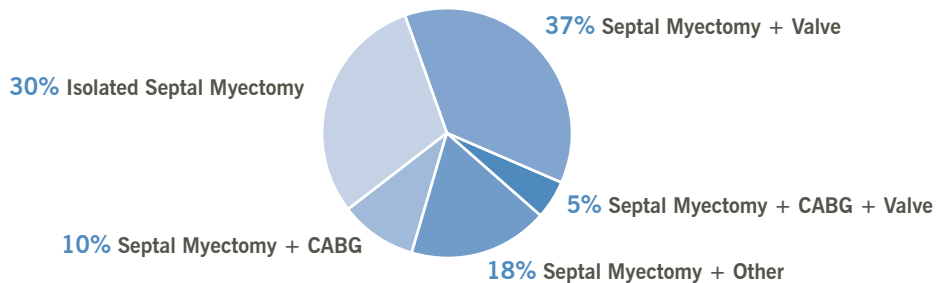
SEPTAL MYECTOMY VOLUME

The volume of septal myectomies performed at Cleveland Clinic in 2006 increased 37% from the previous year.



SEPTAL MYECTOMY & CONCOMITANT PROCEDURES

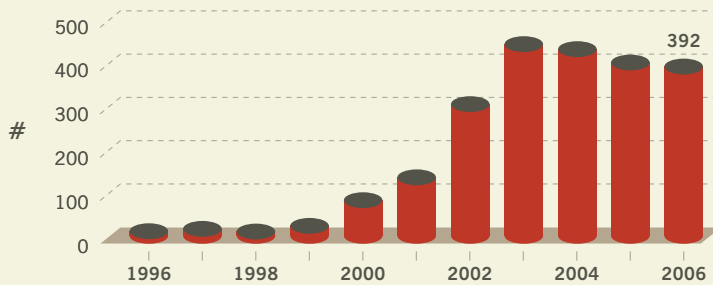
HOCM is an uncommon but serious problem, especially when associated with mitral valve dysfunction. 42% of septal myectomies were performed in conjunction with a valve procedure.



Atrial Fibrillation

ATRIAL FIBRILLATION PROCEDURES

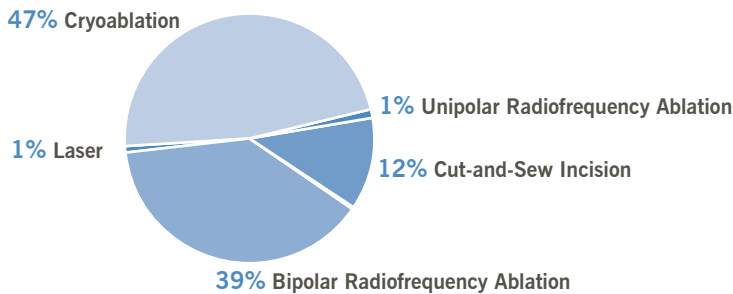
In 2006, 392 surgical procedures to treat atrial fibrillation were performed at Cleveland Clinic. New surgical techniques allow surgeons to successfully treat this common but potentially life-threatening condition.



\$2 Million

Investment in state-of-the-art research facility at Cleveland Clinic by the Atrial Fibrillation Innovation Center, an Ohio Wright Center of Innovation supported by a grant from the State of Ohio's Third Frontier Project.

DISTRIBUTION OF ATRIAL FIBRILLATION SURGICAL TECHNIQUES



LEFT ATRIAL APPENDAGE LIGATION

Physicians and researchers at Cleveland Clinic have developed a ligation device for clipping and isolating the left atrial appendage. Clinical trials of this device are anticipated to begin in 2007.



Heart Transplant



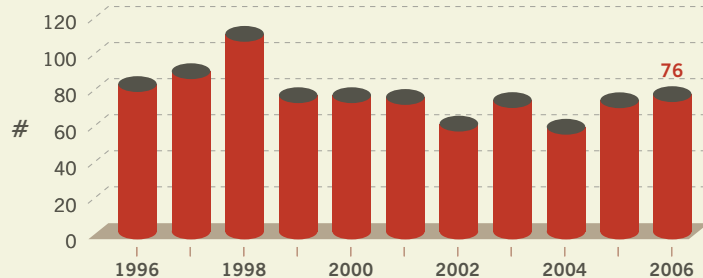
1,285

Heart transplants performed at Cleveland Clinic since inception of the Cardiac Transplant Program



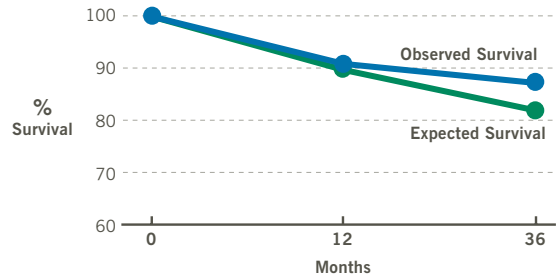
HEART TRANSPLANT VOLUME

Cleveland Clinic's Cardiac Transplant Program was established in 1984 and has become a recognized leader in the field. In 2006, 76 heart transplants were performed (including two heart-lung and one heart-liver).



HEART TRANSPLANT SURVIVAL

The January 2007 report of the Scientific Registry of Transplant Recipients (SRTR) demonstrates Cleveland Clinic achieved better-than-expected survival.



Combined Heart-Liver Transplant

On November 14, 2006, Lorene Parker became an Ohio "medical first." After an 11-hour operation involving several teams of surgeons, the 50-year-old Michigan resident became Ohio's first heart-liver transplant recipient.

Ms. Parker, a former cardiac nurse, developed cardiomyopathy, possibly as a result of a viral infection. She was already being treated for hepatitis C, which she contracted from a needle stick at work. When it became apparent that she would need a heart transplant, she was told her liver would need to be transplanted simultaneously; the immunosuppressive therapy for her new heart would destroy her liver otherwise.

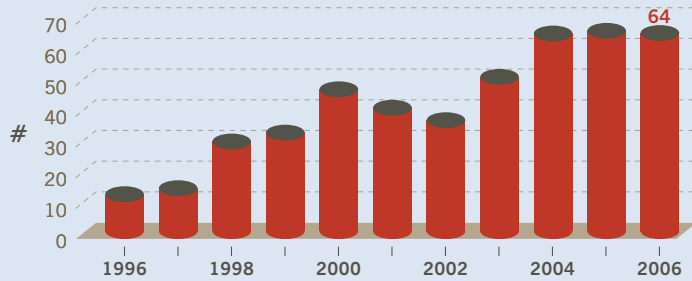
Cardiothoracic surgeon Nicholas Smedira, M.D., transplanted Ms. Parker's heart, and general surgeon Charles Miller, M.D., transplanted the liver. Since Cleveland Clinic's heart transplant program began in 1984, more than 1,200 hearts have been transplanted. Cleveland Clinic's liver transplant program recently performed its 1,000th transplant.



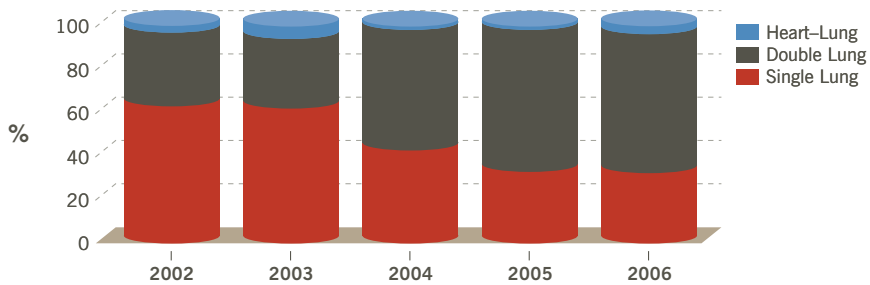
Lung Transplant

LUNG TRANSPLANT VOLUME

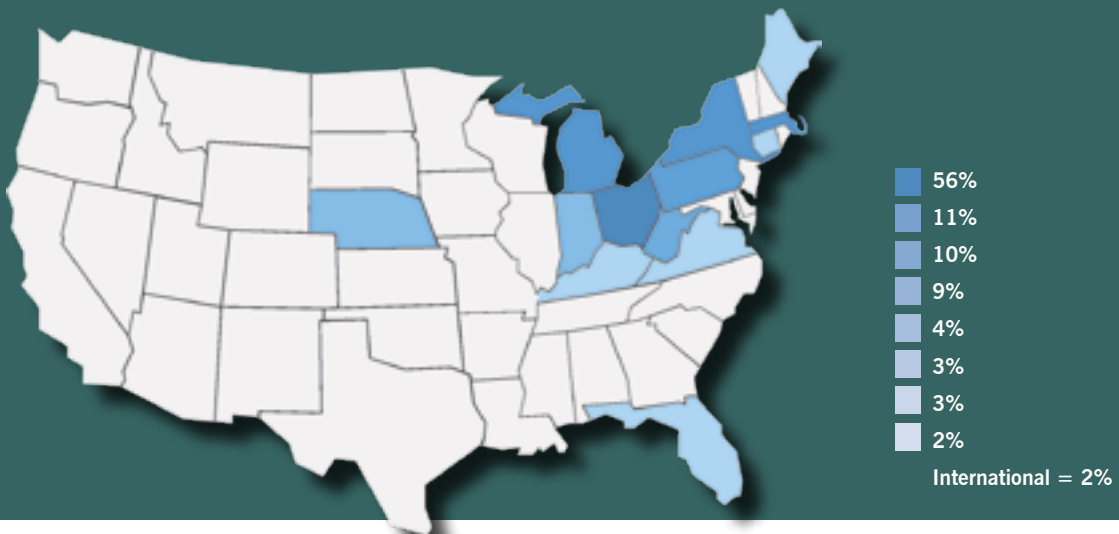
2006 was another successful year for Cleveland Clinic's Lung Transplant Program, with 64 transplants performed.



DISTRIBUTION OF LUNG TRANSPLANT PROCEDURES



2006 DISTRIBUTION BY STATE, HEART TRANSPLANTS AND LUNG TRANSPLANTS (N=140)



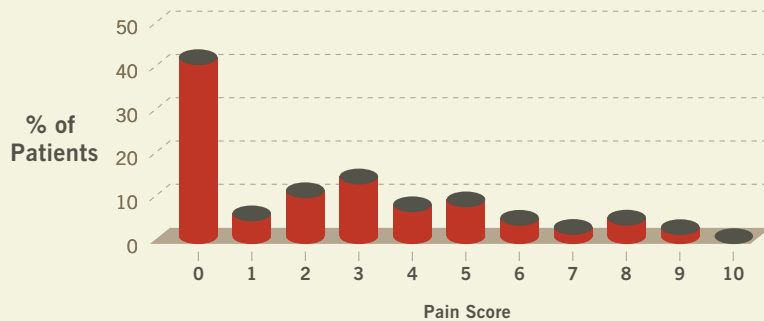


16

Number of advanced cardiothoracic anesthesia fellowship physicians trained annually – the country's largest program

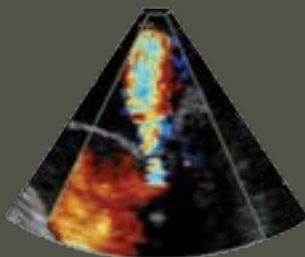
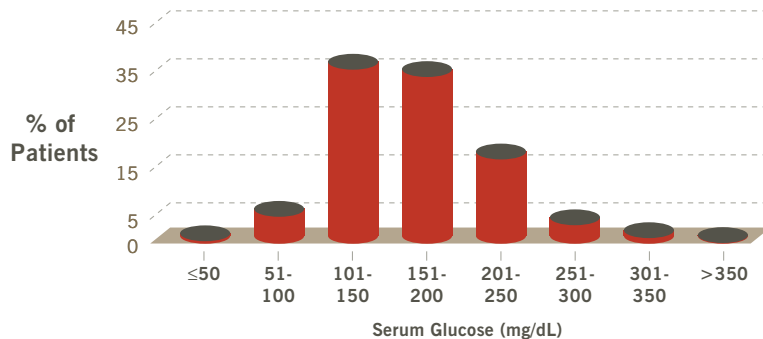
PAIN MANAGEMENT

Cleveland Clinic cardiothoracic anesthesiologists strive to ensure that patients are comfortable postoperatively. A survey of open thoracotomy lung surgery patients found that 63% were pain free or had only mild pain (pain score of 3 or less) 24 hours after surgery.



PERIOPERATIVE SERUM GLUCOSE IN CARDIAC SURGERY PATIENTS

Perioperative control of glucose levels is associated with improved outcomes in all cardiac surgery patients, particularly those with diabetes. 98% of patients receive continuous, intraoperative infusions to achieve this goal. In 2006, a tighter, more desirable range of glucose levels was achieved.

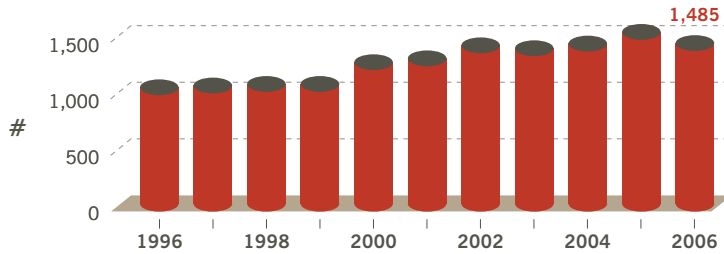


TRANSESOPHAGEAL ECHOCARDIOGRAPHY

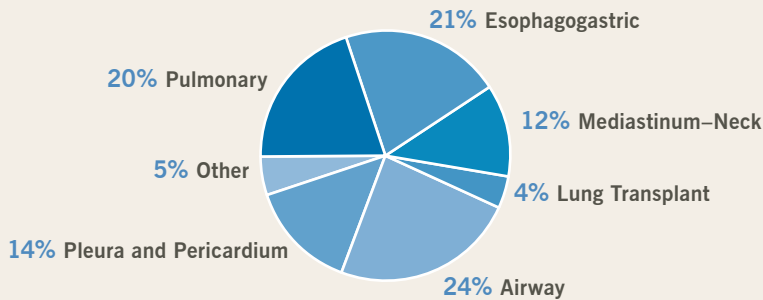
TEE is performed routinely in patients undergoing cardiac surgery at Cleveland Clinic. It is particularly valuable for image-based intraoperative guidance of mitral and aortic valve repair, including for infective endocarditis, and septal myectomy for hypertrophic cardiomyopathy.

GENERAL THORACIC SURGERY

In 2006, Cleveland Clinic thoracic surgeons performed 1,487 procedures. A high volume of operative procedures translates into depth of clinical expertise.

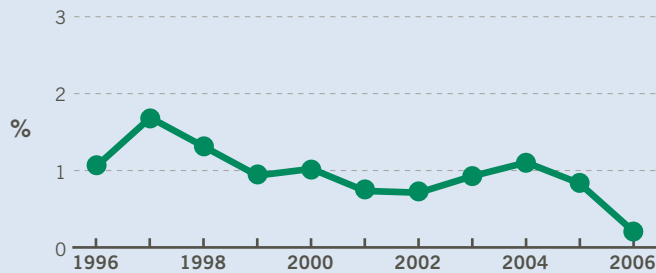


DISTRIBUTION OF THORACIC PROCEDURES



MORTALITY

Overall mortality decreased to 0.2% in 2006, despite the increasing complexity of procedures and comorbid illnesses.



Affiliate Programs



Cleveland Clinic heart surgery Affiliate Programs experienced another successful year, providing outstanding surgical care close to home. Two new clinical affiliations were established: Chester County Hospital in West Chester, Pennsylvania, and the Swedish Heart and Vascular Institute in Seattle, Washington. Overall, the Affiliate Programs contributed 5,111 cases to Cleveland Clinic's total surgical volume—3,076 cardiac procedures, 1,337 thoracic procedures, and 698 other procedures (vascular and pacemaker). Cleveland Clinic and its Affiliate Programs have found that sharing standard clinical protocols, quality management, and efficiencies in administrative practice is mutually beneficial for the clinical staff and patients at each respective hospital.

EMH REGIONAL MEDICAL CENTER
ELYRIA, OHIO



FAIRVIEW HOSPITAL
FAIRVIEW, OHIO



HILLCREST HOSPITAL
MAYFIELD HEIGHTS, OHIO



LAKEWEST HOSPITAL
WILLOUGHBY, OHIO



METROHEALTH MEDICAL CENTER
CLEVELAND, OHIO



ROCHESTER GENERAL HOSPITAL
ROCHESTER, NEW YORK



CLEVELAND CLINIC HOSPITAL
WESTON, FLORIDA



2006 — New affiliates



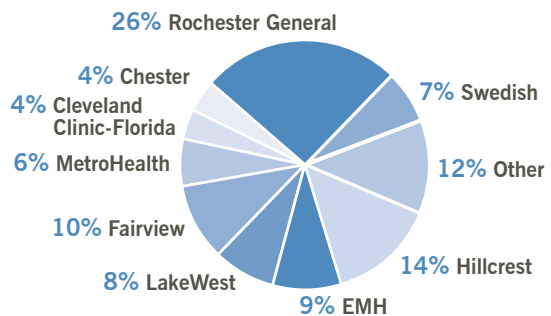
CHESTER COUNTY HOSPITAL
WEST CHESTER, PENNSYLVANIA



SWEDISH HEART AND VASCULAR INSTITUTE
SEATTLE, WASHINGTON

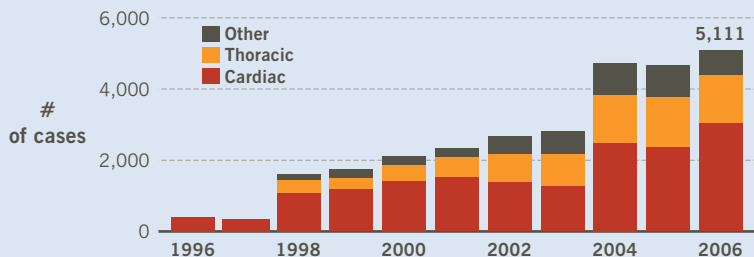
AFFILIATE VOLUME DISTRIBUTION

Greater Cleveland affiliates accounted for 59% of the total affiliate case volume, and our out-of-state affiliates accounted for 41%.





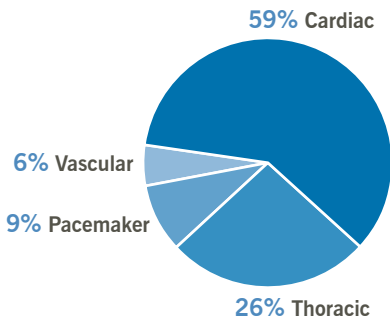
AFFILIATE VOLUME: ALL PROCEDURES



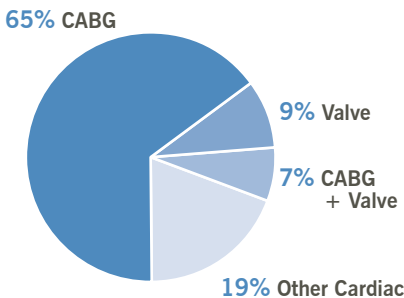
1,976

Number of CABG procedures performed by the Affiliate Programs in 2006

AFFILIATE TOTAL CASE DISTRIBUTION



AFFILIATE CARDIAC CASE DISTRIBUTION

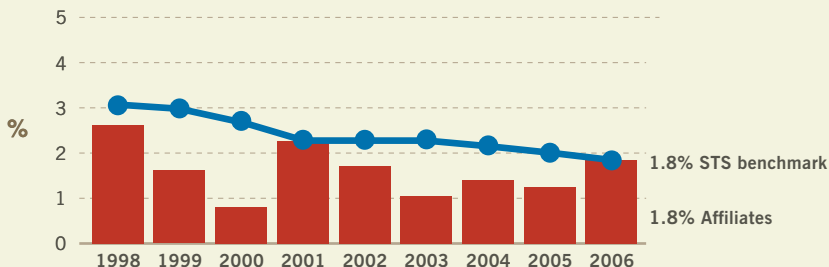


9,683

Number of STS patient-level records collected by the Thoracic and Cardiovascular Surgery Affiliate Programs since 2000

AFFILIATE MORTALITY FOR ISOLATED CABG

Hospital mortality for isolated CABG matched The Society of Thoracic Surgeons' (STS) benchmark.



Patient Experience



2.7
million

Number of visitors to the Heart and Vascular Institute web site in 2006. This represents a 35% increase over 2005.

6
million

Number of Heart and Vascular Institute web site pages viewed by visitors in 2006. This represents a 38% increase over 2005.

ONLINE NURSE CHATS

Our personalized “Chat Online with a Nurse” feature was added to the Heart and Vascular Institute web site (www.clevelandclinic.org/heart) in November 2006.

This technology allows web users to correspond online with a cardiovascular registered nurse in “real-time” through a secure connection, during designated hours.

Our nurses are available to provide information, not to diagnose conditions. They can simultaneously chat and direct the user to specific web pages for more information. The user can choose to remain anonymous, and the correspondence is strictly confidential.

In just a little over a month, the nurses chatted with 437 individuals.



SPECIAL ASSISTANCE FOR OUT-OF-STATE PATIENTS

The Cleveland Clinic's Medical Concierge program is a complimentary service for patients who travel to Cleveland Clinic from outside Ohio. Our patient care representatives facilitate and coordinate the scheduling of multiple appointments; provide access to discounts on airline tickets and hotels, when available; make reservations for hotel or housing accommodations; and arrange leisure activities.



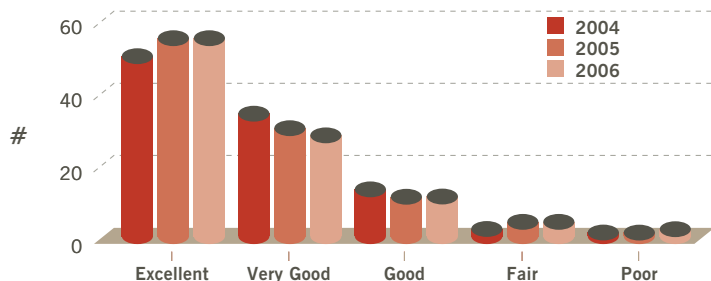
HEART AND VASCULAR RESOURCE AND INFORMATION CENTER NURSES

The Heart and Vascular Institute Resource and Information Center is staffed by cardiovascular registered nurses who are dedicated to providing education and support to patients and families faced with cardiovascular and thoracic disease. Together, our nurses have almost 100 years of cardiovascular nursing experience.

Along with our new chat feature, these nurses are responsible for answering e-mails and phone calls that come into the Heart and Vascular Institute. In 2006, our nurses answered 9,770 e-mails and phone calls.

HOSPITAL SATISFACTION

We ask our patients about their experiences and satisfaction with the services provided by our staff. Although results indicate that we are already providing excellent care, the department is committed to continuous improvement.



We continuously seek feedback from our patients through inpatient and outpatient satisfaction measurement tools.

Rounding the Corner

When museum photographer and lifelong racecar driver Peter Harholdt became sidelined from the racing circuit because of mitral valve prolapse (a condition he was born with) and atrial fibrillation, he knew it was time to act. The Florida resident turned to the Internet and his cardiologist. "All roads led to Cleveland," Mr. Harholdt says. "I discovered that Cleveland Clinic is ranked number one [in the United States] in heart surgery, but what really made me decide was when my doctor told me that he would go to Cleveland Clinic if he needed this surgery."



Cardiothoracic surgeon A. Marc Gillinov, M.D., performed a mitral valve repair and Maze procedure on Mr. Harholdt in November. By January, Mr. Harholdt had returned to his demanding photography business, and by July, he had returned to the racing circuit. "I'm living proof," he says, "that life goes on after heart surgery."





Robotically Assisted Valve Surgery

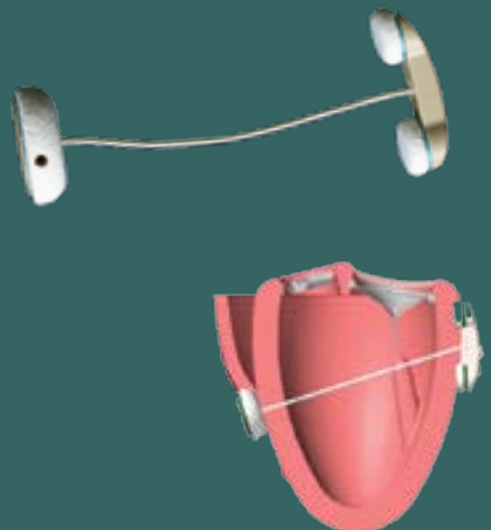
Robotically assisted mitral valve repair represents a novel, minimally invasive approach in treatment of mitral regurgitation (leaky mitral valve). This approach allows performance of complex mitral valve repairs with the least amount of trauma to the patient. The operation is performed through a small incision on the right side of the chest, without the need for division of the breast bone. This operation is suitable for all patients with mitral valve regurgitation.



Tomislav Mihaljevic, M.D., operating the robotic arms

Correcting Mitral Regurgitation

Cleveland Clinic is participating in a large multi-center trial evaluating the Myocor Coapsys® device. This novel instrument is used to correct mitral regurgitation in patients with advanced coronary artery disease and associated functional mitral regurgitation. Mitral regurgitation that is caused by enlargement of the left ventricle is corrected by reduction in the diameter of the left ventricle after placement of the device.



Next-Generation Heart Assist Devices

Cleveland Clinic continues to offer the newest technology available for mechanical circulatory support. We are currently participating in clinical trials for second- and third-generation mechanical circulatory support devices for patients with a failing left ventricle. These devices are compact, easier to implant, and may be used in smaller patients who previously may not have been candidates for this type of support. The devices include Thoratec Corporation's Heartmate® II Left Ventricular Assist System; the MicroMed DeBakey Ventricular Assist Device (VAD)®, and VentrAssist™ by Ventracor.



HeartMate II



DeBakey



VentrAssist

21 Number of ventricular assist devices implanted at Cleveland Clinic in 2006. Cleveland Clinic is one of the leading heart centers using this technology to treat heart failure.

Revolutionary Data Management

Cleveland Clinic has one of the world's largest repositories of clinical research information on cardiac surgery patients, with the first data gathered in 1972. However, current database technology is not well suited for capturing rapidly evolving advances in medical technology and practice and answering new research questions.

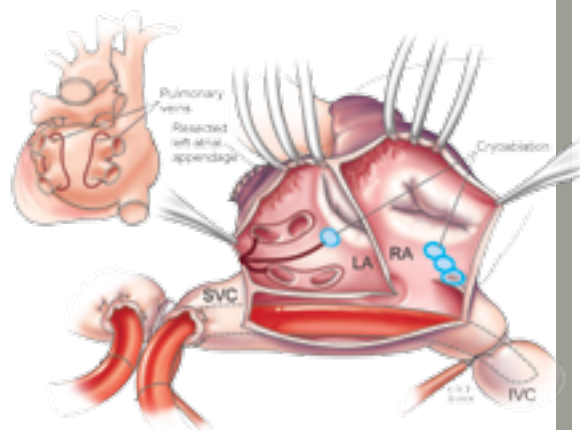
The Cleveland Clinic cardiothoracic research team has developed and implemented a novel data and knowledge management system called SemanticDB™, which permits rapid addition of new types of data. It provides a foundation for computer-based reasoning and advanced data querying for clinical research.



Clinical Research

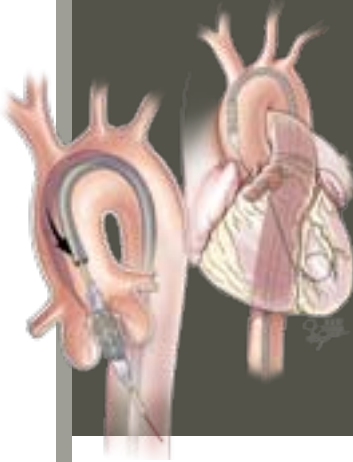
Combined Minimally Invasive Valve Surgery and Ablation

In 2006, Cleveland Clinic surgeons developed a new minimally invasive technique that enables combined mitral valve surgery and ablation of atrial fibrillation through a small chest wall incision. The left and right atrial lesion sets are depicted (blue circles).





Percutaneous Valve Surgery



Cleveland Clinic is one of three centers nationwide designated by the U.S. FDA as a study site for the percutaneous aortic valve technique. The procedure is performed in the cardiac catheterization laboratory under general anesthesia; no chest incision is required, nor is cardiopulmonary bypass. It requires close collaboration among the cardiac surgeon, interventional cardiologist, echocardiologist, and anesthesiologist. Our multidisciplinary Cleveland Clinic team has pioneered several refinements and improvements of the percutaneous aortic valve procedure, including being the first site to:

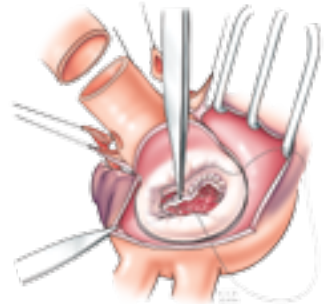
- Utilize the iliac artery
- Treat bicuspid valves
- Place a valve within another valve
- Use 3-D imaging of aortic root to evaluate patients before and after the procedure

Heart Valve Tissue Graft

Cleveland Clinic cardiac surgeons are working with CryoLife Inc., an Atlanta-based biomedical and medical device company, to develop a heart valve tissue graft for patients with serious heart infections.

Currently, the majority of patients receive synthetic implants, which are more prone to infection. This new technology may potentially provide a more infection-resistant treatment option.

Patents covering the tissue preparation methods and implantation techniques have been filed by Cleveland Clinic, as active research and investigation continue.



Total Artificial Heart

As a bridge to a heart transplant, the CardioWest™ total artificial heart by SynCardia Systems remains an option for patients suffering from biventricular failure and those with persistent ventricular arrhythmias. It is a pneumatic, biventricular, implantable system that completely replaces the failing heart.

New Web Features Provide Instant Assistance

Thousands of patients contact the Heart and Vascular Institute each year seeking information about heart disease, treatment options, research, and late-breaking heart news. New functionality added to the Heart and Vascular Institute web site in 2006 allows web visitors to be instantly connected to our highly trained cardiovascular registered nurses via online “chat” or telephone “call back” technology.



NEW! Chat online with a nurse
available 8:30 am-4:00 pm

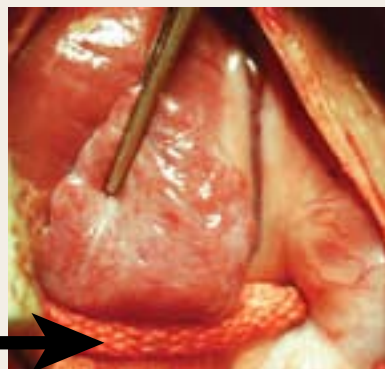
Need Immediate Assistance?
You can chat live with a nurse via a live text chat: **CHAT NOW**

OR have a nurse call you!
CALL ME

This technology provides a secure connection by which resource nurses can simultaneously “chat” and direct the user to specific web pages for more information. The user can choose to remain anonymous, and the correspondence is strictly confidential.

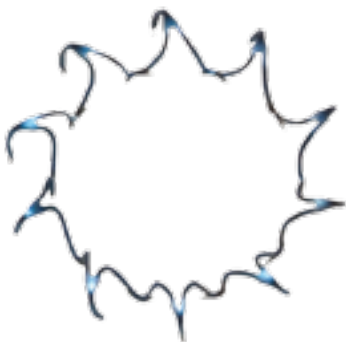
Left Atrial Appendage Ligation

Physicians and researchers at Cleveland Clinic have developed a ligation device for clipping and isolating the left atrial appendage. Clinical trials of this device are under way. Dr. Delos Cosgrove, M.D., and Dr. A. Marc Gillinov, M.D., developed this device in collaboration with medical industry.



Self-Supported Annuloplasty

This complete, self-supported, and semi-flexible mitral and tricuspid annuloplasty stent-ring is introduced percutaneously and deployed using balloon technology. This prosthetic ring allows effective functioning of the valve and reestablishes normal shape and contour of the native annulus. Developed by staff surgeon José L. Navia, M.D., the system will be licensed to a medical device company in Spring 2007.





130

articles published
in peer-reviewed
journals in 2006

W3C

Based on novel
database develop-
ment of our depart-
ment, Cleveland
Clinic was invited to
be the 411th member
of the World Wide
Web Consortium
(W3C).



These articles were selected from 130 published by our staff in 2006. To view the complete listing, please visit the Cleveland Clinic Heart Center website at www.clevelandclinic.org/heartcenter.

VALVULAR HEART DISEASE

Mihaljevic T, Blackstone EH, Lytle BW. Folding valvuloplasty without leaflet resection: Simplified method for mitral valve repair. *Annals of Thoracic Surgery* 2006 Dec;82(6):e46-e48.

We describe a new surgical technique in which the mitral valve repair was accomplished by simply folding the prolapsed segment of the posterior leaflet and inserting a flexible annuloplasty ring.

Roselli EE, Smedira NG, Blackstone EH. Failure modes of the Carpentier-Edwards pericardial bioprosthesis in the aortic position. *Journal of Heart Valve Disease* 2006 May;15(3):421-427.

Perimount bioprostheses rarely fail from design-related causes; rather, they fail at almost equal rates from calcific and non-calcific degeneration, both of which occur late and are age dependent. Further investigation into improved methods for fixation and anti-calcification in preparing these valves is warranted.

Smedira NG, Blackstone EH, Roselli EE, Laffey CC, Cosgrove DM. Are allografts the biologic valve of choice for aortic valve replacement in nonelderly patients? Comparison of explantation for structural valve deterioration of allograft and pericardial prostheses. *Journal of Thoracic and Cardiovascular Surgery* 2006 Mar;131(3):558-564.

In adults across multiple age strata, risk of reoperation for structural valve deterioration after aortic valve replacement was similar for stented bovine pericardial prostheses and allograft valves. This suggests that pericardial valves may be appropriate for nonelderly persons.

ISCHEMIC HEART DISEASE

Brener SJ, Lytle BW, Casserly IP, Ellis SG, Topol EJ, Lauer MS. Predictors of revascularization method and long-term outcome of percutaneous coronary intervention or repeat coronary bypass surgery in patients with multivessel coronary disease and previous coronary bypass surgery. *European Heart Journal* 2006 Feb;27(4):413-418.

Choice of revascularization method in patients with previous CABG is dictated mostly by anatomic considerations and less by clinical characteristics. In contrast, clinical characteristics predominantly affect long-term outcome, but method of revascularization has a limited effect.

Deglurkar I, Mal N, Mills WR, Popovic ZB, McCarthy P, Blackstone EH, Laurita KR, Penn MS. Mechanical and electrical effects of cell-based gene therapy for ischemic cardiomyopathy are independent. *Human Gene Therapy* 2006 Nov;17(11):1144-1151.

Transient reestablishment of stem cell homing via transplantation of modified SKMBs is sufficient to improve cardiac function. However, risk of ventricular tachycardia increased.

Sabik JF, III, Blackstone EH, Gillinov AM, Banbury MK, Smedira NG, Lytle BW. Influence of patient characteristics and arterial grafts on freedom from coronary reoperation. *Journal of Thoracic and Cardiovascular Surgery* 2006 Jan;131(1):90-98.

Arteriosclerosis risk factors increased the likelihood of reoperation, and patient comorbidity and arterial grafting decreased it. Aggressive risk-factor reduction and arterial revascularization should result in fewer coronary reoperations.

CARDIOPULMONARY SUPPORT

Smedira NG, Dyke CM, Koster A, Jurmann M, Bhatia DS, Hu T, McCarthy HL, II, Lincoff AM, Spiess BD, Aronson S. Anticoagulation with bivalirudin for off-pump coronary artery bypass grafting: The results of the EVOLUTION-OFF study. *Journal of Thoracic and Cardiovascular Surgery* 2006 Mar;131(3):686-692.

Bivalirudin, used as an anticoagulant in patients undergoing off-pump CABG, has a safety profile similar to that of heparin with protamine reversal.

HEART FAILURE

Gonzalez-Stawinski GV, Davis RD, Jr. Rituximab as monotherapy for elicited xenoreactive antibody responses. *Journal of Heart and Lung Transplantation* 2006 Dec;25(12):1462-1466.

In a non-human primate model of xenotransplantation, anti-Galalpha-1-3 Gal antibody responses were elicited despite the elimination of B cells by rituximab. These responses seem to be mediated in part by cells lacking common B-cell surface antigens.

Schenk S, McCarthy PM, Blackstone EH, Feng J, Starling RC, Navia JL, Zhou L, Hoercher KJ, Smedira NG, Fukamachi K. Duration of inotropic support after left ventricular assist device implantation: Risk factors and impact on outcome. *Journal of Thoracic and Cardiovascular Surgery* 2006 Feb;131(2):447-454.

Longer inotropic support after left ventricular assist device support, a surrogate for right ventricular dysfunc-

tion, is associated with increased mortality before transplantation. Pre-transplantation right ventricular stroke work index is strongly associated with inotropic support duration and might be useful in decision-making for biventricular support, destination therapy, or total artificial heart.

ATRIAL FIBRILLATION

Gillinov AM, Bhavani S, Blackstone EH, Rajeswaran J, Svensson LG, Navia JL, Pettersson BG, Sabik JF, III, Smedira NG, Mihaljevic T, McCarthy PM, Shewchik J, Natale A. Surgery for permanent atrial fibrillation: Impact of patient factors and lesion set. *Annals of Thoracic Surgery* 2006 Aug;82(2):502-514.

In cardiac surgical patients with permanent atrial fibrillation, the left atrial lesion set should include wide pulmonary vein isolation, at least one connection between right and left pulmonary veins, and a connection to the mitral annulus. Availability of alternative energy sources has virtually eliminated need for the cut-and-sew Cox-maze procedure.

THORACIC AORTA DISEASE

Greenberg RK, West K, Pfaff K, Foster J, Skender D, Haulon S, Sereika J, Geiger L, Lyden SP, Clair D, Svensson L, Lytle B. Beyond the aortic bifurcation: Branched endovascular grafts for thoracoabdominal and aortoiliac aneurysms. *Journal of Vascular Surgery* 2006 May;43(5):879-886.

Branch vessel technology has made it technically feasible to preserve critical end-organ perfusion in the setting of complex thoracoabdominal, suprarenal, and common iliac aneurysms. The relatively low acute mortality rate and lack of short-term branch vessel loss are encouraging.

Greenberg RK, Svensson LG. Hybrid thoracic aneurysm repair. *Endovascular Today* 2006 Feb;5(2):67-72.

Important improvements have been made to the hybrid approach for complex proximal aortic aneurysm repair. Elimination of a thoracotomy, aortic clamping, and extensive exposure will likely render better results and allow a therapeutic option to patients who have historically been relegated to medical management.

Kouchoukos NT, Bavaria JE, Coselli JS, De la Torre R, Ikonomidis JS, Karmy-Jones RC, Mitchell RS, Shemin RJ, Spielvogel D, Svensson LG, Wheatley GH. Guidelines for credentialing of practitioners to perform endovascular stent-grafting of the thoracic aorta. *Journal of Thoracic and Cardiovascular Surgery* 2006 Mar;131(3):530-532.

Cardiothoracic surgeons are encouraged to obtain all of the necessary skills and knowledge to successfully perform endovascular procedures independently, but may elect to participate as part of a team. By combining expertise of physicians of different disciplines, patient safety and the quality of care delivered will be enhanced.

Salemi A, Pettersson GB. Aortic arch reconstruction utilizing a simple reversed graft trimming technique. *Interactive Cardiovascular and Thoracic Surgery* 2006;5(3):247-248.

We describe a simple method for ascending aorta and hemiarch/arch reconstruction that reduces tension, avoids graft kinking, and provides optimal orientation for the proximal anastomosis.

PULMONARY DISEASE

Mason DP, Quader MA, Blackstone EH, Rajeswaran J, DeCamp MM, Murthy SC, Quader AK, Rice TW. Thromboembolism after pneumonectomy for malignancy: an independent marker of poor outcome. *Journal of Thoracic and Cardiovascular Surgery* 2006 Mar;131(3):711-718. Venous thromboembolism is surprisingly common (7.4% prevalence) after pneumonectomy for malignancy. Its incidence peaked at 7 days, with most patients having been discharged and prophylaxis discontinued, and it portended poor long-term survival. Improved screening and better prophylaxis might prevent this complication and enhance outcomes.

Murthy SC, Okereke I, Mason DP, Rice TW. A simple solution for complicated pleural effusions. *Journal of Thoracic Oncology* 2006 Sep;1(7):697-700.

PleurX catheters are safe, effective, and durable solutions for complicated pleural effusions and seem to provide an attractive alternative for patients who have few other palliative options.

PULMONARY TRANSPLANT

Gaca JG, Appel JZ, III, Lukes JG, Gonzalez-Stawinski GV, Leshner A, Palestrant D, Logan JS, Love SD, Holzknecht ZE, Platt JL, Parker W, Davis RD. Effect of an anti-C5a monoclonal antibody indicates a prominent role for anaphylatoxin in pulmonary xenograft dysfunction. *Transplantation* 2006 Jun 27;81(12):1686-1694.

C5a exacerbates pulmonary xenograft injury and compromises recipient hemodynamic status. Blockade of such anaphylatoxins offers a promising approach for future investigations aimed at preventing pulmonary xenograft injury.

Mason DP, Boffa DJ, Murthy SC, Gildea TR, Budev MM, Mehta AC, McNeill AM, Smedira NG, Feng J, Rice TW, Blackstone EH, Pettersson BG. Extended use of extracorporeal membrane oxygenation after lung transplantation. *Journal of Thoracic and Cardiovascular Surgery* 2006 Oct;132(4):954-960.

Severe graft failure after lung transplantation is rare but carries a high mortality. ECMO provides lifesaving support for a substantial proportion of these patients, but complications are common. Best results are achieved in the setting of early graft failure or severe acute rejection, but not pneumonia or sepsis.



MAJOR AIRWAY DISEASE

Ranes JL, Budev MM, Murthy S, Mehta AC. Management of tracheo mediastinal fistulas using self-expanding metallic stents. *Journal of Thoracic and Cardiovascular Surgery* 2006 Mar;131(3):748-749.
SEMS, by promoting formation of granulation tissue, are efficacious in treating complex airway fistulas.

ESOPHAGEAL DISEASE

Rice TW, Khuntia D, Rybicki LA, Adelstein DJ, Vogelbaum MA, Mason DP, Murthy SC, Blackstone EH. Brain metastases from esophageal cancer: A phenomenon of adjuvant therapy? *Annals of Thoracic Surgery* 2006 Dec;82(6):2042-2049.
A dose-related increased incidence of brain metastases after adjuvant therapy for esophageal cancer cannot be explained by increased longevity. Adjuvant therapy itself, not just advanced disease, appears to create conditions conducive to developing these rapidly fatal metastases.

INNOVATION

Kamohara K, Fukamachi K, Ootaki Y, Akiyama M, Cingoz F, Ootaki C, Vince DG, Popovic ZB, Kopcak MW, Jr., Dessoffy R, Liu J, Gillinov AM. Evaluation of a novel device for left atrial appendage exclusion: The second-generation atrial exclusion device. *Journal of Thoracic and Cardiovascular Surgery* 2006 Aug;132(2):340-346.
A second-generation left atrial exclusion device enabled rapid, reliable, and safe epicardial LAA exclusion in a canine model.

QUALITY / GUIDELINES / PREVENTION OF COMPLICATIONS

Banbury MK, Brizzio ME, Rajeswaran J, Lytle BW, Blackstone EH. Transfusion increases the risk of postoperative infection after cardiovascular surgery. *Journal of the American College of Surgeons* 2006 Jan;202(1):131-138.
Blood products tended to be used in the sickest patients. But after accounting for this, risk of infection increased incrementally with each unit of blood transfused. No amount of blood loss treated by transfusion is innocuous.

Bhudia SK, Cosgrove DM, Naugle RI, Rajeswaran J, Lam BK, Walton E, Petrich J, Palumbo RC, Gillinov AM, Apperson-Hansen C, Blackstone EH. Magnesium as a neuroprotectant in cardiac surgery: A randomized clinical trial. *Journal of Thoracic and Cardiovascular Surgery* 2006 Apr;131(4):853-861.
A randomized, blinded, placebo-controlled clinical trial of increasing serum magnesium during cardiopulmonary bypass and for 24 hours thereafter demonstrated that it was safe and offered short-term neurologic benefits, particularly in preserving short-term memory and preventing reemergence of primitive reflexes.

Bonow RO, Carabello BA, Chatterjee K, de Leon AC, Jr., Faxon DP, Freed MD, Gaasch WH, Lytle BW, Nishimura RA, O'Gara PT, O'Rourke RA, Otto CM, Shah PM, Shanewise JS. ACC/AHA 2006 guidelines for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (writing committee to revise the 1998 guidelines for the management of patients with valvular heart disease) developed in collaboration with the Society of Cardiovascular Anesthesiologists endorsed by the Society for Cardiovascular Angiography and Interventions and the Society of Thoracic Surgeons. *Journal of the American College of Cardiology* 2006 Aug 1;48(3):e1-148.

Fleisher LA, Beckman JA, Brown KA, Calkins H, Chaikof E, Fleischmann KE, Freeman WK, Froehlich JB, Kasper EK, Kersten JR, Riegel B, Robb JF, Smith SC, Jr., Jacobs AK, Adams CD, Anderson JL, Antman EM, Faxon DP, Fuster V, Halperin JL, Hiratzka LF, Hunt SA, Lytle BW, Nishimura R, Page RL, Riegel B. ACC/AHA 2006 guideline update on perioperative cardiovascular evaluation for noncardiac surgery: focused update on perioperative beta-blocker therapy: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (writing committee to update the 2002 guidelines on perioperative cardiovascular evaluation for noncardiac surgery): developed in collaboration with the American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Rhythm Society, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, and Society for Vascular Medicine and Biology. *Journal of the American College of Cardiology* 2006 Jun 6;47(11):2343-2355.

GENERAL

Blackstone EH. Thinking beyond the risk factors. *European Journal of Cardio-Thoracic Surgery* 2006 May;29(5):645-652.
Thinking beyond risk factors to their neutralization by research, innovation, and application of knowledge can be as spectacularly successful as was fleeing foul air in halting Black Death.

Svensson LG. Device discordancy: Lost cords, quick-fix seekers, quality, and ethics. *Journal of Thoracic and Cardiovascular Surgery* 2006 Feb;131(2):261-263.
Every surgeon accustomed to 1% mortality and 1% stroke prevalence for CABG or valve surgery with excellent long-term outcome of patients will have to confront ethical dilemmas and the issues involved with survival of cardiovascular and vascular surgery. The high risk of stroke with transcatheter devices will also need to be lowered.

Staff Biographies

BRUCE W. LYTLE, M.D.

CHAIRMAN, DEPARTMENT OF THORACIC AND CARDIOVASCULAR SURGERY

SPECIALTIES: Coronary artery disease, arterial bypass grafting, valvular heart diseases, reoperations, diseases of the thoracic aorta, idiopathic hypertrophic subaortic stenosis, and laser transmyocardial revascularization surgery.

MEDICAL DEGREE: Harvard Medical School, Boston, Massachusetts; Graduated *Cum Laude*

SPECIAL TRAINING: Massachusetts General Hospital, Boston, Massachusetts; Shotley Bridge Hospital, England

Dr. Lytle is a conservationist, fly fisherman, and motorcyclist.



EUGENE H. BLACKSTONE, M.D.

SPECIALTIES: Adult and congenital cardiac surgery; adult thoracic surgery; novel mathematical models for analysis of time-related and longitudinal clinical outcomes; digital signal processing. Dr. Blackstone's multidisciplinary clinical research team is focused on ischemic and valvular heart diseases, heart rhythm disturbances, heart failure, and benign and malignant diseases of the esophagus and lungs.

MEDICAL DEGREE: University of Chicago Division of Biological Sciences, Chicago, Illinois

SPECIAL TRAINING: University of Chicago, Chicago, Illinois; University of Alabama School of Medicine, Birmingham, Alabama

Dr. Blackstone is an organist and pianist, with a 68-rank, 4-manual pipe organ in his home.



DELOS M. COSGROVE, M.D.

PRESIDENT AND CHIEF EXECUTIVE OFFICER

After a cardiac surgical career at Cleveland Clinic that has spanned 32 years and over 20,000 operations, Delos M. Cosgrove, M.D., has retired from clinical practice to allow him to focus on his position as CEO of Cleveland Clinic. Fortunately, Dr. Cosgrove has been an effective teacher as well as surgeon, and many innovations developed during his surgical career have been incorporated into the surgical practices of his colleagues here at Cleveland Clinic, including minimally invasive valve surgery, mitral valve repair, blood conservation, and many more.



Staff Biographies



A. MARC GILLINOV, M.D.

SPECIALTIES: Minimally invasive mitral valve, aortic valve, and tricuspid valve surgery; mitral valve repair, surgical treatment and minimally invasive surgery for atrial fibrillation; off-pump coronary artery bypass surgery; and high-risk mitral valve surgery.

MEDICAL DEGREE: Johns Hopkins University School of Medicine, Baltimore, Maryland

SPECIAL TRAINING: Johns Hopkins University School of Medicine, Baltimore, Maryland

A native Clevelander, Dr. Gillinov spent the summers of 1978 to 1980 dividing his time between working at Cleveland Clinic and playing tennis. He still enjoys both activities.



GONZALO GONZALEZ-STAWINSKI, M.D.

SPECIALTIES: Adult cardiac surgery, heart and lung transplantation, reoperations, coronary artery bypass surgery, pulmonary embolectomies, and valve surgery.

MEDICAL DEGREE: Ponce School of Medicine, Ponce, Puerto Rico

SPECIAL TRAINING: Cleveland Clinic, Cleveland, Ohio; Duke University Medical Center, Durham, North Carolina; Graduate Hospital, Philadelphia, Pennsylvania

Dr. Gonzalez-Stawinski enjoys spending time with his family, surfing, and baseball.



DAVID P. MASON, M.D.

SPECIALTIES: General thoracic surgery, minimally invasive thoroscopic and laparoscopic surgery, lung cancer, esophageal cancer, malignant mesothelioma, and lung transplantation.

MEDICAL DEGREE: Columbia University College of Physicians and Surgeons, New York, New York

SPECIAL TRAINING: Brigham and Women's Hospital, Boston, Massachusetts

Dr. Mason is a native of Boston and an avid runner who enjoys training with his wife, a triathlete.

TOMISLAV MIHALJEVIC, M.D.

SPECIALTIES: Minimally invasive cardiac surgery, robotic cardiac surgery, image-guided cardiac surgery, heart failure, mitral and aortic valve repair and replacement, coronary artery disease, beating heart revascularization, Maze procedure, heart and lung transplantation, ventricular assist devices, and adult congenital heart disease.

MEDICAL DEGREE: University of Zagreb School of Medicine, Zagreb, Croatia

SPECIAL TRAINING: University Hospital, Zurich, Switzerland; Brigham and Women's Hospital, Boston, Massachusetts

An avid reader, Dr. Mihaljevic enjoys contemporary American and European literature.



SUDISH C. MURTHY, M.D., PH.D.

SPECIALTIES: Esophageal surgery; minimally invasive bronchoscopic, laparoscopic, and thoroscopic surgery; general thoracic surgery; and lung transplantation.

MEDICAL DEGREE: Columbia University College of Physicians and Surgeons, New York, New York

DOCTORAL DEGREE: Pathology, University of British Columbia, Vancouver, British Columbia, Canada

SPECIAL TRAINING: Brigham and Women's Hospital and Harvard University, Boston, Massachusetts; Queen Mary Hospital Medical Center, Hong Kong

Dr. Murthy has competed in numerous team and individual sports. The spectrum encompasses playing football in Canada to running road races in Hong Kong.



JOSÉ L. NAVIA, M.D.

SPECIALTIES: Adult acquired heart disease, minimally invasive robotic and video-assisted cardiac surgery, off-pump coronary artery bypass surgery, minimally invasive mitral and aortic valve surgery, heart transplantation, ventricular assist devices, surgical electrical therapies for heart failure, and arrhythmia surgery.

MEDICAL DEGREE: School of Medicine, National University of La Plata, Buenos Aires, Argentina

SPECIAL TRAINING: Hospital General de Agudos, Italian Hospital, Buenos Aires, Argentina; Cleveland Clinic, Cleveland, Ohio

Dr. Navia enjoys spending time with his family, especially on the beaches of his native Argentina or skiing together in the winter.



Staff Biographies



GÖSTA B. PETTERSSON, M.D., PH.D.

SPECIALTIES: Adult acquired heart disease (including aneurysms of the thoracic aorta); reconstructive valve surgery; heart and lung transplantation; reoperations; endocarditis; complex coronary artery surgery; aortic and mitral valve repair/replacement (including the Ross procedure); and adult congenital heart surgery.

MEDICAL AND DOCTORAL DEGREES: University of Gothenburg, Gothenburg, Sweden

SPECIAL TRAINING: University of Illinois College of Medicine, Chicago, Illinois; Sahlgrenska University Hospital, Gothenburg, Sweden; University of Copenhagen and State University Hospital Rigshospitalet, Copenhagen, Denmark. Dr. Pettersson is licensed to practice medicine in Sweden, Denmark, Norway, the United Kingdom, and the United States

When time permits, Dr. Pettersson enjoys skiing, hunting, and horseback riding.



THOMAS W. RICE, M.D.

SPECIALTIES: General thoracic surgery, including esophageal, pulmonary, mediastinal, and diaphragm; and minimally invasive surgeries, including laparoscopic and thoracoscopic surgery.

MEDICAL DEGREE: University of Toronto Faculty of Medicine, Toronto, Ontario, Canada

SPECIAL TRAINING: St. Michael's Hospital and University of Toronto Faculty of Medicine, Toronto, Ontario, Canada; University of California, San Francisco, California

Dr. Rice enjoys spending time with his wife, three children, and grandchild and is an avid bridge player.



ERIC E. ROSELLI, M.D.

SPECIALTIES: Adult cardiac surgery, thoracic aortic surgery, endovascular approaches to cardiothoracic diseases, minimally invasive valve repair and replacement, high-risk valve surgery, peripheral vascular surgery, endovascular stent, and prosthetic valve research.

MEDICAL DEGREE: Loyola University Stritch School of Medicine, Chicago, Illinois

SPECIAL TRAINING: Cleveland Clinic, Cleveland, Ohio

During his free time, Dr. Roselli is a golfer and skier.

JOSEPH F. SABIK III, M.D.

SPECIALTIES: Adult cardiac surgery, valvular heart disease, coronary artery disease, thoracic aortic surgery, minimally invasive cardiac surgery, off-pump coronary artery bypass surgery, mitral and aortic valve repair and replacement, surgery for thoracic aortic aneurysm, reoperations, and Maze procedure for atrial fibrillation.

MEDICAL DEGREE: Harvard Medical School, Boston, Massachusetts

SPECIAL TRAINING: Massachusetts General Hospital, Boston, Massachusetts; Cleveland Clinic, Cleveland, Ohio

In his leisure time, Dr. Sabik enjoys running and skiing.



NICHOLAS G. SMEDIRA, M.D.

SPECIALTIES: Heart and heart-lung transplantation, ventricular assist devices, ECMO, heart failure surgery, aortic and mitral valve repair and replacement, off-pump coronary artery bypass surgery, myectomy, reoperations, and ascending aorta replacement.

MEDICAL DEGREE: University of Rochester School of Medicine and Dentistry, with Honors, Alpha Omega Alpha Medical Honor Society

SPECIALTY TRAINING: University of California, San Francisco Medical Center; Cleveland Clinic, Cleveland, Ohio

Dr. Smedira enjoys playing golf and spending time with his family.



LARS G. SVENSSON, M.D., PH.D.

SPECIALTIES: Adult cardiac surgery; cardio-aortic and aortic surgery, including combined valve and aneurysm surgery; minimally invasive mitral and aortic valve surgery; blood conservation; prevention of stroke and paralysis after aortic surgery; Marfan syndrome; peripheral vascular surgery; and the Maze procedure.

MEDICAL AND DOCTORAL DEGREES: University of Witwatersrand, Johannesburg, South Africa

SPECIAL TRAINING: Baylor College of Medicine, Houston, Texas; Johannesburg General Hospital, Johannesburg South Africa; Cleveland Clinic, Cleveland, Ohio

In his leisure time, Dr. Svensson enjoys photography and sailing.



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Evaluation for Cardiac Surgery (216) 444-3500
 Surgical nurse practice managers will expedite (877) 8 HEART 1
 the review of patient records with a CCF surgeon
 and address questions.

Hospital Transfer (216) 444-8302
 The Appointment Center provides physicians (800) 553-5056
 with 24/7 hospital transfer assistance.

Direct to Surgeon (216) 444-2200
 A Cleveland Clinic operator-assisted (800) 223-2273
 telephone number. State the surgeon's name,
 and you will be connected directly to the office.

Heart Center Resource Nurse (216) 445-9288
 Nurses are available to answer (866) 289-6911
 patients' questions. Live assistance is provided
 Monday-Friday, 8:30am-4:00pm

Insurance Counselor (216) 445-0430

Cardiothoracic Research (216) 444-6712

Thoracic Surgery Appointments (216) 445-6860

Special Assistance for Out-of-State Patients

Our Medical Concierge patient care representatives help facilitate appointments for out-of-state patients. Call 800.223.2273, ext. 55580, or send an e-mail to medicalconcierge@ccf.org.

DrConnect

Whether you are referring from near or far, our new eCleveland Clinic service, DrConnect, can streamline communication from Cleveland Clinic physicians to your office. This new online tool offers you secure access to your patient's treatment progress at Cleveland Clinic. With one-click convenience, you can track your patient's care using the secure DrConnect web site. To establish a DrConnect account, visit eclevelandclinic.org or e-mail drconnect@ccf.org.

CLEVELAND CLINIC

Founded in 1921, Cleveland Clinic is a not-for-profit academic medical center that integrates clinical and hospital care with research and education. Today, 1,700 Cleveland Clinic physicians and scientists practice in 120 medical specialties and subspecialties. Cleveland Clinic's main campus, with 41 buildings spanning 130 acres, includes a 1,000-bed hospital, an outpatient clinic, subspecialty centers, and supporting laboratories and facilities.

Cleveland Clinic also operates 13 family health centers, 8 community hospitals and 2 affiliate hospitals, and a medical facility in Weston, Florida.

Cleveland Clinic is determined to exceed the expectations of patients, families, and referring physicians. In light of this goal, we are committed to providing accurate and timely information about our patient care. Through participation in national initiatives, Cleveland Clinic supports transparent public reporting of healthcare quality data.

Cleveland Clinic participates in the following public reporting initiatives:

- Joint Commission Performance Measurement Initiative (qualitycheck.org)
- Centers for Medicare and Medicaid Services (CMS) Hospital Compare (hospitalcompare.hhs.gov)
- The Leapfrog Group (leapfroggroup.org)
- Ohio Department of Health Service Reporting (odh.state.oh.us)

In addition, this publication was produced to assist patients and referring physicians in making informed decisions. To that end, information about care and services is provided, with a focus on outcomes of care. For more information, please visit the Cleveland Clinic Quality web site at clevelandclinic.org/quality.

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Heart Center in America



For the 12th year in a row, the Cleveland Clinic Heart and Vascular Institute has been ranked America's number one heart program in *U.S. News & World Report's* prestigious "Best Hospitals" survey.

