Quality counts when referring patients to hospitals and physicians, so Cleveland Clinic has created a series of outcomes books similar to this one for its institutes and departments. Designed for a health care provider audience, the outcomes books contain a summary of our surgical and medical trends and approaches; data on patient volume and outcomes; and a review of new technologies and innovations. We hope you find these data valuable. To view all our outcomes books, visit Cleveland Clinic’s Quality Web site at clevelandclinic.org/quality/outcomes.
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On behalf of the Cleveland Clinic Department of Vascular Surgery, I am pleased to present this third edition of *Outcomes*, the condensed report of our achievements, outcomes and innovations over the last year. This booklet also contains an overview of the department and a listing of our providers and locations, along with contact information.

We believe sharing this information with referring physicians, alumni and other individuals is helpful in providing a complete view of our department, our services and our progress toward excellence in patient care. The individuals who comprise our staff are well-trained and uniquely qualified to provide compassionate clinical care, while incorporating innovative technology and maintaining high clinical standards.

While we are proud of our achievements, we are ever thankful to those individuals who have helped us to achieve this level of success. We remain committed to continuing the pursuit of clinical excellence through staying at the forefront of quality and innovative care for our patients.

**Daniel G. Clair, M.D.**
Chairman, Department of Vascular Surgery
The Cleveland Clinic Department of Vascular Surgery includes 17 Board-certified vascular surgeons and 97 support staff who work together to provide care at three inpatient, seven outpatient and four ambulatory surgery facilities. The addition of Dr. Emad Zakhary will increase our capabilities at Hillcrest hospital. Dr. Zakhary will provide increased vascular surgical availability and improved timeliness for referred patients in the coming year along with a wealth of experience in minimally invasive and standard surgical procedures.

Through 2006, clinicians in this department performed more than 5,000 procedures for the third year in a row. These operative undertakings encompass a broad spectrum of vascular diseases, with the majority performed for lower extremity occlusive disease. In addition, the department remains a national and international leader in the provision of care for patients with aneurysmal disease of the thoracic and abdominal aorta, occlusive disease in the cerebrovascular circulation via both open and endovascular methods and the provision of dialysis access and minimally invasive treatments for venous disease.
Either minimally invasive or conventional surgical procedures are provided. Clinicians also provide a detailed discussion of the alternatives to help patients make educated decisions regarding optimal therapeutic intervention to employ in their specific situation.

In the coming year, increases in service and availability at both Marymount and Hillcrest hospitals are expected, along with expansion of outpatient evaluations performed at the regional medical practices. We look forward to improving the availability of expert vascular care, expanded clinical trial availability, and increased vascular laboratory services.
Quality & Outcome Measures

Aneurysm Treatment

With more than 1,500 patients treated with minimally invasive aneurysm repair, the experience we offer patients who require aneurysm surgery is increasingly important. Patients undergoing this approach experience reduced operative morbidity and mortality when the procedure is performed by a skilled team. Our extensive experience in this procedure provides an extremely low risk of urgent conversion to open repair. Over the past two years, not a single patient undergoing endovascular repair of an abdominal aortic aneurysm required emergent conversion to open surgery.

A minimally invasive approach is increasingly becoming the preferred approach, thereby reducing morbidity and mortality.
Endovascular repair of thoracic aortic aneurysms has only recently become a reality, allowing the less invasive repair of aneurysms within the thoracic cavity. This minimally invasive approach allows a dramatic reduction in hospitalization and recovery times and is an important alternative to open surgery. We are more frequently able to offer our patients this option, which has expanded our ability to offer repair of thoracic aortic aneurysm.
Endovascular Grafts to Repair Aneurysms Involving the Visceral Aortic Segment

Progress in endovascular technology made repair of aortic aneurysms with renal or visceral vessel involvement possible. This approach uses custom fenestrated devices with covered or uncovered visceral stents. Cleveland Clinic has the largest single center series in the world of patients with a thoracoabdominal aneurysm treated with a stent-graft.

Endovascular Repair of Complex Aneurysms
Increasingly, surgeons in the department are performing open repair of complex aortic disease. Less than one-quarter of all aortic aneurysm procedures were performed as isolated repair of the aorta below the renal arteries in 2006. The vast majority of aneurysm repairs involved surgical repair of associated vessel pathology.

This extensive experience in treating patients with aneurysms involving the renal and mesenteric arteries enables our surgeons to offer repair for any type of aneurysm of the thoracoabdominal aorta.
Bilateral Helical Hypogastric Aneurysm

Pre-stent Placement

Post-stent Placement

Bilateral Helical Hypogastric Aneurysm

Post Repair
Cerebrovascular Disease

Evolution of the technique of carotid endarterectomy led to a low-impact, low-morbidity procedure with shorter recovery time and less overall discomfort. Few patients undergoing this surgery stay more than a single night in the hospital. Most patients return to their usual activities within one to two weeks. Anesthesia is sometimes limited to regional blockade and the patient is operated upon with a moderate amount of sedation in conjunction with this regional block.
Despite the safety of carotid endarterectomy, we are committed to investigating less-invasive alternatives for the treatment of carotid artery disease. Participation as a site of the CREST trial (a study supported by the National Institutes of Health to evaluate the safety and efficacy of carotid artery stenting compared with carotid endarterectomy for symptomatic and asymptomatic individuals) enables our surgeons to administer this innovative therapeutic modality as part of a national trial. Outcomes of the two procedures will be assessed over a five-year period. Our surgeons are applying carotid artery stenting technology in high-risk, symptomatic patients in an effort to reduce the overall risk of the procedure for patients who are at high risk for carotid endarterectomy.
Lower Extremity Occlusive Disease

With an increasing number of less-invasive therapies available, individuals with poor circulation of the lower extremities may experience improvement in lower extremity circulation for limb salvage. It also has the potential to limit the time patients are incapacitated. In some situations, combinations of therapeutic approaches offer markedly improved flow to the legs with lower morbidity than was previously possible. This minimally invasive mode of therapy has become an integral part in the care of patients with lower extremity occlusive disease.

Over the past two years, the percentage of patients undergoing this therapy has risen. More patients are treated with percutaneous forms of therapy than with standard, open therapeutic interventions.

Limb salvage remains the ultimate goal for lower extremity occlusive disease. We are committed to finding ways in which each patient has an opportunity to save a functional limb. When limb loss is unavoidable, implementation of another strategy for these patients will help them progress to the best functional state that can be achieved.
Pre-angiograms of Leg

Post-angiograms of Leg
Venous Disease

Experience in venous disease increased nearly ten-fold over the past five years. Venous thrombosis remains a disabling problem with long-term sequelae for affected individuals. In conjunction with anticoagulation therapy, early intervention can offer relief of symptoms and reduce the risk of recurrence. Treatment methods for varicose veins are continually evolving. Having the ability to treat this disease process with minimal interference in everyday function is a key component of today’s therapeutic alternatives. Staffs in our Ambulatory Surgery Centers are able to perform radiofrequency and laser venous ablation as well as endoscopic venous removal. In addition, treatment of venous ulcers can be improved through treatment of proximal venous occlusion with endoluminal therapy or by the treatment of perforator incompetence with endoscopic therapy. Both of these modalities allow early recovery and same-day surgery. The ability to diagnose and treat venous disease is reflected in a marked increase in the number of patients treated. With more than 1,000 venous procedures performed each year for the last two years, we have become the leading center in the area for venous disease.
The number of minimally invasive radiofrequency venous ablation procedures performed for varicose veins increased steadily over the past three years. Recently, use of laser venous ablation was added as an option for treatment of venous disease. Utilizing radiofrequency and laser energy within the vein to ablate or scar the diseased greater saphenous vein in patients with varicose veins minimizes nerve damage/irritation, post-procedural complaints of pain and leg numbness and improves outcomes with minimal to no scarring, bruising or swelling. This therapy is the primary procedure of choice for venous varicosities.

**Venous Closures**

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Dialysis Access

The rising number and age of patients undergoing hemodialysis for renal disease spurred the pursuit of methods to achieve and maintain autogenous tissue as a dialysis access conduit. The National Kidney Foundation developed a set of treatment standards for patients with chronic or end-stage renal failure. These guidelines are based on the opinions of experts in the field of dialysis who recommend at least 50% of all new kidney failure patients have primary arteriovenous autogenous fistulae performed to initiate hemodialysis. Average primary fistula creation in the United States is less than 30%. Clinicians in the department maintain a policy of aggressively attempting to create autogenous vein fistulae; an average autogenous fistula rate has exceeded the Disease Outcomes Quality Initiative (DOQI) standard of 60% and the national average.
Patient Experience

We ask our patients about their experiences and satisfaction with the services provided by our staff. Although our patients are already indicating we provide excellent care, we are committed to continuous improvement.
A Note Regarding H-CAHPS, the New National Standard for Reporting Hospital In-Patient Experience of Care:

The service excellence data displayed above shows results from an external patient experience survey administered for Cleveland Clinic.

A new national standard patient experience survey instrument called H-CAHPS was instituted across the country on October 1, 2006. Public reporting of initial results on CMS’s Hospital Compare website is anticipated in late 2007. Accordingly, Cleveland Clinic outcomes booklets will transition to reporting H-CAHPS inpatient service excellence results in 2007.
Innovations

Branched Vessel Endograft Repair of Thoracoabdominal Aortic Aneurysms

Endovascular aortic aneurysm repair has significantly reduced morbidity and mortality for patients undergoing standard repair for infrarenal abdominal aortic aneurysm. Application of this technology to patients suffering from aneurysms involving branches of the aorta or iliac arteries has been limited. Surgeons in the Department of Vascular Surgery pioneered the application of fenestrated and branch graft technologies to allow extension of endovascular repairs in patients whose aneurysmal morphology dramatically increases risk in open repair because of branch vessel involvement. In patients who were either too sick to have standard repair or whose anatomy would not allow endovascular repair, complex endovascular repairs are being offered and completed. These novel devices are allowing repair of both iliac artery aneurysms and aneurysms through the visceral segment of the thoracoabdominal aorta.

Thoracoabdominal Aortic Aneurysm

Four vessel endovascular stentgraft treating a Thoracoabdominal Aortic Aneurysm. Branches allow profusion of vital visceral vessels.
Reversal of Flow for Carotid Stenting

Minimally invasive endovascular treatment of carotid artery disease has proven beneficial in patients who are at high risk for standard surgical repair. A number of technologies limit stroke potential during this procedure; however, surgeons within the department are now employing the use of flow reversal technology to direct embolic debris away from the brain during the performance of this procedure. This technology has the potential to completely alleviate any intracranial embolization during an interventional carotid revascularization procedure. The safety of this technology is currently being tested within the department as part of a national registry to assess this method of cerebral protection during minimally invasive carotid therapy.

Minimally Invasive Therapy for Venous Disease

Utilizing minimally invasive techniques for the treatment of varicose vein disease, surgeons in our department have begun combining laser or radiofrequency ablation of the saphenous vein in conjunction with sclerosant treatment of smaller varicose veins. The combination of these approaches can ultimately allow complete treatment of extensive varicose vein disease through a percutaneous approach. While this approach does not apply to all patients with varicose vein disease, increasingly our surgeons are minimizing scarring and recovery time in patients undergoing treatment for varicose vein disease.


The PIVOTAL Trial

The PIVOTAL trial, run from the academic coordinating center within the Department of Vascular Surgery, is designed to assess the impact of endovascular repair of abdominal aortic aneurysms at an early stage. Abdominal aortic aneurysms (AAA) are usually repaired once they reach a diameter of greater than 5 cm to 5.5 cm. This practice has been followed based upon randomized studies recently completed. It assesses the results of open surgery for AAA disease compared with continued observation and repair after expansion above normal guidelines. With the risks of endovascular surgery for aneurysmal disease significantly less than that of open AAA repair, extrapolation of results from the open repair trials to endovascular repair is unjustified. In an attempt to help clarify whether or not early repair offered via an endovascular approach might reduce mortality from this deadly process, surgeons at Cleveland Clinic have initiated and implemented this trial at more than 70 sites throughout the United States.

This trial, funded by Medtronic, compares results of both endovascular therapy and observational therapy for patients with small aneurysms (AAA greater than 4.0 cm and less than 5.0 cm) to identify the optimal form of therapy for these patients. With over 375 patients already enrolled in this trial, we look forward to increasing enrollment and answering questions surrounding the care of patients with small aneurysms.
The Angiomax Trial

Standard bypass surgery for lower extremity ischemia involves the use of heparin to provide adequate anticoagulation for patients during the procedure. Alternative anticoagulation strategies have been utilized in specific situations, but a formal assessment of the best alternative to date has not been performed. Taking guidance from studies assessing alternative anticoagulation strategies for coronary revascularization, surgeons within the department have devised a trial to assess an alternative anticoagulation strategy using a direct thrombin inhibitor, bivalirudin (Angiomax), for use during open lower extremity revascularization procedures. It is our hope this evaluation of an alternative to standard heparin therapy will help define the ideal anticoagulant regimen to manage patients with lower extremity ischemia who require open surgery.
Daniel G. Clair, M.D.
Chairman, Vascular Surgery

Appointed: 2006

Medical School: University of Virginia School of Medicine, Charlottesville, Va.

Fellowships: Brigham and Women's Hospital, Boston, Mass.

Residency: Brigham and Women's Hospital, Boston, Mass.

Staff Listing

Chairman
Daniel G. Clair, M.D.

Quality Review Officer
Vikram S. Kashyap, M.D.

Vascular Surgery Staff
George E. Anton, M.D.
Matthew J. Eagleton, M.D.
Linda M. Graham, M.D.
Roy Greenberg, M.D.
Neal C. Hadro, M.D.
Vikram S. Kashyap, M.D.
Leonard P. Krajewski, M.D.
Sean P. Lyden, M.D.
Patrick J. O’Hara, M.D.
Kenneth Ouriel, M.D.
Anthony Rizzo, M.D.
Timur P. Sarac, M.D.
Gregory G. Schnier, M.D.
Sunita D. Srivastava, M.D.
Frank J. Veith, M.D.
Emad Zakhary, M.D.
How to Refer Patients
For more details about Vascular Surgery visit clevelandclinic.org/vascular.

For Hospital Transfers or Physician Consults
800.553.5056
24 hours a day, seven days a week
Locations

Cleveland Clinic Main Campus
Department of Vascular Surgery
9500 Euclid Avenue/S40
Cleveland, Ohio 44195
216.444.4508

Cleveland Clinic Vascular Surgery at Hillcrest Hospital
440.461.1150

Cleveland Clinic Vascular Surgery at Marymount Hospital
216.587.4280

Beachwood Family Health and Surgery Center
216.839.3800

Independence Family Health Center
216.986.4000

Lorain Family Health and Surgery Center
440.204.7400

Strongsville Family Health and Surgery Center
440.878.2500

Cleveland Clinic STAR Imaging Vascular Ultrasound
921 Jasonway Avenue
Columbus, Ohio 43214
877.221.2929
Surgical Infection Prevention

Surgical site infections contribute to surgical morbidity and mortality in all specialties. The timely administration and the appropriate selection of antibiotics prior to surgery in appropriate patients have been shown to reduce surgical site infections. A multidisciplinary team, involving Surgery, Infectious Disease, Anesthesia, Nursing and Quality has been working to ensure that our patients receive their antibiotics in a timely fashion. Data collected show our successful results:

* Source: United States Department of Health and Human Services, Hospital Compare
Most current reported discharges April 2005 to March 2006.
The American College of Surgeons’ National Surgical Quality Improvement Program (NSQIP) is a national program that objectively measures surgical outcomes. It reports risk-adjusted 30-day mortality and morbidity outcomes. Currently, the program includes surgical cases from Cleveland Clinic’s departments of Colorectal Surgery, General Surgery and Vascular Surgery. As this program continues to grow at a national level, Cleveland Clinic is committed to expanding it to all surgical departments. We view NSQIP as the most valid, independent way to document our surgical outcomes and provide a basis for ongoing performance improvement.
Cleveland Clinic Overview

Cleveland Clinic, founded in 1921, 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 on 130 acres in Cleveland, Ohio, includes a 1,000-bed hospital, outpatient clinic, subspecialty centers and supporting labs and facilities. Cleveland Clinic also operates 13 family health centers, eight community hospitals, two affiliate hospitals, and a medical facility in Weston, Florida.

At the Cleveland Clinic Lerner Research Institute, hundreds of principal investigators, project scientists, research associates and postdoctoral fellows are involved in laboratory-based research. Total annual research expenditures exceed $150 million from federal agencies, non-federal societies and associations, and endowment funds. In an effort to bring research from bench to bedside, Cleveland Clinic physicians are involved in more than 2,400 clinical studies at any given time.

In September 2004, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University opened and will graduate its first 32 students as physician-scientists in 2009.

For more details about Cleveland Clinic, visit clevelandclinic.org
Online Services

**eCleveland Clinic**

eCleveland Clinic uses state-of-the-art digital information systems to offer several services, including remote second opinions through a secure Web site to patients around the world; personalized medical record access for patients; patient treatment progress access for referring physicians (see below); and imaging interpretations by the Department of eRadiology's subspecialty trained academic radiologists. For more information, please visit eclevelandclinic.org.

**DrConnect**

**Online Access to Your Patient's Treatment Progress**

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

**MyConsult**

**MyConsult** Remote Second Medical Opinion is a secure, online service providing specialist consultations and remote second medical opinions for more than 600 life-threatening and life-altering diagnoses. MyConsult remote second medical opinion service allows you to gather information from nationally recognized specialists without the time and expense of travel. For more information, visit eclevelandclinic.org/myconsult, e-mail eclevelandclinic@ccf.org or call 800.223.2273, ext 43223
Cleveland Clinic Contact Numbers

How to Refer Patients
24/7 Hospital Transfers or Physician Consults
800.553.5056

General Information
216.444.2200

Hospital Patient Information
216.444.2000

Patient Appointments
216.444.2273 or 800.223.2273

Medical Concierge
Complimentary assistance for out-of-state patients and families
800.223.2273, ext. 55580, or email: medicalconcierge@ccf.org

International Center
Complimentary assistance for international patients and families
216.444.6404 or visit www.clevelandclinic.org/ic

Cleveland Clinic in Florida
866.293.7866

www.clevelandclinic.org
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, we support transparent public reporting of healthcare quality data and participate in the following public reporting initiatives:

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