The Department of Cardiothoracic Surgery at UPMC

CARDIOTHORACIC SURGERY update

WINTER 2017

In This Issue

CME Credit

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As founding Chairman of the Department of Cardiothoracic Surgery, I am proud to present this issue of *Cardiothoracic Surgery Update*.

Our department has provided excellent patient care in cardiothoracic surgery since the days of Dr. Henry "Hank" T. Bahnson and Dr. Bartley "Bart" Griffith. Built on the foundation of a storied history in transplantation, clinical milestones for our surgical group include the organization of the UPMC Heart and Vascular Institute (HVI) and the UPMC Esophageal and Lung Surgery Institute (ELSI). In 2010, we celebrated declaration as a full academic department within the University of Pittsburgh School of Medicine. Today, we are internationally recognized for innovations in clinical care, research education, and biomedical research.

In this issue, we celebrate the accomplishments of our growing department, welcome new team members, and provide updates on upcoming events, clinical trials, and research initiatives. We are proud of the accomplishments of our department and are excited to share a few of our recent achievements, including the growth of the Aortic Diseases Center of Excellence, alternative treatment options for high risk patients with lung cancer, and the newest developments in extracorporeal mechanical oxygenation (ECMO). We also congratulate The UPMC Artificial Heart Program on 30 years of success with a continued focus on helping patients who feel that they are out of options for treating their heart failure. We provide an overview of the Pediatric Mechanical Circulatory Support Program and the challenges that accompany treating the pediatric heart failure patients. Finally, we highlight our success as the leading provider of robotic procedures and robotic training and our ability to provide hope and better options for our patients through minimally invasive procedures.

I am extremely proud of our Department and our continued plans for clinical and academic growth. I look forward to keeping you up-to-date on future progress and developments.

For more information about our program, please visit UPMCPhysicianResources.com/thoracicsurgery.

James D. Luketich, MD, FACS

Henry T. Bahnson Professor and Chairman, Department of Cardiothoracic Surgery

Chief, Division of Thoracic and Foregut Surgery

Director, UPMC Esophageal and Lung Surgery Institute

Director, Thoracic Surgical Oncology

UPMC LIFE CHANGING MEDICINE

Alternatives for the High Risk Patient with Lung Cancer

Rajeev Dhupar, MD
Assistant Professor, Cardiothoracic Surgery

Matthew J. Schuchert, MD
Associate Professor, Cardiothoracic Surgery
Chief, Thoracic Surgery, VA Pittsburgh Healthcare System

Lung cancer remains the leading cause of cancer-related death in the United States. Over the last 25 years, thoracic surgeons at UPMC have led the fight against this disease by embracing new treatments and tailoring care that is specific to each patient. Even though our methods to fight cancer have improved tremendously, the disease has become increasingly complex. Excellent medical care is allowing people to live longer with chronic illnesses such as chronic obstructive pulmonary disease (COPD) and cardiovascular disease, while the incidence of malignancy increases as people get older. When patients with multiple co-morbidities are faced with lung cancer, standard treatments can pose unique problems that require thoughtful management.

The UPMC Department of Cardiothoracic Surgery is renowned as a leader in minimally invasive techniques, which has given our patients the opportunity to have the best in cancer care. There has been a recent development of ablative therapies for lung cancer, and our surgeons have incorporated these tools into cutting-edge management for people that require individualized treatment plans. When these patients fall into a "high-risk" category for even minimally invasive surgery, there are a number of alternatives that can provide excellent treatment for both early and advanced cancers in the lung.

Radiofrequency ablation (RFA) has been used for tumors in the liver since the 1990s, and was adopted to use in the lung in 2000. RFA involves high frequency alternating current that is delivered through a probe within the tumor. The current causes ion oscillation (or frictional heating) within the tissue until the temperature rises to greater than 60.0 C, and subsequently, coagulative necrosis of the tumor occurs (Figure 1). High rates of complete tumor destruction and good local control result in a durable effect. Using CT-guided placement of a small electrode, lesions can be treated in a single setting without incisions, allowing high-risk patients to have treatment of their cancer without surgery. For more than 15 years, thoracic surgeons at UPMC have been using this technique in patients that are otherwise ineligible for standard surgical resection with either primary or metastatic cancer in the lung.

More recently, modifications to RFA have emerged, and we are evaluating their role in treating these same high risk patients. Microwave ablation catheters utilize a similar system to RFA, but create an electromagnetic field around the tip of the catheter, which also results in frictional heating. Conceptually, this destroys the tumor in a similar manner to RFA, but has a more predictable area of treatment and less effect on nearby blood vessels. We are currently evaluating this technology to use for our patients. A second modification, which is still in development, is endobronchial ablation catheters. This technique uses a bronchoscope in conjunction with computerized navigation to localize tumors and ablate them without percutaneous probes, thereby minimizing the risk of pneumothorax. These devices are still in the laboratory, but we are in the process of evaluating them for potential use in our patients.

Finally, stereotactic radiosurgery (SRS) is an external radiation technique that we utilize in conjunction with radiation oncologists. When compared to conventional external beam radiation, SRS allows high-dose radiation to be delivered accurately to a limited area in the lung, thereby minimizing radiation to bystander organs (Figure 2). Studies over the last 10 years have shown excellent local control of tumors with reasonable outcomes for high risk patients, making this an additional avenue of therapy for people who are not candidates for standard curative surgery. After planning is completed by the surgeon and radiation oncologist, treatments are usually done within one to two weeks. Similarly to RFA, radiosurgery can be used in both primary and metastatic cancers in the lung.

As the needs of our patients change, the treatment of lung cancer must also change. At UPMC, the Department of Cardiothoracic Surgery has embraced new, less invasive modalities that offer the best opportunity for our patients to have excellent cancer care. Thoughtful, individualized treatment plans that may involve surgery, radiofrequency ablation, or radiosurgery, are offered by the lung cancer specialists in our group. We strive to give every patient the best opportunity to beat cancer.

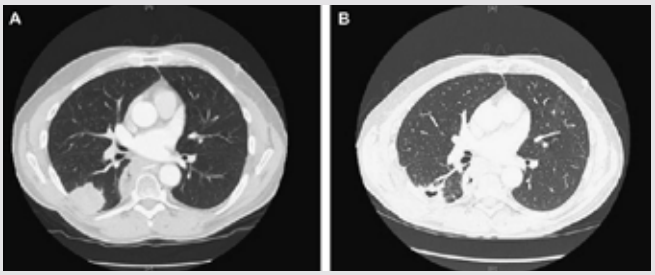

Figure 1. *Representative CT scans showing a tumor before (A) and after (B) radiofrequency ablation.*

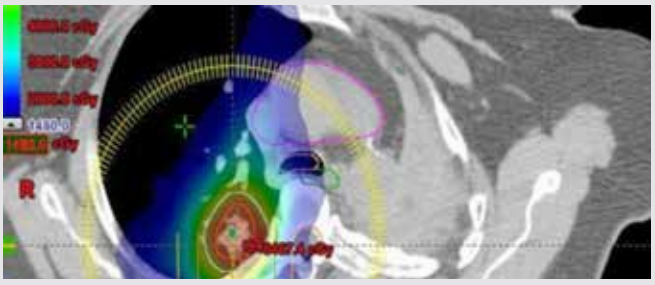

Figure 2. *A typical contouring and radiation plan for stereotactic radiosurgery.*

Current Ventricular Assist Devices (VAD) Techniques

Robert Kormos, MD, FRCS, FACS, FAHA
Professor, Cardiothoracic Surgery and Bioengineering
Brack G. Hattler Professor, Cardiothoracic Transplant

As we celebrate the 30th year of the UPMC Artificial Heart Program, it is appropriate to reflect on the important advancements made by our program and team over the last three decades. Our program distinguishes itself not only through a deep involvement in technology and innovation in the field of mechanical circulatory support, but also through an understanding that the process of translation of innovation into clinical choices for care involves providing compassionate and supportive patient care and education.

We were one of the first artificial heart programs in the country and have contributed dramatically to the science of mechanical circulatory support technology. In 1985, we implanted the nation's second artificial heart as a bridge to cardiac transplantation. We understood from the beginning the importance of preserving quality of life for our patients. As a result, five years later we became the first program to discharge a patient on a left ventricular assist device (LVAD). Our contributions with the McGowan Institute for Regenerative Medicine were essential in developing the Heartmate II, which led to the first implant in man by our surgeons in Tel Aviv, Israel in July 2000. This device has now been implanted in more than 20,000 patients throughout the world. Clinically, we have utilized and have participated in clinical trials with nine LVAD technologies. We are also implementing the next generation of LVAD technology, the Heartmate III, and we will be the National PI center for the new HeartWare MVAD.

We have continually worked to improve our approach to treating patients by helping to develop these new technologies, refining surgical techniques, creating new management protocols, and streamlining our patient selection and management. Over our 30 year history, we have performed nearly 1,000 LVAD implants in adult patients, with more than 60 additional implants in our pediatric program.

One important factor for our success is our partnership and collaboration with other specialties within UPMC, including Heart Failure Cardiology, Infectious Diseases, Neurology, Palliative Care, Nursing, Critical Care Medicine, Rehabilitation Medicine, and Psychiatry. Our members serve on international panels and as experts on society councils. The biomedical engineering group, heart failure cardiology team, nursing staff, and researchers work together to improve our clinical outcomes and patient care.

For 25 years, our biomedical engineering professionals have provided us with expertise and support that is unique to our program and unlike any in the world. They work alongside us in the operating room to ensure that the LVAD and associated equipment are functioning properly. Following the operation, they provide critical troubleshooting supprt for critical care staff and suggest adjustments that keep the device functioning at the optimal capacity.

Their involvement allows the clinical staff, nursing team, and intensive care team to focus on patient management rather than the nuances of the device itself. We are able to provide comprehensive patient education through collaboration with the LVAD coordinators and engineers and clinicians.

Additionally, the bioengineers are an invaluable link to the bioengineering schools at the University of Pittsburgh and Carnegie Mellon University through a program of clinical training that provides us with insights into all medical technology including the LVADs. We utilize this knowledge for collaborative research for improving the medical technology of the future.

At this stage in our history, we want to focus on reaching out to patients and our community, including primary care physicians and referring cardiologists who are faced with limited options for worsening heart failure. An LVAD can provide an alternative to mortality from end-stage congestive heart failure and can significantly improve quality of life even for patients in whom cardiac transplantation is not an option (destination therapy) due to co-morbidities that may prevent them from a heart transplant. Patients who are considered failing maximal medical therapy, include those who have repeated hospital admissions or are taking multiple medications, and still continue to suffer from heart failure. Besides the added benefits from a ventricular assistive device, we also have access to a variety of treatment options which include expanded heart surgery, high risk interventional catheterization procedures, and novel drug regimens.

We have been successful in supporting patients at home with their device, some for more than five years. Part of this success is due to our availability through a dedicated 24-hour help line staffed by an experienced nurse, who works closely with the heart failure cardiology and surgical teams. They answer questions, provide support, and counsel patients on a variety of cardiovascular health concerns that arise from the use of the LVAD. In addition, we have established a 24-hour referral line that makes us available to physicians who wish to receive advice or refer patients to our service.

Continued

Current Ventricular Assist Devices Techniques *continued*

As we celebrate our successes of the past, we also are not content to rest on our laurels. We are developing multiple research studies to continue to improve the care of our LVAD patients. We are looking at many aspects of patient care, from quality of life and financial impact studies to the role of adjuvant injections of stem cells and the care of the right ventricle in patients receiving LVAD systems. A large part of our research is dedicated to understanding adverse events that impact patients on mechanical circulatory support and how these complications may be avoided or treated. The research we are doing today will improve care and provide choices for the heart failure patients of tomorrow.

The Aortic Dissection Program at UPMC

Thomas G. Gleason, MD, FACS
Ronald V. Pellegrini Professor of Cardiothoracic Surgery
Chief, Division of Cardiac Surgery
Co-Director, Heart and Vascular Institute
Director, Center for Thoracic Aortic Disease
Co-Director, Center for Heart Valve Disease

Ibrahim Sultan, MD
Assistant Professor, Cardiothoracic Surgery

One of the qualities that makes the UPMC Cardiothoracic Surgery program exceptional is the approach to the management of aortic dissection. The first obstacle in treating an aortic dissection is recognizing and differentiating the condition from other similar maladies of the heart. Throughout our system, clinicians are trained to have a high index of suspicion for aortic dissection, which directs patients from presenting in the Emergency Department (ED) into a CT scanner as expeditiously as possible. From that point, we work together with ED physicians to make the diagnosis and are able to see the results of imaging across the UPMC network. If the patient has been identified as having an aortic dissection or suspected of having one, a single phone call can transfer them from any facility in the western Pennsylvania area to our operating rooms and ICU. We have a dedicated on-call surgeon who specializes in aortic surgery ready to receive the call and make the necessary arrangements. For these patients, every hour that passes between the inciting event, placing them on the cardiopulmonary bypass machine, and performing surgical repair of the dissected aorta has shown to increase the risk of mortality and morbidity, and we have improved our clinical outcomes by streamlining the entire process.

Every member of the clinical team has been specially trained to identify, manage, and monitor patients with aortic dissection every step of the way. Specialized anesthesiologists, radiologists, nursing staff, cardiologists, intensivists, and the surgical team work together to meet or exceed the standard of care. We are able to eliminate unnecessary tests, expedite the most critical patients, and improve our survival rates while decreasing complications. Once the patient is in the operating room for surgical repair, we utilize our neurophysiology colleagues to help us in monitoring patients during the operation. An EEG is continuously performed to assess for potential tears that may have propagated into the brain thereby causing cerebral malperfusion. This approach is unique to our program and has significantly reduced the risk of stroke for these patients, well below reported results around the world.

We have one of the highest volumes of aortic dissection patients in the country, which provides the opportunity for us to participate in clinical trials to help improve outcomes for our patients. Currently, we are part of a clinical trial to evaluate hybrid arch replacement, a technique to repair complex arch aneurysms and dissections in a single stage operation and potentially with a minimally invasive endovascular procedure if done in two stages. This may effectively reduce our patient's recovery time, reduce the time they are in surgery, and improve function sooner than conventional surgery.

We recently completed being part of a multi-institutional trial to treat complicated acute Type B dissections. These types of aortic dissection makes up about 40 percent of all cases, and this trial helped us utilize a specialized device that helps prevent malperfusion to the body while restoring blood flow through the true lumen using specialized endografts. We hope to see that the patient's aorta will display improved remodeling when compared to conventional therapy.

We also take an aggressive approach to treating patients with valvular dysfunction, especially in maintaining as much native heart tissue as possible. In patients with heart valve dysfunction, we will attempt to repair the valve rather than replace the valve, and to use less invasive methods as an alternative to an open procedure. Mitral valve repair has long been the standard of care for degenerative mitral valve disease. In addition to mitral valve repair, in patients with aortic insufficiency, connective tissue, and bicuspid valves, we attempt to repair the valve rather than replacing the valve with mechanical or tissue prostheses. This may eliminate the need for lifelong anticoagulation therapy if the patient were to have a mechanical valve.

We will continue to provide care that exceeds the standard and puts the needs of patients as the focus of all that we do. It is exciting to help develop and refine new surgical strategies and minimally invasive approaches which can improve a patient's heart and their overall functionality and quality of life.

ECMO: An Evolving and Innovative UPMC Center of Excellence

Jonathan D'Cunha, MD, PhD, FACS
Vice Chairman, Research Affairs and Education
Associate Professor, Cardiothoracic Surgery
Chief, Division of Lung Transplant/Lung Failure

Over the past several years UPMC has established itself as one of the largest centers in the world for patients with heart and lung failure. An important part of the care that we provide is utilizing the newest developments in extracorporeal mechanical oxygenation (ECMO) to care for our most acute patients. Since 2002, we have treated more than 700 cases with this technology and we continue to refine and improve our approach at the systems level and individually for each patient.

One aspect that sets our program apart is the volume of patients that we treat. At any given time, we will have three to five patients relying on ECMO. Due to the volume of patients, we have developed an experienced team capable of delivering quality care based on proven patient outcomes. Additionally, experience has taught us to anticipate the needs of patients and initiate the ECMO process before the patient has reached a crisis point. For example, if a pre-lung transplant patient becomes ill outside of the hospital, we can transition them early to full support and avoid compromising their health through a traumatic decompensation. For our inpatients, we can begin the conversation about initiating ECMO as they become more unstable hemodynamically and have a plan in place to make safer and earlier decisions about cannulation. Through this proactive approach, we can reduce damage to the liver and kidneys, as well as prevent further complications.

As a team, we are also able to develop an individualized plan for each particular patient, specifically designed for their health care goals. It's an evolving process that means a patient can transition from double cannulation to a single catheter as they recover, and then wean from the technology entirely, or receive a lung transplant. Currently, we have patients who are able to ambulate while on veno-venous ECMO, while in the ICU unit, which helps them maintain their strength and conditioning, improving the chances of success with their lung transplant and reducing the potential for thrombosis. Our team has 30 trained professionals from different specialties who provide valuable input. Within those 30 members, there is a built-in redundancy and there is always someone on-call who can perform procedures and intervene as needed. We have a physician on-call at all times and a single phone call can begin the process of bringing them into the service, streamlining the transition to complete support. It takes a village to care for these patients, and between our experienced perfusion team, the nursing staff, the Cardiovascular Intensive Care Unit (CVICU) physicians, and the surgical staff, we have a unified front that works together on all aspects of patient care.

All of these factors are essential to what makes UPMC a Center of Excellence as designated by the Extracorporeal Life Support Organization (ELSO). We are proud of that designation and the cohesive team that we have built. We thrive on open communication and collaboration and provide safety through redundancy and a patient-centered approach.

Our own outcomes are also a serious part of our research efforts. As a group of 10 to 12 experts, we meet monthly to review the data and cases we have participated in each month. We look at all aspects of ECMO care including the impact of blood transfusions, inflammatory mediators, respiratory care, and much more. We are actively publishing our findings regularly to make our important gains in knowledge available to ECMO providers across the nation. We also provide data to outside researchers who submit proposals for our database of information.

We are a center for training and educating providers around the country. Our bioengineering team offers a course that covers material for all levels of treatment centers. It is complete with classroom instruction, high-fidelity simulations, and guidance on developing a successful ECMO program and becoming a Center of Excellence. We are happy to share the knowledge and expertise we have gained through our experience to help physicians and patients around the country.

Through the years we have made huge strides in how we care for ECMO patients and we plan to continue that trend well into the future for patients with acute and chronic heart/lung failure.

Pediatric Ventricular Assist Device (VAD) Treatments

Victor Morell, MD
Eugene S. Wiener Professor
Chief, Division of Pediatric Cardiothoracic Surgery
Vice Chair & Director of Cardiovascular Services, Dept. CT Surgery
Co-Director, Heart and Vascular Institute
Co-Director, Heart Institute,
Children's Hospital of Pittsburgh of UPMC

Mahesh S. Sharma, MD
Director, Pediatric Mechanical Circulatory Support & Artifical Heart Technology
Children's Hospital of Pittsburgh of UPMC
Assistant Professor of Cardiothoracic Surgery

As a highly established program for pediatric cardiothoracic surgery, the Pediatric Mechanical Circulatory Support and Artificial Heart Program at UPMC is tackling the unique challenges that come with treating the youngest and most vulnerable patients. Our program is comprehensive, treating acute and chronic heart failure in children. When a child presents in an emergency, we are able to support them with life-saving technology in the form of extracorporeal membrane oxygenation (ECMO), allowing for stabilization of their circulation. As an ELSO National Center of Excellence, we pride ourselves in being able to provide this treatment in the most expeditious manner, allowing us to make further treatment decisions. ECMO is often used as a bridge to a decision whereby we are able to offer more durable solutions for heart failure in children in the form of ventricular assist devices (VADs).

Our team is capable of providing treatment for advanced failure of both left and right ventricle, and in rare instances, mechanical support of the failing univentricular heart. We are one of the few programs in the nation who have offered mechanical support for children with rare diseases, such as metabolic disorders and certain genetic abnormalities which lead to progressive heart failure. VADs can be used in children as a bridge to transplantation or myocardial recovery, eliminating the need for transplantation entirely.

The VAD program at Children's Hospital of Pittsburgh of UPMC has been at the forefront of technological innovation since the inception of this therapy, and we have performed more than seventy implants for neonates, children, and adolescents with refractory heart failure. Our bridge to transplant success rate is among the best in the world for the complex group of patients at 85 percent. In addition, these children who are coping with the realities of living with heart failure, are further supported by occupational therapists, nutritionists, dedicated pharmacists, physical therapists, and behavioral health specialists. A unique feature of our program is the involvement of a dedicated biomedical engineer for each child on a device. Our specialists monitor the mechanical functioning of the VAD around the clock allowing for adjustments which optimize device output while minimizing complications. We are one of the only programs in the world in which this added expertise is available.

Children in our region have access to a multitude of device technologies, including the Berlin Heart Excor, a pulsatile paracorporeal VAD capable of supporting a newborn to older child. In addition, we have used other devices such as Thoratec Heart Mate II axial flow VAD, and third generation devices such Thoratec Pedimag Centrifugal VAD and HeartWare HVAD. The HeartWare HVAD is a totally implantable VAD which allows for up to 10 liters of blood flow while its design minimizes trauma to blood elements decreasing the morbidity associated with such devices. To date we have had several children with this implant at home while awaiting transplantation and successfully bridged all children to heart transplantation. Our ambulatory VAD program for children is possible due to a coordinated effort by our team specifically providing teaching and education to the patient and family regarding the device. The patient follows up in our Heart Failure Clinic and shares data with the pediatric care team between bimonthly visits. A registered nurse VAD coordinator is available by telephone to provide support, 24 hours a day.

Recent technology has made the SynCardia Total Artificial Heart available, which replaces the failing heart in entirety in selected patients awaiting transplantation. We are intimately involved in moving the field of biomedical engineering and VAD technology forward. At this time, in conjunction with the McGowan Institute for Regenerative Medicine, we are part of a multi-center grant from the National Heart and Lung Institute to develop an implantable device that will be the size of a AA battery. This new device, called the Pediaflow, minimizes the size of the pump, allowing it to be implanted within the pericardial space of small children. Once approved, the device could be used for all pediatric patients, including neonates and infants. Furthermore, we are part of multicenter research initiatives looking at the clinical impact of device technologies including the PumpKin (Pump for Kids, Infants, and Neonates) Investigators and the Pediatric Interagency Registry for Mechanical Circulatory Support (PediMACS).

Our basic science efforts are in collaboration with the lab of Berhard Kühn, MD. This innovative research center studies cardiomyocytes and explores ways for these cells aid in myocardial regeneration. In the future, we hope to continue our long-standing traditions of exceptional patient care, innovation, and intellectual curiosity to positively impact the lives of children with heart failure.

Advancements in Mediastinal and Robotic Procedures at UPMC

Inderpal Sarkaria, MD, FACS
Vice Chairman, Clinical Affairs
Director, Thoracic Robotic Surgery
Co-Director, UPMC Esophageal and Lung Surgery Institute

As a leading provider of robotic procedures and training, UPMC is dedicated to advancing the proven capabilities of the platform. As an adjunct to the surgeon's knowledge and expertise, we consider robotics to provide a better operation for many patients. For surgeries involving tumors of the mediastinum, especially for thymomas, the most common operation in the anterior mediastinum, sternotomy has been the traditional approach. This method has been effective, allowing for complete visualization of the surrounding structures, and a thorough removal of thymic tissue. However, it is not without its potential complications, such as respiratory difficulties, increased pain, a long recovery time, and slow return to normal life for these patients.

Over the past 15 years, minimally invasive approaches to this procedure have shown to be effective for removal of the thymus. Small incisions, coupled with the visualization and imaging technology of the robotic surgery platform, means that performing this procedure less invasively can reduce complications and improve recovery time, while still delivering the same quality of operation as the open sternotomy approach.

The importance of the surgeon's knowledge of the anatomy, disease process, and patient profile cannot be overstated. It is an essential part of the procedure that no piece of robotic technology can replace. However, the robotic platform, in the hands of a properly trained and competent surgeon, can provide better dexterity, better visualization of the anatomy, and a better ability to perform an operation that provides the best outcome.

Thymectomy is a highly technical operation. It is complex in that it requires complete removal of the thymus and any other potential thymus containing tissues. This is all done within a tight space that contains the heart, lungs, phrenic nerves, aorta, pulmonary artery, internal mammary arteries, and innominate vein. In some advanced cases, additional lung, pericardium, or nerves must be resected with the tumor to ensure its complete removal. It is exactly within this tight, contained space that the robotic platform truly excels. We can approach the procedure with better technical confidence all while taking a minimally invasive approach.

Robotics is not without potential drawbacks. Not every patient's case is appropriate for the robotic platform. A skilled and experienced surgeon will know when to convert the procedure to an open operation requiring sternotomy. Robotics relies heavily on the knowledge, technical skill, and ability of the surgeon, as well as requiring additional training on the platform itself.

Figure 1. *Image of anterior undetermined mass.*

UPMC is known nationally and internationally for our training programs in the field of robotic surgery. Over the years we have offered many physicians the opportunity to develop the skills necessary to successfully use the robotic system by offering proctorship, mentorship, and direct training through our residency and fellowship programs, and through the Center for Advanced Robotics Training at the University of Pittsburgh. Physicians travel from all over the country and all over the world to learn procedures such as lobectomy, esophagectomy, and the resection of mediastinal tumors from our skilled practitioners. They can learn how to develop robotic surgery programs for their home facilities. We have also provided intensive training to attending physicians, training seven physicians in thoracic surgery alone in the last year and a half. We also have one of the largest thoracic residency and fellowship training programs in North America. Our thoracic trainees rotate through a number of thoracic services, obtaining a thorough and broad base of knowledge in thoracic surgery, including robotics.

Part of our mission is to continually advance the field of robotics through research in technologies that can potentially improve the conduct of these operations and enhance patient outcomes. An example is the use of advanced surgical imaging integrated into many of these robotic platforms, such as near infrared fluorescence. These advanced imaging systems allow the surgeon to more clearly identify critical anatomy, tumors, and tissue perfusion by direct visualization of fluorescence, or glowing.

Continued

Advancements in Mediastinal and Robotic Procedures at UPMC *continued*

Among other possibilities, these technologies may significantly increase the safety of surgery in the future, and also allow for better visualization of tumors to better ensure their intraoperative identification and complete removal. This is an added layer of confidence that the surgeon is providing the best possible operative outcome for the patient. Our current and developing research protocols are examining this technology for primary and metastatic lung cancers and pulmonary nodules, esophageal cancers, and mediastinal tumors. It is our hope that these advanced technologies will further improve outcomes for our patients.

We are firm believers that better tools and technology in the hands of an experienced surgeon can signify better operations and better outcomes for patients. For patients with mediastinal tumors, our Division of Thoracic and Foregut Surgery is well equipped with the tools and internationally recognized expertise that can make a difference in their treatment and we are active in providing that knowledge and expertise to other physicians.

Figure 2. *Complete thymectomy specimen after robotic assisted resection of thymoma.*

In Memoriam

A Legend in Thoracic Surgery

F. Griffith Pearson, MD
1926–2016

The Department of Cardiothoracic Surgery remembers a legendary leader in thoracic surgery. Griffith (Griff) Pearson, MD, died peacefully on August 10, 2016.

Dr. Pearson attended the University of Toronto Schools and received his medical degree in 1949. He was passionate about the management of thoracic disease and is widely recognized throughout the world as the founder of the specialty of thoracic surgery and for the establishment of the "Toronto School of Thoracic Surgery" at Toronto General Hospital, University of Toronto. This training program became the template for thoracic training programs throughout the world.

Dr. Pearson was a brave master surgeon, teacher, and friend to many. He positively touched the lives of those he encountered by truly defining the specialty and changing the world. His talent, wonderful bedside manner, innate curiosity, and his innovative spirit were an inspiration to us all.

Department News

The Department of Cardiothoracic Surgery congratulates:

- **Jonathan D'Cunha, MD, PhD, FACS,** who was promoted to chief, Division of Lung Transplant/Lung Failure of the UPMC Department of Cardiothoracic Surgery and program director of the Traditional Two-Year Cardiothoracic Surgery Residency Program.
- **Norihisa Shigemura, MD, PhD,** who was promoted to associate professor of Cardiothoracic Surgery.
- Four members of the department who were named to Pittsburgh Magazine's 2016 "Best Doctors": **Drs. James D. Luketich, Thomas G. Gleason, Neil A. Christie,** and **Matthew J. Schuchert**.
- **Neil A. Christie, MD**, who was awarded the Leo H. Criep, MD Excellence in Patient Care Award by the University of Pittsburgh Cancer Institute.
- **Robert L. Kormos, MD, FAHA, FRCS(C)**, who was named the 2016 Peter J. Safar Pulse of Pittsburgh Award Winner by the American Heart Association.
- **Nicholas Baker, MD**, who was awarded the American Association of Thoracic Surgery Graham Fellowship for Robotics.
- **Matthew J. Schuchert, MD**, who was awarded the second annual James D. Luketich Chairman's alumni award. This award is given annually to the outstanding graduate of the Department of Cardiothoracic Surgery's residence and fellowship programs. Dr. Schuchert's academic and clinical achievements have exemplified the innovative spirit of progress and commitment to cardiothoracic surgery excellence.
- **Inderpal Sarkaria, MD, FACS,** who was awarded funding by the University of Pittsburgh Physicians Foundation for his project *A Pilot Trial of Near Infrared Fluorescence Imaging with Indocyanine Green in the Detection and Diagnosis of Neoplastic Pulmonary Nodules.*

The Department of Cardiothoracic Surgery welcomes five new attending surgeons:

Ibrahim Sultan, MD

We are pleased to announce that Ibrahim Sultan, MD, has joined the Department of Cardiothoracic Surgery as assistant professor of Cardiothoracic Surgery. Dr. Sultan has joined as a new faculty member at the Center for Thoracic Aortic Disease, the Center for Aortic Valve Disease, and the UPMC Shadyside Cardiac Surgery Program.

Dr. Sultan brings specific expertise in the areas of thoracic aortic diseases, aortic dissection management, endovascular and transcatheter aortic and aortic valve techniques, and advanced valvular repair strategies via open and minimally invasive strategies.

Dr. Sultan earned his undergraduate and medical degrees from Cornell University. He then trained in general surgery at The Johns Hopkins Hospital in Baltimore where he earned numerous awards. From there, he went on to the University of Pennsylvania in Philadelphia and completed his cardiothoracic surgery residency and his advanced cardiac surgery fellowship focusing on thoracic aortic surgery and valvular disease. His research interest is in clinical outcomes, and he will help coordinate clinical research and analytics for the Center for Thoracic Aortic Disease's growing practice and its database.

We are extremely fortunate to have recruited Dr. Sultan, noted by his mentors at Penn to be a uniquely gifted surgeon with tremendous potential clinically and academically.

Christopher M. Sciortino, MD, PhD, FACS

We are pleased that Christopher Sciortino, MD, PhD, FACS, has joined the UPMC Advanced Heart Failure Center and the Division of Cardiac Surgery. Dr. Sciortino joins us as the surgical director of the Advanced Heart Failure Center to help lead our efforts in cardiac transplantation and mechanical circulatory support with ventricular assist devices (VAD).

In addition to his experience with heart failure surgery, Dr. Sciortino has an extensive background in bioengineering research and will pursue his cardiac transplantation and VAD development research interests at the McGowan Institute of Regenerative Medicine.

Dr. Sciortino earned two undergraduate degrees from Pennsylvania State University and then several advanced degrees from Case Western Reserve University in Cleveland, including a master of science in applied anatomy, a doctoral degree in biophysics and bioengineering, and his medical degree. From there he went on to The Johns Hopkins Hospital in Baltimore where he completed both his general surgery and cardiothoracic surgery residencies, receiving numerous awards for both clinical and academic excellence. He has served as assistant professor of surgery, surgical chief of MCS and Heart Transplantation, and director of Adult Extracorporeal Life Support at Johns Hopkins, where he also maintained a very robust cardiac surgical practice and clinically outstanding heart failure program and was known as a tireless and dedicated surgeon toward those efforts.

Dr. Sciortino will work closely with our outstanding heart failure clinical team to provide leadership and further advance our world renowned program.

Continued

Department News

Welcoming new attending surgeons continued:

José Pedro da Silva, MD

José da Silva, MD, is a visiting professor of cardiothoracic surgery at the University of Pittsburgh School of Medicine and surgical director of the Center for Valve Therapy at the Heart Institute at Children's Hospital of Pittsburgh of UPMC.

He earned his medical degree and completed residencies in general surgery and thoracic and cardiovascular surgery at Instituto de Assisténcia Médica ao Servidor Público Estadual in Sao Paulo, Brazil, followed by a cardiothoracic residency and cardiovascular surgery fellowship at the Cleveland Clinic.

Dr. da Silva's clinical interests include congenital heart disease, heart and heart-lung transplantation, adult cardiac surgery, and pediatric cardiac surgery. He is also internationally recognized as the developer of the Cone Technique, an innovative procedure for tricuspid valve repair in Ebstein's anomaly.

Pyongsoo David Yoon, MD

Pyongsoo David Yoon, MD, is director of Cardiac Surgery at UPMC Passavant and is board-certified in general and cardiothoracic surgery.

He earned his medical degree from the Medical College of Virginia in Richmond, Va., and completed his residency at Eastern Virginia Graduate School of Medicine in Norfolk, Va., followed by clinical and research fellowships in cardiothoracic surgery at Allegheny General Hospital in Pittsburgh.

Dr. Yoon recently served as medical director of Cardiovascular Surgery at ValleyCare Health System of Ohio; he performed the first open-heart surgery in Trumbull County, Ohio, in 2002. His clinical practice includes all aspects of adult cardiac surgery.

Neha Reddy, MD

We are pleased to welcome Neha Reddy, MD, to the Department of Cardiothoracic Surgery as an assistant professor of Cardiothoracic Surgery.

Dr. Reddy completed a fellowship in advanced minimally invasive thoracic and foregut surgery under the mentorship of Dr. James D. Luketich.

She earned her medical degree from the University of Cincinnati College of Medicine, after which she completed her general surgery residency at UPMC Mercy followed by a cardiothoracic surgery residency with the UPMC Department of Cardiothoracic Surgery.

Meetings and Conferences

- The department was well represented at the 96th Annual Meeting of the American Association for Thoracic Surgery in Baltimore. Our experts contributed four lectures and one research presentation.
- Our physicians participated in the 36th Annual Meeting and Scientific Sessions of the International Society for Heart & Lung Transplantation in Washington, DC. Our experts contributed four research presentations, eights mini-oral presentations, 13 poster presentations, and one lecture.
- During the 52nd Annual Meeting of the Society of Thoracic Surgeons in Phoenix, our physicians participated in three research presentations and one poster presentation.

Clinical Trials

Division of Thoracic and Foregut Surgery

- A Pilot Trial of Near Infrared Fluorescence Imaging with Indocyanine Green in the Detection and Diagnosis of Neoplastic Pulmonary Nodules
- ALCHEMIST Screening Trial
- Detection of Genetic Markers of Lung Cancer
- Esophagectomy Outcomes
- GERD Outcomes
- Lobectomy versus Sublobar Resection
- Photodynamic Therapy Registry
- Quantitative Analysis of Barriers to Early Detection of Esophageal Adenocarcinoma
- Esophageal Cancer Risk Registry
- The CALIBER Study Randomized Controlled Trial of LINX vs. Double-Dose Proton Pump Inhibitor Therapy for Reflux Disease
- Lung Cancer Registry: An Open Registry to Measure the Impact of Adding RNA Expression Testing on Referral Decisions in Early Stage Lung Cancer Patients
- The National Mesothelioma Virtual Bank

Division of Lung Transplant/Lung Failure

- A Phase 2, Multicenter, Open-label Study to Measure the Safety of Extending Preservation and Assessment Time of Donor Lungs Using Normothermic Ex Vivo Lung Perfusion and Ventilation (EVLP)
- Novel Lung Trial: Normothermic Ex Vivo Lung Perfusion (EVLP) as an Assessment Of Extended/Marginal Donor Lungs
- Prospective, International, Multicenter, Randomized Clinical Investigation of TransMedics® Organ Care System™ (OCS™ LUNG) for Lung Preservation and Transplantation
- Sodium Nitrite Administration at the Time of Lung Organ Procurement and Transplantation to Minimize the Risk of Pulmonary Graft Dysfunction
- A Phase 2, Multicenter, open-label study to measure the safety of extending preservation and assessment time of donor lungs using normothermic ex vivo lung perfusion and ventilation (EVLP) as administered by the sponsor using the Toronto EVLP system

Division of Adult Cardiac Surgery

- CoreValve® Continued Access Study
- CoreValve® SURTAVI Study
- CoreValve® U.S. Expanded Use
- CoreValve™ Evolut™ R US Clinical Study
- Echocardiography to Predict Recurrent IMR After Surgical Mitral Valve Repair
- Evaluation of Zenith® Dissection Endovascular System
- Genomics and Postoperative Atrial Fibrillation
- HeartWare® Endurance Trial
- International Registry of Acute Aortic Dissections (IRAD) Protocol
- PORTICO Study
- Randomized On-X Anticoagulation Trial
- Study of GSK1278863 to Reduce Ischemic Events in Patients Undergoing Thoracic Aortic Aneurysm Repair
- The Use of Impella® RP Support System in Patients With Right Heart Failure
- Tissue Bank (Aortic Valve)
- TRANSFORM Trial
- Reprise
- Hybrid II
- Momentum
- CTSN Stem Cell
- Cytosorb Refresh Trial

Division of Pediatric Cardiothoracic Surgery

- AAOCA Study
- Critical Left Ventricular Outflow Tract Obstruction Study
- Nikaidoh Operation Research Registry
- Unbalanced AVSD Study

UPMC LIFE CHANGING MEDICINE

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UPCOMING CONTINUING MEDICAL EDUCATION COURSES

Donor Heart and Lung Procurement Simulation Lab

Monday, April 3

Center for the Future of Surgery, University of California San Diego

Minimally Invasive Approaches to the Management of Achalasia and Other Benign Esophageal Diseases

Wednesday, May 17 to Friday, May 19

Day 1: Hands-On Wet Lab

Day 2: Lectures

Day 3: Live-Surgery Demonstrations

For more information, contact Angela Kinnunen, **CTSurgCME@upmc.edu** or **412-648-6342**.

To learn more about the UPMC Department of Cardiothoracic Surgery, please visit **UPMCPhysicianResources.com/ThoracicSurgery**.

UPMC PHYSICIAN RESOURCES

Contact the UPMC Department of Cardiothoracic Surgery at:

Division of Cardiac Surgery
412-648-6200
UPMC Presbyterian
Suite C-700, 200 Lothrop St.
Pittsburgh, PA 15213

Division of Pediatric Cardiac Surgery
412-692-5218
Children's Hospital of Pittsburgh of UPMC
4401 Penn Ave.
5th Floor, Faculty Pavilion
Pittsburgh, PA 15224

Division of Thoracic and Foregut Surgery
412-647-7555
UPMC Presbyterian
Suite C-800, 200 Lothrop St.
Pittsburgh, PA 15213

Division of Lung Transplant/Lung Failure
412-648-6315
UPMC Presbyterian
Suite C-900, 200 Lothrop St.
Pittsburgh, PA 15213

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