Penn Medicine

Penn Heart & Vascular

PIONEERING THE FUTURE OF ELECTROPHYSIOLOGY

Full clinical activity report ▶

Penn Medicine is pleased to provide you with the second in a series of updates on Penn Heart & Vascular activities, outcomes and accomplishments for 2011 – 2012.

This icon represents online access to videos of Penn experts and additional highlights.

Visit ▸**PennMedicine.org/heart/outcomes** for more information.

David Callans, MD, reviews ASPIRE, a clinical trial seeking to determine if early ablation is better than medication alone for ischemic VT in ICD patients with infrequent episodes of VT.

Mathew Hutchinson, MD, and Gregory Supple, MD, examine the threat of strokes originating from clots in the heart's left atrial appendage and devices in development to prevent this danger.

Gregory Supple, MD, reviews the introduction of a new "leadless" ICD that will reduce or eliminate the risks associated with aging leads and their extraction.

NATIONAL LEADERS IN CARDIAC ARRHYTHMIA TREATMENT

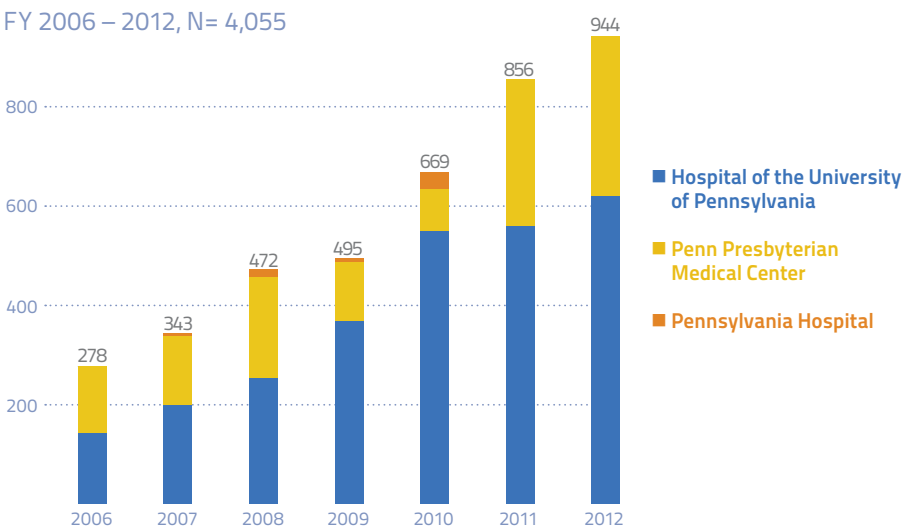
The Electrophysiology Program at Penn Medicine performs more atrial fibrillation ablations than any other program in the region and is among the largest hospital-based programs in the United States.

The Penn EP Program is renowned for:

- Leading the nation and the region in atrial fibrillation (AF) ablation procedures
- Treatment of complex heart rhythm disorders
- Complex pacemaker and defibrillator implantation and management
- National and international referrals after failed procedures
- Innovative clinical research that changes patient care
- A highly-skilled, multidisciplinary, team-oriented approach to treatment

AF Ablation Case Volume at Penn Medicine

FY 2006 – 2012, N= 4,055



Research shows that medical centers performing more than 100 AF ablation procedures per year have better outcomes and fewer complications.*

Treating the Most Complex Patients

A testament to the program's renowned track record of success with refractory and complex cases, Penn Medicine's EP program routinely accepts patients who have been treated without success at hospitals elsewhere in the region.

- Nearly a third of all patients having ablation procedures at the Hospital of the University of Pennsylvania (HUP) have failed procedures elsewhere.

Leading the Region and the Nation in Cardiac Ablations

The Penn EP Program performs more catheter ablation procedures than the next three largest EP programs in the region combined, and more than six times the national average number of AF ablation procedures per year.*

Team Depth and Experience

The electrophysiology team at Penn Medicine is comprised of 19 board-certified electrophysiologists and more than 20 dedicated nurse practitioners and physician assistants.

- Together, this team provides consultation to cardiovascular specialists throughout the region to select appropriate patients for catheter and surgical ablation therapy for AF and ventricular tachycardia (VT).

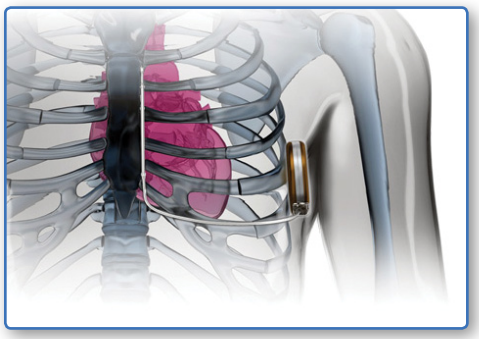
*Presented at the AFib Summit and Heart Rhythm Society Scientific Sessions, 2013.

INNOVATION TREATMENT & ADVANCED

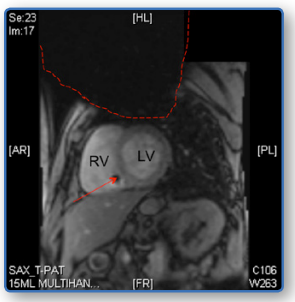
Advancing The Treatment of Cardiac Arrhythmias

"Leadless" (ICD) for Ventricular Arrhythmias

Penn Medicine's EP specialists are placing the Cameron (*Boston Scientific*) leadless subcutaneous cardiac defibrillator in selected patients with ventricular arrhythmias. The Cameron device contains a vertical subcutaneous lead or electrode implanted under the skin at the chest. From this position, the electrode senses the heart's electrical signals and corrects aberrant rhythms with appropriate shocks.



Cardiac MRI for Patients with ICDs/Pacemakers



In the Philadelphia region, Penn Medicine alone has developed techniques to image the hearts of patients with implantable cardioverter defibrillators (ICDs) and other implantable devices. The imaging involves electrophysiologists and radiologists, and requires a thorough knowledge of MRI physics and device technology.

Cardiac MRI in patient with ICD. Hashed red line is around shadow from ICD can, red arrow points to lead artifact. RV=right ventricle, LV=left ventricle

nContact Ablation Procedure

Penn surgeons are investigating the nContact hybrid endocardial ablation procedure for patients with persistent or paroxysmal Afib, including patients with failed previous procedures and patients who are refractory to medical intervention. The Penn EP Program will soon take part in a randomized multicenter trial of nContact vs. catheter ablation in persistent AF.

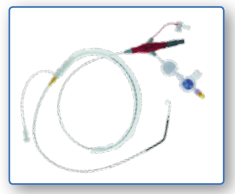
Cardiac EP Imaging To Improve Safety and Outcomes

Penn is working to create new electrical mapping and recording systems for more rapid arrhythmia diagnosis, including creating software with new algorithms to analyze AF signals, further enhancing AF mapping and ablation.

Surgical, Medical and Mechanical Approaches to Ventricular Tachycardia

Electrophysiologists at Penn Medicine pioneered substrate-based catheter ablation to treat unmappable ventricular tachycardias, as well as the use of intracardiac echo to facilitate mapping and ablation of a variety of rhythm disorders.

Peripheral Bypass for VT Mapping



Penn electrophysiologists are using the Impella™, a percutaneous cardiac assist device. The Impella device permits increased blood flow to benefit patients with hemodynamic instability who might not otherwise tolerate a lengthy procedure and complex VT mapping.

TECHNOLOGY

Cutting Edge Approaches to VT

Percutaneous Therapy for Epicardial VT in Nonischemic Cardiomyopathy

Employing a percutaneous approach that targets the epicardium, the Penn EP team eliminates VT associated with nonischemic cardiomyopathy of the right and left ventricles. Penn physicians have described their success in achieving complete reversal of myocardial weakening with ablation of frequent ventricular ectopy.*

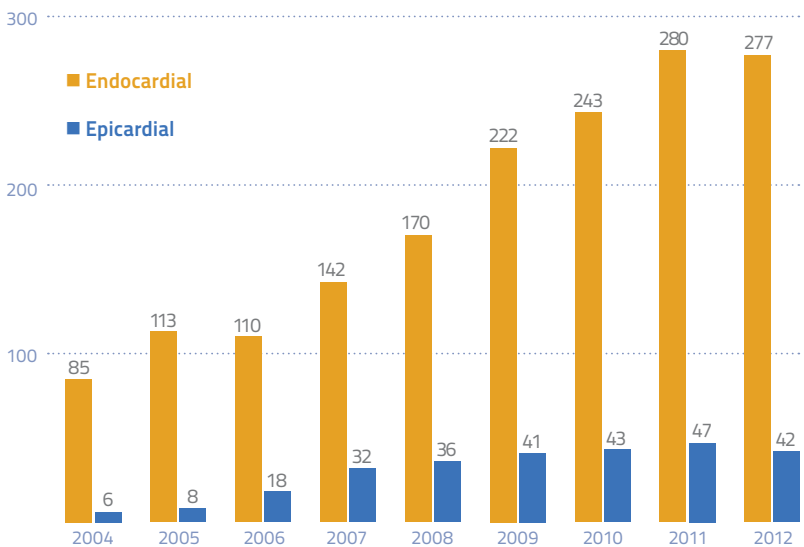
Preventing Death and Advancing Treatment of VT

In addition to VT ablation procedures, the physicians at Penn are working on techniques to distinguish between patients at risk for sudden death who are likely to respond to medications or pacing for heart failure and those that are likely to progress despite treatment.

In 2012, the HUP EP team performed 319 ablations for ventricular tachycardia including 42 epicardial ablation procedures, and received patient referrals from Canada, Australia, Venezuela and across the United States for the treatment of VT.

VT Ablation Case Volumes at HUP

FY 2004 – 2012, N = 2,332



*J Cardiovasc Electrophysiol. 2007;18(1):9-14.

Significant Findings: Clinical Research in Electrophysiology at Penn Medicine

Clinical research is a substantial part of the EP Program mission at Penn Medicine. The program is currently participating in the following studies:

- **ASPIRE (VT ICD)**
  Objective: Determining whether early ablation of VT in patients with infrequent episodes is more effective than medication alone for ischemic VT in patients with ICDs.

- **CardioFocus HEARTLIGHT Study**
  Objective: To compare the CardioFocus Ablation System (Laser) and the Navistar ThermoCool catheter for the treatment of symptomatic paroxysmal atrial fibrillation (PAF).

- **Catheter Ablation vs. Antiarrhythmic Drug Therapy for AF (CABANA)**
  Objective: Determining whether catheter ablation for AF elimination is superior to current medical therapy (rate or rhythm control) in reducing mortality, stroke, serious bleeding or cardiac arrest.

- **OAT Pilot Study**
  Objective: Assessing the safety of withdrawing oral anticoagulation therapy (OAT) following successful pulmonary vein isolation (PVI) procedures.

- **REDUCE AF Study**
  Objective: Evaluating the long term occurrence of atrial arrhythmias and thromboembolic complications in patients with typical atrial flutter randomized to cavo tricuspid isthmus (CTI) ablation vs. CTI with PVI.

- **Quadripolar Pacing Study**
  Objective: Objective: To investigate the Quadripolar CRT-D device system; the Quartet left heart lead used for LV pacing can be programmed in ten pacing configurations.

- **Venture-AF Study**
  Objective: To assess the efficacy and safety of rivaroxaban vs. warfarin before, during and after AF ablation.

ELECTROPHYSIOLOGY

INNOVATION

Since the inception of the EP program, Penn Medicine has introduced a number of major clinical and scientific contributions in electrophysiology to the region including the first ICD implant and first catheter ablation.

INDIVIDUALIZED CARE

Although physicians in Penn Medicine's EP program perform six times the national standard of AF ablation procedures, Penn's team of experts remain dedicated to providing individualized care for patients with AF and ventricular tachycardia.

INSTRUCTION

Penn EP physicians are leaders in educating electrophysiologists and other medical professionals from around the world. Dr. Marchlinski and his team host a yearly State of the Art Arrhythmia Symposium and co-host the International Symposium on Ventricular Arrhythmias, which brings together the best and brightest from around the world in an effort to advance the science and clinical applications of electrophysiology.

THE QUALITIES OF EXCELLENCE

The Penn EP Program is renowned for clinical excellence and the diversity of its services.

Device Extraction Expertise

The EP program at Penn Medicine receives many referrals for pacemaker and implantable defibrillator lead extraction, a delicate and often complicated procedure. Fractured or malfunctioning leads increase the risk of complications and are a common reason for device replacement.

A Design for Quality Care

Penn Medicine has eight EP laboratories. These laboratories are equipped with advanced imaging and mapping systems that improve accuracy, safety and effectiveness of catheter placement, provide individualization of treatment and enhance the safety and effectiveness of catheter ablation therapy and cardiac device implantation for the treatment of cardiac arrhythmias.

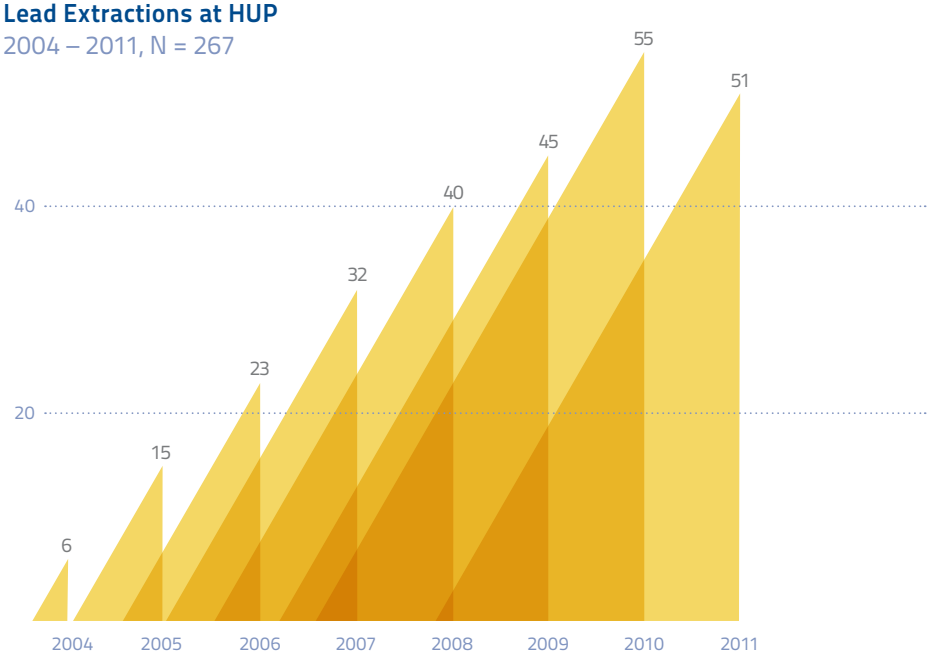
To manage simple and complex arrhythmia disorders, the Penn team uses a variety of novel imaging tools, ablation strategies and devices, including:

- Jet ventilation (high frequency and low-volume) to avoid catheter movement during breathing
- Substrate characterization using electrogram analysis
- Pulmonary vein (PV) isolation and non-PV trigger ablation for long-standing persistent AF
- Intracardiac echocardiography
- MRI, CT scans, remote navigation Stereotaxis and integrated mapping using the CARTO system (Biosense Webster), and the Ensite NavX system (St. Jude Medical)
- Epicardial ablation
- Left atrial appendage closure

The Penn EP team is at the vanguard nationally for pacemaker and implantable defibrillator lead extraction procedures.

Lead Extractions at HUP

2004 – 2011, N = 267



Penn PhysicianLink™

Consults • Referrals • Transfers

An Exclusive Program for Referring Physicians

Penn Medicine is committed to its role as a world-renowned resource for consultation, diagnosis and providing the most advanced treatment options in the region. Penn PhysicianLink simplifies the lines of communication between referring physicians and Penn Medicine. This comprehensive, coordinated collection of support services expedites and facilitates consults, referrals and transfers for all heart and vascular patients.

877.937.PENN (7366) • PennMedicine.org/PhysicianLink

Exclusive, Physician-Only Telephone Line 877.937.PENN (7366)

This single, dedicated physician-only telephone line offers direct access to a special Call Center reserved for medical professionals to facilitate patient consults, referrals and transfers to Penn Medicine. The physician-to-physician phone line is available 24-hours-a-day, seven-days-a-week. All calls will be answered within three rings, helping to expedite referrals, transfers, consults and appointments. By calling just one number, physicians and their staff will have access to any Penn Medicine physician and/or location.

Urgent Transport Services

Rapid access to emergency services including Penn Heart Rescue® and PennSTAR® flight medical transportation are available for referring physicians. PennSTAR provides rapid transport of critical care patients between medical centers, as well as "on-scene" services at the site of accidents and trauma-related incidents. Support for major disasters and organ transplant teams are also provided.

Online Resources PennMedicine.org/PhysicianLink

Penn Medicine offers referring physicians access to patients' medical records. An online physician portal on PennMedicine.org grants referring physicians access to a patient's clinical information and medical records including:

- Patient Encounters
- Lab Reports
- Radiology Reports
- Procedure Reports
- Cardiology Reports
- Medications
- Physician Correspondence
- Allergies
- Medical History
- Problem List