

CARDIOLOGY

Advances in the Treatment of Ventricular Tachycardia

The section of electrophysiology has a long tradition of innovation in treating atrial arrhythmias. Today electrophysiologist Philip Cuculich, MD, and radiation oncologist Clifford Robinson, MD are continuing this long tradition by developing a non-invasive method for treating ventricular tachycardia (VT), using stereotactic cardiac ablation radiotherapy (a.k.a. the Gamma Knife). “The procedure is an extension of more than a decade’s worth of technical advancements in precision ablative radiotherapy for tumors,” says Robinson. In 2015 Cuculich and Robinson have performed radiotherapy ablation on three patients. Each of these patients had no other options to treat their life-threatening ventricular tachycardia, and each had experienced multiple shocks from their defibrillators. In one case, that patient had received 30 ICD shocks the week prior to the ablation procedure. “Five months out, we documented only a single episode of VT among the three patients,” says Cuculich, who began enrolling patients in a new safety and feasibility protocol in late 2015, in order to further evaluate the procedure. “This isn’t for everybody, but this holds promise that it could be part of the armamentarium for VT. Because it’s noninvasive and quicker than conventional mapping and ablation, it seems to be a considerably safer procedure in the short term but we need to know more about the long-term safety of this procedure.” Mitch Faddis, who is Director of Electrophysiology, commented that “The heart is a thick muscle and we are limited with a catheter to ablating arrhythmias on the surfaces of the heart. In cases where the circuit is deeper or there are obstacles (fat or blood vessels) that

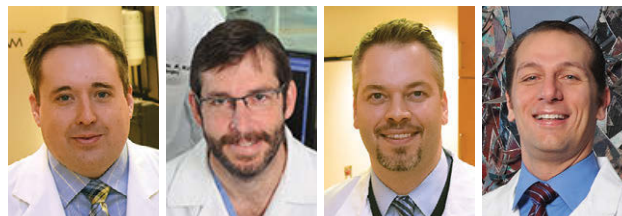
can block the radiofrequency waves from the catheter, radiotherapy ablation for VT is another tool in our toolbox.” Robinson commented that “I’m proud to work here. Only in an academic center like Washington University could two physicians from such disparate disciplines manage to conceive of such a concept and treat their first patient in just a few short months.”

Washington U electrophysiologists also are trying to identify which patients might benefit from early ablation therapy for VT. Between 30-40% of patients with defibrillators will experience recurrent shocks or VT storms, which Dr. Faddis says, can start a cascade of events that leads to heart failure or death. Washington University electrophysiologists are participating in the Substrate Targeted Ablation Using the FlexAbility™ Ablation Catheter System for

the Reduction of Ventricular Tachycardia (STAR-VT) clinical trial. Daniel Cooper, MD, is the principal investigator for the study at Wash U. “Our hypothesis is that early ablation will prevent these ongoing episodes,” says Cooper. We’re looking to see if prophylactic ablation...can not only prevent shocks but also enable patients to live longer and not end up with heart failure.” Enrollment in the STAR-VT trial began in mid-2015, and Wash U was the first center in the region to participate in the trial.

Traditionally patients with difficult to manage VT are often referred very late to electrophysiologists. With the recent clinical studies offering new potential treatment

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From left: Clifford Robinson, MD; Mitchell Faddis, MD; Daniel Cooper, MD; and Philip Cuculich, MD

Heart & Vascular Center



NATIONAL LEADERS IN MEDICINE

The mission of the Washington University and Barnes-Jewish Heart & Vascular Center is to achieve excellence in patient care, research and education through seamless integration of heart and vascular care. The Heart and Vascular Center is committed to promoting heart and vascular health through education, prevention and treatment of heart and vascular disease.

MESSAGE FROM THE CHIEF



Douglas Mann, MD

This past fall, we held our first Dr. Michael Beardslee Memorial Lecture for Cardiology Grand Rounds. As you may recall, Mike passed away unexpectedly last year just prior to returning to our faculty. Thanks to generous contributions by Mark Fesenmyer, Mr. and Mrs. John C. Wolber, faculty members, and the Centene Charitable Foundation, we were able to establish the lectureship in Mike's memory.

I know he would have enjoyed our first guest lecturer, Robert Bonow, MD, the Goldberg Distinguished Professor of Cardiology at Northwestern University Feinberg School of Medicine. Dr. Bonow, who also serves as Director of the Center for Cardiovascular Innovation at Northwestern Memorial Hospital, focused on "Progress in Aortic Stenosis: New Insights, Options and Challenges."

Donations to our Division are greatly appreciated. As you will read on the back page, the Robert and Casey O'Brien Heart and Vascular Fellowship Fund has enabled us to support advanced subspecialty training during external rotations for several of our fellows. Many have said that they would not have been able to afford the full cost of these opportu-

nities without this fund. As you reflect upon the benefits of your own training here at Washington University, I humbly ask that you consider giving back so that we can advance the training of the next generation of cardiovascular specialists.

I was pleased to see many alumni and colleagues from across the country at the November AHA meeting and those who attended our cardiology satellite symposium, where we focused on the latest options for hypertrophic cardiomyopathy. These symposiums have grown in popularity over the past several years and we are committed to offering timely topics and the latest in research and clinical care practices.

Continue to keep the Division updated on your career advancements. We always enjoy catching up with our alumni and hearing all that you have accomplished.

Douglas L. Mann, MD

Lewin Professor and
Chief, Cardiovascular Division

VT Ablation Continued from page 1

options for patients, early referrals to a comprehensive VT storm referral center are now

warranted. "Certainly after one ICD shock, physicians should question whether ablation should be considered," says Faddis. "And if a patient's medical condition is more serious,

we have the full complement of advanced therapies available, including mechanical assist devices and a robust heart failure and transplant program."

THANK YOU to Our 2015 Donors

The following physicians have made donations in the past year to the Cardiovascular Division. Your support helps us to advance the field of cardiology by enhancing our fellowship training programs and supporting distinguished lectureships and other activities. Thank you for your support!

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Fellowship Program Update

Andrew Kates, MD

We are on an upward trajectory in the number and quality of fellowship applicants. I am so pleased to announce that for the first time in the history of the division, we have recruited five women cardiology fellows! Our program is now recognized as a vibrant and comprehensive cardiovascular training program with multiple options for forging new clinical and research pathways based upon individual interests. Our fellows not only have opportunities here to work with esteemed faculty, they also have widening options for subspecialty career exploration, thanks to a fellowship fund established by Bob and Casey O'Brien. As a result, several fellows have experienced dynamic rotations, including one in Alaska.

I believe these rotations strengthen critical thinking skills as well as expand networking and mentorship opportunities. Through my new role as an elected Missouri Governor for the American College of Cardiology, I hope to do the same thing — expand the visibility and opportunities for cardiovascular fellows across that state and around the country. Already, fellows have been able to participate in statewide abstract competitions to showcase their exciting and relevant research efforts. At Washington University School of Medicine, we've also strengthened our own research pathways for trainees and encouraged multidisciplinary collaborative investigations. These efforts serve to push translational research into clinical practice so that all of us advance cardiovascular care for our patients.

Alumni Profile-

Mary "Minnow" Walsh, MD, FACC

WU Cardiology Fellow 1986-1990

Currently: Dr. Walsh serves as Vice President of the American College of Cardiology and directs the Heart Failure and Transplantation Program at St. Vincent Heart Center in Indianapolis. As such, she is heavily involved in patient care and quality initiatives. She also serves as Program Director for the Advanced Heart Failure and Transplant Fellowship. In research, she focuses on clinical trials in heart failure and participates in collaborative projects focused on heart disease in women.

Favorite Leisure Activities: I enjoy running and make it a priority. The first thing I pack when I travel are my running shoes. Saturday mornings are reserved for long runs with a group of women I've been running with for years.

Favorite Fellowship Memories: I will always be grateful for Dr. Burt Sobel's insistence that all fellows conduct research. I arrived fresh from internal medicine training ready to be a clinical cardiology fellow and start working in the CCU. Instead, Burt asked us to begin with research. I had no research experience prior to my fellowship, and I was reluctant to follow that path. But I liked research so much that by the end of my first year, I asked to stay in the lab another year. Under the mentorship of Burt, Steve Bergmann and many other faculty members, I learned critical thinking, writing, trial design and much more. My research training has informed the rest of my professional career. I will always be grateful to them for their mentoring.



Mary Walsh, MD, center, at the Indianapolis Mini Marathon

First Year Cardiology Fellows, July 2016

We welcome the following physicians to our Cardiovascular Fellowship training program at Washington University School of Medicine:



Mark Gdowski



Gmerice Hammond



Jesus Jimenez



Benjamin Kopecky



Chien-Jung Lin



Amanda Verma



Dominique Williams



Erica Young



Kathleen Zhang

2nd Edition: *Washington University Manual of Echocardiography*[®]

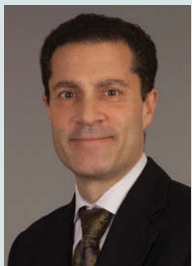
Stay tuned for the Second Edition of the Washington University Manual of Echocardiography that will be available this spring. Initially debuting in 2012, the Manual has been fully updated and contains new images and topics as well as an easier-to-read format while retaining its core focus as a rapid reference tool on echocardiography.

This edition, which again includes information written in collaboration by our fellows and faculty, features new chapters on

hypertrophic cardiomyopathy and cardiac devices, such as LVAD, IABP and Impella,” says Nishath Quader, MD, who served as the editor of the second edition. “In addition, the chapter on LV systolic and diastolic function now has integrated the updated chamber quantification guidelines recommended by the American Society of Echocardiography. In the TEE section, we have a special focus on mitral valve evaluation, three-dimensional, and structural echocardiography.”

Cardiovascular Division fellows first came up with the idea for this book because they wanted an easy-to-carry reference manual while on various cardiology rotations. The book highlights some of the critical echocardiographic findings not only in a normal heart but also those found in various disease states. “In addition to Cardiology fellows, Anesthesia fellows and cardiac sonographers, who utilize echocardiography on a daily basis, will find this book extremely helpful” adds Quader. “Intensive care physicians who are increasingly using hand-held ultrasound will also find that this book provides a succinct overview of the cardiac diseases they frequently encounter.”

Kates Named New ACC Missouri Governor



Andrew Kates, MD, Associate Professor and Director of the Cardiovascular Fellowship Program, has been elected to serve on the Board of Governors of the

American College of Cardiology (ACC) as the Missouri Governor. He concurrently will serve as the President of the ACC's Missouri Chapter.

Kates, who has been active in the ACC for the past decade, has served as chair of the organization's Fellows in Training Committee and was among a group of cardiologists (including faculty member Victor Davila, MD) who established a statewide scientific symposium. The symposium, which has been ongoing for the past seven years, rotates locations around the state and highlights excellence in the field of cardiology from around Missouri. Kates also led the effort to promote cardiovascular research within the Missouri ACC's many fellowship programs

by starting an abstract competition for fellows at the statewide symposium.

The ACC Board of Governors is a leadership group of cardiovascular specialists who represent the voice of patients, practices as well as hospitals and doctors in all 50 states and Puerto Rico. Kates will help guide health policy initiatives and the implementation of quality improvement activities as well as promote the ACC's education mission both in Missouri and nationwide.

2015 AHA Symposium

Management of Hypertrophic Cardiomyopathy for the Clinical Cardiologist

It was a packed house at the Cardiovascular Division's annual Satellite Symposium during the American Heart Association's Scientific Sessions in Orlando, FL in November. This year, the symposium focused on the current management of patients with hypertrophic cardiomyopathy (HCM). Speakers discussed several aspects of the care of patients with HCM, including comprehensive evaluation strategies, the assessment of sudden death risk along with the recently shown added value of MRI for that assessment, nonsurgical and novel surgical approaches, and the role of genetic testing.

“The topic was timely since patients with HCM are not uncommonly encountered in practice for internists and cardiologists, and attention to unique aspects of their evaluation and management is critical,” says Richard Bach, MD, Director of the WU Hypertrophic Cardiomyopathy Center, who also served as the symposium's course chair and moderator. Other speakers from the Washington University included cardiologist and geneticist Sharon Cresci, MD; cardiothoracic surgeon Ralph Damiano, MD; and electrophysiologist Marye Gleva, MD, who also serves as Director of the Cardiac Implantable Electronic Devices Clinic.

Martin Maron, MD, director of the Hypertrophic Cardiomyopathy Center and Co-Director of Cardiac CT and MRI at Tufts University School of Medicine in Boston (and a former WU internal medicine fellow), was



Richard Bach, MD, speaks at the 5th Annual AHA Satellite Symposium

the guest speaker. He discussed the “Emerging Role of Cardiac MR in Risk Stratification of Sudden Death in HCM.”

Adds Bach, “The attendance of 200+ exceeded our expectations. Afterward, I received very positive feedback from several attendees, one of whom asked us to organize another, even full-day HCM program at next year's AHA meeting!”

DIVISION RESEARCH HIGHLIGHTS

Novel Imaging Technology Tracks LVAD Pump Thrombosis

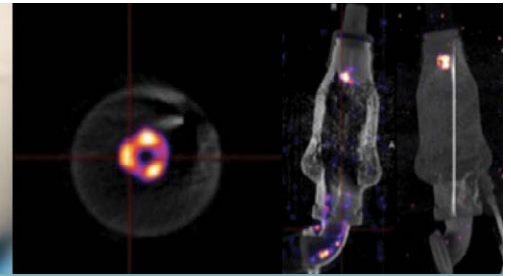
Managing patients with left ventricular assist devices (LVADs) requires a delicate balance between the use of anticoagulants to prevent LVAD thrombosis and preventing thromboembolic stroke originating in the pump. Statistics find that up to 30% of LVAD patients require transfusions because of bleeding complications and more than 10% experience thrombotic complications one year post-implantation. Unfortunately, there is no reliable test to determine whether early thrombus is forming in the LVAD requiring more aggressive anticoagulation to mitigate the potential for stroke or if the mechanical pump is free of thrombus and anticoagulation intensity can be eased to lessen the risk of gastrointestinal bleeding.

At Washington University, a collaborative effort between cardiologists and radiologists is fine-tuning the development of a probe that is able to image through a pump and check for thrombosis. “Currently we look for hemolysis and conduct echocardiographic “ramp studies” where we watch the pump while turning up its speed incrementally,” says Gregory Ewald, MD, Director of the Section of Heart Failure and Cardiac Transplantation. “Those technologies are relatively insensitive in pumps with small amounts of clot.”

Ewald and Gregory Lanza, MD, PhD, Professor of Medicine, Biomedical Engineering and Biology and Biomedical Sciences in the Cardiovascular Division, have teamed up with cardiothoracic surgeon Aki Itoh, MD, and radiologists Samuel Achilefu, MD, and Barry Siegel, MD, to create and test what they tentatively call the Thrombo-



Thrombus located in an LVAD that was removed.



Picture of ThromboScint imaging probe in thrombosis.

Scint imaging probe. In laboratory studies, the researchers found that the probe could image and quantify thrombus in pumps previously used in patients. Lanza and Achilefu are co-principal investigators on an NIH RO1 grant to try and bring the probe to clinical use.

“If we identify thrombus early after its development in the pump or with some clinical clue, then one can decide to intervene medically in several ways. This could avoid the costly and risky need to surgically replace the pump,” says Lanza. “On the other side of the equation, if we can determine that the pump is clean or only has inconsequential fibrin accumulation, then we have an option to reduce the intensity of anticoagulation.”

Their results indicate that the probe represents the first diagnostic approach to directly detect, localize and quantify thrombus accumulation in an LVAD circuit. They now are investigating if a similar nanomedicine approach can also be used as a treatment tool to complement the diagnostic tool. Says Ewald, “Instead of a nuclear imaging particle on the probe, we may be able to attach urokinase and dissolve clots in the pump. This could mean truly personalized, targeted therapy in the far horizon as we work to manage this delicate balance of bleeding and thrombosis.”

4th Annual Cardiovascular Research Day

The Center for Cardiovascular Research and the Division of Cardiology hosted the Fourth Annual Cardiovascular Research Day in October. Drawing more than 200 attendees from the Medical School and the Danforth Campus, the Program highlighted the research accomplishments and ongoing research efforts of some of our rising cardiovascular junior faculty investigators: Amit Amin, MD; Brian Lindman, MD; Jennifer Silva, MD; and Nate Stitzel, MD, PhD.

“The energy level was high as more than 60 posters describing works in progress were presented by graduate students, postdoctoral fellows, cardiology residents and clinical fellows,”

says Jeanne Nerbonne, PhD, director of the Center for Cardiovascular Research.

Awards for the best poster presentations went to: Wandu Zhu, PhD candidate in biomedical engineering, for “How Mutations



Douglas Mann, MD, Chief of the Cardiovascular Division, with Brian Kobilka, MD, and Jeanne Nerbonne, PhD.

in Sodium Channel Accessory Subunits Cause Atrial Arrhythmias and Mediate Responses to Anti-arrhythmics;” Jamie Rimer, PhD, postdoctoral fellow in the cardiovascular division, for “Long Range Functions of snoRNAs;” and Praveen Rao, MD, clinical fellow in cardiology, for a presentation on “Left Ventricular Assist Device Patients Do Not Benefit from Cardiac Resynchronization Therapy.”

The Burton E. Sobel Lecture on Cardiovascular Research Day 2015 was presented by Brian Kobilka, M.D., Professor and Chair of the Department of Molecular and Cellular Physiology, Stanford University School of Medicine, and recipient of the 2012 Nobel Prize in Chemistry, who spoke on “Structural Insights into GPCR Activation: Implications for Drug Discovery.”

Added Value — Fellowship Fund Supports External Rotations

In 2011, Robert and Casey O'Brien established the Heart and Vascular Fellowship fund in their name through the Foundation for Barnes-Jewish Hospital. The fund enables the Cardiovascular Division to support unique subspecialty training opportunities for some of its fellows.

"My father passed away at an early age from a heart-related illness and I have inherited a few of the conditions that are part of the heart disease umbrella," says Robert O'Brien in explaining why he and his wife established the fund. "We hope a fellowship is one more tool to help create a better cardiologist and improve care for patients."

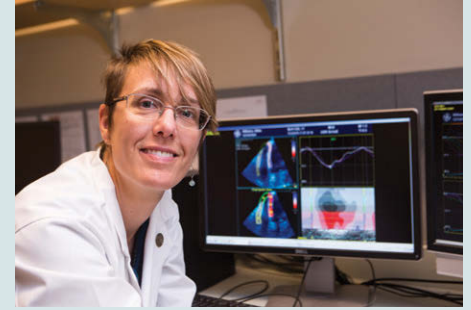
Elisa Bradley, MD, a WU cardiovascular fellow from 2010 to 2013, was the first to receive an award from the fund. She clearly remembers the benefit of her external subspecialty rotation with the Boston Adult Congenital Heart (BACH) Group. "Washington University had a robust ACHD clinical program, but there was no formal ACHD subspecialty training when I was there," she says. "Ultimately this rotation convinced me to pursue another two years of subspecialty

training. There is no doubt that this opportunity gave me expertise in a very complex and evolving cardiology subspecialty. I still have relationships with mentors I met on the elective rotation."

Third-year fellow Tracy Hagerty recently returned from Anchorage, AK. "I completed inpatient consults, outpatient clinic visits and participated in procedures such as cardiac catheterizations and transesophageal echocardiograms," she says. "Although these are routine procedures in most fellowships in the 'lower 48,' they take on a different meaning in Alaska because of the significant challenges in coordinating care for many who live in remote areas. Through this experience and another opportunity working with Native American Indians, I began to understand the barriers to traditional methods of healthcare delivery. It sharpened my commitment to work with underserved populations and to study and illuminate cardiovascular disparities in minority populations."

"The generosity of the O'Briens will definitely shape the careers of many cardiovascular fellows in our program," says Douglas

Casey and Robert O'Brien's generous endowment supports advanced training for cardiovascular fellows such as Tracy Hagerty, MD.



Mann, MD, chief of the Cardiovascular Division. "In addition, we know that support of innovative career paths through the exploration of external rotations is an attractive enticement for prospective fellows. Because of that, the O'Briens are helping us to attract the best and brightest to our cardiovascular fellowship program."

