Successful ablation for managing atrial fibrillation

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Preventing cardiovascular disease in children
Can a microwave give me problems with my pacemaker?
It is a great pleasure to welcome you to our first Cardiovascular News of Excellence from the Cardiovascular Center at Medical College of Georgia. In each semiannual edition of the News we will describe the latest developments in cardiovascular care and discovery. We will also provide a perspective on the best methods for treating and preventing cardiovascular problems.

In this edition, our electrophysiology experts discuss cutting-edge approaches to a common problem, atrial fibrillation. Dr. Adam Berman specializes in the advanced care of patients with atrial fibrillation and other arrhythmias at MCG. Dr. Robert Sorrentino, Director of Arrhythmia Services at MCG, answers patient questions about pacemakers and defibrillators.

Cardiovascular research is the single largest focus of extramural funding on the MCG campus. Studies from the Georgia Prevention Institute (www.mcg.edu/institutes/gpi/) have identified some of the key environmental and genetic risks that lead to the development of cardiovascular disease in children and adolescents. In this edition of News, Greg Harshfield, Ph.D., gives an overview of some of the exciting studies underway at the GPI.

We welcome your suggestions and cardiovascular questions. Please contact us at cvnews@mcg.edu.

Guy L. Reed, MD
Kupperman Professor and Chair of Cardiovascular Medicine
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New leadership
Richard Bias takes over the Senior Vice President responsibilities from Patricia Sodomka who provided initial administrative leadership of the CV Center. Her work in Cardiovascular and other areas at MCG was recently featured in the PBS documentary Remaking American Medicine.

Enhancing the Quality of Cardiovascular Care for Georgians
This year MCG Health System, Inc. was cited for the best in state performance on the quality of care for myocardial infarction. A leading health care grading organization gave MCG the highest possible rating for heart failure care.

Cardiovascular Program Growth.
Clinical care provides an important source of revenue for program development, education and research. The new Outpatient Cardiovascular Center has been very successful and 48% more patients were seen compared with the year before. There were also significant increases in patient satisfaction scores. Other services cared for more patients this past year as well: 73% more in Electrophysiology, 15% in Echocardiography, and 13% more in ECG. There was also an increase in the contribution margin of cardiovascular services to MCG Health System and the Medical College of Georgia.
Atrial Fibrillation (AF) is the most common arrhythmia of adults in the United States. This arrhythmia, characterized by disorderly atrial electrical activation and muscular contraction, can produce dramatic symptoms in patients who experience it. Common complaints of patients with AF include fatigue, exercise intolerance, heart racing and dizziness. Additionally, AF increases the patient’s risk of stroke, particularly in older patients and those with other forms of cardiovascular disease.

Traditional Management
Historically, AF was treated with medications. Warfarin reduces the risk of stroke in patients with AF. Medications such as beta-blockers or calcium channel blockers have been used to control the heart rate during AF. More powerful medications, termed anti-arrhythmic agents, have been used in an effort to suppress AF and maintain normal rhythm with variable degrees of success. Electrical cardioversion (shock) remains a standard method for returning patients with AF to normal sinus rhythm.

Recent Developments
Many patients continue to have problems with AF despite the use of medications. Accordingly, researchers have focused on developing a better understanding of the mechanisms involved in the genesis and perpetuation of AF.

In the late 1990’s, French researchers published a landmark study that described the potential role of the pulmonary veins in the initiation and maintenance of atrial fibrillation. These veins return oxygen-rich blood from the lungs to the left atrium. Careful analyses of human hearts have demonstrated the presence of “sleeves” of heart tissue that extend over these veins. These sleeves of heart tissue possess the ability to generate and conduct electrical heart impulses, and frequently initiate AF by “driving” the arrhythmia itself.

Over the past seven years, intense clinical investigation has focused on the development of minimally invasive procedures to reduce or cure AF by targeting the pulmonary vein sleeves. Advanced electromagnetic systems were developed to map focal points termed “triggers” within the pulmonary veins themselves using catheters. A modification of this procedure electrically isolates the pulmonary veins from the remainder of the left atrium by ablating around their openings, thereby electrically “disconnecting” them from the rest of the heart. Further modifications of this procedure now include more extensive ablation in the left atrium around the pulmo-
nary veins. This renders the left atrium essentially “debulked” of the arrhythmic areas, and its ability to initiate and sustain AF is markedly reduced.

Utilizing sophisticated 3-dimensional mapping systems, and echocardiographic techniques from within the heart itself, the pulmonary vein isolation (PVI) procedure dramatically reduces the burden of AF in about 80% of patients. Cryo-ablation (where heart tissue is frozen instead of heated) is also available to make the procedure safer and more effective. PVI is considered a minimally invasive procedure and typically patients stay only one night in the hospital.

The 2006 American College of Cardiology/ American Heart Association guidelines recommend PVI ablation for patients in whom AF causes significant symptoms despite the use of an anti-arrhythmic agent. PVI is now considered the next step in treatment of symptomatic AF, and the number of patients undergoing this procedure in the US is growing exponentially.

Taken together, the AF patient now has a number of therapeutic options available for controlling symptoms and treating the arrhythmia. For patients in whom medications are not successful or attractive, PVI ablation can dramatically improve the symptoms of AF. With a proven track record and rapidly developing technology, PVI ablation has emerged as a highly effective weapon against atrial fibrillation.

Patients or physicians interested in scheduling an appointment for ablation evaluation can contact: Dianne Sheffield (706) 721-6660.
Preventing Cardiovascular Disease in Our Children

The Georgia Prevention Institute

The Georgia Prevention Institute (GPI) in the Department of Pediatrics was founded 25 years ago to promote research to stem the development of cardiovascular disease in the young. It has emerged as a world leader in programs aimed at identifying children at increased environmental and genetic risk, as well as reducing risk through education and lifestyle management. This has been accomplished through partnerships among investigators with diverse areas of expertise ranging from molecular genetics to lifestyle management.

Prevention of Cardiovascular Disease

Obesity has reached epidemic proportions and GPI researchers were among the first to develop preventive strategies for childhood obesity. Under the direction of Dr. Bernard Gutin and later Dr. Paule Barbeau, National Institute of Health (NIH)-funded studies showed that after-school programs which increased the activity of children helped to curb progression of obesity. Dr. Catherine Davis’s NIH-funded studies are demonstrating that increased physical activity is effective in children at risk for the development of obesity-related diabetes, a growing health problem in youth. Dr. Deborah Young-Hyman is performing early studies to develop a family-based intervention to prevent the development of obesity in babies of overweight mothers.

High blood pressure in children has become relatively common disease in the last decade, particularly in minority populations. Dr. Vernon Barnes and Dr. Frank Treiber are conducting NIH-funded studies to prevent the development of hypertension in youth by teaching those at risk techniques for stress management to lower their blood pressure and prevent the development of adult cardiovascular disease.

The NIH-funded primary prevention studies of Dr. Martha Tingen focus on smoking prevention and the harmful effects of second hand smoke in children with a family history of cardiovascular disease.

Markers/ Mechanisms of Adult Diseases in Youth

The goal of these NIH and American Heart Association-funded studies is to identify the mechanisms through which mental stress contributes to cardiovascular disease. Dr. Frank Treiber’s longitudinal and twin studies focus on the mechanisms underlying acute “hyper-reactive” responses to stress. Dr. Gregory Harshfield’s research investigates the mechanisms underlying impaired sodium regulation and blood pressure to prolonged stress. Dr. Gaston Kapuku exposes the role of impaired sodium regulation during stress on the development of congestive heart failure and diastolic dysfunction in both adults and adolescents. Studies by Dr. Yanbin Dong consider gene-related impaired sodium regulation during stress. Dr. Haidong Zhu is extending the genetic research to cytokines by examining the role of the IL-6 pathway on the dynamic regulation of sodium homeostasis and blood pressure. The focus of Dr. Xiaoling Wang’s genetic research is to study the potential role of candidate genes on heart rate variability, under normal conditions and during stress.

Whether it is in identifying children at risk or finding novel ways to reduce that risk, scientists at the GPI are working towards the common goal of better health and better health care for children and adolescents.

More information can be found at www.mcg.edu/institutes/gpi/index.htm
Can a microwave give me problems with my pacemaker?

When microwave ovens and pacemakers were relatively new technology, scientists were concerned about possible interactions. Researchers have since determined that there is no need to be concerned about pacemakers or ICDs interacting with microwave ovens. Manufacturers design microwave ovens to optimize consumer safety. The ovens do not function while the door is open, so the risk of microwave energy leakage to affect an external device is very low. Additionally, device manufacturers produce pacemakers and defibrillators that are very well shielded from microwaves and other external sources of radiofrequency energy. If you still feel concerned, certain electronic stores sell microwave detectors. Another option would be to place the item that you are cooking into the microwave, close the door, start it, and walk away until the buzzer rings.

How long will my Pacemaker/ICD last?

Most pacemakers generally last 7-10 years, implantable defibrillators can properly function for five to seven years, and biventricular defibrillators generally have a lifetime of four to six years. The longevity of a pacemaker/ICD is determined by the size of the battery, how many energy-depleting functions are performed, how often the device is being used, and how well the physician calibrates it.

Some patients ask why their old pacemaker from 20 years ago lasted longer than current devices. Patients and doctors increasingly demand smaller devices that require smaller batteries. In addition, as the devices have become more sophisticated, they consume additional energy. Current pacemakers and ICDs offer advanced features that increase their effectiveness and require more energy. Cardiac rhythm devices continually monitor the heartbeat and store useful information, allowing your doctor to assess abnormal heart rhythms. The newer devices even analyze the degree of heart failure that patients may be experiencing. Some devices also provide rate responsiveness, that is, the ability to increase the heart rate if one’s own heartbeat doesn’t increase spontaneously. All of these features consume energy to varying degrees.

The greatest consumption of energy occurs when the device is frequently used. Patients who are completely pacemaker dependent tend to have battery longevity that is on the shorter side of estimated battery life than a patient who does not pace as much. When you come to the device clinic your doctor, nurse, or technologist evaluates and safely programs the energy delivery of your device. This ensures that it sufficiently assists the heart without unnecessarily depleting the battery. There are now some devices that automatically make these adjustments.

Got a question? E-mail our experts at cvnews.mcg.edu, or write to us:

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