

NOVEMBER/DECEMBER 2014

Emile A. Bacha, MD

Chief, Division of Cardiac,
Thoracic and Vascular Surgery
NewYork-Presbyterian/Columbia
University Medical Center
Director, Congenital and
Pediatric Cardiac Surgery
NewYork-Presbyterian Hospital
eb2709@cumc.columbia.edu

Allan Schwartz, MD

Chief, Division of Cardiology
NewYork-Presbyterian/Columbia
University Medical Center
as20@cumc.columbia.edu

O. Wayne Isom, MD

Cardiothoracic Surgeon-in-Chief
NewYork-Presbyterian/
Weill Cornell Medical Center
owisom@med.cornell.edu

Bruce B. Lerman, MD

Chief, Maurice R. and Corinne P.
Greenberg Division of Cardiology
NewYork-Presbyterian/
Weill Cornell Medical Center
blerman@med.cornell.edu

A Focus on Valve-Sparing Ascending Aortic Aneurysm Repair

The most frequent location for aneurysms in the chest occurs in the ascending aorta – and these aneurysms are often associated with either aortic stenosis or aortic insufficiency, especially when the aneurysm involves a bicuspid aortic valve.

“We know that patients who have enlarged aortas or aneurysms of the ascending aorta are at great risk for one of two major life-threatening events: an aortic rupture or an aortic dissection,” says **Leonard N. Girardi, MD**, Director of Thoracic Aortic Surgery in the Department of Cardiothoracic Surgery, NewYork-Presbyterian/Weill Cornell Medical Center. “Dissection of the inner lining of the wall of the blood vessel can also lead to rupture or other complications down the line. For example, as the tear extends it may affect the vessels that supply the brain or the coronary arteries or cause tremendous damage to the aortic valve.”

Traditionally, these patients would have their valve removed and replaced. “There wasn’t a great alternative to treat this condition from the 1960s to early 2000,” says Dr. Girardi. Over the



Valve-sparing ascending aortic aneurysm repair

last 15 years, the Aortic Surgery Program at Weill Cornell has been aggressively pursuing the development of a procedure that would enable surgeons to spare the patient’s native valve. Today, valve-sparing ascending aortic aneurysm repair is a viable option for an increasing number of patients.

“In the past, surgery for patients involved either a biological valve replacement, which,

(continued on page 2)

CONTINUING MEDICAL EDUCATION

For all upcoming education events through NewYork-Presbyterian Hospital, visit www.nyp.org/pro.

**NewYork-Presbyterian
Cardiology and Heart Surgery
ranks #3 in the nation.**



NewYork-Presbyterian/Columbia Welcomes Director of Aortic Surgery and Columbia Cardiovascular Institute

In August 2014, internationally renowned heart surgeon **Michael A. Borger, MD, PhD**, joined NewYork-Presbyterian/Columbia University Medical Center as Director of Aortic Surgery and Director of the Columbia Cardiovascular Institute. Dr. Borger’s experience and expertise in performing complex aortic surgery, including root and arch replacement and valve repair using both traditional and minimally invasive procedures, will further enhance Columbia’s outstanding cardiovascular surgery program. In his leadership of the Cardiovascular Institute, Dr. Borger oversees a multidisciplinary approach to the diagnosis and management of cardiovascular disease.

In accepting his new appointments, Dr. Borger, who most recently served as Assistant Director of the Department of Surgery at the Leipzig Heart Center and a Professor of Surgery at the University of Leipzig in Leipzig, Germany, notes, “Columbia obviously has an internationally recognized name in many different fields, including cardiovascular surgery. The main reason that I was interested in coming here was through personal connections. I had known Dr. Craig Smith, Surgeon-in-Chief, for quite a while and was always impressed by his honesty and humbleness despite his world-renowned status. Through the recruiting process I

(continued on page 3)



COLUMBIA UNIVERSITY

College of Physicians
and Surgeons



Weill Cornell Medical College

A Focus on Valve-Sparing Ascending Aortic Aneurysm Repair *(continued from page 1)*

potentially, would fail in 10 to 15 years, or they would have to have a valve replaced with a metal valve that required them to be on anticoagulants for the rest of their lives,” explains Dr. Girardi. “We can now repair the aneurysm and save and reconstruct the patient’s own native aortic valve in such a way that it works fine, is quite durable, and the patient doesn’t need to be on blood thinners. Also, the risk of needing to re-operate on that valve is very, very low.”

According to Dr. Girardi, the ideal candidate for valve-sparing surgery is someone whose aorta is approximately 5 cm, even upwards of 5.5 cm, and whose aortic valve still functions fairly well. As a general rule, he says, the procedure is particularly beneficial for younger patients. “We know that replacement with a biological valve, such as a cow or pig valve, definitely fails earlier in younger people,” says Dr. Girardi. “When we put a biological valve in older patients, the data is clear that it is likely going to last them the rest of their lives.”

Sparing the valve also obviates the need for patients to be on anticoagulants for many years. “The risks associated with blood thinners increase as you get older,” says Dr. Girardi. “It is certainly an advantage if you don’t have to take them.”

Preoperative imaging studies include CT scan or MRA, as well as an echocardiogram. “All of our patients get an echo because we want to look at the valve and see how well the heart is squeezing,” says Dr. Girardi.

In the valve-sparing ascending aortic aneurysm repair, the surgeon reimplants the native aortic valve inside a Dacron tube



Dr. Leonard N. Girardi

graft and removes the aneurysm while retaining natural valve function in the patient. “Dacron is a woven material that has been used for aneurysm surgery since the 1950s,” notes Dr. Girardi. “It’s really the perfect blood vessel substitute. It lasts forever and it doesn’t require blood thinners. We then reattach the patient’s native aortic valve inside the Dacron graft to make it fit appropriately and make sure the leaflets are working correctly. It’s a very complicated procedure, but one that we have particular expertise and experience in performing.”

In the operating room, the cardiac anesthesiology team utilizes 3D transesophageal echocardiography (3D TEE) to visualize cardiac structure and function in real-time before surgery commences and during surgery. “3D TEE imaging can show us how far down the aneurysm goes and

which leaflets of the valve are not coming together well. Then we’ll know the exact location of the leak and how severe it is,” says Dr. Girardi. “These images also serve as a road map for restoring the anatomy once we have completed the repair. 3D TEE is not yet the standard of care everywhere, but I believe it is headed in that direction.”

In approximately 70 percent of cases, the native valve will function well for the remainder of the patient’s life, says Dr. Girardi.

For More Information

Dr. Leonard N. Girardi • lngirard@med.cornell.edu

Marfan Syndrome and Ascending Aortic Aneurysms

Patients with Marfan syndrome are at particular risk for aortic aneurysms and aortic dissection. Defects in elastin-associated microfibrils, predominately composed of fibrillin, leave the aortic wall fragile and susceptible to dissection. A majority of Marfan patients will develop some enlargement of the aorta; 85 to 90 percent will develop at least a minor aneurysm, and many will require aortic surgery at some time in their lives.

With its large base of experience in aortic aneurysm procedures, NewYork-Presbyterian/Weill Cornell was one of 19 international surgery centers chosen to participate in the Aortic Valve Operative Outcomes in Marfan Patients Study Group. “These patients often have a weakened or dilated aortic valve annulus,” says Dr. Girardi. “The valve-sparing technique can help stabilize the annulus, preventing further dilation after surgery.”

The Marfan Patients Study Group recently published results of a study in the *Journal of Thoracic and Cardiovascular Surgery* that compared outcomes at one year following aortic valve-sparing or valve-replacing aortic root replacement in 316 patients with Marfan syndrome who had surgery between 2005 and 2010.

The valve-sparing procedure was not associated with greater 30-day mortality or morbidity rates than valve replacement and, at one year, no differences were found in survival, valve-related morbidity, or major adverse valve-related events between the two groups.

“There was concern that 7 percent of patients undergoing valve sparing developed aortic regurgitation,” notes Dr. Girardi. “This emphasizes the importance of the need for long-term follow-up to determine durability of each procedure in this particular population.”

Reference Article

Coselli JS1, Volguina IV2, LeMaire SA1, Sundt TM3, Connolly HM4, Stephens EH5, Schaff HV6, Milewicz DM7, Vricella LA8, Dietz HC9, Minard CG10, Miller DC5; Aortic Valve Operative Outcomes in Marfan Patients Study Group. Early and 1-year outcomes of aortic root surgery in patients with Marfan syndrome: a prospective, multicenter, comparative study. *Journal of Thoracic and Cardiovascular Surgery*. 2014 Jun;147(6):1758-66, 1767.e1-4.

NewYork-Presbyterian/Columbia Welcomes Director of Aortic Surgery *(continued from page 1)*



Dr. Michael A. Borger

also came to know Dr. Emile Bacha, Chief of Cardiac, Thoracic and Vascular Surgery. I was very impressed by the culture of teamwork that exists at Columbia. Emile and Craig have put together a team of cardiac surgeons that works well together and has, as far as I'm concerned, unlimited potential."

A native of Canada, Dr. Borger earned his medical degree at the University of Alberta and his doctorate at the University of Toronto. He completed fellowships in cardiothoracic surgery at the University of Toronto, Toronto General Hospital, and the University of Leipzig Heart Center.

Dr. Borger believes that his unique skill set in aortic surgery is a perfect fit for the Columbia program. In particular, he has extensive experience in performing the commonly referred to "David Operation," so named for Tirone E. David, MD, at Toronto General Hospital, who developed the pioneering procedure that preserves the aortic valve in patients with aortic root aneurysms, such as in Marfan syndrome. Dr. Borger trained with Dr. David, who he considers an important mentor, during his fellowship and subsequently served on staff for four years. He then joined the University of Leipzig Heart Center, one of the largest cardiovascular surgery programs in Europe, where some 4,000 cardiac surgery operations are performed each year.

It was in Leipzig that Dr. Borger honed his skills in minimally invasive mitral valve surgery. "Again, I learned from another world master, Dr. Friedrich Mohr," says Dr. Borger. "During my tenure in Leipzig, I performed a hundred of these cases each year."

While skilled in all facets of cardiovascular surgery, Dr. Borger brings the latest techniques in aortic valve repair, valve-sparing aortic replacement, and percutaneous and hybrid approaches to chronic and acute aortic pathology. "If you look at the trends in medicine over the last 20 years it's clear that patients prefer less invasive therapies," says Dr. Borger. "Therefore if you are able to do a less invasive operation and still achieve equivalent patient safety and efficacy outcomes, then why not? Minimally invasive surgical approaches are technically more complicated than standard open procedures, but I think that there needs to be people at the forefront of the specialty who are pushing new developments in the field to match the patients' desires."

On the Horizon for Mitral Valve Repair

Coming from Europe where regulatory bodies are not quite as stringent as in the U.S., Dr. Borger points to his exposure to innovations in technology and techniques in mitral valve repair. "I am quite excited about adjustable mitral rings which a surgeon can modify under transesophageal echocardiographic guidance after taking the patient off cardiopulmonary bypass," he says. "The mitral rings will be particularly helpful for functional mitral regurgitation, and especially for surgeons who do not do a lot of these operations. The surgeon can insert the ring and, under echo guidance, obtain the optimal size before disengaging the wire."

Another area that Dr. Borger believes will become more prominent in the future are transcatheter techniques. "Just as in the transapical approach to the aortic valve, the transapical approach to the mitral valve makes a lot of sense because it's a very short distance, it's easy to control, and we can correct mitral regurgitation without cardiopulmonary bypass and without cardioplegic arrest. At Columbia I have the opportunity to work with world leaders in transcatheter valve therapy. Together with Dr. Marty Leon and his team, we'll be performing the first transapical mitral valve replacement operation for native mitral valve disease in the United States."

Dr. Borger also emphasizes, however, that complex multivalve procedures, particularly those that require multiple revisions, must still be performed through the traditional full sternotomy technique.

A Leader in the Field

Academically, Dr. Borger has led the development of new techniques and technologies, published more than 250 scientific articles, and has spoken at and moderated numerous international conferences. His research interests primarily focus on outcomes research of aortic disease, heart valve repair, ischemic mitral regurgitation, and minimally invasive surgery.

Dr. Borger is the Inaugural President of the international Heart Valve Society, which was formed from members of two previously established societies, the Heart Valve Society of America and the Society of Heart Valve Disease. The Heart Valve Society aims to advance the knowledge and management of valve disease through education, information, and research.

"Dr. Borger is a highly skilled surgeon and accomplished leader who will not only take great care of our patients, but also continue our long history of research to improve cardiovascular surgery – and people's lives," says **Craig R. Smith, MD**, Chair of the Department of Surgery at NewYork-Presbyterian/Columbia.

Reference Articles

Stephens EH, Borger MA. "Forgotten" valve or "enigmatic" valve? Further insights into the tricuspid valve in patients undergoing mitral valve surgery. *Journal of Thoracic and Cardiovascular Surgery*. 2014 Nov;148(5):1962-64.

Borger MA, Moustafine V, Conradi L, Knosalla C, Richter M, Merk DR, Doenst T, Hammerschmidt R, Treede H, Dohmen P, Strauch JT. A randomized multicenter trial of minimally invasive rapid deployment versus conventional full sternotomy aortic valve replacement. *Annals of Thoracic Surgery*. 2014 Nov 20. [Epub ahead of print]

Borger MA, Kodali S. Transcatheter mitral valve-in-ring with the Melody prosthesis: a new therapeutic opportunity. *Eurointervention*. 2014;10:903-5.

For More Information

Dr. Michael A. Borger • mb3851@cumc.columbia.edu

Advances in Cardiology, Interventional Cardiology, and Cardiovascular Surgery

New York-Presbyterian Hospital
525 East 68th Street
New York, NY 10065
www.nyp.org

NON-PROFIT ORG.
US POSTAGE
PAID
STATEN ISLAND, NY
PERMIT NO. 169