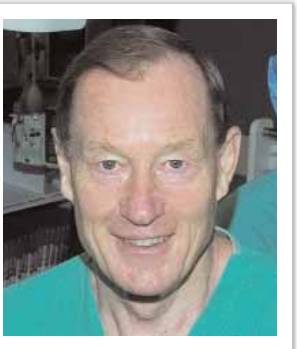
Barry D. Rutherford, MD

The renowned Dr. Rutherford tells us about his current endeavors and what progress we will see in the future of cardiac care.

What can you tell us about your program at Saint Luke's Mid America Heart Institute?

Saint Luke's Mid America Heart Institute was one of the first hospitals dedicated to cardiovascular care in the US. The Heart Institute opened in 1981 and has since grown to the point that we now have 40 cardiologists, nine of whom are interventional cardiologists. We feature a large multispecialty cardiology practice, including interventional cardiology (approximately 2,500 stenting procedures per year); heart failure cardiac transplant; imaging, including CT and echocardiography; electrophysiology (complex electrophysiology studies and pacing); as well as a large preventive cardiology program, particularly in women's health. We are currently in the process of building a new Heart Institute, to be completed in approximately 4 years.



What is the current focus of your research energy?

We are involved with percutaneous aortic valve replacement. We are working with the Edwards Sapien heart valve (Edwards Lifesciences, Irvine, CA) and have now placed our first two valves.

Development of new technologies for chronic total occlusions (CTOs) is one of our major interests. These new technologies include not only wires and devices but also the new forward-looking intravascular ultrasound (IVUS). The forward-looking IVUS was developed by Novelis, which was recently acquired by Volcano Corp. (Rancho Cordova, CA). I think it has real promise because it allows us to reach the point of the CTO and actually view the vessel a millimeter or two ahead.

Dr. Steve Marso and I have been interested in virtual histology, assessing vulnerable plaque in both acute myocardial infarction (MI) and unstable angina patients. We are trying to determine if there is a relationship between necrotic core and the conventional risk factors of diabetes, dyslipidemia, and hypertension and the possible relationship between necrotic core and distal embolization in the acute MI patient.

We also continue to be involved with new stent technology by conducting new stent trials. We are currently conducting a trial with the Cypher Elite stent (Cordis Corporation, Warren, NJ) and anticipate working with Medtronic Vascular (Santa Rosa, CA) to assess their new Resolute stent.

What areas of cardiology need the most attention from physicians and industry in the next several years?

We still have to solve stent thrombosis. Late-stent thrombosis continues to be an Achilles' heel of stent technology. Coupled with that is the need for improved pharmacology. One thing that we are always battling is the long-term use of clopidogrel. Patients either cannot financially afford it, or they are not compliant.

I think that biodegradable stents demonstrate real promise. It would be great to have patients who, a year after placing a stent, have no stent material remaining in their body. The new biodegradable stents that are being developed by Abbott Vascular (Santa Clara, CA) look very promising. John Ormiston, MD, and Patrick Surreys, MD, have very promising early data regarding this new technology.

Our work with identification of vulnerable plaque is important. We are all anxiously awaiting the results of the PROSPECT trial, which may be presented at the TCT this year. It is essential to determine if we can identify a vulnerable plaque at an early stage and document its behavior. For example, is there a possibility that we could get to a point that we could identify a vulnerable plaque that would, in the future, give a patient an acute coronary syndrome? If so, a biodegradable stent could be placed to stabilize the plaque, and the stent would be completely gone 6 months to 1 year later. This technology could usher in a golden age of stenting and managing coronary artery disease. There would still need to be medical therapy to manage risk factors, such as diabetes and dyslipidemia. However, I think this whole concept is

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extremely interesting and important.

In general, we need improved programs for the acute MI patient. It is always dismaying to realize that only 50% of the acute MI population actually gets to a catheterization lab within 90 minutes. There must be ways that we can improve issues relating to the ambulance and identification and transmission of the EKG findings earlier. These programs would also include public education emphasizing the early warning signs of acute MI and the need to get medical attention.

The other area that I see developing quickly will be the structural and endovascular arenas—not only aortic valve replacement but mitral valve repair. There are some fascinating things going on with patent foramen ovale (PFO) closure; the Lenox Hill group has the SuperStitch (Sutura, Inc., Fountain Valley, CA) for PFO closure, which is like a surgical suture closure of the PFO.

Left atrial appendage ablation devices are going to be widely used. There is a huge incidence of atrial fibrillation in the population, and patients do not like to be on long-term warfarin therapy due to the associated complication. I think left atrial ablation techniques will become relatively commonplace.

With the recent approval of the Xience V (Promus) drug-eluting stent (DES) (Abbott Vascular [Boston Scientific Corporation, Natick, MA]), we are entering the next-generation era for DES. What impact will these new stents have, and what can we look forward to from future devices?

The Xience V (Promus) stent is still a DES, although the late loss is very low (and very similar to that of the Cypher stent), there is still the issue of late-stent thrombosis. The Xience V (Promus) stent is much more deliverable because of the thin-strut technology. However, in terms of impact on coronary disease, I do not believe that this stent will make that much difference over the next few years. I think all DES behave in a similar fashion, and to achieve a quantum leap forward in the overall treatment of coronary artery disease, we are going to have to move toward biodegradability or a totally different stent platform concept that will prevent late-stent thrombosis.

How far have we come in developing devices and techniques for successfully treating CTOs? What more needs to be done?

It is disturbing, when looking at CTO-PCI across the US, that attempt rates are still in the range of 16%. These data come from a review of the National Cardiovascular Data Registry. This is a very low percentage. It means that there are a lot of operators out there who are just not prepared to take on CTOs. This is somewhat understandable because of the increased fluoro time, increased time in the catheterization lab, and increased cost. There is no reimbursement specifically for CTOs. If it is going to take an hour or longer in the catheterization lab to cross a CTO, and you use three or four guides and maybe six wires, there are a lot of people who think the time and cost are not justified. The way that I think we can improve this situation is through education. We need younger physicians who are entering into interventional cardiology to become involved and skilled in the techniques that we use for treating CTOs.

Another aspect is that we do need new specialty devices. The first thing that comes to mind is that we need (and I have asked industry repeatedly) ultra-low-profile balloons. We need balloons that are under 1.5 mm in diameter (eg, 1.25- and 1.3-mm balloons). These balloons are available in Japan and Canada, but we still need FDA approval for them in the US. We also need additional wires in terms of tip stiffness. The stiffest wire available in the US is a 12-gram wire, but we need wires that have 15- and 20-gram tip stiffness to allow us to penetrate through the heavily calcified and fibrotic zones of CTOs.

There are some other new devices available in other countries but not in the US, one of which is called a *channel dilator* that allows the operator to go down a septal perforator and therefore perform a retrograde approach to a CTO. We have a lot of catching up to do with the rest of the world.

What might the data from SYNTAX tell us about left main and triple-vessel disease stenting versus bypass surgery?

With the TAXUS stent that was used in the SYNTAX trial, I will be very surprised if there is any difference in mortality or recurrent MI rates in surgery versus stenting. The one category of patients that may have a difference in mortality would be left main patients that have a lesion in the distal left main involving the origin of both the LAD and the circumflex such that you have to perform bifurcation stenting in the distal left main. This particular group is technically difficult and the current results may not be quite as good, so there may be a higher late mortality and recurrent MI rate. However, in patients with ostial and midstenosis of the left main, I expect to see the stent and surgical results to be about the same. In patients with distal left main bifurcation stenting, revascularization rates will continue to be significantly higher when compared to bypass surgery. ■