15th Annual Update in Cardiology Highlights
by Wayne N. Leimbach, Jr., MD

Metabolic Syndrome
by Tobie L. Bresloff, MD

Atrial Flutter
by David A. Sandler, MD
Some of the nation’s most groundbreaking cardiology research occurs at the James D. Harvey Center for Cardiovascular Research at Hillcrest Medical Center with Oklahoma Heart Institute (OHI) cardiologists. Exceptional care, innovative techniques and expansive services--Hillcrest Medical Center and OHI.
In this issue

Letter from Dr. Leimbach

15th Annual Update in Cardiology
Highlights

Late Breaking Clinical Trials
By Wayne N. Leimbach, Jr., MD, FACC, FSCAI, FCCP, FAHA

Metabolic Syndrome
A Harbinger of Bad Things to Come
By Tobie L. Bresloff, MD

Atrial Flutter
New Treatment Strategies
By David A. Sandler, MD

Research Corner
Cardiovascular Research at Oklahoma Heart Institute

Cover photo by Rick Stillier
Tulsa from the Arkansas River by Day
TO OUR READERS:

Cardiology continues to be a rapidly evolving specialty with new technologies, new therapeu tic agents, and new treatment algorithms. We at Oklahoma Heart Institute find the changes exciting and enjoy the challenge of keeping up to date.

Atrial flutter, a heart rhythm disorder that was once difficult to control, can now be treated very effectively. In this issue, Dr. David Sandler writes about some of the new ways to conquer this problem.

Each year, Oklahoma Heart Institute Research and Education Foundation sponsors four educational symposiums. The Winter Symposium, held in Las Vegas in February, concentrates on the subspecialty of electrophysiology. The Spring Symposium – Update In Cardiology – focuses on general cardiology issues. The Summer Symposium, held this year in July in Chicago, was devoted to Cardiovascular MRI. The Fall Nursing Symposium highlights cardiology issues faced by nurses and other allied health professionals. This issue of Oklahoma Heart Institute Magazine briefly summarizes some of the late breaking clinical trials presented at this year’s 15th annual Spring Symposium.

In order to maximize the benefits of preventive cardiovascular medicine, Oklahoma Heart Institute is pleased to expand our endocrine division with the addition of a third endocrinologist. This summer, Dr. Erik Aspenson, a Board Certified endocrinologist, joined Doctors Hanson and Bresloff in developing aggressive treatment algorithms for the management of major risk factors for cardiovascular disease, including diabetes mellitus, hyperlipidemia, hypertension and the dysmetabolic syndromes.

We are also pleased to announce the addition of three new cardiovascular subspecialists to our team – Dr. Frank Gaffney and Dr. Tushar Shah, both noninvasive cardiologists and Dr. Yunus Moosa, an interventional cardiologist. Now, with 20 doctors, our physician staff can provide patients even better care.

We hope you enjoy the magazine and find it informative. We are interested in your comments and suggestions.

Sincerely,

Wayne N. Leimbach, M.D.
Advances in the field of cardiology continue to grow at a rapid pace. The use of large randomized double-blind clinical trials has accelerated the testing of new treatment strategies. These clinical trials are refining and improving our ability to treat cardiovascular disease. At the Oklahoma Heart Research and Education Foundation’s 15th Annual Update in Cardiology, highlights from significant late-breaking clinical trials were presented and discussed.

The first two trials presented addressed the issue of how low LDL cholesterol levels should be lowered. It is important to remember that lovastatin, the first statin to be approved for lowering LDL cholesterol, was approved in 1987. In 1991 (13 years ago), pravastatin and simvastatin were approved. At that time Sir Michael Oliver, a prominent researcher in the field of lipid lowering, published an editorial stating emphatically that “until primary prevention studies are complete, widespread use of hypolipidemic agents should be halted.” Since then, multiple large clinical trials have demonstrated the benefit of lowering LDL cholesterol in both primary and secondary prevention studies.

Two of the most recent trials include the PROVE IT – TIMI-22 trial, which looked at whether intensive LDL lowering with atorvastatin produced greater reductions in clinical events than standard LDL cholesterol lowering with pravastatin, in patients presenting with acute coronary artery syndromes. The other study, the ALLIANCE Trial, was a comparison of clinical outcomes in managed care patients with coronary artery disease, treated with aggressive lipid lowering programs using atorvastatin versus the usual care programs using a variety of statins.

The PROVE IT-TIMI-22 trial questioned whether intensive LDL cholesterol lowering, to an average of less than 65mg/dl, achieves greater reductions in clinical events than “standard” LDL lowering, to an average of 95mg/dl. In this trial 4,162 patients with acute coronary artery syndrome were treated with intensive standard medical therapy and randomized to receive either pravastatin 40m q hs or atorvastatin 80mg q hs. The primary end point for this study was death, MI, documented unstable angina requiring hospitalization, revascularization or stroke. The median treatment LDL cholesterol for the pravastatin group was 95mg/dl; the median LDL cholesterol for the atorvastatin group was 62mg/dl. Compared to the gold standard treatment of lowering LDL cholesterol to less than 100mg/dl, the more intensive lipid lowering strategy was associated with a 16% additional reduc-

<table>
<thead>
<tr>
<th>End of Follow-up</th>
<th>Atorvastatin 80mg Better</th>
<th>Pravastatin 40mg Better</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 Days</td>
<td>RR Atorva 80 Prava 40</td>
<td></td>
</tr>
<tr>
<td>17%</td>
<td>1.9% 2.2%</td>
<td></td>
</tr>
<tr>
<td>18%</td>
<td>6.3% 7.7%</td>
<td></td>
</tr>
<tr>
<td>14%</td>
<td>12.2% 14.1%</td>
<td></td>
</tr>
<tr>
<td>16%</td>
<td>22.4% 26.3%</td>
<td></td>
</tr>
</tbody>
</table>
tion in risk of all causes of death or major cardiovascular events. The reduction in relative risk of all causes of mortality was even greater, at 28%, for atorvastatin versus pravastatin. This study, therefore, shows that there is added benefit to further lowering LDL cholesterol by intensively treating high risk patients. Interestingly, the benefit of the additional lipid lowering began at 30 days and achieved statistical significance by 180 days. The benefit was seen in all of the subgroups. There was a mild increase in liver enzyme elevations with more aggressive therapy. However, in the atorvastatin 80mg group, only 3.3% had significant liver enzyme elevations.

The ALLIANCE study compared the clinical outcomes in managed care patients with coronary heart disease, treated with aggressive lipid lowering using atorvastatin versus usual care programs using a variety of different statin medications. This study was presented at the American College of Cardiology meeting in March, 2004 by Dr. Donald B. Hunninghake from the University of Minnesota. The background of this study was that different lipid lowering strategies have not been prospectively studied in real world settings. In addition, physicians and patients have been reluctant to use high dose statins due to perceived safety concerns. The hypothesis of the ALLIANCE study was that aggressive treatment of LDL cholesterol with atorvastatin to below recommended levels can provide incremental benefit, compared to standard clinical practice, in patients with coronary heart disease. 2,441 patients with a history of coronary artery disease were randomized to receive atorvastatin 10-80mg a day to get their LDL cholesterol below 80mg/dl versus usual care to get the LDL cholesterol below 100mg/dl. The LDL cholesterol levels changed from 147 to 95 in the atorvastatin group versus 147 to 111 in the usual care group. The primary end point for this study was cardiac death, non-fatal MI, resuscitative cardiac arrest, cardiac revascularization, or unstable angina requiring hospitalization. A 17% additional reduction in cardiac mortality or major adverse cardiac events and a 47% reduction non-fatal MI’s was shown with the more aggressive lipid lowering strategy. In the atorvastatin group, liver enzyme elevations occurred in 0.7% of patients in regards to the AST level and in 1.3% of patients in regards to the ALT levels. There were no documented cases of rhabdomyolysis or myopathy. The ALLIANCE trial proved that aggressive LDL lowering with atorvastatin, to levels lower than currently recommended, resulted in incremental clinical benefits, compared to usual care, without additional safety concerns.

These two studies (PROVE IT-TIMI-22, and ALLIANCE) demonstrate significant additional reductions in cardiovascular risk by lowering LDL cholesterol.
levels to below the currently recommended target levels. In addition, these benefits occurred without major increases in side effects. Physicians should, therefore, feel comfortable being more aggressive to lower LDL cholesterol levels in their patients.

The next late-breaking clinical trial to be presented was the VALIANT Trial. This study looked at the use of an angiotensin receptor blocker, valsartan, as compared to an ace-inhibitor, captopril, for the treatment of patients with left ventricular dysfunction post MI. The trial was to determine whether valsartan was superior or equal to captopril, or whether a combination of the two produced the best outcomes. 14,703 patients were randomized post MI to receive either captopril, with the maximum dose being 50mg tid, versus valsartan, the maximum dose being 160mg bid, versus the combination of the two. The study found there was no difference between the treatment groups in regards to mortality. In addition, there was no difference between the treatment groups in regards to the combined endpoint of cardiovascular death, non-fatal MI or heart failure. There was an increased incidence of adverse side effects with captopril or the combination of captopril plus valsartan, as compared to valsartan by itself. The conclusions were that in patients with a myocardial infarction complicated by heart failure and left ventricular dysfunction, or both, valsartan was as effective as cap-

topril in reducing the risk of death and in reducing the combined risk of cardiovascular death, non-fatal MI, or heart failure. Therefore, based on this study, it is felt that angiotensin receptor blockers can be used in place of ace-inhibitors where deemed appropriate by the physician.

“We physicians should feel comfortable being more aggressive to lower LDL cholesterol levels in their patients.”
The SYNERGY Trial evaluated the use of enoxaparin (low molecular weight heparin) versus unfractionated heparin in 10,027 patients who presented with an acute coronary syndrome. These patients presented to the emergency room and were randomized to receive enoxaparin 1mg/kg sub q versus unfractionated heparin and were then transferred to the catheterization laboratory for possible emergency percutaneous coronary interventions. The primary end point was death or MI at 30 days. This study found that enoxaparin was not superior to unfractionated heparin, but was as effective, and that the enoxaparin can be considered a safe and effective alternative to unfractionated heparin for patients at high risk of acute coronary syndrome. Enoxaparin was, however, associated with a higher incidence of TIMI major bleeding as compared to heparin.

The next two studies looked at a new drug that targets the endocannabinoid system to help smokers quit smoking and help obese patients lose weight. The endocannabinoid system is involved in the control of energy, balance and body weight. It is also involved in the establishment of steady state homeostasis for other neurotransmitters, mediators, hormones and cytokines. The endocannabinoid system exists in neurons of the mesolimbic system which participates in reinforcing reward and in translating motivation to action. Endocannabinoids induce food intake after food deprivation. It is now known that nicotine stimulates the endocannabinoid receptors and repeated stimulation can lead to self-administration of substance abuse. Rimonabant is an endocannabinoid receptor antagonist. The first study presented was the Reolipid study. In this study, obese patients were randomized between placebo and rimonabant either 5mg or 20mg q day. The 20mg dose of rimonabant produced a weight loss of greater than 5% of baseline in almost 73% of patients. This represented a major difference from placebo. In regards to smoking cessation, rimonabant not only produced a 36% smoking abstinence rate, but also led to weight loss in obese patients who quit smoking. This represents a major change from the usual 10 pound weight gain seen in patients who quit smoking in the placebo group. Rimonabant is currently not available, but is in clinical trials. It looks to be a very promising therapy for both smoking cessation and weight loss.

The SES-SMART trial looked at the problems associated with high restenosis rates when treating small coronary blood vessels with angioplasty and stents. In the past, bare metal stents failed to significantly reduce the restenosis rates seen with angioplasty procedures. In this trial, patients were randomized to receive either the new drug-eluting stents versus the standard bare metal stents for treating small coronary blood vessels. At 8 months, restenosis rates were 9.8% for the drug-eluting group versus 53.1% for the angioplasty group. These results are very encouraging and suggest that many patients referred for surgery...
Articles about Metabolic Syndrome are becoming prevalent in the medical literature. Recently I was reading USA Weekend, in the Sunday Tulsa World, and there was an article titled, “Do you suffer from Syndrome X? This deadly condition leads to diabetes and heart disease.” The article goes on to call Metabolic Syndrome the number 1 health problem in America. You need to know more about this syndrome than the patients who are going to ask you questions.

Syndrome X was first described in 1988 by Dr. G.M. Reaven. It has also been called Reaven’s Syndrome, Metabolic Syndrome, Dysmetabolic Syndrome and Insulin Resistance Syndrome. In 1998 the World Health Organization (WHO) published a working definition. This initial definition required an abnormality in handling glucose, or at least, insulin resistance plus 2 of four other factors. The more recent definition from the National Cholesterol Education Program (NCEP) which appears in the Adult Treatment Panel III (ATP III) Report is the most commonly used set of criteria. The criteria are listed in the table below. Three of the five listed values must be met to make the diagnosis.

Recently there has been criticism that using three of the five criteria might be too strict. The risk of cardiovascular disease and diabetes goes up significantly with only 2 of the criteria being met.

Current estimates of the prevalence of Metabolic Syndrome figure that about 25% of all adults in America meet the criteria. This increases greatly with age, so that over age 60 the rate is between 40 and 45% of the population. According to the CDC, this also varies by ethnic background. Hispanics have the highest prevalence, with non-Hispanic whites having among the lowest, and Native Americans as well as African Americans in the middle. This correlates inversely with insulin sensitivity (how much a certain dose of insulin will bring blood sugar down) in these groups. Whites are the most insulin sensitive, then blacks, then Hispanics, who have the least response to insulin.

The underlying defect that is felt to be common to people with Metabolic Syndrome is insulin resistance. This is defined by Haffner in Diabetes Care as “Impaired response to the physiological effects of insulin (including those on glucose, lipid and protein metabolism) and the effects on vascular endothelial function.” This is likely due to increased visceral fat as well as

**NCEP ATP III Guidelines*: Identification Of The Metabolic Syndrome**

<table>
<thead>
<tr>
<th>Positive Diagnosis Based on the Presence of 3 or More of the Following:</th>
<th>Defining Level</th>
</tr>
</thead>
</table>
| **Abdominal Obesity (waist circumference)** | Men >40 in (>102 cm)  
Women >35 in (>88 cm) |
| **Triglycerides** | <40 mg/dL |
| **HDL Cholesterol** | <50 mg/dL |
| **Blood Pressure** | Men 130/85 mm Hg  
Women 110 mg/dL (New level 100) |

decreased activity level. The resistance then causes an increase in insulin levels in the blood stream, and this hyperinsulinemia is felt to directly increase the factors that cause cardiovascular disease. The final result is an increase in diabetes mellitus, coronary heart disease, CVAs and mortality from all causes.

**How to make the diagnosis:**

You can suspect Metabolic Syndrome if the patient is obviously overweight with the waist being the biggest part. A family history of premature CAD or many relatives with diabetes or lipid abnormalities should be clues, also. In addition, if a patient has hypertension, a lipid abnormality or a hint of a glucose metabolism problem, you should get out the tape measure and see how big the waist actually is, or calculate a BMI. You need a fasting lipid profile, not just a total cholesterol level. In addition, I suggest you check both a fasting glucose level, plus a 2 hour post-prandial blood sugar (after a normal lunch or a good sized breakfast) to look for impaired glucose tolerance (IGT). If you only check fasting blood sugars, you will miss a significant number of people who have impaired glucose tolerance as their only metabolic defect. This pre-diabetic state should be just as important in deciding risk as fasting glucose is. A normal HgA1c does not rule out Metabolic Syndrome.

Polycystic ovary disease and acanthosis nigricans are also related to insulin resistance and are minor criteria that point towards a diagnosis of Metabolic Syndrome. In addition the WHO lists urinary microalbumin excretion of greater than 20 microgram/minute as a criterion.

**Should Metabolic Syndrome be treated?** I heard an expert say at a lecture that *Food is the strongest drug* and *Exercise is the best diet*. It would be great if we could write a prescription for healthy diet and exercise and have the pharmacist dispense it in a bottle. Instead, at the first sign of Metabolic Syndrome, you should be urging the patient to start a judicious diet to lose weight and make the body more sensitive to insulin. This needs to be repeated at each visit. A referral to a trusted dietician is also a good idea. A diet with low glycemic index foods like the Mediterranean diet will help. I have seen Type 2 diabetes mellitus go away entirely with a significant weight loss. Metabolic Syndrome patients can lessen their risk of developing diabetes with only a 7-10% loss from their original weight. They do not need to lose down to ideal weight to get benefit.

Patients always have reasons for not doing exercise. Or they tell you how busy they keep with activities like knitting. (Knitting is actually better than just watching TV, since it is hard to eat while working 2 knitting needles, but this is hardly exercise.) Exercise, at least every other day,
SERVICES OF OKLAHOMA HEART INSTITUTE

Noninvasive Cardiology
- Nuclear Cardiology
- Echocardiography & Doppler Studies
- Nuclear and Echocardiographic Exercise & Pharmacological Stress Testing
- Transesophageal Echocardiography
- Arterial Venous Peripheral Vascular Imaging & Doppler Studies
- Cardiovascular Magnetic Resonance Imaging
- External Counterpulsation (ECP) Therapy

Invasive Cardiology
- Cardiac Catheterization
- Coronary Angioplasty
- Atherectomy
- Rotablator Atherectomy
- Thrombolytic Therapy
- Thyroid
- Other Endocrine Problems

Metabolic Disorders
- Diabetes
- Hypertension
- Hyperlipidemia
- Thyroid
- Other Endocrine Problems

Electrophysiology
- Electrophysiology Studies
- Ablation Therapy
- Pacemaker Implantation
- Pacemaker and Lead Extraction
- Pacemaker Programming
- Pacemaker Monitoring & Clinic
- Implantable Cardioverter Defibrillator (ICD) Placement
- ICD Replacement
- ICD and Hardware Removal
- ICD Programming
- ICD Monitoring and Clinic

Electrophysiology
- Holter Monitoring and Interpretation
- 30 Day Cardiac Event Monitors
- Implantation and Interpretation of Long-term Heart Monitors
- Signal Averaged EKGs and Interpretation
- Head Up Tilt Testing and Interpretation
- Direct Current Cardiostimulation
- Antiarrhythmic Drug Loading and Monitoring

Specialty Clinics
- Executive Health Clinic
- Adolescent & Adult Congenital Heart Clinic
- Lipid & Wellness Clinic
- Heart Failure Clinic
- Dysrhythmia & Pacer Clinic
Wayne N. Leimbach, Jr., MD, FACC, FSCAI, FCCP, FAHA

Dr. Leimbach is a subspecialist in interventional cardiology, including cardiac catheterization, coronary angioplasty and related interventional procedures such as stents, atherectomy, laser, intravascular ultrasound imaging and direct PTCA for acute myocardial infarction. He is Director of the Cardiac and Interventional Laboratories at Hillcrest Medical Center. Dr. Leimbach is Co-Director of the Lipid and Wellness Clinic at Oklahoma Heart Institute. He is Director of the James D. Harvey Center for Cardiovascular Research at Hillcrest Medical Center, as well as Director of the Oklahoma Heart Research and Education Foundation. He also serves as Clinical Associate Professor of Medicine at the University of Oklahoma College of Medicine – Tulsa. Dr. Leimbach completed a Clinical Cardiology Fellowship and a Research Fellowship at the University of Iowa Hospitals and Clinics. He received his medical degree from Northwestern University in Chicago and his Bachelor of Science degree from the University of Michigan.

Robert C. Sonnenschein, MD, FACC

Dr. Sonnenschein specializes in echocardiography and noninvasive peripheral vascular imaging. He is Director of Peripheral Vascular Ultrasound Imaging at Hillcrest Medical Center and Oklahoma Heart Institute and serves as Clinical Associate Professor of Medicine at the University of Oklahoma College of Medicine – Tulsa. He completed his Cardiology Fellowship at the State University of New York Upstate Medical Center in Syracuse, where he also completed his Internal Medicine Internship and Residency programs. Dr. Sonnenschein received his medical degree from Rush Medical College in Chicago and his Bachelor of Arts degree from the University of Pennsylvania.

Robert E. Lynch, MD, FACC

Ultrasound Imaging at Hillcrest Medical Center and Oklahoma Heart Institute and serves as Clinical Associate Professor of Medicine at the University of Oklahoma College of Medicine – Tulsa. He completed his Cardiology Fellowship at the State University of New York Upstate Medical Center in Syracuse, where he also completed his Internal Medicine Internship and Residency programs. Dr. Sonnenschein received his medical degree from Rush Medical College in Chicago and his Bachelor of Arts degree from the University of Pennsylvania.

James J. Nemec, MD, FACC

Dr. Nemec is a subspecialist in echocardiography, stress echocardiography and nuclear cardiology. He serves as Director of Nuclear Cardiology for Oklahoma Heart Institute. Dr. Nemec has served as Assistant Professor of Internal Medicine, Division of Cardiology, at Creighton University and as Assistant
John G. Ivanoff, MD, FACC, FSCAI

Dr. Ivanoff specializes in interventional cardiology, including cardiac catheterization, coronary angioplasty and related interventional procedures such as stents, atherectomy and direct PTCA for acute myocardial infarction. He is Director of the Catheterization Laboratories at SouthCrest Hospital. Dr. Ivanoff serves as Clinical Associate Professor of Medicine at the University of Oklahoma College of Medicine – Tulsa. He has also served as Assistant Professor of Medicine at the Medical College of Pennsylvania, as well as Associate Director of the Coronary Care Unit and Assistant Professor of Medicine at Hahnemann University Hospital, where he also completed his Cardiology Fellowship. He completed his Internal Medicine Internship and Residency at the Medical College of Pennsylvania, where he served as Chief Resident. Dr. Ivanoff also received his medical degree from the Medical College of Pennsylvania. He completed his Masters degree in biochemistry at Columbia University and received his Bachelor of Arts degree from the University of Pennsylvania. Board certified in Internal Medicine, Cardiovascular Disease and Interventional Cardiology

Gregory D. Johnsen, MD, FACC

Dr. Johnsen is an interventional cardiologist with expertise in cardiac catheterization, angioplasty and related interventional procedures, such as stents and atherectomy. He is Director of Cardiac Rehabilitation at Hillcrest Medical Center and Director of the Hillcrest Exercise and Lifestyle Programs. He completed his Clinical Cardiology Fellowship at the University of Oklahoma – Oklahoma City, where he then finished an extra year of dedicated training in interventional cardiology. He completed his Internal Medicine Internship and Residency training at the University of Oklahoma – Oklahoma City, where he also received his medical degree. Dr. Johnsen received his Bachelor of Science degree from Oklahoma State University. Board certified in Internal Medicine, Cardiovascular Disease and Interventional Cardiology

Alan M. Kaneshige, MD, FACC

Dr. Kaneshige is a noninvasive cardiologist with expertise in adult echocardiography, stress echocardiography and transesophageal echocardiography. He is Chief of Cardiology at Hillcrest Medical Center. Dr. Kaneshige is also the Director of the Adolescent and Adult Congenital Heart Clinic at Oklahoma Heart Institute and Director of the Congestive Heart Failure C.A.R.E. Center at Hillcrest Medical Center. Dr. Kaneshige completed his Internal Medicine Internship and Residency at Creighton University School of Medicine, where he also received his medical degree. He received a Bachelor of Science in chemistry at Creighton University. Dr. Kaneshige completed his Clinical Cardiology Fellowship at Creighton, where he also served as Chief Cardiology Fellow for two years. He completed an additional Cardiac Ultrasound Fellowship at the Mayo Clinic in Rochester, MN. Dr. Kaneshige served as Assistant Professor of Medicine at Creighton University School of Medicine, where he was Director of the Noninvasive Cardiovascular Imaging and Hemodynamic Laboratory. Board certified in Internal Medicine and Cardiovascular Disease Board certified in Adult and Transesophageal Echocardiography

Ernest Pickering, DO, FACOI

Dr. Pickering is a cardiology specialist trained in noninvasive and invasive cardiology with subspecialty expertise in cardiac catheterization and angioplasty. He is Chief of Cardiology at SouthCrest Hospital and past Chief of Cardiology at Tulsa Regional Medical Center. He completed a Cardiovascular Disease Fellowship at Baylor College of Medicine in Houston, TX. Dr. Pickering’s Internal Medicine Residency was completed at Oklahoma Osteopathic Hospital in Tulsa. He received his medical degree from Philadelphia College of Osteopathic Medicine and his Bachelor of Science degree from Shelton College, Ringwood, NJ. Board certified in Internal Medicine and Cardiovascular Disease

James A. Coman, MD, FACC

Dr. Coman is a subspecialist in cardiac electrophysiology, ablation therapy and pacemakers. He is Director of Electrophysiology at Hillcrest Medical Center. Dr. Coman also serves as Clinical Associate Professor of Medicine at the University of Oklahoma College of Medicine – Tulsa. He completed an
Cardiovascular Disease

Board certified in Internal Medicine and Cardiovascular Disease and Board certified in Internal Medicine, Vanderbilt University, Nashville, TN.

Christian S. Hanson, DO, FACE

Dr. Hanson is a specialist in Endocrinology, Metabolism and Hypertension at Oklahoma Heart Institute with expertise in diabetes, lipids and hypertension. He also serves as Clinical Associate Professor of Medicine in the College of Osteopathic Medicine – Oklahoma State University. He completed a Fellowship in Endocrinology, Metabolism and Hypertension at the University of Oklahoma in Oklahoma City. Dr. Hanson’s Internal Medicine Residency and Rotating Internship were completed at Tulsa Regional Medical Center. He received his medical degree from Oklahoma State University and his Bachelor of Science degree from orthopedic engineering.

Edward T. Martin, MS, MD, FACC, FACP, FAHA

Dr. Martin is a noninvasive cardiologist with subspecialty expertise in noninvasive imaging. He is Director of Cardiovascular Magnetic Resonance Imaging at Oklahoma Heart Institute, SouthCrest Hospital and Hillcrest Medical Center. Dr. Martin is also Director of Nuclear Cardiology at Southcrest Hospital. In addition, he is a Clinical Associate Professor of Medicine at the University of Oklahoma College of Medicine – Tulsa. Dr. Martin has specialty training in Nuclear Medicine, as well as additional training dedicated to Cardiovascular Magnetic Resonance Imaging. He completed his Cardiology Fellowship at the University of Alabama. Dr. Martin’s Internal Medicine Internship and Residency training were performed at Temple University Hospital in Philadelphia. He received his medical degree from the Medical College of Ohio. Dr. Martin completed his Master of Science degree in mechanical engineering at the University of Cincinnati and his Bachelor of Science degree in physics at Xavier University. Dr. Martin is a founding member of the Society of Cardiovascular Magnetic Resonance and is an editorial board member of the Journal of Cardiovascular Magnetic Resonance.

Board certified in Internal Medicine and Cardiovascular Disease

Roger D. Des Prez, MD, FACC

Dr. Des Prez is a noninvasive cardiologist with subspecialty expertise in echocardiography, nuclear cardiology and transesophageal echocardiography. He is Director of Echocardiography and Peripheral Vascular Ultrasound Imaging at SouthCrest Hospital. Dr. Des Prez received his medical degree and Bachelor of Arts degree from Vanderbilt University. He completed his Residency in Internal Medicine and Pediatrics at University Hospital of Cleveland. Dr. Des Prez practiced for six years as an intern with the Indian Health Services in Gallup, NM. He returned to Vanderbilt University as a member of the Internal Medicine Faculty, at which time he also completed his cardiology training. In addition to noninvasive cardiology, Dr. Des Prez is interested in outcomes research and computers in medicine.

Board certified in Internal Medicine, Pediatrics, Critical Care and Cardiovascular Disease

Rebecca L. Smith, MD

Dr. Smith is a noninvasive cardiologist with subspecialty expertise in transesophageal echocardiography, intra-operative echocardiography, stress and pharmacological echocardiography and contrast echo-cardiography. She completed an Advanced Cardiac Imaging Fellowship at the Cleveland Clinic Foundation and her Cardiology Fellowship at the University of New Mexico Health Sciences Center, Albuquerque, NM. Dr. Smith’s Internal Medicine Internship and Residency training were performed at the University of Arizona Health Sciences Center in Tucson. She received her medical degree from the Medical College of Ohio. Dr. Smith completed her Bachelor of Science degree at Cleveland State University.

Tobie L. Bresloff, MD

Dr. Bresloff is a specialist in Endocrinology, Metabolism and Hypertension, with expertise in diabetes, lipids, hypertension and thyroid diseases. She also serves as Assistant Professor in Clinical Medicine at the University of Oklahoma College of Medicine – Tulsa. She completed an NIH Fellowship in Endocrinology and Metabolism at Vanderbilt University in Nashville, TN. Dr. Bresloff’s Internal Medicine Internship and Residency were completed at Sinai Hospital of Detroit, Detroit, MI. She received her medical degree from Wayne State University School of Medicine in Detroit and her Master of Science and Bachelor of Science degrees at the University of Michigan, Ann Arbor, MI.
David A. Sandler, MD

Dr. Sandler is a cardiologist with subspecialty expertise in electrophysiology. He completed his Cardiac Electrophysiology Fellowship and his Cardiovascular Medicine Fellowship at New York University Medical Center, New York, NY. Dr. Sandler's Internal Medicine Internship and Residency were performed at Mount Sinai Medical Center, New York, NY. He earned his medical degree from Georgetown University School of Medicine in Washington, DC. Dr. Sandler received his Bachelor of Arts degree at the University of Pennsylvania in Philadelphia.
Board certified in Internal Medicine and Cardiovascular Disease
Board certified in Cardiac Electrophysiology

Raj H. Chandwaney, MD, FSCAI

Dr. Chandwaney is an interventional cardiologist with expertise in transcatheter, coronary angioplasty, and related interventional procedures such as coronary stents, atherectomy, intravascular ultrasound, and peripheral vascular interventional procedures. He completed his Clinical Cardiology Fellowship at Northwestern University Medical School in Chicago, IL, where he also completed an Interventional Cardiology Fellowship. Dr. Chandwaney's Internal Medicine Internship and Residency were performed at Baylor College of Medicine in Houston, TX. He received his medical degree from the University of Illinois at Chicago. Dr. Chandwaney completed his Master of Science degree at the University of Illinois at Urbana Champaign, where he also received his Bachelor of Science degree.
Board certified in Internal Medicine and Cardiovascular Disease
Board certified in Interventional Cardiology

D. Erik Aspenson, MD, FACE, FACP

Dr. Aspenson is a subspecialist in Endocrinology, Metabolism and Hypertension at Oklahoma Heart Institute, with expertise in diabetes, lipids, hypertension and thyroid diseases. He completed a Fellowship in Endocrinology at Wilford Hall Medical Center, Lackland AFB, Texas. Dr. Aspenson's Internal Medicine Internship and Residency were completed at David Grant Medical Center, Travis AFB, California where he served as Chief Resident. He received his medical degree from the University of Oklahoma and his Bachelor of Science degree at Oklahoma State University.
Board certified in Internal Medicine
Board certified in Endocrinology and Metabolic Diseases

Tushar N. Shah, MD

Dr. Shah is a non-invasive cardiologist with subspecialization in cardiac imaging. He has advanced training in adult and transesophageal echocardiography, nuclear cardiology, cardiac CT, and vascular imaging. He completed his Cardiology Fellowship at Baylor University Medical Center in Dallas, Texas, where he was Chief Fellow for two years. Dr. Shah completed his Internal Medicine training at Duke University Medical Center in Durham, North Carolina. He received his medical degree with highest honors from the University of North Carolina in Chapel Hill and his Bachelor of Arts degree from the University of Pennsylvania in Philadelphia.
Board certified in Internal Medicine and Cardiovascular Disease
Board certified in Adult and Transesophageal Echocardiography
Board certified in Nuclear Cardiology

Frank J. Gaffney, MD

Dr. Gaffney is an invasive and non-invasive cardiologist with subspecialty expertise in transesophageal echocardiography. He completed his Cardiovascular Medicine Fellowship at Scott & White Memorial Hospital in Temple, Texas. Dr. Gaffney completed his Internal Medicine Internship and Residency at Brooke Army Medical Center in San Antonio. He then remained on staff at Scott & White Memorial Hospital for several years, before entering his Fellowship in Cardiovascular Medicine. Dr. Gaffney earned his medical degree from New York Medical College, Valhalla, New York, and he received his Bachelor of Arts degree at Hofstra University in Hempstead, New York.
Board certified in Internal Medicine
Board eligible in Cardiovascular Disease

Yunus A. Moosa, MD, FACC, FACP, FSCAI

Dr. Moosa is an interventional cardiologist with expertise in cardiac catheterization, coronary angioplasty, and related interventional procedures such as coronary stents, atherectomy, intravascular ultrasound, and peripheral vascular interventional procedures. He completed his Clinical Cardiology Fellowship at Howard University in Washington, DC, where he also completed his Internal Medicine Internship and Residency. Dr. Moosa received his medical degree from the University of Ibadan, Nigeria. He obtained his Bachelor of Science degree at the University of Durban-Westville, South Africa.
Board certified in Internal Medicine and Cardiovascular Disease
Board certified in Interventional Cardiology
Thank you!

to all our co-sponsors for helping to make our magazine a success.

This magazine serves as a major communication source for Oklahoma Heart Institute, providing physicians and their patients throughout Northeastern Oklahoma with important information.

If you would like to become a co-sponsor call Laura Norris at 1.800.561.4686 or email lnorris@pcipublishing.com

Peace of Mind.

What Do You Need a Law Firm For?

- Stark
- Antikickback
- HIPAA
- Shareholder and Employment Agreements
- Sale of Practice
- Medicare
- Physician contract review
- Hospital medical staffs
- Audits & recoupments

And handling a wide variety of other legal matters:
- Estate planning and probate
- Tax planning
- Retirement plan design and consulting
- Corporate and business law
- Contracts
- Real estate
- Securities

JOHNSON, JONES, DORNBLASER, COFFMAN & SHORB, P.C.
providing Oklahoma Heart Institute since its inception

E. Andrew Johnson, attorney-at-law
15 W. Sixth Street, Suite 2200 • Tulsa, OK 74119 • (918) 584-6644 • ajohnson@jjdcs.com
Therapeutic Lifestyle Changes (TLC)

TLC Features
• TLC Diet:
  – Saturated fat <7% of calories, cholesterol <200 mg/day
  – Consider increased viscous (soluble) fiber (10-25 g/day) and plant stanols/sterols (2g/day) as therapeutic options to enhance LDL lowering
• Weight management
• Increased physical activity

NCEP ATP III = National Cholesterol Education Program Adult Treatment Panel III.
http://www.nhlbi.nih.gov/guidelines/cholesterol/atglance

Identify metabolic syndrome and treat, if present, after 3 months of therapeutic lifestyle changes (TLC)

Treatment
• Treat underlying causes (overweight/obesity and physical inactivity):
  – Intensify weight management
  – Increase physical activity
• Treat lipid and non-lipid risk factors if they persist despite these lifestyle therapies:
  – Treat hypertension
  – Use aspirin for CHD patients to reduce prothrombotic state
  – Treat elevated triglycerides and/or low HDL

NCEP ATP III = National Cholesterol Education Program Adult Treatment Panel III.
http://www.nhlbi.nih.gov/guidelines/cholesterol/atglance

Helpful web sites:

American Diabetes Association “Standards of Medical Care in Diabetes”
http://care.diabetesjournals.org/content/vol27/suppl_1/#POSITION_STATEMENTS

Glycemic index:

ADA Patient handout on Metabolic Syndrome:

American Heart Association Patient handout:
http://www.americanheart.org/presenter.jhtml?identifier=4756

AHA Definition of Metabolic Syndrome and treatment recommendations:
http://circ.ahajournals.org/cgi/content/full/109/3/433
Atrial flutter is perhaps the most well described heart rhythm disorder, and its treatment is an excellent example of the progress of modern medicine. Through advances in science and technology we have developed ways to conquer a disorder that was once difficult to control.

Atrial flutter was first described by its “sawtooth” electrocardiographic appearance in 1911. Amazingly, as early as 1920, Sir Thomas Lewis envisioned the mechanism of this arrhythmia to be circus movement in the right atrium. However, it was not until the development of clinical electrophysiology in the 1970s, that we solidified our understanding of this arrhythmia. We now recognize that electrical activation in typical atrial flutter is a counter-clockwise reentrant circuit within the right atrium, circling the tricuspid valve (Figure 1). Importantly, there is a region of slowed conduction between the inferior vena cava and the tricuspid valve that is critical to arrhythmia propagation. It is this area that is targeted in ablation.

In order to properly diagnose typical atrial flutter, it is important to analyze the morphology of the flutter waves on a 12-lead electrocardiogram. Downward flutter waves in leads II, III and aVF with pointed, upward P waves in V1 are diagnostic of typical atrial flutter (Figure 2). Upward P waves in V1 – even at regular intervals – are seen commonly in atrial fibrillation and do not alone diagnose atrial flutter. Although often recognized easily, atrial flutter can occasionally be missed if rapid conduction obscures every other flutter wave, as seen with 2:1 conduction.

Recent population studies have shown that atrial flutter is a common arrhythmia, affecting 88 people in every 100,000. Of great importance is that the risk of stroke appears to be similar to that in patients with atrial fibrillation. Until the development of radiofrequency ablation, therapies for atrial flutter were limited and generally ineffective. With cardioversion alone, the six-month recurrence rate is 55%. Even with anti-arrhythmic medications, long-term recurrence is 60%.

In the 1980s, catheter ablation procedures revolutionized the treatment of atrial flutter. Because conduction through the region between the inferior vena cava and tricuspid valve (cavotricuspid isthmus) is critical to arrhythmia propagation, it was hypothesized that destroying this tissue would terminate the arrhythmia. More importantly, eradicating conduction in this area would eliminate the substrate for recurrence.

Because of its effectiveness, ablation for atrial flutter has become commonplace. In our laboratory, the procedure involves placement of electrical catheters through the right femoral vein. The catheters are then positioned in various locations within the right atrium and right ventricle. One catheter is placed in the region of the cavotricuspid isthmus and radiofrequency energy is applied. A line is created from the tricuspid valve to the inferior vena cava (Figure 3).

Initially, the endpoint of ablation of atrial flutter was termination of the tachycardia. However, this approach had two major drawbacks. This approach required the presence of the arrhythmia at the time of the procedure and was fraught with a significant recurrence rate. The current endpoint of the procedure is development of con-
duction block across the cavotricuspid isthmus. Because this endpoint does not require the presence of atrial flutter, the procedure may be performed in normal sinus rhythm. Another benefit of this approach is a very low rate of recurrence. The duration of the entire procedure is usually less than one hour.

In contrast to the poor success of anti-arrhythmic therapy, ablation carries a success rate greater than 95%. The complication rate of this procedure is remarkably low, under 1%. Typical complications are those associated with femoral venous access, such as hematoma, bleeding and deep venous thrombosis. Major complications, such as stroke, AV block, pericardial tamponade and pulmonary embolism, are extremely rare.

Clearly, ablation procedures have dramatically improved the management of atrial flutter, but should ablation be a first-line therapy? As seen in Figure 4, the risk of hospitalization or developing atrial fibrillation at two years is lower with ablation than with anti-arrhythmic therapy. Furthermore, ablation confers a higher likelihood of maintaining normal sinus rhythm.

If there is an Achilles’ heel to ablation of atrial flutter, it is the development of atrial fibrillation. Although atrial flutter can occur in the absence of heart disease, many patients with atrial flutter have concomitant congestive heart failure, hypertension and coronary artery disease. As one would expect, it is these risk factors that predict the development of atrial fibrillation. Also intuitively, the presence of prior atrial fibrillation predicts development of atrial fibrillation after atrial flutter ablation. This is shown in Figure 5.

Applying these concepts, patients at high risk of developing atrial fibrillation should generally be treated medically. Patients at low to medium risk of developing atrial fibrillation should be targeted for flutter ablation, even as a first-line therapy. After ablation, most patients should be treated aggressively for prevention of atrial fibrillation with ACE inhibitors and beta-blockers. Anti-coagulation should be guided by the same principles that apply for atrial fibrillation.

The understanding and management of atrial flutter have advanced significantly since its description almost a century ago. We now can identify and cure patients with atrial flutter readily with radiofrequency ablation. The efficacy and safety profile of ablation is far superior to anti-arrhythmic therapy alone.
because of small vessels can now be treated in the catheterization laboratory with angioplasty and drug-eluting stents.

The SCD-HeFT trial compared amiodarone treatment with conservatively programmed shock-only implantable defibrillators. The study showed virtually no benefit was derived from the amiodarone therapy, whereas even the conservative shock-only ICDs were beneficial. The DINAMIT trial was a randomized trial testing prophylactic implantable defibrillator therapy against optimal medical management early after myocardial infarction. There was a highly significant reduction in dysrhythmic deaths in the implantable cardiac defibrillator group. These trials continue to show the benefits of cardiac implantable defibrillators.

The late breaking clinical trials this year demonstrate the accelerating pace of treating and preventing cardiovascular diseases. Aggressive lowering of LDL cholesterol produces significant benefits within just a couple years. Angiotensin receptor blockers can be used instead of ace-inhibitors for the treatment of left ventricular dysfunction post MI. Unfractionated heparin and low molecular weight heparin can be used interchangeably for patients taken to the catheterization laboratory for percutaneous coronary interventional procedures. There is significant value of implantable cardiac defibrillators in preventing sudden cardiac death. Finally, the new class of agents to block the endocannabinoid receptors may show substantial benefit for the treatment of obesity and smoking addiction.
Through the Oklahoma Heart Institute Research and Education Foundation, Oklahoma Heart Institute doctors have been involved in clinical research studies for the past 15 years. The research conducted by Oklahoma Heart Institute includes studies on hypertension, acute myocardial infarction, unstable angina, congestive heart failure, angiogenesis, hyperlipidemia, diabetes mellitus, and dysrhythmias. Oklahoma Heart Institute has also been engaged in research involving new devices such as stents, pacemakers, implantable cardiac defibrillators, bi-ventricular pacemakers for the treatment of heart failure, and intravascular imaging devices. In addition, new imaging techniques involving nuclear medicine imaging, as well as cardiovascular MRI imaging, have been carried out.

Oklahoma Heart Institute participates in clinical research trials to provide patients with the newest treatment strategies, as much as several years prior to FDA approval and normal clinical availability. Additionally, the research studies provide training and expertise in new therapies for both physicians and the medical staff working with them. Oklahoma Heart Institute employs seven research nurses; three are involved with inpatient studies and four with outpatient studies. Outpatient research includes studies on treatment strategies for patients with hyperlipidemia, hypertension, diabetes mellitus, and heart failure. Many studies start with patients while they are in the hospital. These are referred to as inpatient trials. The FINESSE trial looks at different treatment strategies for patients presenting with an acute myocardial infarction, analyzing the use of thrombolytic therapy prior to emergency catheterization and primary angioplasty versus primary angioplasty without pre-cath thrombolytic therapy. The goal of the FINESSE trial is to determine whether the benefits of earlier reperfusion with thrombolytic therapy outweigh the potential bleeding risk of thrombolytic therapy, as compared to primary angioplasty by itself. The ACUITY trial compares different anticoagulation strategies with primary angioplasty in the setting of acute coronary artery syndromes by examining the relative value of low molecular weight heparin versus standard heparin therapy versus angiomax (bivalirudin).

The HAT trial studies the use of home defibrillators for patients post anterior wall myocardial infarction who do not meet the criteria for implantable cardiac defibrillators. The PERISCOPE Trial compares two types of diabetic medicines to see whether or not there is less progression of atherosclerotic coronary artery disease and, possibly, more regression of coronary artery disease with P PAR agonists versus standard hypoglycemic agents. This investigation is an intravascular ultrasound study similar to the REVERSAL Trial, which recently demonstrated that coronary artery disease regression can occur within 18 months with aggressive lipid lowering.

Another intravascular ultrasound guided study randomized patients between Lipitor versus Lipitor plus torcetrapib. This trial looks at the use of a statin to lower LDL versus the combination of statin therapy plus an HDL-cholesterol raising medicine to evaluate whether significant regression can occur in less than two years with the combination of Lipitor plus torcetrapib.

The A-HeFT study looks at a hydralazine Isordil combination pill versus placebo in African American patients having New York Heart Association class III...
and IV heart failure. This investigation compares the new medication to the current standard therapy of ACE inhibitors, diuretics and beta blockers. Patients are randomized to the new hydralazine Isordil combination plus standard therapy versus placebo plus standard therapy. There are preliminary studies suggesting that the addition of hydralazine plus nitrates may be particularly beneficial to African Americans with heart failure.

The SALT-II trial looks at a new class of medicine involving the inhibition of vasopressin. This study uses Tolvaptan for the treatment of hypernatremia. Patients with serum sodium of 134 or less are eligible for this study.

The Carperatide IV study for heart failure analyzes the value of an atrial naturetic peptide when given as an intravenous infusion in patients with severe heart failure.

Several trials currently being performed examine the use of biventricular pacemakers and implantable cardiac defibrillators. In addition, drug studies for dysrhythmias are also being performed. These include studies on Azimilide for the treatment of atrial dysrhythmias, as well as a study called the SHIELD Trial, evaluating the use of Azimilide to decrease the episodes of implantable cardiac defibrillator firings in patients.

The recently completed PREVAIL Trial looked at a new class of antioxidants for the prevention of restenosis following coronary artery stent placement. Oklahoma Heart Institute has been involved in many landmark trials over the years, including the recently published REVERSAL trial, investigating the use of intravascular ultrasound to demonstrate the value of very aggressive cholesterol lowering. In this study, Lipitor 80mg a day was used in patients to lower LDL cholesterol significantly below currently recommended target levels, demonstrating that progression can be stopped within 18 months by very aggressive cholesterol lowering. In addition, many patients demonstrated actual plaque regression within 18 months as evidenced by intravascular ultrasound studies. Oklahoma Heart also participated in such trials as the CARE Trial, which confirmed the value of secondary prevention with the use of statins.

Oklahoma Heart Institute was involved in the SAVE Trial, which demonstrated the benefit of ACE inhibitors for the prevention of heart failure post MI. The VALIANT Trial was a similar trial, showing the value of angiotensin receptor blockers in patients with LV dysfunction post MI.

Physicians with patients who might be interested in participating in clinical research trials can contact Oklahoma Heart Institute to obtain details on currently enrolling studies. Physicians may also inquire about new therapies not clinically available to the public outside of research studies. These have been particularly helpful for patients for whom there is currently no good clinical therapy.

The past 15 years have been very exciting in regards to clinical and technical advances in the field of cardiology. The physicians at Oklahoma Heart Institute are very optimistic about even more exciting advances that will be made over the next 5-10 years.

Oklahoma Heart participates in 20-40 research trials at any given time. Studies can last from a few days for up to five-six years.

For further details of the research studies being conducted at Oklahoma Heart Institute, please call 592-0999 and ask for one of the research nurses.
Efficient design creates more time for care

Marshall Erdman & Associates understands outpatient healthcare facilities better than anyone else. We designed South Pointe Medical Park to be an operationally efficient facility that supports the Oklahoma Heart Institute cardiology team, so physicians have more time to provide the highest quality of care to patients.

Marshall Erdman & Associates
Over 50 years of healthcare facility design and construction
Dallas | 1-800-766-5321 | www.erdman.com

With your support,

Every 7 seconds
the life of someone is improved by a Medtronic product or therapy.

Medtronic is the world's leading medical technology company, providing lifelong solutions for people with chronic disease.

enquiryap@medtronic.com
www.medtronic.com

Welcome to Oklahoma Heart Institute Magazine

This magazine serves as a major communication source for Oklahoma Heart Institute, providing physicians and their patients throughout Northeastern Oklahoma with important information.

For Advertising information
call Laura Norris at 1.800.561.4686 or email lnorris@pcipublishing.com

Treating Hypercholesterolemia by Wayne N. Leimbach, Jr., MD
Implantable Defibrillators Clearly Lifesavers by James A. Coman, Jr., MD
A Sharper Cardiac Image by Edward T. Martin, MD
The Executive Health Program at Oklahoma Heart Institute by Robert E. Lynch, MD
Avid athletes and tennis players, Denise and Norma could be quite the doubles team. But when cardiac problems slammed the ball in their court, they turned to SouthCrest for the ultimate save.

SouthCrest Hospital is dedicated to innovative cardiac care. With an entire floor designed for heart patients – complete with thirty-two all-private rooms – a low patient-to-nurse ratio and a beautiful comfortable environment, we provide the right conditions for recovery.

Now, Denise and Norma take care of their hearts and play by a new set of rules. With all the improvements that SouthCrest brings to cardiac care, you’ll see that we take innovation to heart.

What brought you to SouthCrest – Tulsa’s Heart Hospital?

Avid athletes and tennis players, Denise and Norma could be quite the doubles team. But when cardiac problems slammed the ball in their court, they turned to SouthCrest for the ultimate save.

SouthCrest Hospital is dedicated to innovative cardiac care. With an entire floor designed for heart patients – complete with thirty-two all-private rooms – a low patient-to-nurse ratio and a beautiful comfortable environment, we provide the right conditions for recovery.

Now, Denise and Norma take care of their hearts and play by a new set of rules. With all the improvements that SouthCrest brings to cardiac care, you’ll see that we take innovation to heart.

NORMA DUKE
Mother of Denise, grandmother of nine.
Lifelong tennis player.
Experienced chest pains, went to family doctor.
Stress test revealed 95% blockage in an artery.
Now, she’s back in the swing after angioplasty and stent implantation at SouthCrest.

DENISE WESTFALL
Daughter of Norma.
Director of the swimming program at Jenks.
Gave her mom a cardiac stress test, but mom gave it back.
Denise was diagnosed with cardiomyopathy.
Takes medicine, exercises, is getting along swimmingly.

DENISE WESTFALL
Daughter of Norma.
Director of the swimming program at Jenks.
Gave her mom a cardiac stress test, but mom gave it back.
Denise was diagnosed with cardiomyopathy.
Takes medicine, exercises, is getting along swimmingly.

WE TAKE innovation TO HEART
LOCATED AT HIGHWAY 169 & 91ST STREET
www.southcresthospital.com / 918-294-4000