



MHI QUARTERLY

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PATIENTS CAN RECOVER FROM A "BROKEN HEART"

New Heart Condition Recognizes Stress as Heart Stunner

What may feel like a heart attack, look like a heart attack, and even be diagnosed as a heart attack may clinically be very different than a heart attack. A relatively new condition known as stress cardiomyopathy has been making the headlines recently as the "broken heart" syndrome. First observed in Japan during the 1990s, this heart condition is often triggered by some type of emotional or physical stress. Not familiar to many physicians, it is the first documented scientific connection between stress and the heart.

When the condition occurs, one-half to two-thirds of the heart stops contracting abruptly. The heart acts almost as if it is stunned or has a concussion and goes into a sleep mode. A patient may experience chest pain in the front of the chest but without a prior history of heart problems. Often times, the pain is not distinguishable from heart attack pain so a physician may initially suspect a blocked artery because of an abnormal EKG and elevated levels of creatine kinase and troponin. An urgent coronary angiogram, however, is necessary to exclude a blocked coronary artery.

With funding and support from the Minneapolis Heart Institute Foundation, the Minneapolis Heart Institute® (MHI®) is a leader in treating and researching this condition with the largest series of patients worldwide. Minneapolis Heart Institute cardiologists Scott W. Sharkey, MD; John Lesser, MD; Terrence Longe, MD; and Barry Maron, MD, led the first descriptive study on the condition from 2001-2003 with 22 patients. Published in the American Heart Association's February 2005 issue of *Circulation*, the study found that some type of emotional stress triggered the condition in one-third of patients, physical stress acted as a trigger in another one-third and a combination of the two caused the condition in others. The importance of this study was recognized by *Circulation* with the prestigious "Paper of the Year" award presented at the American Heart Association Scientific Meeting in Chicago in November 2006.

"Referring to the condition as the 'broken heart' syndrome is somewhat misleading because it implies the condition occurs during grief or loss when it is actually much broader than that," said Sharkey. "We've found the most common trigger to be some type of stressful event, making 'stress' cardiomyopathy a more accurate name for it."

While grief is the most common emotional stress trigger, anger, personal loss and fear can also initiate it. According to Sharkey, stress cardiomyopathy can result from a variety of stressors ranging from the sudden death of a loved one, a heated argument, and severe financial loss to fear from physical harm, abuse or crime. Even the anxiety brought on by being lost in traffic has been noted as a cause of this condition.

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IMPROVING HEART HEALTH FOR WOMEN

Although heart disease is the number one killer of women, a recent survey by the American Heart Association found that more than 50 percent of American women are not aware of this fact. In addition, women have been traditionally underrepresented in clinical research studies that focus on cardiovascular disease, which has resulted in tests and treatments for women based on studies predominantly done on men. The good news is several national leading health care institutions, including the Minneapolis Heart Institute at Abbott Northwestern Hospital, are trying to change these statistics.

Two years ago, the Minneapolis Heart Institute started its Women's Heart Health Program to improve the heart health of women in Minnesota. Led by program director and Minneapolis Heart Institute cardiologist Elizabeth Grey, MD, along with cardiologists Robert Hauser, MD; Norma Thiessen, MD; and Barry Welge, MD, and a multidisciplinary team, the program was designed to focus on the specific cardiovascular needs of women and is centered on three key pillars: education, clinical care and research.

"The Women's Heart Health Program was started here because women with heart disease have been understudied," said Grey. "What we know for sure is that typically, coronary heart disease shows up in women 10 years later than it does in men, and their outcomes are much worse."

Since prevention is key with heart disease, one long-term program goal is to educate women and health care providers in general about women's heart health. Community education is done by fostering relationships with Minneapolis Heart Institute's outreach and satellite sites throughout Minnesota to offer educational and clinical opportunities tailored to each respective community. Through educational seminars, school partnerships and conferences, the program is reinforcing the messages of prevention and self care.

Clinical care is another program pillar. A clinic visit will often begin with a consultation with multidisciplinary health care providers, which can include one of the staff physicians, advanced providers or dietitians. The patient will have a full assessment to learn health history and assess risk. Once a woman's cardiovascular risk is evaluated, a personalized plan is created to optimize her cardiovascular health. A key benefit for the patient is that the Minneapolis Heart Institute is a leader in a wide variety of imaging techniques and does

more CT scans of coronary arteries and cardiac MRIs than any institution in the country.

"Imaging is a benefit to women in terms of heart health," said Grey. "A good calcium score alone is reassuring, but it does not guarantee 100 percent a woman is not at risk because women tend to have less calcified plaque. A CTA can take it one more step by identifying any soft plaque on the CT scan, which is commonly found in women."



Another key program differentiator is the Women's Heart Health Program's affiliation with the Minneapolis Heart Institute Foundation. A leader in cardiovascular research, the Minneapolis Heart Institute Foundation provides the program access to cutting edge research protocols. It is well known that there is a great need for more data on how heart disease affects women. The women's heart health program is helping to meet this need

by participating in national studies and protocols specific to women. Currently, the program is focusing on its Level One Heart Attack Program patients, in particular the differences between men and women presenting with heart attacks.

"Our program is really one of the few that focuses on community education and research," said Grey. "Women currently only make up 25 percent of the research studies. Our goal is to raise these numbers and publish the results because we need more good data on women."

Unlike other women's heart health programs, the Minneapolis Heart Institute's program has an advisory board that is comprised of women from the community who have an interest in women and heart health. The board helps ensure that the program's vision and its patients are the focus of any major program decisions or initiatives.

"It is important for health care providers to know that our Women's Heart Health Program is available to all women, with or without disease," said Grey. "It is about offering a continuum of care for women and heart health that begins with education and prevention and follows with intervention and research."

For more information about the Women's Heart Health Program or to make a referral, call 612-863-3900 or 800-582-5175.

HEART DISEASE PREVENTION: AGGRESSIVE THINKING HELPS HIGH-RISK PATIENTS

A Conversation with Kevin Graham, MD, director, preventive cardiology at the Minneapolis Heart Institute

Beyond The Usual Categories

Heart disease prevention generally follows tried and true patterns of thinking: watch for and treat high LDL cholesterol levels and blood pressure. Encourage patients to stop smoking and to lose weight – standard and well established interventions. While these predictors help determine, in general, a patient's risk of heart disease and suggest treatment, they are not sufficient to predict with certainty future events. Kevin Graham, MD, FACC, director of preventive cardiology for the Minneapolis Heart Institute follows a line of thinking that helps make prevention a priority in every patient.

"Every patient fits somewhere on my heart disease prevention grid," said Graham. "Let's think of three common categories:

- Is this a secondary prevention patient? If so, they'll receive aggressive treatment with the goal that they will never develop symptomatic disease again in their lifetime.
- Is this apple-shaped, asymptomatic person before me indicative of metabolic syndrome? If so, the person is at high-risk for heart disease and will also receive aggressive treatment. Since 50 percent of people with metabolic syndrome never make it to the front door of a hospital with an acute MI, it's important to find these high-risk people before the inevitable plaque rupture.
- Is this the common 'tweener' patient – that patient with some risk, but with whom we have to think twice before placing on lifelong preventive therapies?"

Categories Help. Aggressive Treatment Helps More. High-Risk and Symptomatic

"For those high-risk symptomatic patients, we do just what you would think: aggressive treatment – and then some," said Graham. "One thing we've learned over the years is that when we aggressively treat patients with known heart disease, we expect they will not come back to see us. I recently saw a patient who was bypassed in 1970. His bypass graft was still wide open. Not common, but possible. That's what aggressive treatment can do."

For the person with known CAD, as well as for the high-risk prevention patient, Graham moves directly to aggressive treatment. "It's good to get LDL levels down from 200 to 120," said Graham. "But what's really needed is to go below 70 mg/dl. Seventy is a physiologic level. And it's physiologic levels that keep people from coming back. It's good for blood pressure to go from 180 to 160. But in fact, it needs to get to 115-120. If we do that and you stay on the right medications – aspirin, fish oil, statins, beta-blockers and the like – we expect that most people will not come back and see us again."

Metabolic Syndrome—No Fancy Tests Needed

We all know there are a large number of people who are high-risk but still asymptomatic. "When I see a 50-year-old apple-shaped person, I think, 'How many 75-year-olds do you see like that?'" asked Graham. "These [apple-shaped] people have a 100 percent 25-year cardiac mortality. You don't need fancy tests for these people. They are already high risk. All you have to do is look at them. Then you look down and see Triglycerides of 250 mg/dl, HDL of 33 mg/dl, BP 144/90, Glucose of 123 mg/dl – it's all there; the recipe for cardiac disaster and sudden cardiac death. We treat these people exactly like those who have had a stent or CABG."

Everyday Dilemma

Graham – just like every physician – commonly faces the "tweener." This patient is 50 years old, his father died of a heart attack at age 58 ("but was a smoker"), LDL 145 mg/dl, HDL 44 mg/dl, Trigs 106 mg/dl, BP 134/85 ("It's lower at home"), non-smoker, glucose 106, exercises three times per week and reads all the pop stories about heart disease.

"Do I put that patient on electron beam CT scanning drugs for the rest of his or her life, and what are my goals?" asks Graham. HeartScan MN (electron beam CT scanning) is useful in these moderate risk, asymptomatic people. HeartScan MN allows Graham and colleagues to look at the calcium buildup in the coronary arteries and get a sense of the amount of blockage before emergency intervention is required. "With HeartScan MN, we avoid waiting for an MI," said Graham. But HeartScan MN also provides a window for the patient to see and understand just how clear (or not) their coronary arteries really are. "It can be a slap in the face for some people," said Graham. "It's a wake-up call."

With HeartScan MN pictures, patients can see the actual white specks of calcium in their coronary arteries, which can be scary for them. "It's one of the most effective motivational tools I have," said Graham. And at a tenth of the price of an echo or nuclear test, the HeartScan MN is a quick, motivational and predictive test. "If patients have significant calcium, we treat them exactly like someone who has had a heart attack," said Graham.

Deliver Messages that Matter

Graham considers HeartScan MN to be one of his best motivational tools because it gives patients a clear picture of the state of their arteries and moves them into action. "We never want to give a patient the wrong message coming out of a test: Say you put a 65-year-old man

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HEART DISEASE PREVENTION: AGGRESSIVE THINKING HELPS HIGH-RISK PATIENTS ~ *continued from page 3*

on a treadmill. He's apple-shaped. He's a smoker. He huffs and puffs through six minutes and hears the test is "normal." That patient isn't going to see 75. He hears a doctor say 'You're OK.' The statement becomes an endorsement of his lifestyle. But that's the wrong message to leave with the patient. He needs to take care of his lifestyle right away because we never know when his plaque will rupture.

"There's a 54-year-old guy down the hall who just had an anterior MI. One year ago he had a 'normal' cardiac stress test. He did fine and heard he was OK," said Graham. "Fast forward one year: a plaque ruptured – big anterior MI, cardiac arrest. We've cooled him to 83 degrees under our 'COOL IT' protocol. Because he was in a great ER (St. Francis in Shakopee) and they had 'all hands on deck,' he will survive. But at home or even in an ambulance, he wouldn't have made it. Unfortunately, we see this every day.

Stress testing checks for 80 percent-plus blockages. But most MIs happens when a 30-50 percent plaque ruptures and suddenly thromboses the artery to 100 percent, like a popcorn seed popping. The trick in 2007 is to tell patients if they have these 'seeds of discontent' in their coronary arteries before they are in a life-threatening crisis."

Unlike many preventive cardiologists, Graham does the full spectrum of acute cardiac care and sees patients every day who are completely surprised they have developed symptomatic coronary artery disease. "We do our best work when we identify and treat high-risk preventive patients before the heart attack and keep the ones with disease from ever coming to the hospital again," said Graham. "But it's gratifying to see patients now, 20 years after by-pass surgery or angioplasty, who are living healthy lives and have never had another problem."

PATIENTS CAN RECOVER FROM A "BROKEN HEART" ~ *continued from front page*

A second major trigger group is some type of physical stress due to a non-cardiac related ailment or illness. Sharkey has seen a variety of medical ailments instigate the condition in patients including asthma attacks, gall bladder surgery and spine surgery.

"There are another percentage of patients where a combination of emotional and physical stresses can trigger it," said Sharkey. "For example, a patient may be having a biopsy done and has a panic attack."

According to Sharkey, what is believed to cause this heart phenomenon to occur is an overreaction from the autonomic nervous system. The brain perceives a threat and then sends a jolt to the heart, causing an increase in both the heart rate and the force of heart contraction.

"There is clearly an interaction between the brain and the heart," said Sharkey. "What is normally a healthy reaction and designed to be a lifesaving reflex has an adverse effect in some patients. The response is not controlled by the individual."

One of the remarkable aspects of stress cardiomyopathy is that 99 percent of patients recover completely within one week without any permanent heart damage when given the proper care. In some cases during recovery, however, patients may need the support of a blood pressure device because of low blood pressure or a ventilator because of heart failure. While there is no permanent damage, stress cardiomyopathy has reoccurred in 15 percent of patients.

Gender does seem to be a factor with the condition as 95 percent of patients who experience stress cardiomyopathy are women older than 50 years of age. While there is no known reason why women are more susceptible, some researchers attribute it to the post-menopausal hormone state. Another possibility may be related to gender differences in how the autonomic nervous system responds to stress. A current research goal at MHI® is genetic testing to look at the genes controlling the autonomic nervous system in people who have experienced the condition versus those who have not.

In addition, the team has other research goals they are currently pursuing, including learning more about the variety of circumstances under which the condition can occur and gaining a better understanding of the specific mechanisms that cause it. They are also following up with patients to identify the recurrence rate and potential for transmission to children. Because it is a new condition, MHI® is also trying to help physicians better recognize it clinically.

"It is a new condition that physicians should become familiar with and is often under diagnosed," said Sharkey. "They may see it in different scenarios, so it is very important physicians ask more questions about the patients' history, even going so far as asking family members about recent events. A big part of our success in learning more about this phenomenon has been physicians being able to recognize it and referring patients here from all over the state."

LEVEL 1 HEART ATTACK OUTCOME REPORT

Level 1 Heart Attack Program interventional therapies are available 24 hours a day, 365 days a year.

UNIQUE LEVEL 1 HEART ATTACK PROGRAM: NO PATIENT EXCLUDED FROM TREATMENT*

The Level 1 Heart Attack Program has completed three consecutive years of operation. The Minneapolis Heart Institute at Abbott Northwestern Hospital began this unique treatment program in March 2003. This is the first program of its kind in the United States to coordinate community emergency departments

with trained emergency transportation professionals and an expert angioplasty team available 24 hours a day.

Since its inception, 1121 patients have been treated through MHI's Level 1 Heart Attack Program. When compared to benchmarks, the Level 1 program shows a significant reduction in mortality rates.

*No patients excluded based on age, cardiac shock, cardiac arrest, comorbidity, etc.

Level 1 Heart Attack Outcome Report — March 1, 2003 - November 30, 2006

Patients	
Total	1345
Zone 1	627
Zone 2	421
Abbott Northwestern ED3	297
Male/Female	72%/28%
Average age	62.2 years
Anterior MI or LBBB	37.2%
Cardiogenic shock	12.3%
Pre-PCI cardiac arrest	10.8%
Transport	
Ground/Air	30%/70%
Median elapsed time	
Community ED arrival to balloon inflation at ANW	
Zone 1	95 minutes
Zone 2	120 minutes
Abbott Northwestern ED	65 minutes
Cath lab arrival to balloon inflation, zone 1 and 2	13 minutes

OVERALL PROGRAM OUTCOMES

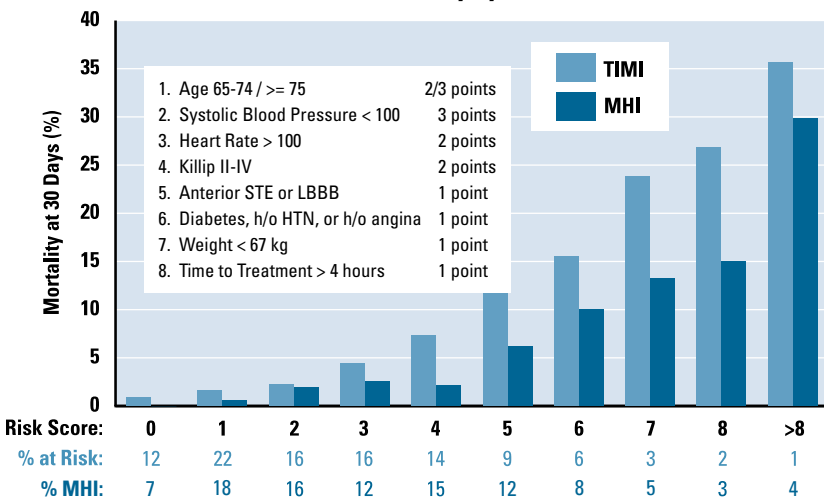
Mortality at 30 days	
Zone 1	4.6%
Zone 2	5.7%
Abbott Northwestern ED	4.4%
Overall mortality at 1 year	7.2%
Overall cardiovascular mortality at 1 year	5.7%
Stroke rate at 30 days	1.2%
Reinfarction at 30 days	1.6%
Median hospital length of stay	3.0 days
TIMI major bleeding	0.6%

OUTCOMES WITH EXCLUSIONS USED BY OTHER PROGRAMS AND CLINICAL TRIALS

Mortality at 30 days	1.0%
Mortality at 1 year	1.9%

1. Zone 1: Hospitals 22-60 miles from Abbott Northwestern Hospital. No thrombolytic therapy. Immediate transfer and stenting.
2. Zone 2: Hospitals 61-190 miles from Abbott Northwestern Hospital. Half-dose thrombolytic therapy followed by immediate transfer and stenting.
3. Patients entering the Level 1 Program through Abbott Northwestern Hospital's Emergency Department.

Level 1 MI Mortality by TIMI Risk Score**



**Expected mortality is based on national data versus MHI data.

LEVEL 1 OVERSIGHT COMMITTEE

Kevin Graham, MD	James Madison, MD
Tim Henry, MD	Mike Mooney, MD
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Daniel Lips, MD	Barbara Unger, RN

MHI[®] PHYSICIANS TRAVEL TO TAKE CARDIOVASCULAR CARE TO LOCAL COMMUNITIES

MHI[®] works closely with family practice and internal medicine physicians throughout the upper Midwest. The MHI physicians believe that the best model for seamless primary and cardiac specialty care is to take the specialists to the primary care setting, which is why MHI[®] offers one of the largest consultative cardiology outreach and mobile diagnostic programs in the United States. In addition to services at Minneapolis Heart Institute at Abbott Northwestern Hospital, MHI physicians are also available at the following locations:



- | | |
|--------------|----------------|
| Aitkin | Grantsburg, WI |
| Alexandria | Hinckley |
| Arlington | Hutchinson |
| Blue Earth | LeSueur |
| Brainerd | Litchfield |
| Cambridge | Mankato |
| Crosby | Monticello |
| Edina | Mora |
| Faribault | Morris |
| Glencoe | Mound |
| Grand Rapids | New Prague |

- | | |
|------------|------------|
| New Ulm | Sleepy Eye |
| Northfield | St. Cloud |
| Olivia | Waconia |
| Pine City | Willmar |
| Plymouth | |
| Richfield | |
| Shakopee | |

OPTIMIST PROGRAM PATIENT POPULATION

For the majority of Americans with heart disease, traditional medical approaches such as medication, a heart-healthy diet, regular exercise, angioplasty, surgery and stents offer clear and successful answers to the problems they face.

But for others, despite the individual's best efforts to practice a heart-healthy lifestyle, these traditional approaches are not enough. Their heart disease has a real, ongoing impact on their daily activities and the quality of their lives. For many of them, it may seem that there are no other options and no real hope for the future. It is for these patients that the OPTIMIST Program was developed.

The OPTIMIST Program – which stands for OPTIONS In Myocardial Ischemic Syndrome Therapy – offers new approaches to improve quality of life for individuals who have coronary artery disease and chronic chest pain who do not respond to usual treatments and are not candidates for angioplasty or surgery. Essentially, the goal of the OPTIMIST

Program is to help patients who are beyond the help of standard therapies.

Patients who are seen in the OPTIMIST Program have access in one location to a range of treatment options. All patients meet with staff nurses and physicians so it can be determined which treatment or research options best suit their individual needs and health status. Some of those options include:

- enhanced external counterpulsation (EECP)
- myocardial angiogenesis
- new drugs that are available to treat chronic angina.

If you have a patient that you think would be a good candidate for the OPTIMIST Program, please ask them to call 612-863-3900 for an appointment.

TIME, TECHNOLOGY AND “COOL IT” PROTOCOL LESSEN RISK OF NEUROLOGICAL DAMAGE FOR SOME CARDIAC ARREST PATIENTS

Sudden cardiac arrest is a killer, causing more than 350,000 deaths a year. Yet, even if a patient survives cardiac arrest, chances are high they will sustain permanent neurological damage. One of the ways to lessen this risk is to quickly cool the patient’s core body temperature to 33 degrees Celsius through induced or therapeutic hypothermia – making time and temperature critical components to successfully treating cardiac arrest.

Cardiac arrest generally occurs when the electrical system of the heart malfunctions. In this state, the heart can no longer beat and is unable to pump blood throughout the body. Patients who are able to survive the arrest itself are still at risk for anoxic encephalopathy resulting from the lack of oxygen to the brain during the arrest. Even after circulation has been restored, the brain is still at risk for damage. As one of the leading pioneers of the cooling treatment in the nation, the Minneapolis Heart Institute at Abbott Northwestern Hospital established a “Cool It” protocol in 2006 to immediately initiate the treatment for a patient who meets the medical criteria.

The “Cool It” program is a facilitated collaboration among cardiologists, emergency medicine staff, intensive care physicians, emergency medical services, critical care nurses and pharmacists at Abbott Northwestern Hospital. Therapeutic hypothermia can be of benefit to patients up to four hours after an arrest occurs, but it takes well orchestrated and coordinated care to effectively apply cooling as soon as possible after the arrest in order to minimize damage. Set standards, processes, medications and equipment are part of the protocol to minimize time and get the patient to the ideal core temperature quickly.

Approximately half of the “Cool It” patients treated are part of Abbott Northwestern’s Level One Heart Attack Program. This innovative heart attack program makes angioplasty possible quickly to patients who are transferred from partnering hospitals throughout the state. Several of these patients require immediate percutaneous coronary intervention in the catheterization lab. Minneapolis Heart Institute was able to take its “Cool It” protocol even one step further by being the first program ever to combine emergency angioplasty and cooling at the same time.



“In November, our team was the first to use the Arctic Sun® cooling device on patients right in the catheterization lab in order to maximize the benefits to the brain and heart simultaneously while minimizing the time from return of spontaneous circulation to cooling,” said Michael Mooney, MD, Minneapolis Heart Institute cardiologist and lead on the developmental team. “The goal is always to apply cooling as soon as possible after the cardiac arrest to lessen neurological risk, and being able to do that right in the cath lab enables us to accomplish that. We now house an Arctic Sun device right in the lab for immediate cooling implementation for our Level One patients.”

The outcomes of this treatment and “Cool It” protocol have been outstanding. Since its implementation, 33 patients have been treated, of whom 47 percent were discharged with full neurological recovery. Within this group, 14 patients were also part of the Level One program, of whom 57 percent were discharged with full neurological recovery. This is a substantially higher success rate than would be expected based on prior data.

“We continue to analyze the results and shape the ‘Cool It’ protocol so we are providing the best care to cardiac arrest patients to improve their chances of survival and quality of life,” said Mooney.

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CME events

Upcoming
2007

CARDIOLOGY UPDATE IN BRAINERD

Wednesday, March 21, 4 to 6 p.m.
Brainerd Medical Center, Conference Room "B", Brainerd, Minn.

SPECIALTY CARE CONFERENCE FOR PRIMARY CARE PROVIDERS

Friday, April 13, 6 to 8:30 p.m. and Saturday, April 14, 8 a.m. to noon
New Ulm Country Club, New Ulm, Minn.
Register early: Call Anna Bastian at 507-233-1400 or
email: anna.bastian@allina.com

EVENING OF CARDIOLOGY

Thursday, April 26, 6 to 8:30 p.m.
Hutchinson Event Center, Hutchinson, Minn.

EVENING OF CARDIOLOGY

Thursday, May 3, 6 to 8:30 p.m.
Holiday Inn Conference Center, Alexandria, Minn.

VASCULAR MASTERS SERIES

Wednesday, May 23, 6 to 8:30 p.m.
Guest Speaker: John S. Matsumura, MD
Northwestern University School of Medicine
Solera Restaurant, Minneapolis, Minn.

MINNEAPOLIS HEART INSTITUTE'S LANDMARKS IN CARDIOLOGY PROGRAM

Three dates available to choose from:

- Thursday, June 14 evening and Friday, June 15
- Thursday, Oct. 4 evening and Friday, Oct. 5
- Thursday, Oct. 11 evening and Friday, Oct. 12

More information to follow. Please call 612-863-1919 for
questions/early reservations.

LOOK FOR MORE INFORMATION ABOUT THESE
AND OTHER EVENTS BY LOGGING ONTO
WWW.MPLSHEART.COM OR CALLING 612-863-3900.