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Statewide stroke project achieves dramatic improvements in warfarin use

AF prevention collaborative helps patients, saves health care dollars

The atrial fibrillation (AF) team at HealthInsight, a nonprofit community quality improvement organization in Las Vegas, initiated a stroke prevention project that sought to increase the use of warfarin in eligible AF candidates in both inpatient and outpatient settings.

To accomplish the substantial improvements they were aiming for, the team decided that they would have to design their project as a statewide collaborative and obtain the cooperation of as many Nevada facilities as possible. The circle graphs accompanying this story (see p. 26) demonstrate the project's accomplishments: statistically significant improvement in the percentage of eligible AF patients admitted or discharged on warfarin from 40.4% at baseline to 78.5% at re-measurement.

Kevin Kennedy, MHS, senior health care analyst at HealthInsight, says as with all of the quality improvement organization's projects, the focus of this project was on providers and health care organizations throughout the state of Nevada, where there are a total of 24 hospitals.

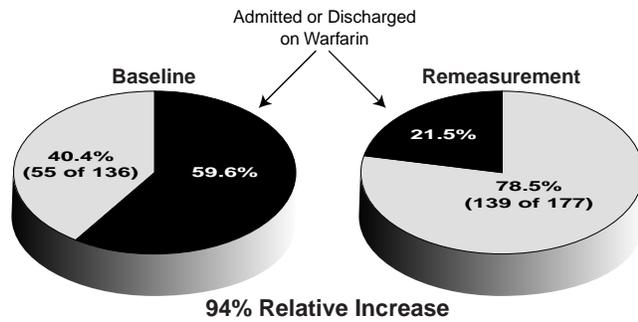
By gaining the support of physician leaders, they were able to get the facilities to sign on.

"Mainly by acquiring what we called physician 'champions' who promoted the project out in the community and within their own hospital

KEY POINTS

- Nevada health care providers collaborated and managed to significantly improve state warfarin utilization in the state's hospitals.
- A 118% relative increase in the percentage of AF patients receiving warfarin upon admission was accomplished.
- Also, they accomplished a 152% relative increase in the percentage of AF patients receiving warfarin upon discharge.
- Overall, upward of 78% of AF patients were admitted or discharged on the drug.
- Increased warfarin use should prevent about 74 strokes per year, resulting in potential savings of more than \$2 million per year.

Percentage of AF Patients Receiving Warfarin



Source: HealthInsight, Las Vegas, 1999.

Kevin Kennedy, MHS, senior health care analyst at Las Vegas-based HealthInsight, says, "if you treat 100 AF patients with warfarin, you prevent approximately three strokes."

Clinical trials demonstrate that stroke rates in control groups (without warfarin) were 4½% annually compared to 1.4% in those taking warfarin.¹ "That's where you get the 3.1% absolute risk reduction," he explains.

Stroke costs, risk reduced

A few years ago, researchers in Palo Alto, CA, estimated that acute and annual chronic costs of moderate-to-severe stroke were \$34,200 and \$18,000, respectively.²

HealthInsight estimates it costs \$700 annually to treat one patient with warfarin. "In Nevada, if we can prevent 74 strokes, that would save more than \$2 million in health care costs." The population of Nevada is 2 million, and the cost savings would be much larger if they are extrapolated to a more populous state.

Over 2 million people in this country have AF, especially those over 65. The risk of stroke in AF patients without coexistent risk factors increases slowly with age, and the annual stroke rate almost doubles between patients under 65 and those over 75 with coexistent risk factors.

The stroke rate of patients with AF is five to six times that of those without AF — 30% of AF patients will have a stroke. Pooled results from five trials show an annual stroke rate of 4.5% in controls vs. 1.4% for warfarin-treated patients — a 68% risk reduction.³ (See bar graph on annual stroke incidence, p. 27.)

As early as 1995, the AHCPR's Patient Outcomes Research Team (PORT) reported warfarin is effective in preventing stroke in many patients with AF. Yet warfarin is still underutilized in eligible patients, and only 25% receive the therapy. The agency points out that half of the country's strokes could be avoided through more judicious use of warfarin, resulting in an annual savings of \$600 million.⁴

Warfarin under-utilization is avoidable. Education is key because under-use of the drug has been linked to misperceptions about the drug's risks and benefits. Misunderstandings include:

- Providers may overestimate the risks of bleeding and underestimate the importance of

setting," says Justine Bizette, RN, MSN, the project's senior coordinator. "We called them 'champions,' because if they supported the project, others in the community would follow.

"HealthInsight's medical director, William Berliner, MD, was actively involved with our project team," says Bizette, "and he made presentations to hospitals and physician groups around the state."

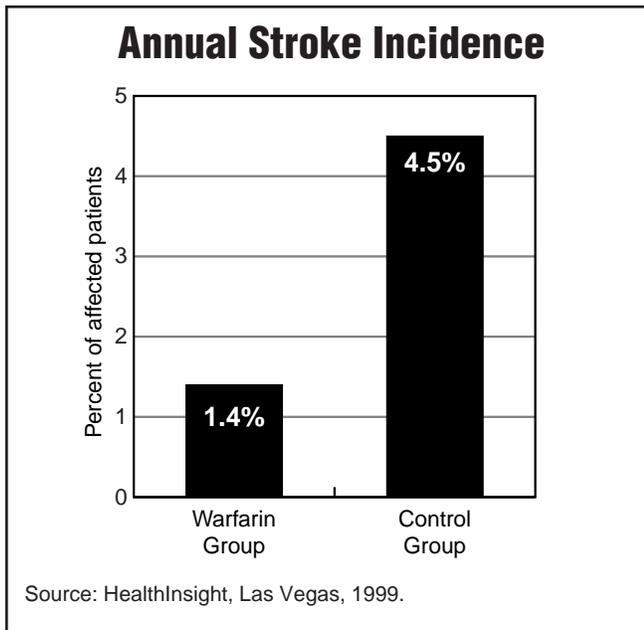
Nine out of 24 hospitals participated, accounting for 80% of the AF discharges.

Bizette says, "Warfarin's effect on stroke prevention is not a controversial topic, and a quality improvement department can take on a similar project and accomplish satisfying results. Hospitals may want to alter the interventions to meet their own needs, but they can easily run a project like ours." HealthInsight also has offices in Reno, NV, and Salt Lake City, UT. ■

The message is clear: Warfarin saves money

\$700 for therapy vs. \$100,000 for stroke care

There is clear evidence in the research literature that getting warfarin to atrial fibrillation (AF) patients saves money. There have been several nationwide studies on how much it costs to treat and prevent stroke. *Cost Management in Cardiac Care's* January issue carried a news brief that points out that it costs about \$15,000 to prevent a stroke; the average total cost for a 65-year-old stroke patient in this country is \$100,000. (See January *CMCC*, p. 12.)



optimal dosing to prevent that complication.

- Age is perceived to be a contraindication rather than an indication for warfarin.
- Physicians have concerns regarding patient noncompliance.
- PT/INR testing is considered complex and time consuming.⁵

Warfarin is contraindicated in some AF patients because the blood-thinner potentiates bleeding disorders. The drug is contraindicated in any patient with aneurysms, cerebrovascular, or other hemorrhagic tendencies, gastrointestinal bleeding tendencies, or active ulcerations. Factors that increase hemorrhagic risk are:

- 3+ conditions, including seizures, peptic ulcer disease, liver disease, bleeding tendency, alcohol.
- INR >4.
- Highly variable INR.
- Acute warfarin therapy

Patients who are senile, alcoholic, or psychotic and have a tendency to fall are not candidates, nor are those with pericarditis, bacterial endocarditis, hepatic or renal insufficiency, or an allergy to warfarin. (In patients for whom warfarin is contraindicated, aspirin, while about half as effective as warfarin, has been shown to be of benefit in stroke reduction.)

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ACCP, AHCPR standards form basis for project

Med-surg technologies make stroke preventable

HealthInsight's project (see related articles on p. 28.) was based on the standards of the Irving, TX-based American College of Chest Physicians' (ACCP) Fourth Consensus Statement on Antithrombotic Therapy and the Agency for Health Care Policy and Research.¹

"Our main goal," say **Kevin Kennedy**, MHS, senior health care analyst at HealthInsight, and **Justine Bizette**, RN, MSN, the project's senior coordinator, "was to improve compliance with the standards of practice and guidelines so that the quality of care could be improved."

Stroke is now considered to be as preventable as heart attack. Primary prevention — reducing risk by stopping smoking, losing weight, and lowering blood pressure — is the first line of defense.

Guidelines confirm drug's efficacy

Current ACCP guidelines and the Fifth Consensus (issued last November) both reconfirm the efficacy of warfarin for stroke prevention.²

"There have been several important studies on stroke prevention in atrial fibrillation since 1995," said **Daniel Singer**, MD, ACCP Fifth Consensus panel member and a cardiologist at Massachusetts General Hospital in Boston. "The guiding principle is that oral anticoagulation markedly decreases the risk of ischemic stroke in patients with atrial fibrillation and that aspirin is much less effective [than warfarin]."

Project-in-a-Box gets attention and results

Booklets, videos spread word about warfarin

Cost Management in Cardiac Care asked **Justine Bizette**, MSN, the senior coordinator of HealthInsight's atrial fibrillation project how they accomplished improvements in warfarin utilization. To help convince health care professionals to join in their efforts, the project team developed and produced "Project-in-a-Box," a box containing tools for hospitals and physicians. It includes videos and brochures with educational materials for both physicians and patients.

"We wanted people to open it and not just put it on the shelf," says Bizette.

Binder rejected as ho-hum

Rather than send out the routine binder with a lot of literature, they put pertinent pieces into an attractive box and mailed it to physicians and hospitals throughout Nevada who requested it. It was also made available at nursing stations and medical libraries.

"We made up 350 pieces," says Bizette. "Half were requested by physicians and were sent out to them. We collaborated with the manufacturers of Coumadin [warfarin] and the National Stroke Association, and they provided some tools and educational materials that providers can use with their patients."

For more information, contact HealthInsight, 500 S. Rancho Drive, Suite C-17, Las Vegas, NV 89106. ■

The 1998 guidelines include revised recommendations that take into account recent clinical trials evaluating the use of warfarin and aspirin. For example, the recommendation patients with a history of hypertension but no other risk factors be considered for oral anticoagulation has been strengthened. Other changes relate to a reprioritization of risk factors, such as diabetes, which was found to be a less consistent risk factor in the clinical trials reviewed.

From the guidelines: "Long-term oral anticoagulation is strongly recommended for prevention of stroke in AF patients who have suffered a recent stroke. . . . A target INR of 2.5 is recommended. Oral anticoagulation is also beneficial for prevention of recurrent stroke in patients with several other high risk cardiac sources."

According to Singer, the challenge is to identify those patients with AF at low enough risk to safely forego anticoagulation. "It appears that AF patients younger than 65 with no risk factors for stroke are at low enough risk to be treated with aspirin, he said. "For older patients with AF, especially those with risk factors [including hypertension, prior stroke or TIA, or left ventricular dysfunction], warfarin is recommended."

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AHA creates American Stroke Association

Goal: Reduce heart disease, stroke deaths by 2008

Late in January, the American Heart Association (AHA) renamed its Stroke Division, created in 1997, the American Stroke Association.

"Our enhanced focus on stroke will help us to attain our goal of reducing the deaths from heart disease and stroke by 25% between now and 2008," said **Cass Wheeler**, CEO of the AHA.

The AHA already publishes *Stroke: Journal of the American Heart Association*, hosts the world's largest medical meeting on stroke, and last year piloted a Metro Stroke Task Force with the goal of increased stroke awareness among the public and medical professionals.

In addition, the AHA sponsors Stroke Connection, "a grass-roots network of alliances, coalitions, outreach programs, and support groups dedicated to improving quality of life for stroke survivors and caregivers." ■

CHF valve repair may supplant replacement

New technique may avoid downward spiral of CHF

A new surgical procedure focuses on the role of the mitral valve in treating patients with congestive heart failure (CHF).

The technique uses a ring to reinforce the valve so it can keep blood from flowing backward into the left atrium. Instead of the traditional method of replacing the mitral valve, the procedure involves “scrunching it down;” reinforcing it so the heart won’t pull it open when it should stay closed. Better flow is restored without loss in power.

With more efficient blood flow through the heart, patients may be able to regain cardiac performance over time. For now, the procedure may help some patients in advanced heart failure live longer even if they are not candidates for a transplant. Eventually, researchers hope that, as they learn more about who is right for the procedure, they can use it to help their patients avoid the downward spiral of CHF.

“We think this is a viable alternative,” says University of Michigan cardiothoracic surgeon **Steven Bolling, MD**.

Bolling says when the heart enlarges during failure, its inner walls pull at the mitral valve. The pressure causes a problem, not in the organic makeup of the valve, but in the way it functions. Because it can’t stay closed when it should, regurgitation develops. Half of the blood that should be exiting the heart goes back into the atrium. This reverse flow becomes yet another obstacle to circulation that the heart has to overcome.

Going in to replace the valve has meant robbing the heart of some pumping power, and surgeons leave the valve alone when the ejection fraction is low — less than 40%. But if patients are already compromised by heart failure, Bolling says, they “have nothing more to give. . . . We are taking no function away from the heart.” That could make the procedure available to a broader spectrum of CHF patients.

Changing our way of thinking

“We have to change our thinking about these patients,” says Bolling. The perspective change begins with understanding the relationship between valve and ventricle. The elements work

together and should not be seen as separate parts. “We are not treating a ventricular problem with a valve solution. We are treating a ventricular problem with a ventricular solution.”

Another conceptual change is that perhaps damaged heart muscle, like other tissue, can heal if it can be rested. Finding a way to give the myocytes some down time is tough, however, because surrounding tissue continues to be worked on and has to keep pumping. Bolling says helping flow efficiency can make tasks easier on the heart. Also, it is possible the surgery can be used in combination with other techniques such as the left-ventricular assist devices.

Surgery prolongs life, study shows

In the first phase of his study, Bolling operated on nearly 100 patients and found 70% to 80% were alive two years after surgery, compared to about 10% if the patient didn’t have the surgery. He reported his findings at the American Heart Association conference in Dallas last November.

“He is getting some marvelous results,” says **Mehmet C. Oz, MD**, a cardiothoracic surgeon at Columbia-Presbyterian Medical Center in New York City. Oz says his hospital performed a dozen mitral valve procedures with similar findings.

Bolling notes the first stage of the study was to determine the feasibility of the surgery and if it should be studied against traditional drug therapy. Randomizing patients to medication and surgery is the next step.

“We need to identify patients who would do well,” he notes. Being able to get to them for a quick surgical intervention may keep many from going on to develop serious disease requiring extensive and expensive treatment like transplantation.

If we could go upstream and head them off at the pass, Bolling notes, “the patient would then never go down the inevitable cascade of CHF.”

A patient who had an ejection fraction of 5% came into the surgical program after living with CHF for years. Bolling operated on her and notes that he wishes now that he could have performed the operation on her 10 years ago, before her quality of life declined to a point where she had to spend most of her day sitting in a chair. Right after surgery, her ejection fraction probably was the same as before. Without the regurgitation, her heart has a better chance of regaining some lost ground. It will take about two years to be more certain of the long-term benefits, he says.

In the first study, patients were at advanced stages of the disease. The second part of the study, dubbed the PREMIUM trial, will include patients in NYHA Class III disease. Because patients are not as sick with heart failure, it may take longer to determine the benefit of the surgery because, unlike the first study, most patients would be expected to survive longer than a year without the surgery. The PREMIUM trial also could hint at which patients may be at a stage of failure that cannot be reversed. ■

NLM, researchers work on speeding AMI Tx

Informatics may speed thrombolytic administration

The National Library of Medicine (NLM) in Bethesda, MD, is funding 14 projects to accelerate life-saving treatment for acute myocardial infarction (AMI).

The projects will apply medical information science, or informatics, to the problem of gross under-utilization of the timely administration of thrombolytics.

"It is a joining of forces between the NLM and the National Heart, Lung, and Blood Institute at the National Institutes of Health," says **Bob Mehnert**, NLM program official. "They tell us the problem of delayed treatment isn't resolved yet, despite numerous attempts to correct the situation. They thought the informatics approach might have something to offer."

Fleshed-out proposals will be submitted by mid-August.

The 14 tentative proposed projects:

- Massachusetts General Hospital in Boston proposes to modify decision-making by emergency department (ED) personnel by exposing them to computerized scenarios simulating real-life situations that involve the user in decision-making on early management of AMI.
- Infinity Healthcare/National Heart Attack Information Consortium in Mequon, WI, proposes the creation of a National Emergency Medicine Extranet to improve AMI care by addressing the political, hardware, and software problems involved in using the Internet to address the problem nationally.
- Utilizing a database of clinical profiles, Web-based management aids, a case manager, and

provision of relevant information to health care providers as needed, Massachusetts General Hospital plans to provide a continuum of care spanning home, clinic, and hospital for patients at risk for heart attack.

- Columbia University in New York City intends to link patients, and, as needed, professional personnel, to patients' health care records for education and facilitate prompt, informed response to AMI symptoms. They will use the Web to provide patients and providers with access to their medical records.
- The University of Southern California in Los Angeles plans to use medical informatics and advanced communication technology for education of patients/public, pre-hospital/paramedic practitioners, and physicians/health care workers.
- UCLA intends to develop and evaluate a cardiac education module appropriate for patients, general practitioners, and remote specialists.
- The City of Las Vegas Department of Fire Services proposes to install and evaluate telemetry, including use of visual images and 12-lead EKGs for its responses to calls for emergency services.
- The University of Missouri at Columbia will develop a project to improve AMI care in rural EDs that uses informatics and telemedicine to provide training for physicians and connect them to specialists at a medical center.
- Engineering Management and Economics, Rockville, MD, proposes to develop "Listen to Your Heart," a suite of informatics-based tools to help reduce the time delay between initial symptoms suggestive of a heart attack and initiation of definitive medical work up and treatment.
- Brigham and Women's Hospital in Boston plans to create patient-centered, computer-based decision support systems to help patients assess their risks of AMI and help them and bystanders decide when to seek emergency care.
- The University of Utah in Salt Lake City plans to review a variety of informatics technologies for suitability in education and for improved efficiency with one or more aspects of the AMI therapy problem.
- The BE ALERT project of New England Research Institutes in Watertown, MA, plans education about heart attacks and thrombolytic therapy by creating educational material for patients and health-care providers, using innovative electronic educational materials and emergency hotlines.
- New England Medical Center in Boston plans a controlled clinical trial to evaluate the

value of 12-lead EKGs with the addition of computerized predictive instruments during pre-hospital transport and treatment.

- The University of Michigan in Ann Arbor plans to provide widespread public education by developing an interactive multimedia Heart Attack Alert channel for use on 100 existing kiosks located in libraries, work sites, churches, shopping malls, and other sites convenient to the public.

Go to www.nlm.nih.gov on the Internet for more information on the projects. ■

On the horizon: Therapeutic angiogenesis

Patients grow their own bypasses

Two phase I trials offer a glimmer of hope for pain relief for patients with coronary artery disease. One dose of either of two experimental drugs injected directly into the heart seems to encourage the growth of new blood vessels that bypass clogged arteries. Research is preliminary and on limited samples; it may be years before the therapies are available, but its progress is worth following because such treatment could mean substantial savings in the cost of cardiac care.

One treatment is gene therapy to produce a protein called VegF (vascular endothelial growth factor).¹ VegF is the body's signal to grow new blood vessels. The other involves the injection of a protein called FGF-1 (fibroblast growth factor). In each case, the factor is given in a single injection through a chest incision under general anesthesia, and the goal is to allow patients to grow their own bypasses by sprouting thin collateral blood vessels.

KEY POINTS

- Injecting VegF directly to the heart encourages the growth of new blood vessels that bypass clogged arteries.
- This still-experimental method can avoid costly bypass procedures.
- The procedure takes about an hour in the OR, and hospital stays average four days.
- VegF patients reported using substantially fewer nitroglycerine pills to relieve angina.
- Injecting a second protein, FGF-1, accomplishes similar goals.

Following the VegF procedure, participants reported pain relief about three weeks after the injection procedures. The procedure took about an hour in the OR, and hospital stays averaged four days. Patients reported using substantially fewer nitroglycerine pills to relieve angina — 9.8/patient/week as opposed to a previous average of 53.9.

Jonathan D. Marmur, MD, a cardiologist at Mount Sinai Hospital in New York City, states he was optimistic the therapy could one day be administered less invasively through catheterization.

Results of the trials on VegF were reported during the 71st annual scientific sessions of the American Heart Association in Dallas.

Jeffrey M. Isner, MD, of Tufts University in Boston and colleagues administered the gene as sole therapy to 16 patients with myocardial ischemia refractory to other treatment options. Patients had a history of, on average, three heart attacks and two bypass surgeries. All 16 were in functional heart class IV before treatment. The VegF plasmid was injected directly into the myocardium via minithoracotomy. No adverse effects were seen, including no fundoscopic changes during assessment of retinopathy.

Coronary angiography shows improved filling, and nuclear perfusion tests show “a highly statistical increase in the number of segments of the left ventricle being perfused,” Isner reports.

Another investigator, **Ronald G. Crystal**, MD, of New York Hospital-Cornell Medical Center in New York City reports similar results using VegF. Crystal's team administered the gene to 21 patients during bypass procedures at location on vessels that were not being bypassed. Crystal cautions that this was a phase I trial and was not designed to assess clinical endpoints, however, “all of the patients report improvement” and show increased exercise tolerance without side effects.

Isner and Crystal concur that persistent gene expression is a problem among all of the trials: “The duration of expression is pretty well exhausted after two to three weeks.”

VegF has its drawbacks

A serious caveat accompanies that research: A related study shows that VegF might promote heart disease as well as treat it. The factor might also have a pathophysiologic role in the progression of coronary atherosclerosis, according to the results of the first study to investigate this possibility.²

Hiroshi Itoh, MD, of Kyoto University in Japan, writes a word of caution: "Our observations also suggest that VegF itself may promote the process of atherogenesis."

Itoh's team investigated the expression of VegF in coronary artery segments from 15 patients. Twelve segments were normal except for diffuse intimal thickening, seven contained early atherosclerotic lesions, and 19 contained advanced lesions, including four that were totally occlusive.

The research team determined that expression of VegF was significantly higher in the macrophages, endothelial cells, and smooth muscle cells of atherosclerotic lesions than in healthy arteries. "Considering the multipotent actions of VegF . . .," the authors write, "our findings suggest that VegF may have some role in the progression of human coronary atherosclerosis, as well as in recanalization processes in obstructive coronary diseases."

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AMA: Beta blockers underused

Recent studies confirm position

Late last year, the American Medical Association (AMA) in Dallas joined five other medical specialty societies to announce a new call to action to expand the use of beta blockers to a larger group of patients than previously considered — even those at low-risk, as well as those who may not have been candidates for this therapy due to contraindications.

Since 1995, the AMA recommended beta blockers as part of a comprehensive program to prevent second heart attacks for those at high risk — having conditions such as heart rhythm problems, chest pain, or high blood pressure. The organization reaffirms its position that beta

blockers are useful and effective for individuals at high risk for a repeat heart attack and goes a step further to point out that some contraindications for the drugs may need to be reevaluated. For example, the benefits of beta blockers may outweigh their risks for patients with conditions such as asthma, diabetes, chronic obstructive pulmonary disease, or abnormal EKGs.

Skewed views of drug's use

Even though IV beta blockers have been shown to reduce mortality, infarct size, and the incidence of complications in patients with acute myocardial infarction (AMI), many such patients — even those without contraindications — do not receive this adjunctive therapy. Investigators wanted to know if that could be because practitioners have a skewed view of the drug's use.

They ran a retrospective review of 35 charts from Morristown (NJ) Hospital to determine the difference between the actual and perceived use of IV beta blockers in emergency department (ED) patients with diagnoses of AMI.¹

The researchers analyzed the records to determine if beta blockers were used and if any contraindications were present. In addition, they surveyed ED physicians and cardiologists to determine their perceptions concerning the appropriate use of beta blockers in these patients.

Of the 35 participants, four patients received IV beta blockers while only 15 of the rest had contraindications to the drug. The survey indicates ED physicians were less likely than cardiologists to use IV beta blockers in patients who were normotensive and not tachycardic, and tend to defer the decision to a cardiologist. The investigators concluded a written protocol for treating ED patients with AMI might increase the early use of IV beta blockers.

In a related study, beta blocker therapy was shown to improve left-ventricular function in patients with heart failure.² The CIBIS-II investigators ran a 15-month randomized trial of about 2,600 patients with symptoms of heart disease who were already on diuretics or angiotensin-converting enzyme (ACE) inhibitors. The beta-blocker bisoprolol or a placebo was randomly assigned to patients. Bisoprolol significantly lowered all-cause mortality, and the rate of sudden death before the end of the trial — 17% in placebo patients vs. 12% in bisoprolol patients. Though patients were less likely to die of any cause and there were fewer deaths due to cardiovascular

problems in the patients treated with bisoprolol, the stroke rate was higher in patients on the beta blocker compared with patients on placebo.

The results apply only to patients with mild to moderate heart failure, stated **Harlan Krumholz**, MD, of Yale University in New Haven, CT. He called CIBIS-II a landmark study for those patients and points out that evidence is needed for benefit among patients with severe heart failure, symptom-free left-ventricular dysfunction, new myocardial infarction, and older patients.

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Patients don't recognize heart attack symptoms

All except chest pains are ignored

While most people are aware that chest pain is a heart attack symptom, other symptoms—numbness or pain in the arm, shortness of breath, sweating, nausea or vomiting, and dizziness or light-headedness—are often ignored, according to results of a recent study.¹

The issue is critical because clot-busters work only for a limited time after a heart attack begins, and delay may mean permanent heart damage, or even death.

The REACT (Rapid Early Action for Coronary Treatment) study surveyed more than 1,000 adults regardless of age, race, education, or household income, and nearly nine out of 10 people knew chest pain to be a heart attack symptom. But knowledge of the next most common heart attack symptom, arm pain or numbness, varied widely.

More than three-quarters of the middle- and upper-income respondents surveyed knew arm pain or numbness was a symptom, compared to just half of those with incomes under \$25,000. Three-quarters of whites knew, compared to half of African-Americans and Hispanics.

Half of the people from virtually all demographic divisions recognized shortness of breath as a symptom, whereas recognition of unexplained profuse sweating as a symptom varied

widely, from 25% among whites to 12% among African-Americans and 10% among Hispanics. Nearly one-third of those with incomes over \$55,000 recognized sweating as a symptom, compared to just 13% of those with incomes under \$25,000.

Even people who are at higher risk—smokers and those with diabetes, high blood pressure, and high cholesterol levels—did not demonstrate greater knowledge of heart attack symptoms than lower-risk persons. People with a personal history of heart disease or previous experience with heart disease in the family or in a friend generally did better in recognition of symptoms.

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Physicians give mixed angiography ratings

Is angiography worth doing?

For a recent study, 1,000 internists, family practitioners, and cardiologists in California, Florida, New York, Pennsylvania, and Texas were asked to rate the appropriateness of coronary angiography on a nine-point scale, ranging from extremely inappropriate (1), to uncertain (5), and extremely appropriate (9) for 20 common indications.¹

Appropriateness was defined as the expected health benefits—increased life expectancy or functional capacity and relief of pain or anxiety—exceed the expected negative consequences—mortality, morbidity, pain, or anxiety associated with the procedure. Since angiography does not reduce morbidity or mortality, its benefit or harm is generally related to its effect on the subsequent use of medical therapy, angioplasty, or bypass surgery.

The physicians were asked to assess the following scenarios during initial hospitalizations for acute myocardial infarction of patients over 75, then patients under 75:

A. Within six hours of the onset of symptoms, the patient has not received thrombolytic therapy because of strong contraindications, and the

myocardial infarction is uncomplicated.

B. Within six hours of the onset of symptoms, the patient has not received thrombolytic therapy because of strong contraindications and has persistent chest pain.

C. Within six hours of the onset of symptoms, the patient has not received thrombolytic therapy but has no strong contraindications, and the myocardial infarction is uncomplicated.

D. Within six hours of the onset of symptoms, the patient has not received thrombolytic therapy but has no strong contraindications and has persistent chest pain.

E. Within six hours of the onset of symptoms, the patient has received thrombolytic therapy, and the myocardial infarction is uncomplicated.

F. Within six hours of the onset of symptoms, the patient has received thrombolytic therapy and has persistent chest pain.

G. Between 12 hours after the onset of symptoms and discharge, the patient has not received thrombolytic therapy, and the myocardial infarction is uncomplicated.

H. Between 12 hours after the onset of symptoms and discharge, the patient has not received thrombolytic therapy and has persistent chest pain.

I. Between 12 hours after the onset of symptoms and discharge, the patient has not received thrombolytic therapy and has persistent pulmonary edema.

J. Between 12 hours after the onset of symptoms and discharge, the patient has not received thrombolytic therapy and has stress-induced ischemia.

Indications K through T were phrased identically for patients who were 75 or older.

For 17 of the 20 indications, the ratings of the surveyed physicians agreed within one unit on the nine-unit scale. Patients' older age had no negative effect on ratings.

Cardiologists rated angiography as significantly more appropriate than did primary care physicians for complicated indications, and for

uncomplicated indications cardiologists who performed invasive procedures gave higher appropriateness ratings for angiography than did cardiologists who did not perform such procedures and primary care physicians. For uncomplicated indications, physicians from hospitals providing coronary angioplasty and bypass surgery rated angiography as more appropriate than did physicians from other hospitals. Physicians from New York and those employed by health maintenance organizations rated angiography as less appropriate than did other physicians.

Reference

1. Ayanian JZ, Landrum MB, Normand ST, et al. Rating the appropriateness of coronary angiography. *N Engl J Med* 1998; 338:1,896-1,904. ■



Antiplatelet Tx preferred over anticoagulation

The combination of aspirin plus ticlopidine is preferable to aspirin plus oral anticoagulation following stent implantation for all patients regardless of risk stratification, say researchers in the Multicenter Aspirin and Ticlopidine Trial after Intracoronary Stenting (MATTIS) study.¹

The study results was already known to be true for low- and intermediate-risk patients, but now the recommendation to use combined antiplatelet therapy can be extended to all patients. The MATTIS researchers determined clinical outcomes 30 days following stenting in 350 high-risk patients

COMING IN FUTURE MONTHS

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■ Organ transplant regs delayed one year

randomized to either antiplatelet therapy or to aspirin and anticoagulation therapy administered within six hours of implantation. The team reports "treatment is greatly simplified by the use of an [aspirin plus ticlopidine] combination, duration of hospital stay is reduced, and bleeding and/or vascular complications are clearly less frequent than with [aspirin plus oral anticoagulation]."

Reference

1. Urban P, Macaya C, Rupprecht H, et al. Randomized evaluation of anticoagulation vs. antiplatelet therapy after coronary stent implantation in high-risk patients: The Multicenter Aspirin and Ticlopidine Trial after Intracoronary Stenting (MATTIS). *Circulation* 1998; 98:2,126-2,132. ▼

FDA OKs telmisartan for hypertension

The Food and Drug Administration (FDA) approved the angiotensin II receptor blocker, telmisartan (Boehringer Ingelheim's Micardis), for the management of hypertensive patients. In clinical trials, a once-daily dose of telmisartan effectively controlled hypertension in up to 65% of patients and has been shown to be effective when compared to treatment with amlodipine, enalapril, and losartan. The drug was well tolerated, with the incidence of adverse effects similar to that seen in patients receiving placebos. ▼

Adenosine reduces heart attack damage

Study findings indicate the drug adenosine, when used in conjunction with clot busters to treat a heart attack, significantly reduces permanent damage to heart tissue. The area of infarct may be reduced by as much as an additional 67% over clot busters alone.

The findings were presented at the American Heart Association's 71st scientific sessions in Dallas last fall.

The results of the phase II trial, which involved 236 patients at 30 sites, show that adenosine plus clot busters such as tissue plasminogen activator (rt-PA) and streptokinase can reduce the size of infarct. The combination was more effective

among heart attacks that affect the anterior wall, reducing the size of infarct by an additional 67%.

Adenosine is a naturally occurring hormone-like substance and the body's own anti-ischemic metabolite. It protects the heart by triggering a number of actions, such as increasing blood supply and/or decreasing oxygen demand during episodes of cardiac ischemia. ▼

Super clot-buster combo improves blood flow

A combination of anti-platelet therapy and a low-dose of a clot-dissolving agent achieved optimal blood flow in nearly 75% of heart attack patients in a study that was presented at the American Heart Association's 71st scientific sessions in Dallas last fall.

According to researchers at Brigham and Women's Hospital in Boston, three-fourths of the

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Editorial Questions

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heart attack patients who received the powerful anti-platelet agent abciximab (Malvern, PA-based Centocor's ReoPro), referred to as "super aspirin," combined with half the standard dose of the clot-dissolving agent alteplase (tissue plasminogen activator or tPA) achieved optimal blood flow within 60 minutes of treatment.

This compared favorably with a control group of 43% of patients treated with a full dose of alteplase without abciximab. The study is based on results from the Thrombolysis in Myocardial Infarction (TIMI)-14 Trial, which examined the success of single and combination therapies in restoring normal blood flow to the heart in AMI patients within 60 to 90 minutes of the start of treatment. The TIMI-14 Trial is being continued to define the optimal dose of reteplase (rPA), another clot-dissolving agent, in combination with abciximab. ▼

DUMC puts cardiac images with records

Doctors and staff at Duke University Medical Center (DUMC) in Durham, NC, no longer have to wait for cardiac images to be accessed from other floors, departments, or doctor's offices, and there will be fewer misplaced films. In March, the facility's cardiac cath labs began using new digital imaging that allows them to acquire, store, and retrieve patient images digitally. By integrating cardiac images with the electronic patient record, doctors and staff can simultaneously view all information concerning a particular patient — images that reveal the extent of heart disease, as well as data including vital test results and patient history. Viewing all this information from a workstation marks a significant advance in the speed of diagnosis and choosing a course of treatment.

In the near future, Duke's staffers will be able to view patient records and images via PCs at their homes and offices. DUMC performs approximately 8,000 catheterizations each year. Prior to installing the new system, images were processed and viewed on "cine" film that can cost upward of \$60 per procedure. Digitally storing patient studies on disk costs about \$10 per study. Additional information on the manufacturer of DUMC's new system, Philips Medical Systems, can be obtained at <http://www.medical.philips.com>. ■

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