4. Belcaro G. Evolution of superficial vein thrombosis treated with defibrotide: comparison with low dose subcutaneous heparin. *Int J Tissue React* 1990; 12:319–324.

5. Becherucci A, Bagilet D, Marenghini J, Diab M, Biancardi H. [Effect of topical and oral diclofenac on superficial thrombophlebitis caused by intravenous infusion]. *Med Clin (Barc)* 2000; 114:371–373.

6. Mehta PP, Sagar S, Kakkar VV. Treatment of superficial thrombophlebitis: a randomized, double-blind trial of heparinoid cream. *Br Med J* 1975; 3:614–616.

7. Vilardell M, Sabat D, Arnaiz JA, et al. Topical heparin for the treatment of acute superficial phlebitis secondary to indwelling intravenous catheter. A double-blind, randomized, placebo-controlled trial. *Eur J Clin Pharmacol* 1999; 54:917–921.

8. Almenar L, Hernandez M, Gimeno JV, Palencia M, Algarra F. [Heparionoids versus nitroglycerin in the treatment of superficial phlebitis]. *Rev Clin Esp* 1993; 193:229–231.

9. Bergqvist D, Brunkwall J, Jensen N, Persson NH. Treatment of superficial thrombophlebitis. A comparative trial between placebo, Hirudoid cream, and piroxicam gel. *Ann Chir Gynaecol* 1990; 79:92–96.

10. Fernandez, L. Superficial phlebitis. UpToDate [online database]. Last updated September 2, 2003. Available at: www.uptodateonline.com.

Does moderate exercise prevent MI for patients with coronary heart disease?

■ EVIDENCE-BASED ANSWER

Moderate exercise reduces mortality for patients with known coronary heart disease but does not significantly decrease the risk of recurrent nonfatal myocardial infarction (MI) (strength of recommendation [SOR]: **A**, based on systematic review of randomized controlled trials). Exercise-based cardiac rehabilitation also reduces all-cause mortality (SOR: **A**, based on systematic review).

For patients with stable angina, a daily exercise program is more effective than percutaneous transluminal coronary angioplasty (PTCA) with stenting in preventing major cardiovascular events (number needed to treat [NNT]=5.5; SOR: **A**, based on a single randomized controlled trial).

■ EVIDENCE SUMMARY

A systematic review of cardiac rehabilitation programs evaluated 14 randomized controlled trials with exercise-based interventions.[1] An updated review added 5 more for a total of 2984 patients with coronary heart disease.[2] Patients with coronary heart disease comprised those with prior MI, prior coronary artery bypass graft surgery, or PTCA, and those with angina pectoris and angiographically confirmed coronary heart disease.

Exercise-based cardiac rehabilitation significantly reduced all-cause mortality (relative risk [RR]=0.76; 95% confidence interval [CI], 0.59–0.98) compared with usual care (NNT=66; 95% CI, 35–273). Cardiac mortality also decreased significantly with exercise (RR=0.73; 95% CI, 0.56–0.96) compared with usual care (NNT=49; 95% CI, 26–120).

Six studies showed particularly significant improvement in total cardiac mortality.[3–8] Exercise was variably defined. Training sessions lasted 30 minutes and occurred on 2 to 5 days per week. Intensity was typically 75% to 85% of a maximum work capacity determined on an exercise test before initiating the training sessions. The type of exercise ranged from cycling alone to circuit training with 6 stationary devices. Patients were trained with supervision 1 to 36 months and followed for a mean of 24 months (range, 6–60 months).

A trend was observed toward decreased recurrence of nonfatal MI with exercise-based cardiac rehabilitation, which did not reach significance (RR=0.78; 95% CI, 0.59–1.03). An inadequate number of subjects is the most likely reason; however, other possibilities include an increase in the frequency of nonfatal MI after rehabilitation, or an increased rate of survival after MI for patients undergoing exercise-based rehabilitation.

The studies included in these reviews had several limitations. The population appears skewed in age (mean=54 years, with patients aged >65 years excluded from most studies) and gender (4.9% female); ethnicity was rarely reported. The adequacy of randomization was poor or unclear in 71% of studies, and only 4 trials reported blind assessment of outcomes. Finally, in 34% of studies the loss of participants to follow-up was more than 20%.

A well-done study randomized 101 male patients (age <70 years) with stable angina to

either a daily exercise program or standard PTCA with stenting.[9] After 12 months, event-free survival was significantly greater among patients randomized to exercise than in those randomized to PTCA with stenting (88% vs 70%; *P*=.023; NNT=5.5). Cardiovascular events were defined as percutaneous interventions, hospitalizations, acute MI, cerebrovascular accidents, coronary artery bypass graft operation, and death.

■ RECOMMENDATION FROM OTHERS

The American Heart Association (AHA) supports aggressive risk factor management for patients with coronary heart disease, and recommends a minimum of 30 minutes of exercise 3 to 4 days per week as well as an increase in daily lifestyle activities.[10] The American College of Cardiology endorses the position of the AHA.

Rodney Riedel, MD, Gary Kelsberg, MD, Valley Family Medicine, Renton, Wash; Sarah Greenley, Information Specialist, Clinical Evidence, BMJ Publishing Group, London

REFERENCES

1. Jolliffe JA, Rees K, Taylor RS, Thompson D, Oldridge N, Ebrahim S. Exercise-based rehabilitation for coronary heart disease (Cochrane Review). In: *The Cochrane Library,* Issue 2, 2004. Chichester, UK: John Wiley & Sons, Ltd.
2. Brown A, Noorani H, Taylor R, Stone J, Skidmore B. A clinical and economic review of exercise-based cardiac rehabilitation programs for coronary artery disease. Technology overview no. 11. Ottawa: Canadian Coordinating Office for Health Technology Assessment; 2003.
3. Carson P, Phillips R, Lloyd M, et al. Exercise after myocardial infarction: a controlled trial. *J R Coll Physicians Lond* 1982; 16:147–151.
4. Kentala E. Physical fitness and feasibility of physical rehabilitation after myocardial infarction in men of working age. *Ann Clin Res* 1972;4 Suppl 9:1–84.
5. Shaw LW. Effects of a prescribed supervised exercise program on mortality and cardiovascular morbidity in patients after a myocardial infarction. The National Exercise and Heart Disease Project. *Am J Cardiol* 1981; 48:39–46.
6. Specchia G, DeServi S, Scire A, et al. Interaction between exercise training and ejection fraction in predicting prognosis after a first myocardial infarction. *Circulation* 1996; 94:978–982.
7. Sanne H. Exercise tolerance and physical training of non-selected patients after myocardial infarction. *Acta Med Scan Suppl* 1973; 551:1–124.
8. Wilhelmsen L, Sanne H, Elmfeldt D, Grimby G, Tibblin G, Wedel H. A controlled trial of physical training after myocardial infarction. Effects on risk factors, nonfatal reinfarction an death. *Prev Med* 1975; 4:491–508.
9. Hambrecht R, Walther C, Möbius-Winkler S, et al. Percutaneous coronary angioplasty compared with exercise training in patients with stable coronary artery disease: a randomized trial. *Circulation* 2004; 109:1371–1378.
10. Smith SC, Blair SN, Bonow RO, et al. AHA/ACC Scientific Statement: AHA/ACC guidelines for preventing heart attack and death in patients with atherosclerotic cardiovascular disease: 2001 update. A statement for healthcare professionals from the American Heart Association and the American College of Cardiology. *Circulation* 2001; 104:1577.
11. US Preventive Services Task Force. Behavioral counseling in primary care to promote physical activity: recommendation and rationale. *Ann Intern Med* 2002; 137:205–207.

■ CLINICAL COMMENTARY:

Add exercise to routine post-MI treatment

We should add exercise to routine post-MI treatment checklists, along with aspirin, beta-blockers, statins, angiotensin-converting enzyme inhibitors, and so on. *Precise* exercise prescribing requires a stress test because, as the adage goes, "If we don't do an exercise test with monitoring, the patient will eventually do one unmonitored at home."

Medicare pays for cardiac rehabilitation for acute MI (within 6 months), coronary artery bypass (within a year), and stable angina. Other insurance reimbursement varies.

The evidence isn't the quality I would like, and for women and minorities it is lacking. However, evidence sticklers like USPSTF[11] state that exercise reduces morbidity and mortality for (almost) everyone. The question is how to make exercise happen; people with CHD can often be motivated.

Bill Kerns, MD, Shenandoah Valley Family Practice Residency, Virginia Commonwealth University/Medical College of Virginia, Winchester

DRUG BRAND NAMES

Amiodarone • Cordarone
Atenolol • Tenormin
Atorvastatin • Lipitor
Diclofenac • Cataflam, Voltaren
Disopyramide • Norpace
Dofetilide • Tikosyn
Enoxaparin • Lovenox
Flecainide • Tambocor
Metoprolol • Lopressor
Propafenone • Rythmol
Simvastatin • Zocor
Solatol • Betapace
Warfarin • Coumadin