Diabetes Impairs Patients' Ability to Exercise

BY BRUCE JANCIN

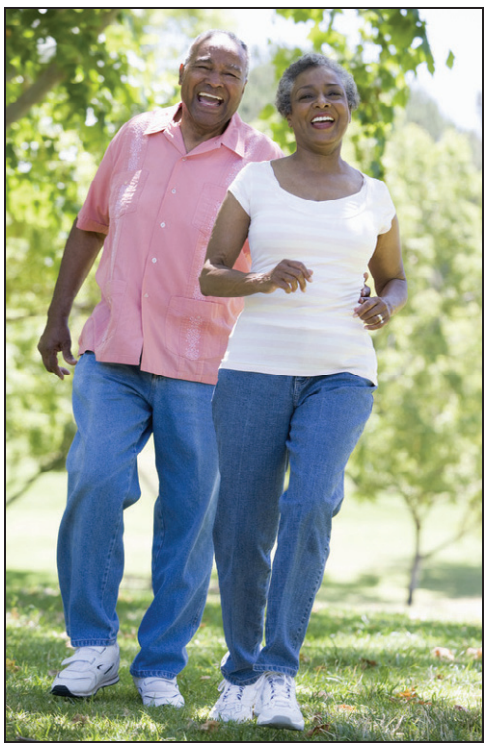
FROM A CONFERENCE ON PRACTICAL WAYS TO ACHIEVE TARGETS IN DIABETES CARE

KEYSTONE, COLO. – Regular physical activity is a cornerstone of the treatment of type 2 diabetes, yet patients with the disease often have an impaired ability to exercise even in the absence of clinically evident coronary heart disease.

It's a catch-22 situation. Recent studies suggest a couple of explanations for this impaired ability to exercise, vs. that of sedentary nondiabetic controls. One, subclinical cardiac dysfunction during exercise is present quite early in the course of type 2 diabetes. Two, patients with type 2 diabetes perceive even a very low exercise workload as requiring much more effort than do matched controls, Judith G. Regensteiner, Ph.D., said at the conference, sponsored by the University of Colorado and the Children's Diabetes Foundation at Denver.

She and her coworkers studied 10 premenopausal women with type 2 diabetes and 10 healthy but equally sedentary controls in the cardiac catheterization lab. Their purpose was to learn why the disease is associated with reduced peak exercise capacity as expressed via peak oxygen uptake. The diabetic subjects had been diagnosed an average of 3.6 years earlier, and all were free of clinical cardiovascular disease.

Resting measurements of cardiac hemodynamics assessed via an indwelling pulmonary artery catheter were similar in diabetic subjects and controls. However, during a peak cardiopulmonary exercise test one glaring difference between the groups became evident: All 10 diabetic subjects had a significantly greater increase in pulmonary capillary wedge pressure than controls. The mean increase was 23.6 mm Hg in the diabetic subjects compared to 16.7 mm Hg in controls.



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Simple walking provides effective aerobic exercise for patients with diabetes.

"This was a most startling result. It showed evidence of a stiff heart suggestive of diastolic dysfunction in people who'd been diagnosed with diabetes only 3.6 years earlier. It's a scary finding," said Dr. Regensteiner, professor of medicine and director of the Center for Women's Health at the University of Colorado.

On another day the investigators performed myocardial perfusion imaging using technetium-99m sestamibi in seven subjects in each group during peak exercise. The normalized myocardial perfusion index was significantly diminished in the diabetic patients: a mean of 11.0 compared to 17.5 x e-9 in controls. This is indicative of significantly less blood flow to the heart in the diabetic group. The myocardial perfusion index was inversely related to pulmonary capillary wedge pressure during peak exercise.

The investigators restricted this study to women because the gap in exercise tolerance between diabetic women and men is greater than between nondiabetic women and men.

Dr. Regensteiner and coworkers are now studying leg muscle blood flow to learn if abnormalities in peripheral circulation also contribute to exercise intolerance in patients with type 2 diabetes.

Another barrier to physical activity on the part of patients with type 2 diabetes may be mental. In a separate study, she and her coinvestigators utilized a standardized rate-of-perceived-exertion scale to study 13 women with type 2 diabetes and a mean body mass index of 34.2 kg/m^2 along with 13 sedentary overweight controls and 13 equally sedentary but normal-weight controls. All subjects performed three 7-minute bicycle exercise tests at workloads of 20 W and 30 W.

These are very modest workloads. Indeed, the two groups of nondiabetic controls barely perceived them as workloads at all. The diabetic subjects perceived the physical effort as being much greater than did either control group.

"Is it all in the head? I don't know. We're looking now to see if there are things about having diabetes that may make patients perceive low-intensity exercise as being more difficult physiologically," Dr. Regensteiner said. ■

VITALS

Major Finding: During a peak cardiopulmonary exercise test, all 10 diabetic subjects demonstrated a significantly greater mean increase in pulmonary capillary wedge pressure, compared with controls (23.6 mm Hg versus 16.7 mm Hg).

Data Source: A series of observational studies that involved sedentary patients with and without diabetes.

Disclosures: Dr. Regensteiner declared having no financial conflicts.

Current Guidelines Provide More Realistic Exercise Goals

BY BRUCE JANCIN

EXPERT ANALYSIS FROM A CONFERENCE ON PRACTICAL WAYS TO ACHIEVE TARGETS IN DIABETES CARE

KEYSTONE, COLO. – Contemporary exercise guidelines for type 2 diabetes patients take a kinder, gentler approach than previous versions did.

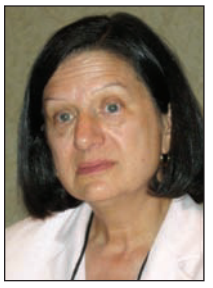
This stance is based partly on scientific advances, but there's also a greater common-sense recognition among health care providers that type 2 diabetes patients find it tough to embark on an exercise program and even harder to stick with it. Current guidelines aim to remove barriers to doing so, Judith G. Regensteiner, Ph.D., said.

"Once you get them started, a minority will love it and will continue to exercise for life, but the majority will struggle. If you can't make it fun for them, they're not going to persist with it. Exercising with a group, with your family, your children or grandchildren – we have to keep working on this behavioral piece," explained Dr. Regensteiner, professor of medicine and director of the center for women's health at the University of Colorado at Denver.

One major barrier to exercising is a still-widespread misconception that activity must be vigorous to provide health benefits. It's an idea dating back to the pre-1995 American Heart Association and American College of Sports Medicine exercise guidelines, which called for at least 20 minutes of vigorous exercise continuously three or more times a week.

"This was the 'no pain/no gain' era, and it did us a lot of damage, I think. That's where people got the idea that if they weren't running a marathon or a 10-K or doing something equally vigorous, they weren't helping themselves. … We did ourselves harm by saying it because we scared people off in droves," she said at the meeting, which was sponsored by the Children's Diabetes Foundation at Denver and the university.

"We know very well from reams of data that walking – simple walking – is effective for the aerobic component of an exercise program. We want people to walk because it's the easiest exercise to do," Dr. Regensteiner added.



'People got the idea that if they weren't running a marathon or a 10-K … they weren't helping themselves.'

DR. REGENSTEINER

That core message is contained in two recent sets of exercise guidelines that she coauthored. One is the comprehensive Physical Activity Guidelines Advisory Committee Report 2008 to the Secretary of Health and Human Services. The report reviews in detail the strong evidence for all of the medical conditions in which exercise has been shown to be beneficial, including colon and breast cancer, depression, and numerous other diseases in addition to type 2 diabetes. Dr. Regensteiner summed up the 683-page tome in three words: "Exercise is medicine."

The HHS guidelines state that even though any amount of physical activity provides some health benefit, 150 minutes per week of moderate-intensity aerobic activity – such as brisk walking – substantially reduce the risk of many chronic diseases. Moving up to 5 hours per week provides additional health benefits. A 20-minute session devoted to strengthening all the major muscle groups is recommended on 2 or more days per week.

More recently, Dr. Regensteiner coauthored an American College of Sports Medicine/American Diabetes Association joint position statement on exercise and type 2 diabetes (Med. Sci. Sports Exerc. 2010;42;2282-303; Diabetes Care 2010;33:e147-67). The detailed document knocks down another major barrier to exercise that was a fixture in older exercise guidelines: the recommendation that everybody who has type 2 diabetes or who is at least 40 years old, with multiple cardiovascular risk factors, should get an exercise stress test before starting an exercise program.

"This is completely unrealistic. It's not going to happen. What it did was provide people with another reason not to exercise," she said.

The joint position statement declares, "Before undertaking exercise more intensive than brisk walking, sedentary persons with type 2 diabetes will likely benefit from an evaluation by a physician. Electrocardiogram exercise stress testing for asymptomatic individuals at low risk for [coronary artery disease] is not recommended but may be indicated for higher risk."

What that means, Dr. Regensteiner explained, is that many sedentary patients with type 2 diabetes don't need a stress test if they simply want to start a walking program.

"We want people to get out there and walk, so don't put a barrier up," she said.

Dr. Regensteiner reported having no financial conflicts. ■