

SOUTHWESTERN NEWS

Media Contact: Rachel Horton
214-648-3404
rachel.horton@utsouthwestern.edu

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UT SOUTHWESTERN RESEARCHERS DISCOVER FIRST EFFECTIVE TREATMENT FOR EXERCISE DISORDER

DALLAS – Dec. 25, 2003 – People with McArdle’s disease – a condition marked by low tolerance for exercise and high risk of activity-related muscle injury – can dramatically improve their exercise tolerance by consuming a soft drink or equivalent before physical activity, investigators at the UT Southwestern Medical Center at Dallas have discovered.

A 2½-year study, published today in *The New England Journal of Medicine*, details the first viable treatment for McArdle’s disease, a muscle disorder first defined in the 1950s that results from a deficiency of an enzyme that breaks down muscle glycogen – a stored form of carbohydrate that has long been recognized to be an important anaerobic fuel. Less well recognized is the fact that glycogen is also critical for normal oxidative metabolism.

“When there is no glycogen available, as is the case in McArdle’s disease, patients have a very low oxidative capacity and rapidly fatigue with modest exercise such as walking up a slight incline,” said Dr. Ronald Haller, a professor of neurology and internal medicine at UT Southwestern, staff physician at the North Texas Veterans Affairs Health Care System and senior author of the paper.

“By using an oral source of glucose – the equivalent of a soft drink – we show in this study that these patients are able to undertake exercise more easily, especially in the first eight to 10 minutes of physical activity. That’s important because it’s in that period that they are particularly vulnerable to muscle injury.”

Dr. Haller, who developed and directs the Neuromuscular Center at the Institute for Exercise and Environmental Medicine at Presbyterian Hospital, said a conservative estimate of the prevalence of McArdle’s disease is one case in every 100,000 people.

“These patients appear normal – their main problem is exercise intolerance,” Dr. Haller said. “Often, they are told by physicians that they are simply out of shape or not trying hard

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enough. It's easy for people, even doctors, to dismiss someone when they complain of fatigue and cramping during exercise."

A diagnosis of McArdle's disease often only occurs after a patient suffers a massive muscle injury and undergoes a muscle biopsy, he said.

Doctors have known for decades that administering glucose intravenously before physical activities can improve exercise capacity in patients with McArdle's disease. But this study is the first to measure the effect of oral glucose on exercise tolerance.

Drs. Haller and John Vissing, lead author and a former postdoctoral fellow at UT Southwestern who is now at the National Hospital of University of Copenhagen in Sweden, studied 12 McArdle's patients – seven men and five women – between 1999 and 2002.

Patients were studied after fasting overnight. On the first visit, they were monitored during a 15-minute workout on a stationary bike. During the other two visits, patients were randomly given either a caffeine-free diet soft drink or one (also caffeine-free) that contained 75 grams of sugar 30 to 40 minutes before beginning exercise.

Patients who drank the diet-drink placebo reached a mean peak heart rate of 156 beats per minute and an excessive level of perceived exertion during the seventh minute of exercise, then achieved a spontaneous second wind and a drop in heart rate by 35 beats per minute. The second wind phenomenon is a hallmark of McArdle's disease.

Patients who drank a sugared cola had about a 30 percent increase in plasma glucose levels and no second wind. But, during the seventh minute of exercise, the mean heart rate of these patients was on average 34 beats per minute lower than patients who received the placebo.

The study was funded by the Danish National Research Foundation, the Novo Nordisk Foundation, the Muscular Dystrophy Association and a Veterans Affairs Merit Review.

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