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Teens with type 2 diabetes already show possible signs of impaired heart function

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Heart function may be affected in people with Type 2 diabetes as early as adolescence, according to a new study that will be presented Sunday at The Endocrine Society's 93rd Annual Meeting in Boston.

"Past studies in adults with Type 2 diabetes show that their heart and blood vessels' ability to adapt to exercise may be impaired. Our study shows that these changes in heart function may begin to happen very early after Type 2 diabetes occurs," said the study's lead author, Teresa Pinto, MD, a pediatric endocrinologist at the Dalhousie University IWK Health Centre in Halifax, Nova Scotia, Canada.

Pinto performed the research while at the University of Auckland in New Zealand. The researchers studied how the heart and blood vessels of 13 teenagers with Type 2 diabetes adapted to exercise, compared with 27 overweight or obese subjects who did not have diabetes and 19 nondiabetic and nonobese control subjects. The subjects were ages 12 to 20 and from New Zealand. Their body composition, including percentage of body fat, was determined using dual-energy x-ray absorptiometry (DEXA) scans.

All subjects performed an exercise test on a stationary bicycle designed for use in a magnetic resonance imaging (MRI) machine. With MRI, images were taken of each subject's heart and femoral artery, a large blood vessel in the leg that supplies the leg with blood. MRI took place while the subjects were at rest and during or immediately after exercise on the cycle.

The images of the heart showed that the hearts of subjects with Type 2 diabetes did not expand and fill up with blood between heart beats as well as the hearts of subjects in the other two groups. This occurred during exercise only, the authors found. With exercise, the amount of blood pumped out with each heart beat (the cardiac output) was normal in all three groups, although still lower in the diabetic group.

"We showed that the heart's pumping function is strong, but it is not filling as well as normal between heart beats. This is known as diastolic dysfunction," Pinto said. "Although this study did not determine the reason for this, we know that with diabetes, the heart can become stiffer, limiting its ability to stretch and expand."

In addition, images of the femoral artery showed that the flow of blood through the artery was significantly less in the diabetic group during exercise compared with the other two groups.

"It appears that irrespective of weight, Type 2 diabetes seems to have a negative effect on the heart and blood vessels in adolescents," Pinto said. "This impaired exercise capacity may be reversible with exercise training however, as some literature in adults suggests, but further studies are required to determine this."

Provided by The Endocrine Society