

The Effect of Diet and Exercise or Metformin on the Metabolic Syndrome

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The full report is titled “The Effect of Metformin and Intensive Lifestyle Intervention on the Metabolic Syndrome: The Diabetes Prevention Program Randomized Trial.” It is in the 19 April 2005 issue of *Annals of Internal Medicine* (volume 142, pages 611-619). The authors are T.J. Orchard, M. Temprosa, R. Goldberg, S. Haffner, R. Ratner, S. Marcovina, and S. Fowler, for the Diabetes Prevention Program Research Group.

What is the problem and what is known about it so far?

The metabolic syndrome is a condition in which people have at least 3 of the following abnormalities: overweight, high blood pressure, high triglyceride levels (a bad type of fat in the blood), low high-density lipoprotein cholesterol levels (“good” cholesterol), and high blood sugar levels. People with the metabolic syndrome are at high risk for developing type 2 diabetes and cardiovascular disease, including heart attack and stroke. Type 2 diabetes (adult-onset diabetes) interferes with the body’s ability to store energy from food. The result is high blood levels of sugar. Many people with type 2 diabetes have slightly high levels of blood sugar for years before reaching diabetes levels, a condition sometimes called *pre-diabetes*. A large study showed 2 ways to prevent or delay the development of diabetes in people with pre-diabetes. The first is a diet and exercise program for weight loss. The other is a small daily dose of a diabetes medication called metformin. It is unknown whether these treatments might also prevent or reverse the metabolic syndrome.

Why did the researchers do this particular study?

To see whether diet and exercise or metformin prevents or reverses the metabolic syndrome in people with high blood sugar levels (impaired glucose tolerance).

Who was studied?

3234 patients from a large study that assigned patients with pre-diabetes to diet and exercise, metformin, or neither.

How was the study done?

The researchers categorized patients as having the metabolic syndrome if they had at least 3 of the following: large waist size, low good cholesterol level, high triglyceride level, high blood pressure, or high fasting blood sugar. For patients who did not have the metabolic syndrome at the start of the study, the researchers determined whether those who received the diet and exercise program or metformin were less likely to develop the metabolic syndrome over the course of the study than those who did not receive these treatments. For patients who already had the metabolic syndrome at the start of the study, the authors determined whether those who got one of the treatments were more likely to no longer have the syndrome at the end of the study than patients who did not get these treatments.

What did the researchers find?

Over half of the patients had the metabolic syndrome at the start of the study. Diet and exercise or metformin each prevented the development of the metabolic syndrome in patients who did not have it at the start of the study. Patients who had the syndrome at the start of the study were more likely to be free of it at the end if they received a diet and exercise intervention or metformin than if they received neither. The benefit of the diet and exercise program was larger than the benefit of metformin.

What were the limitations of the study?

The study included only people with impaired glucose tolerance, so it might not apply to people with normal blood sugar. The study was also too short to see whether the reduction in the metabolic syndrome led to fewer cardiovascular events.

What are the implications of the study?

Diet and exercise or metformin can reduce the metabolic syndrome in people with high blood sugar.

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