Hydration before, during, and after activity remains the cornerstone to approaching cramping in athletes

EVIDENCE-BASED ANSWER

Diets that result in long-term weight loss of 5% to 7%, along with moderate-intensity exercise for more than 150 minutes per week, reduce the incidence of type 2 diabetes for patients with impaired glucose tolerance (IGT) (strength of recommendation [SOR]: A, based on multiple randomized controlled trials [RCTs]). Each of the trials demonstrating this finding included fairly intensive counseling as part of the successful intervention. Diet and exercise reduce the incidence of diabetes in both lean (body mass index [BMI] <25) and overweight patients with IGT (SOR: B, based on a single, large RCT).

EVIDENCE SUMMARY

Three large prospective RCTs evaluated the effect of dietary and exercise interventions in populations at risk for developing diabetes.

The Diabetes Prevention Program Research Group1 randomized 3234 patients age >24 years without diabetes but with IGT and a BMI >24 to 1 of 3 groups: intensive lifestyle modification, metformin, or control; they then compared the incidence of diabetes over 3 years. Patients were men and women from primary care populations and represented diverse ethnic backgrounds. Investigators defined IGT as plasma glucose of 140 to 200 mg/dL 2 hours after a 75-g glucose bolus when the fasting glucose was <140 mg/dL. Intensive lifestyle intervention comprised individual training sessions on a
low-calorie, low-fat diet, aerobic exercise (such as brisk walking), and behavior modification. Case managers met with each participant for at least 16 sessions during the first 24 weeks and at least monthly thereafter. The control group received lifestyle change recommendations without individualized attention.

After 24 weeks, 50% of the lifestyle group met the 7% weight loss goal and 74% were exercising at least 150 minutes per week. At the final visit, 38% maintained their target weight and 58% met their exercise goal. Lifestyle intervention produced greater weight reduction and increased activity compared with the metformin and control groups, with a corresponding decreased incidence of diabetes (Table). Subgroup analysis found that lifestyle intervention produced the greatest reduction in diabetes (71%) for patients aged >60 years.

The Finnish Diabetes Prevention Study similarly randomized 522 patients, aged 40 to 65 years, with IGT and obesity (mean BMI=31) to either intensive lifestyle intervention or control and followed them for 3.2 years. The lifestyle intervention included moderate exercise for at least 150 minutes per week and weight loss of at least 5%. Patients were offered an individualized exercise plan with supervised aerobic exercise plus circuit-type resistance sessions 3 times a week. Nutritionists met with patients 7 times in the first year and every 3 months after that. Patients were counseled to increase fiber intake, reduce total fat below 30% of total calories, and reduce saturated fat below 10%. The control group was given general information on diet and exercise without individualized programs. Most patients (86%) in the intervention group met their exercise goal, and 25% met the fiber requirement.

Compared with the control group, the intervention group had greater success rate for each category. Intensive lifestyle intervention reduced the incidence of diabetes by 58% (number needed to treat=5 for 5 years; see Table).

The Da Qing IGT and Diabetes Study divided...
Exercise was more effective in reducing diabetes in lean patients, but overweight patients also benefited

577 patients with IGT into 1 control and 3 intervention groups: diet, aerobic exercise, and combined diet plus aerobic exercise. Patients in this study had the lowest average BMI (25.8) of the 3 studies. The intervention group received individual and group counseling sessions at weekly intervals for 1 month, then monthly for 3 months, and then every 3 months. The control group received generalized information on IGT and diabetes but individual or group instruction was not included.

At the 6-year follow-up, the quantity of exercise was significantly higher in the exercise intervention groups, but no significant difference in caloric intake was seen among all 4 groups. The incidence of diabetes in the exercise intervention group was approximately half that in the control group overall (Table 1). Exercise was more effective in reducing diabetes in lean patients (BMI <25), but both lean and overweight patients benefited. The combination of diet plus exercise and diet changes also significantly reduced diabetes, although to a lesser degree.

RECOMMENDATIONS FROM OTHERS

The American Diabetes Association recommends structured programs that emphasize lifestyle changes, including education, reduced fat and energy intake, regular physical activity, and regular participant contact. These changes can produce long-term weight loss of 5% to 7% of starting weight and reduce the risk for developing diabetes. They also stress the importance of promoting exercise as a vital component of the prevention as well as management of type 2 diabetes. The benefit of exercise in improving the metabolic abnormalities of type 2 diabetes is probably greatest when it is used early in its progression from insulin resistance to impaired glucose tolerance to overt hyperglycemia.

World Health Organization states that increased physical activity and maintaining a healthy weight play critical roles in the prevention and treatment of diabetes.

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REFERENCES


CLINICAL COMMENTARY

Encourage patients to exercise and eat well, and see a dietician if they are willing

Diet and exercise are important components in the management of patients at risk for diabetes; the challenge revolves around the time and money commitment necessary for these interventions. A physician in a typical office setting has limited time to implement the interventions used in these trials. Referral to other health professionals (dietician, exercise