DIABETES AND EXERCISE

Description

Diabetes mellitus is a chronic disease characterized by elevated blood sugar (glucose), inadequate insulin production, and excessive production of blood sugar by the liver. The disease is divided into two types. Type I diabetes was previously referred to as juvenile diabetes and constitutes only about 10% to 20% of all persons with diabetes. In type I diabetes, patients suffer from an inability to make insulin and must give themselves injections to control their blood sugar. In type II diabetes, patients do not make enough insulin and must either control their intake of food or use medications to lower blood sugar or slow absorption of food to control glucose levels. If they are unable to control their blood sugar levels, they must take insulin. Exercise has been recommended as part of the treatment of diabetes. When muscles exercise, muscle uptake of glucose can increase twenty times above baseline. Endurance athletes have been shown to be more sensitive to insulin than sedentary people. However, the effects of any one exercise session last only about 48 hours.

Common Signs and Symptoms

Many persons with mild diabetes do not have symptoms. With more severe disease and poorer control of blood sugar, patients have more symptoms. Over time, diabetes can lead to several complications related to control of the disease; these can often be reduced or prevented by proper care. General symptoms of diabetes include:

- Polyuria (frequent urination)
- Polydipsia (frequent thirst and drinking)
- Polyphagia (increased food consumption)
- Fatigue
- Poor exercise performance
- Blurred vision
- Vaginitis (secondary to fungal infections)
- Skin infections (uncommon)
- Numbness in feet (secondary to nerve injury)
- Kidney disease

Causes

The cause of most cases of diabetes is unknown. In children it is often caused by antibodies to the cells in the pancreas that make insulin (autoimmune disease). It is also associated with other diseases, such as cystic fibrosis.

Preventive Measures

- Athletes should strive to begin exercise with blood sugar in a well-controlled state.
- Feet should always be kept clean and dry.
- Athletes with diabetes should avoid sports such as distance swimming, scuba diving, rock climbing, and caving in which episodes of low blood sugar cannot be treated easily.
- Athletes should try to anticipate alterations in diet and training to avoid hypoglycemia and hyperglycemia.
- Athletes should try to increase sugar consumption after strenuous exercise to avoid postexercise hypoglycemia.
- Short-acting insulin should not be injected into an actively exercising muscle. The athlete should rest the injection site for about 1 hour after exercise.
- Patients with diabetes should obtain routine checkups of the feet to prevent complications.

Expected Outcome

Exercise provides many benefits to the person with diabetes:

- Reduced body fat
- Lower blood pressure
- Improved lipid profile (decreased cholesterol and low-density lipoproteins)
- Lower insulin levels
- Weight loss
- Often, reduced need for medications
- Improved exercise tolerance

Possible Complications

Exercise can result in worsening of symptoms and complications of diabetes:

- Poor control of blood sugar when exercise is performed at the wrong time
- Increase in renal disease from dehydration
- Increased nerve injury when exercises that increase foot trauma are performed
- Increased risk of eye problems with breath holding and activities that lower or jar the head
- Increased risk of sudden death from exercise in patients with cardiovascular disease
- Worsening of hypertension (high blood pressure) with heavy lifting. Altered blood sugar and insulin dose as a result of mild illness that produces loss of appetite
- Altered uptake of insulin after injection when insulin injection site is changed

NOTE: Exercise can lower blood sugar effectively, but the effect lasts only for a few days. Regular exercise will improve the body's sensitivity to insulin or other agents used to treat diabetes, and there is increasing evidence that it can improve control of diabetes, although this is not as clear in type I diabetes. The response to exercise is variable, and each athlete must determine how much insulin to inject, when to consume a preparticipation meal, and where to inject insulin to avoid an excessive insulin response.

General Treatment Considerations

- Eat about 1 to 3 hours before exercise.
- Check blood sugar immediately before exercise.

- Stop exercise if blood sugar is more than 250 mg/dL.
- Stop exercise if blood sugar is less than 100 mg/dL.
- Do not exercise if insulin is given within 1 hour of expected start.
- Be prepared to treat low blood sugar while exercising. Keep some sugar product with you (such as Skittles).
- For prolonged exercise, use a sports drink to maintain glucose level.
- Check blood sugar after exercise.
- Replenish glycogen stores after exercise.
- Consume fluids during and after exercise to avoid dehydration.

Notify Our Office If

- You experience vision changes after a run
- You experience a loss of sensation in your feet after exercise
- You have increased numbness, tingling, or pins and needles sensations after exercise
- You experience chest pain during or after exercise
- You experience palpitations (feeling of rapid heart beat in chest) during or after exercise
- Your exercise tolerance worsens
- You experience fainting, dizzy spells, or loss of consciousness for brief periods after or during exercise

Notes: (Up to 4400 characters only)

Notes and suggestions