



BEATING THE HEAT: UNDERSTANDING DIABETES AND MANAGING ITS COMPLICATIONS DURING SUMMER

Internal Medicine

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KEYWORDS

INTRODUCTION

Diabetes is one of the well-known chronic metabolic diseases which occurs when there is raised blood sugar levels due to insufficient production of insulin or its ineffective use. Some other external factors like weather changes can influence diabetes control. In this context summer season has posed unique challenges particularly in those areas with very high temperatures. High heat increases temperature, enabling sweating, while also causing dehydration, and influencing insulin sensitivity, making it worse and preventing diabetes control. The combination of these factors increases the chance of diabetes complications diabetes further aggravates the condition.

This article will discuss the effects of summer on diabetes such as heat, increased complications, and summer diabetes management tips as well as best practices to augment the condition.

Effects of The Summer on Metabolic Rate and Blood Sugar Levels

1. Hyperglycaemia and Dehydration

Excessive sweating during summer months can lead to fluid loss resulting in severe dehydration. Dehydration increases blood glucose levels because the amount of water in the body is less, the body retains less water, reducing blood volume and concentrating glucose in blood stream. In addition to this, kidney functioning suffers because dehydration impairs them, making it difficult to remove glucose from the body by urine leading to further increase in blood sugar levels.

Studies have shown that dehydration can trigger a stress response, leading to increased cortisol secretion, which further increases the blood sugar levels. Diabetic individuals especially those on diuretics or SGLT-2 inhibitors, are at high risk of dehydration and hyperglycaemia.

2. Impaired Insulin absorption and effectiveness

Higher temperature influences how insulin is absorbed in the body. Exposure to heat leads to dilatation of blood vessels, leading to faster absorption of subcutaneous Insulin, which can result in hypoglycaemia. Conversely, extreme heat also reduce insulin sensitivity, making glucose regulation more difficult.

Insulin degrades when exposed to high temperatures leading to reduced efficacy. Patients who are unaware of storage guidelines may end up in taking insulin with less efficacy.

Impact of Summer on Diabetes Complications

1. Increased Risk of Heat Stroke and Heat Exhaustion

Diabetes affects the body's ability to regulate temperature. Autonomic neuropathy is a common complication in Diabetics—sweat glands are damaged, impairs the body's ability to cool itself effectively. This increases the risk of heat exhaustion and heat stroke, particularly in elderly diabetic patients.

Symptoms of heat exhaustion include:

- Excessive sweating or lack of sweating (in neuropathy patients)
- Rapid heart rate
- Dizziness and confusion
- Fatigue and muscle cramps

If untreated, heat exhaustion can progress to heat stroke, a life-threatening condition characterized by a body temperature above 40°C (104°F), unconsciousness, and organ failure.

2. Increased Risk of Hypoglycaemia

Hot weather can enhance insulin absorption, increasing the risk of

hypoglycaemia (low blood sugar), especially during exercise. Excessive sweating and prolonged exposure to the sun may lead to energy depletion, making diabetic individuals more susceptible to sudden hypoglycaemic episodes.

Signs of heat-related hypoglycaemia include:

- Dizziness and confusion
- Sweating followed by cold, clammy skin
- Rapid heartbeat
- Weakness and irritability

3. Cardiovascular Risks and Heat-Related Mortality

Diabetes significantly increases the risk of cardiovascular disease (CVD). Heat waves cause an increase in cardiovascular-related deaths, particularly among diabetic patients. High temperatures increase heart rate and blood pressure, increasing cardiac workload. Dehydration thickens the blood, increasing the risk of blood clots and heart attacks.

A study published in Diabetes Care reported that diabetic individuals are twice as likely to suffer from heat-related deaths compared to non-diabetics due to pre-existing cardiovascular complications and impaired thermoregulation.

4. Diabetic Foot Complications and Infections

Diabetic neuropathy increases susceptibility to foot complications, and summer exacerbates the risk of infections. Walking barefoot on hot surfaces, prolonged exposure to humidity, and increased sweating in feet can lead to:

- Fungal infections (e.g., athlete's foot).
- Blisters and ulcers due to excessive sweating and friction.
- Bacterial infections from cuts or wounds left untreated.

Patients with diabetic neuropathy may not feel foot injuries, allowing minor wounds to progress to severe infections.

5. Urinary Tract Infections (UTIs) and Kidney Stress

Dehydration during summer decreases urine output, increasing the risk of Urinary tract infections and kidney infections in diabetic patients. High glucose levels in urine create a favourable environment for bacterial growth, leading to recurrent infections.

Diabetic nephropathy patients are particularly vulnerable, as dehydration can further strain the kidneys, increasing the likelihood of acute kidney injury (AKI).

Diabetes Management During Summer: Practical Guidelines

1. Hydration is Key

- Drink at least 2-3 Liters of water daily to prevent dehydration.
- Avoid sugary drinks, sodas, and excessive caffeine, which can worsen dehydration.
- Monitor urine colour; dark yellow urine is a sign of dehydration.

2. Monitor Blood Glucose More Frequently

- Check blood sugar levels more frequently during extreme heat, especially before and after outdoor activities.
- Keep a log of blood glucose fluctuations and adjust insulin or medications as advised by a physician.

3. Protect Insulin and Medications from Heat

- Store insulin and other medications in a cool, shaded place (below 30°C/86°F).
- Use insulated medication bags if traveling.
- Avoid leaving insulin pens or glucose meters in direct sunlight or hot cars.

4. Choose Light, Breathable Clothing

- Wear loose-fitting, cotton or moisture-wicking clothing to prevent excessive sweating and overheating.
- Wear closed, well-ventilated shoes to prevent foot injuries and infections.

5. Avoid Outdoor Activities During Peak Heat Hours

- Schedule exercise and outdoor activities in the early morning or late evening when temperatures are cooler.
- Take breaks in shaded areas or air-conditioned spaces to prevent overheating.

6. Foot Care and Hygiene

- Check feet daily for blisters, cuts, or infections.
- Keep feet clean and dry; avoid walking barefoot.
- Apply antifungal powder or lotion to prevent fungal infections.

7. Recognize Early Signs of Heat Exhaustion

- If feeling dizzy, lightheaded, or excessively sweating, move to a cool place immediately, hydrate, and take rest.
- Seek medical help if symptoms persist or worsen.

CONCLUSION

Summer presents unique challenges for people with diabetes, ranging from increased dehydration and hyperglycaemia to heightened risks of cardiovascular complications, heat stroke, and infections. Proper hydration, frequent sugar monitoring, safe and proper insulin storage, and temperature regulation strategies are essential for maintaining optimal diabetes control during Summers.

Diabetic individuals, particularly the elderly and those with pre-existing complications, must be proactive in adapting their management strategies during summer to prevent severe health consequences. Raising awareness among patients and healthcare providers can help mitigate seasonal risks and improve overall health outcomes.

By following this practical lifestyle changes and medical recommendations, people with diabetes can enjoy a safe and healthy summer while effectively managing their condition.

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