



Prevention and Treatment of Hypoglycemia

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March 13, 2025



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Hypoglycemia (blood glucose below 4mmol/L) is the most common acute complication in diabetes mellitus. It is the major obstacle in achieving the targets to prevent long-term complications.

Symptoms:

Mild symptoms include trembling, or shaking, irregular or fast heartbeat, sweating, anxiety, hunger, headache, and nausea. **Moderate symptoms** include difficulty concentrating, confusion, weakness, drowsiness, loss of coordination, vision changes, slurred speech, dizziness, nightmares, and behavioural changes. In **severe hypoglycemia**, seizures and coma/loss of consciousness/unresponsiveness may occur requiring 3rd party assistance suggestive of hypoglycemic unawareness. The risk of hypoglycemic unawareness increases if you have frequent episodes of hypoglycemia.

Risk Factors:

Hypoglycemia is more common with the sulfonylurea medications (especially glyburide), meglitinides (repaglinide), intensive insulin therapy, and regular insulin. There is a lower risk with the newer rapid acting insulins (lispro, aspart, glulisine) and the newer basal long acting insulins (degludec, glargine, and detemir). There is no difference between the animal and human insulins.

With metformin, SGLT-2 inhibitors, GLP-1 agonists, DPP-4 inhibitors, acarbose, glitazones, and diet alone, the risk is low.

Risk factors for severe hypoglycemia include previous history of severe hypoglycemia, those who don't feel mild or moderate symptoms of hypoglycemia, longer duration of diabetes, lower recent A1c (< 6%), and a history of hypoglycemic unawareness. Other risks include advanced age/adolescents/children, severe cognitive impairment, food insecurity, poor health literacy, alcohol use, and multiple diabetic complications such as nerve/kidney damage.

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Reducing the risk of hypoglycemia and its unawareness:

Hypoglycemia and its unawareness can be prevented by adjusting insulin or medications to reduce the frequency of hypoglycemia with respect to meals and physical activity, not skipping meals, minimizing alcohol intake, frequent glucose monitoring, using rapid acting insulins and newer basal insulins rather than the older insulins (regular, animal, NPH, small frequent meals, and blood glucose awareness training).

There is also evidence that in patients at high risk for hypoglycemia, continuous glucose monitoring (CGM) devices such as the Libre and Dexcom which also monitor glucose while sleeping may lower the risk of hypoglycemia and improve glucose control. In very severe cases, islet cell or pancreatic transplantation can be considered in patients with Type 1 Diabetes.

Short- & long-term complications:

Short-term risks include the dangerous situations that can arise while one is hypoglycemic, whether at home or at work (e.g. driving, operating machinery). The potential long-term complications of severe hypoglycemia are cognitive dysfunction and in those with or at high risk for heart disease, there is an increased risk of death.

Treatment:

For mild to moderate symptoms and if conscious, take 15-20g of glucose tablets, or 3 hard candies/6 Life Savers, or a half a glass of sweetened orange or apple juice, or 150mL of juice/regular soft drink, or 5 cubes of sugar, or one tablespoon of honey, or 3 teaspoons/packets of sugar dissolved in water. In most people, this will raise the glucose by about 2.1 mmol/L and symptom relief within 20 minutes for most people. Repeat this treatment in 15 minutes if glucose still less than 4mmol/L.

Once the hypoglycemia is corrected, the usual meal or snack that is due at that time of the day should be taken to prevent repeated hypoglycemia. If a meal is more than 1 hour away, a snack (consisting of 15 g carbohydrate and a protein source) should be taken.

If severe or unconscious, glucagon (given by injection under the skin or into the muscle or into the nose) can be given at home by someone who is taught how to do this. Call 911 if glucagon isn't on hand, you don't know how to use it, or the person isn't responding after using glucagon.

The good news:

Although hypoglycemia is common, the good news is that simple measures can reduce its frequency and allow one to optimize glucose control to prevent the long-term complications of diabetes.

Useful Website

<https://www.diabetes.ca/DiabetesCanada/Website/media/Managing-My-Diabetes/Tools%20and%20Resources/hypoglycemia-low-blood-sugar-in-adults.pdf?ext=.pdf>



<https://knowing-diabetes.com/>