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HYPOGLYCEMIA



Hypoglycemia is an abnormally low rate of sugar in the blood. This means that your glycemia or blood glucose reading is less than 4 mmol/l.

Diabetic people who are treated with insulin or with medications such as Diabeta, Diamicron, Amaryl, Gluconorm or Starlix may have hypoglycemia.

On the other hand, if you are treated with Glucophage, Actos, Glucobay, Januvia, Onglyza or Victoza or if you take no medication for diabetes, there is little risk that you will face this problem.

SYMPTOMS

- Cold sweats;
- Shivers, weakness, dizziness;
- Palpitations;
- Irritable or agressive mood;
- Intense hunger;
- Headache;
- Clouded vision (blurry or double);
- Numbnesss/tingling of the tips of the fingers;
- Difficulty speaking;
- Changes in personality;
- Confusion.
- Cauchemars et sommeil agité

If hypoglycemia is not treated, it may lead to seizures or coma, but this rarely happens.

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CANADIAN DIABETES ASSOCIATION WEBSITE : www.diabete.qc.ca

Centre hospitalier universitaire de Sherbrooke website : www.chus.qc.ca

1. Take your blood glucose test; if the level of sugar in your blood is less than 4 mmol/L, **act immediately**;

TREATMENT

2. Eat 15 g of rapidly acting carbohydrates (or the equivalent of 3 tsp. of sugar) in solid or liquid form;

First choice :

- ➢ 3 tablets of Glucose BD;
- Or \succ 4 tablets of DEX 4;
- Or > 15 ml (1 tbsp.) of honey, molasses, corn syrup or maple syrup;
- Or > 15 ml (1 tbsp. or 3 packets) of white sugar dissolved in
- Or \succ 175 ml (3/4 cup) of regular soft drink or fruit drink.

Second choice :

- \succ 175 ml (3/4 cup) of fruit juice;
- Or ➤ 300 ml (1 1/4 cup) of milk.

N.B.: If your blood glucose reading is less than 2.8 mmol/L, take 20 g of carbohydrates rather than 15 g, that is, add the equivalent of 1 tsp. of sugar.

 Wait for 15 minutes then take another blood glucose test. If there is no improvement in the symptoms or if your result is again below 4 mmol/L, repeat step 2;

Avoid foods rich in fats (e.g.: chocolate, ice cream, etc.). Fat retards absorption of the sugar you need immediately to treat your hypoglycemia.

And finally...

4. Have a snack if you are not planning to eat a meal in the hour following the episode of hypoglycemia. This snack should include 15 g of carbohydrates and a source of protein.

E.g.: 6 soda biscuits + 30 g (1 ounce) of cheese or peanut butter

OR

175 ml (3/4 cup) of cereal 125 ml (4 ounces) of milk

OR

1 fruit + 30 g (1ounce) of cheese

N.B. If an episode of hypoglycemia occurs immediately before a meal, **you must correct** it as described on the previous page, then have your meal.

Special recommendations for travelling

- During the flight, frequently use your leg muscles by doing some exercises such as ankle rotations and foot flexes. Every hour or two, stretch your legs by walking for a few minutes;
- For long car trips, plan on frequent stops and regular snacks;
- Take your blood glucose test as often as possible during your trip and **before driving a car**;
- Try as much as possible to keep to a regular meal schedule;
- Drink bottled water; avoid unwashed vegetables, unpeeled and unwashed fruit, tap water and ice cubes;
- Wear comfortable shoes and check your feet every day;
- Use sunscreen to protect your skin.

These recommendations should help you to have a good holiday.

Bon voyage !

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Precautions to take for your treatment equipment

 Keep everything you need for treatment in your hand luggage (and not in the baggage compartment);



- Have extra test strips and lancets, medication, insulin, syringes or pen-injectors;
- Keep your test strips under the required storage conditions;
- Keep your insulin in an insulated holder;
- Bring a supply of food in case the meal is delayed;
- Always keep with you some rapid-acting sugar (glucose tablets, packets of sugar, etc.) to quickly correct if you have a hypoglycemic reaction.

EMERGENCIES

If the symptoms of hypoglycemia continue to worsen, what should you do...

 Warn you family and friends and your work colleagues that if you faint, no solid or liquid food may be given to you; that this could cause you to choke, making the situation even more serious;



If you should faint or lose consciousness:



- Someone should call an **ambulance** to take you to the hospital; you will there receive the appropriate treatment;
- A friend or relative could inject a medication called **GLUCAGON**, which would quickly raise your blood glucose and allow you to regain consciousness. When you do, you should immediately have a snack containing sugar, then proteins if you will not be eating a meal within the following hour.

CAUSES

Too much insulin or oral medication (pills for diabetes);



- An incomplete meal;
- Skipping or postponing a meal or a snack;
- An unplanned or unusual physical activity not compensated for by eating more and/or adjusting the insulin dose;
- Alcohol, particularly on an empty stomach;
- An excessive loss of liquid by diarrhea or vomitting. This may cause a severe episode of hypoglycemia. It is important to take your blood glucose reading more often when you are sick.

- Have with you something to identify you as diabetic (e.g.: Medic-Alert bracelet);
- Have a travel insurance plan that includes provision for care and an eventual return to Canada;
- Get more information about the dietary habits of the country you will visit; consult your nutritionist if you need to;
- Bring medication to treat nausea, vomiting or diarrhea;
- Know how to adjust your treatment if necessary; a trip in which you quickly cross 3 time zones may require you to adjust your insulin on the day of your departure and your return;
- Have with you a Glucagon kit;
- Arrange for the necessary vaccinations (contact your CSSS or the Clinique du Voyageur international at 819-564-5160);
- Advise the travel company as well as the persons with whom you will be travelling that you are diabetic (several companies offer specific menus);
- For travel tips, you may consult the following link on the Canadian Diabetes Association Website : www.diabetes.ca/diabetes-andyou/living/guidelines/travel



LEAVING ON A TRIP

Diabetes does not keep you from travelling. However, it is necessary to plan carefully, especially if you are being treated with insulin, so you can avoid various difficulties and make your trip much more fun.



Planning before your departure

- See your doctor;
- Make sure that your diabetes is well under control;
- Ask your pharmacist to give you a list of your medications;
- It is advised to ask the doctor for a **medical note** attesting that you have diabetes and that you must have with you the equipment you need for your treatment (lancets, needles), to avoid a long wait in **customs**.

An example of such a letter is available of the Diabète Québec website, at the following address : www.diabete.qc.ca/html/vivre_avec_diabete/voyageur.html;

PREVENTION

- Regularly take your blood glucose readings;
- Follow your eating plan with respect to the time of meals, their content and snacks, if they are recommended;
- Take your insulin or your medications as prescribed;



- Modify your meals or snacks in relation to physical activity;
- If you are being treated with insulin:
 - At supper (R, Toronto or premixed) or;
 - At bedtime (N or NPH);
 - Have a snack before going to bed if your evening blood sugar reading is lower than 7 mmol/L.
- Always have with you (in the car, your purse, etc.) rapid action sugar (glucose tablets, packets of sugar) in case of hypoglycemia;
- Wear a bracelet indicating that you are diabetic;
- Tell your family and friends and those you work with about the symptoms of hypoglycemia and the ways of treating it;
- Avoid drinking alcohol on an empty stomach;
- If you have frequent hypoglycemia reactions and you do not know the cause, **tell your doctor**. It may be necessary to reduce the quantity of your medications.

HYPERGLYCEMIA



Hyperglycemia means having many blood sugar readings are higher than normal during a certain period of time.



Warning :

Your body does not always detect the symptoms (signs) of high blood sugar. It may even adapt to hyperglycemia.

If hyperglycemia occurs gradually, it is possible and even frequent that you may not feel any symptoms or that they fail to bother you. It is often said that diabetes is a sneaky disease.

TYPE 1 DIABETES (CONTINUED)

ur blood sugar is higher than 17 mmol/L in spite of having justed your insulin doses; e results of the ketone tests are: - more than 2 ++ or 4 mmol/L in the urine for more than 8 hours OR
- more than 2 ++ or 4 mmol/L in the urine for more than 8 hours
Un
- more than 1.5 mmol/L in the blood according to a meter
u have not been able to drink or eat for more than 6 hours;
u have persistent diarrhea;
u have had a fever higher than 38.5 ⁰ C for more than 48 hours.

TYPE 1 DIABETES (CONTINUED)

If you vomit after a rapid or ultrarapid insulin injection

- Take your blood glucose reading every 2 hours;
- Drink sweetened liquids every hour;
- If your blood glucose is less than 5.0 mmol/L and you are not able to tolerate sweetened liquids (because they cause vomiting), have someone take you to the hospital (risk of hypoglycemia);
- If your blood glucose is **more than 6.1 mmol/L**, use only rapid action insulin (Toronto or Humulin R) or ultra-rapid (NovoRapid, Humalog or Apidra) every 4 hours according to the scale on the previous page as prescribed by your doctor.

IMPORTANT:

You must inject intermediate insulin (Humulin N, Novolin NPH) or long-acting insulin as you usually do, even if you are sick.

Go back to your usual treatment when the vomiting has ended and you can eat.

<u>SYMPTOMS</u>

- More frequent urination and more important quantities of urine;
- Intense thirst, dryness of the mouth;
- Frequent need to eat;
- Fatigue, drowsiness.

Other symptoms may appear if hyperglycemia is prolonged :

- Dryness and itching of the skin;
- Tingling of the fingers and toes;
- More frequent infections;
- Slower scarring of wounds;
- Blurry vision for a while;
- Frequent headaches.

It is possible that you feel only a few of those symptoms. Every person reacts differently to a high blood sugar level.

CAUSES

• Eating too much;

- Insufficient quantity of oral medication or insulin (you forgot or made a mistake);
- Reduced physical activity;

Infection, illness, stress;

• Weight gain;

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• Taking certain medications (e.g. Cortisone).

TYPE 1 DIABETES (CONTINUED)

Example of an insulin scale prescribed by your doctor for the days you are sick.

SCALE FOR RAPID-ACTING (R OR TORONTO) OR ULTRARAPID ACTING INSULIN (HUMALOG, NOVO RAPID OR APIDRA)			
If your blood glucose level is		AT MEALTIME OR EVERY 4 HOURS	AT BEDTIME
•	Less than 6 mmol/L	•	•
•	6.1 to 8.0 mmol/L	•	•
•	8.1 to 11.0 mmol/L	•	•
•	11.1 to 14.0 mmol/L	•	•
•	14.1 to 18.0 mmol/L	•	•
•	More than 18 mmol/L	•	•

This table will be used for the blood sugar testing before mealtimes and at bedtime.

TYPE 1 DIABETES (CONTINUED)

Adjustment of your insulin dose

It will be necessary to change your dose of insulin (increase or decrease it) if one of the following situations presents itself:

You are sick but able to eat:

• Use the scale for rapid-acting (Humulin R or Toronto) or ultrarapid insulin (Humalog, NovoRapid or Apidra) prescribed by your doctor before each meal and in the evening. This will be added to the usual mealtime dose. It may be necessary to also add a dose in the evening if the blood glucose level is high.

You are vomiting:

- Check your blood glucose level every 2 to 4 hours;
- Stop calculating carbohydrates and the usual calculation for the insulin dose;
- Inject rapid or ultrarapid insulin according to the scale prescribed by your doctor;
- Take sweetened liquids every hour to maintain your blood glucose level;
- Continue to inject the same dose of intermediate or long-acting insulin.

PREVENTION

 Follow your treatment plan, including proper diet, physical activity and taking your oral medications or insulin, as prescribed;



- Monitor your blood glucose level regularly and at different times of the day; note the results in your logbook;
- **Try to identify for yourself** what causes your glucose levels to rise; modify your habits, if necessary;



- See your doctor regularly so your treatment (medication or insulin) can be adjusted to your needs;
- If you need help, workers with training related to diabetes can help you;
- If your blood glucose levels remain high despite these recommendations, **drink lots of liquid without sugar** and talk to your doctor.

PHYSICAL ACTIVITY

Immediate benefits:	 Meet new people, enjoyable activity; Feel more relaxed, have more energy; Sleep better; Feel better and have a better outlook.
Regular physical activ	ity will make it possible to :
Prevent :	 Back pain; High blood pressure; Colon, prostate and breast cancers; Cardiovascular disease.
Reduce :	- Stress; - Pain (knee, back, etc.).
Improve :	 Mobility and balance; Strength, endurance and flexibility; Weight control; Bone density; Lipidic profile (cholesterol); Quality of life and autonomy; Control of blood pressure; Blood glucose control.

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By increasing your base level metabolism, you will burn more sugar by the simple fact of moving while increasing the sensitivity of cells in the body to insulin and decreasing insulin resistance.

TYPE 1 DIABETES

- **Measure your blood glucose level** at least four 4 times per day or every 2 hours if the results are high;
- If your blood glucose is higher than 17 mmol/L, check for the presence of ketones in the urine (Ketostix strips) or with a drop of blood (only one reader makes that analysis);
- Do not stop your insulin injections even if you are not eating because your blood glucose will tend to be higher when you have an infection;
- If your appetite decreases, eat small snacks more often and go back to your regular meals as soon as possible;
- Drink lots of liquids (water, bouillon, consommé) to avoid becoming dehydrated;
- If you cannot eat, drink sweetened liquids in small amounts every hour, depending on your blood sugar reading;
- Check your temperature;
- Adjust your insulin if you have received the necessary information and are use to; in case of doubt, speak to a doctor or someone at Centre de jour du diabète.

TYPE 2 DIABETES (CONTINUED)

D) Treated with 2 or 4 injections of insulin per day:

- Measure your blood glucose levels more often, that is, 4 ٠ times a day or more;
- Continue to inject your insulin as usual if your appetite is not affected;
- If your appetite has decreased, eat small snacks more often and ٠ go back to your usual meals as soon as possible;
- Drink lots of liquids (water, bouillon, consommé); ٠
- If you cannot eat, drink sweetened liquids in small quantities ٠ every hour;
- In the case of frequent vomiting, decrease the dose of insulin by half for 1 2 doses; go back to your usual dose when you are able to eat again;

CALL YOUR DOCTOR OR GO TO THE HOSPITAL IF :

- Your blood glucose is higher than 20 mmol/L; you have continual ٠ vomiting or you cannot drink liquids;
- You have a fever (higher than 38.5° C) for more than 48 hours. ٠

RECOMMENDATIONS FOR THE TYPE OF ACTIVITY, DURATION AND INTENSITY

I do some physical activity including :

Aerobic exercises

- Do at least 150 minutes per week at a moderate intensity, which corresponds to marked pace increased breathing. Example: Walking, cycling, swimming, cross-country, skiing, any exercise that pace increase breathing;



Spread out your aerobic activity over a minimum of 3 non-consecutive days. Physical activity is a health-promoting way of life, in the same category as taking a shower and brushing your teeth!:





aerobic An effort of 3-4 is ideal for aerobics.

I'm still able to sing !

• Muscle exercises



Include resistance exercises to your exercise routine at least 3 times a week (exercises using gym apparatus, dumbbel, swiss ball, weight training, etc.). These exercises help to increase your base metabolism (and use more sugar) and decrease the resistance to insulin;



In general, walking is an excellent aerobic activity (free, very accessible and usually without danger);

Create opportunities to get moving :

- Walk when you go to grocery store;
- Park you car on a road a bit farther away;
- Take the stairs sometimes instead of sing the elevators all the time.



Consult your physician if you want to begin a moderate-intensity exercise program; he will assess your general state of health (heart, eyes, nerves, etc.).

TYPE 2 DIABETES (CONTINUED)

C) Treated with pills at meals and with insulin in the evening:

- Measure your blood glucose more often, that is, 4 times a day;
- Continue to take your medication and your insulin because your blood sugar will tend to be higher;
- If, however, your blood glucose is less than 5 mmol/L, decrease your dose of pills and insulin by half;
- Drink lots of water;
- Take the amount of carbohydrates recommended at meals and in snacks in the form of foods that are easy to digest or as sweetened liquids;
- If it is impossible to eat because you are vomiting a lot, consult a doctor.

TYPE 2 DIABETES (CONTINUED)

- B) Treated with medication such as Diabeta (Novo-Glyburide), Diamicron (Gliclazide), Amaryl (Glimepiride), Gluconorm, or Starlix :
 - Measure your blood glucose more frequently, that is, 4 times a day;
 - Continue to take your medication because your blood glucose level will tend to be higher;
 - If, however, your blood glucose falls below 5 mmol/L, decrease the dose of your medication by half;
 - Drink lots of water;
 - Take the amount of carbohydrates recommended at meals and in snacks in the form of foods that are easy to digest or as sweetened liquids;
 - If it is impossible to eat or drink because you are vomiting a lot, consult a doctor.

WHEN TO AVOID PHYSICAL ACTIVITY ?

If you are in **hypoglycemia**, you should correct it adequately before beginning your physical activity.

If you are in **hyperglycemia**, you should avoid **moderate** or **intense activity** in the following cases :

Diabetes type 1

If your blood glucose level is above 14 mmol/L **AND** if there is acetone in the urine or blood, exercising may increase your blood glucose and thus cause a deterioration in your condition.

Diabetes type 1 or type 2

If your blood glucose level is higher than 17 mmol/L at any time.

In case of heart problems, choose a program of physical activity with supervision.

In case of eye problems with a risk of hemorrhage, any type of exercise requiring strength, jumps, rapid movements or contact exercises must be avoided.

N.B Walking is, in general, always permitted, even in situations such as those noted above.



GENERAL PRECAUTIONS

- Warm up your muscles before beginning any physical activity (first start walking at a slow pace; second move your wrists, ankles, arm and leg, third do some stretching, etc.);
- Wear comfortable shoes adapted to the activity;
- Examine your feet **before** and **after** exercising; watch for blisters, redness or cuts;
- Drink sufficient water to avoid dehydratation, which can interfere with controlling diabetes;
- Avoid drinking alcohol before, during and after exercise;
- Stop all activity if you feel weak, have discomfort or if you feel some pain. Wear your Medic-Alert bracelet, make it easier for people to help you with your sickness (fast facilitates access).

Important principle

Light to moderate physical activity lowers blood sugar while intense physical activity may raise it temporarily during and after the activity.

Try it out : take your blood glucose before and after your exercises and see for yourself!







Diabetes puts stress on the body. In a situation of stress, your blood glucose tends to rise even if you have changed nothing in your daily routine or even if you eat less. Whether it is a cold, the flu or a gastroenteritis, these illnesses, no matter how mild, will have a tendency to upset the balance for diabetes.

The following information is important; it could help you to avoid a major diabetic upset, more specifically, a serious hyperglycemia, which could require you to be hospitalized or, on the contrary in certain cases, severe hypoglycemia. Depending on your treatment, the procedures to follow may vary. In the next pages, look for the information relative to your situation.

TYPE 2 DIABETES

- A) Treatment only with medication such as Glucophage (Metformin), Actos, Glucobay, Januvia, Onglyza or Victoza.
 - Continue to take your medication;
 - If you are suffering from diarrhea or vomiting, you can decrease the amount of Glucophage, Victoza or Glucobay; begin again taking this medication progressively, increasing the dose over several days, when the symptoms have ceased;
 - Measure your blood sugar more frequently, that is 3 to 4 times a day;
 - Drink lots of water;
 - Take the amount of carbohydrates recommended in meals and snacks, in the form of foods that are easy to digest or as sweetened liquids.

HOW TO STAY MOTIVATED

- Observe your blood glucose level before and after physical activity : See the effect for yourself!
- Use a pedometer and set objectives to reach;
- Keep a calendar of the physical activities that you do;



- Register for a program of physical activity directed by a professional with recognized training;
- Look in the listing of community activities in your MRC, and find the ones that interest you;
- Be open to trying new activities;
- Set yourself realistic objectives;
- 😬 🖌 Have fun doing your chosen physical activity. 🙂









ADDITIONAL PRECAUTIONS if you use insulin or if you take drugs such as Diabeta, Diamicron, Amaryl, GlucoNorm, Starlix

- The following information is intended to prevent hypoglycemia that could result from an unplanned, moderate or prolonged physical activity. This particularly applies to diabetic persons treated with the medications mentioned above. Diabetics who take no medications have less risk of having a hypoglycemic episode so no adjustment is necessary (e.g.: no snack is necessary before physical activity), but hydratation always remains important;
- Check your **blood glucose before** and **after** exercising; your experience with the impact of exercise on your blood glucose will guide you in the adjustments to make; nothing replaces personal experience in the matter;
- Adjust your eating accordingly (increase food intake in the meal before exercise or add a snack);



 If you take insulin, adjust the dose of rapid or ultra-rapid insulin before the activity, according to the recommendations from your care team. The dose of insulin must be reduced if you plan to exercise at the peak time of the drug's action. The percentage of decrease in the insulin dose (in general 25 % to 50 %) will depend on the duration and intensity of the activity; • It is preferable to avoid moderate or intense physical activity in the 2 hours following the injection of Humalog, NovoRapid or Apidra insulin ;



- Avoid injecting insulin in an area of the body involved in the exercise (e.g.: the arm or thigh during a rapid walk) because the speed of absorption of the insulin will be increased (risking hypoglycemia). The abdomen is preferred as the site of the injection;
- If you take medications (pills), and you often have hypoglycemic episodes during or after physical activities, discuss it with your doctor. Lowering the quantity of your medications would be better than having extra snacks that may interfere with your weight control;
- Bring a reserve of rapid-acting sugar with you, in case you decide to continue your physical activity longer than planned. E.g..: DEX 4 (4 tablets), glucose BD (3 tablets), 3 packet of coffee sugar;



 Do your physical activity, if possible, every day, at the same time, for the same duration and at the same intensity; this will make it easier to make changes in your treatment.



If moderate or intense exercise <u>was not planned</u> and you take insulin

It is even more important to control your blood sugar **before** beginning to exercise. You should have a snack of 15 g of carbohydrates upon leaving, then regularly every 30 to 60 minutes. Here are a few ideas for snacks:



- 1 fruit or;
- 1 granola bar or;
- 2 tbsp. of dry raisins (1 little box) or;
- 175 ml (6 ounces) of fruit juice or regular soft drink or;
- 250 ml of Gatorade or;
- 3 tablets of BD glucose or 4 tablets of DEX 4.

Check your blood glucose BEFORE, DURING and AFTER physical activity and the hours after; the effects of exercise may last from 12 to 16 hours and in certain cases **up to 24 hours** after exercise. Furthermore, be sure to follow the schedule for meals and snacks.

