



# Hypoglycemia

## (Low Blood Sugar)

### Basics

#### OVERVIEW

- Abnormally low blood glucose (sugar) concentration

#### SIGNALMENT/DESCRIPTION OF PET

##### Species

- Dogs
- Cats

#### SIGNS/OBSERVED CHANGES IN THE PET

- Seizures
- Partial paralysis of the hindquarters or rear limbs (known as “posterior paresis”)
- Weakness
- Collapse
- Involuntary muscle twitches
- Abnormal behavior
- Sluggishness (lethargy) and depression
- Wobbly gait (known as “ataxia”)
- Increased appetite (known as “polyphagia”)
- Weight gain
- Increased urination (known as “polyuria” or PU) and increased thirst (known as “polydipsia” or PD)
- Exercise intolerance
- Some pets appear normal, aside from findings associated with underlying disease
- May have episodic signs

#### CAUSES

##### Endocrine

- Tumor involving cells of the pancreas that secrete the hormone, insulin (known as an “insulinoma”); excessive levels of insulin decrease the blood glucose levels
- Hormonal disturbances caused by cancer or tumors not involving the pancreas (known as “extrapancreatic

paraneoplasia”), such as liver cancer or tumors, intestinal cancer or tumors

- Overdose of prescribed insulin for treatment of diabetes (known as “iatrogenic insulin overdose”)
- Inadequate production of steroids by the adrenal glands (known as “hypoadrenocorticism” or “Addison’s disease”)

### **Hepatic Disease**

- Portosystemic shunt (condition in which abnormal blood vessels allow blood to flow between the portal vein [vein that normally carries blood from the digestive organs to the liver] and the body circulation without first going through the liver)
- Damage and scarring of the liver (known as “cirrhosis”)
- Severe inflammation of the liver (known as “hepatitis”)
- Glycogen-storage diseases—inherited disorders caused by a lack of normal enzymes to convert glycogen to glucose, resulting in greater than normal accumulation of glycogen in the liver; glycogen is the primary carbohydrate reserve in the body and is converted easily into glucose (sugar) under normal body conditions; it usually is found in the liver and other tissues in the body

### **Overuse of Glucose by the Body**

- “Hunting-dog hypoglycemia” (condition seen in some hunting dogs, in which their blood glucose drops after one to two hours of strenuous exercise in the field)
- Pregnancy
- True increase in the number of red-blood cells in the body (known as “polycythemia”)
- Cancer
- Presence of pus-forming bacteria and their poisons in the blood or tissues (known as “sepsis”)

### **Reduced Intake/Under-Production of Glucose by the Body**

- Young puppies and kittens
- Toy-breed dogs
- Severe malnutrition or starvation

### **Toxicity**

- Administration of excessive amount of insulin (known as “iatrogenic insulin overdose”)
- Xylitol toxicity; xylitol is a sugar alcohol sweetener used as a sugar substitute in a variety of products, such as some chewing gum
- Antihyperglycemic agent toxicity (medication such as sulfonylureas); antihyperglycemic agents are medications that are designed to decrease blood glucose (sugar) in pets with high levels of glucose in their blood (hyperglycemia)

## **RISK FACTORS**

- Low intake of food for energy increases the likelihood of low blood sugar (hypoglycemia) in pets with conditions causing overuse of body glucose or under-production of glucose by the body
- Fasting, excitement, exercise, and eating may or may not increase the risk of low blood sugar (hypoglycemic) episodes in pets with insulin-producing tumors (insulinomas)

## **Treatment**

### **HEALTH CARE**

- Treat pets with signs of low blood sugar (hypoglycemia) as inpatients
- Treat underlying disease
- If able to eat (pet is responsive and has no signs of vomiting), feeding should be part or all of initial treatment
- If unable to eat, the veterinarian may start intravenous fluid therapy with 2.5% dextrose; if clinical signs persist, a 5% dextrose solution may be used

### **ACTIVITY**

- Depends on underlying disease

### **DIET**

- If able to eat (that is, the pet is responsive and is not vomiting), feeding should be part or all of initial treatment
- Hunting-dog hypoglycemia—feed moderate meal of fat, protein, and complex carbohydrates a few hours before

hunting; can feed snacks (such as dog biscuits) every 3–5 hours during the hunt

- Toy-breed hypoglycemia—increase frequency of feeding; feed several meals a day, as directed by your pet's veterinarian
- Puppy and kitten hypoglycemia—increase frequency of feeding (nursing or hand-feeding)

## **SURGERY**

- Surgery is indicated if a portosystemic shunt (condition in which abnormal blood vessels allow blood to flow between the portal vein [vein that normally carries blood from the digestive organs to the liver] and the body circulation without first going through the liver) or insulin-secreting tumor is the cause of hypoglycemia

## **Medications**

- Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive

## **EMERGENCY /ACUTE TREATMENT**

- In hospital—administer 50% dextrose
- At home—do not attempt to administer medication by mouth during a seizure; seizures related to low blood sugar (known as “hypoglycemic seizures”) usually stop within 1–2 minutes; if a seizure is prolonged, recommend transportation to hospital; if a short seizure has ended or other signs of extremely low blood sugar (known as a “hypoglycemic crisis”) exist, recommend rubbing corn syrup or 50% dextrose on the tissues of the mouth, lining the cheek, and then followed by giving the same solution by mouth once the pet can swallow; then seek immediate veterinary medical attention
- Initiate frequent feeding of a diet low in simple sugars or, if the pet is unable to eat, intravenous fluid therapy with 2.5% dextrose

## **Follow-Up Care**

### **PATIENT MONITORING**

- At home—for return or progression of clinical signs of low blood sugar (hypoglycemia); assess glucose levels on blood tests, if signs recur
- Single, intermittent serum glucose determinations may not truly reflect the effect of different foods on blood glucose (sugar) levels (known as “glycemic status”) of the pet
- Other monitoring is based on the underlying disease

### **PREVENTIONS AND AVOIDANCE**

- Hunting-dog hypoglycemia—feed moderate meal of fat, protein, and complex carbohydrates a few hours before hunting; can feed snacks (such as dog biscuits) every 3–5 hours during the hunt
- Toy-breed hypoglycemia—increase frequency of feeding; feed several meals a day, as directed by your pet's veterinarian
- Puppy and kitten hypoglycemia—increase frequency of feeding (nursing or hand-feeding)

### **POSSIBLE COMPLICATIONS**

- Recurrent, progressive episodes of low blood sugar (hypoglycemia)
- Seizures

### **EXPECTED COURSE AND PROGNOSIS**

- Depends on underlying disease

## **Key Points**

- Abnormally low blood glucose (sugar) concentration
- Treat pets with signs of low blood sugar (hypoglycemia) as inpatients
- Treat underlying disease
- Low intake of food for energy increases the likelihood of low blood sugar (hypoglycemia) in pets with conditions causing overuse of body glucose or under-production

- Fasting, excitement, exercise, and eating may or may not increase the risk of low blood sugar (hypoglycemic) episodes in pets with insulin-producing tumors (insulinoma)

# Notes

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