

# HYPOGLYCEMIA (LOW BLOOD SUGAR)

## BASICS

### OVERVIEW

- Abnormally low blood glucose (sugar) concentration

### SIGNALMENT/DESCRIPTION of ANIMAL

#### *Species*

- Dog and cat

### SIGNS/OBSERVED CHANGES in the ANIMAL

- 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 animals 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 not involving the pancreas (known as “extrapancreatic paraneoplasia”)
- 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/Underproduction of Glucose by the Body*

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

### RISK FACTORS

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

## TREATMENT

### HEALTH CARE

- Treat animals with signs of low blood sugar (hypoglycemia) as inpatients
- Treat underlying disease
- 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 animal 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 to 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 insulinoma (tumor involving cells of the pancreas that secrete the hormone, insulin) 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 to 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 patient can swallow; then seek immediate veterinary medical attention
- Initiate frequent feeding of a diet low in simple sugars or, if patient 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 patient
- 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 to 5 hours during the hunt
- Toy-breed hypoglycemia—increase frequency of feeding; feed several meals a day, as directed by your pet's veterinarian
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### 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 animals 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 patients with conditions causing overuse of body glucose or underproduction
- Fasting, excitement, exercise, and eating may or may not increase the risk of low blood sugar (hypoglycemic) episodes in patients with insulin-producing tumors (insulinoma)

