

Diabetes Mellitus

A PowerPage Presented By



Diabetes mellitus is a common endocrine problem in dogs and cats caused by inadequate insulin production or peripheral insulin resistance. You should be prepared to answer questions about treating the critically ill diabetic patient in diabetic ketoacidosis (DKA) and the diagnosis and management of stable diabetic animals. This PowerPage reviews the key principles of recognizing and managing diabetic dogs and cats in these scenarios.

Key Points

- Key clinical signs are **PU/PD, polyphagia and weight loss**
- Less common clinical signs that may be hints are **plantigrade stance (cat)** and **cataracts (dog)**
- Diagnosed by documenting persistent hyperglycemia, glucosuria and/or ketonuria
- Treatment with dietary changes and insulin

Clinical Signs

2 presentations: “Healthy diabetic” and severe diabetic ketoacidosis

- **Healthy diabetic:**
 - PU/PD
 - Polyphagia and weight loss
 - Recurrent infections
 - Plantigrade stance from diabetic neuropathy (cats)
 - Cataracts (dogs)
- **Severe DKA:**
 - Anorexia
 - Vomiting
 - Weakness
 - Severe metabolic acidosis
 - Blood glucose > 500 mg/dl
 - May have previous history of the signs of a “healthy diabetic”

Diagnosis

Based on clinical signs and bloodwork/urinalysis

- **Hyperglycemia** (often >300 mg/dl)
 - NOTE: Stress can cause hyperglycemia, particularly in cats
- **Glucosuria** +/- ketonuria
 - NOTE: While less common, stress in cats can cause glucosuria too
- Other common bloodwork abnormalities:
 - Metabolic acidosis
 - Elevated liver enzymes and cholesterol

- Ancillary tests of fructosamine and glycosylated hemoglobin reflect the patient's glycemic status over several weeks

Treatment

- Healthy diabetic
 - **Insulin** injections:
 - All dogs and 90% of cats require insulin, usually twice daily
 - Nearly all intermediate and long-acting insulins (Vetsulin, PZI, NPH, lente, ultralente, Glargine) are acceptable for managing the healthy diabetic
 - Choice is largely a matter of personal preference for the species and determining what works for a particular patient by trial and error
 - Insulin therapy should be monitored by blood glucose curves whenever possible to see that the dose is of sufficient potency and duration without causing a Somogyi effect from overdosage
 - **Oral Hypoglycemics:** These can be used to try to decrease insulin requirements or insulin resistance
 - **Glipizide (Glucotrol)** - the most widely used oral hypoglycemic. Efficacy is controversial
 - Metformin (Glucophage), rosiglitazone (Avandia) and acarbose are other oral hypoglycemics that are not yet well evaluated in dogs and cats
 - **Diet:** A **consistent** diet is critical, the type of food, amount, and time of feeding
 - **High fiber**, moderately fat-restricted diets are recommended
 - High protein and low carbohydrate diets for cats may be beneficial
- Severe DKA-
 - **Aggressive IV Fluids** - 0.9% saline with potassium and phosphate supplementation as needed
 - **Regular insulin:** Regular insulin is the fast-acting insulin of choice for severe DKA. It can be given intermittently (q 6-8 hrs) or by continuous IV infusion
 - With either, **frequent blood glucose monitoring** and insulin dose adjustment is necessary to achieve gradual decline in blood glucose level
 - **Bicarbonate Therapy** - if metabolic acidosis is severe and/or not improving with IV fluids
 - Identify and address any concurrent infections or diseases

References and Links

Ettinger, Feldman- Veterinary Internal Medicine 3rd ed pp 1460-1488

On-line Conference Proceedings from VIN

<http://www.vin.com/Members/Proceedings/Proceedings.plx?CID=bsava2007&PID=pr16366&O=VIN>

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