

Introduction to Canine Diabetes Mellitus

Causes

Diabetes mellitus is not a single disease or condition with a solitary cause or treatment. It is the state of persistent uncontrolled hyperglycaemia and may be the result of many contributory factors. Factors that promote relative hyperglycaemia include anything that causes failure of adequate insulin secretion and/or peripheral insulin antagonism. Common causes of insulin secretory failure in dogs include immune mediated B-cell destruction and chronic pancreatitis, whereas insulin antagonism is often the result of obesity, or an increased progestagen, glucocorticoid or growth hormone influence (*both naturally occurring and therapeutic*). Depending on the cause/s, the Diabetes may be temporary/reversible (*e.g. DM caused by increased circulating endogenous progestogen during metoestrus*) or persistent (*eg end stage chronic pancreatitis*). It is important to understand the variable causes of DM as this can influence both the treatment and long term prognosis.

Signalment and Clinical Signs

Diabetes affects both males and females of any age but is most common in middle aged and elderly dogs. Typical breeds include rottweilers, small terrier breeds, poodles and crossbreed terriers. The main clinical signs of Diabetes mellitus are polydipsia, polyuria, polyphagia, weight loss, scurfy coat, signs related to cataract development, exercise intolerance and recurrent infection esp. chronic cystitis.

Diagnostic Tests

Diabetes mellitus is confirmed by demonstrating **persistent** hyperglycaemia. Isolated episodes of hyperglycaemia do not confirm DM almost irrespective of their magnitude. Fructosamine is the product of glycated proteins and its rate of production is directly related to circulating glucose concentration. Circulating fructosamine concentration reflects the “*average*” blood glucose over the preceding 2-3 weeks. Increased blood fructosamine values are confirmatory of DM.

Treatment

Treatment of DM in dogs usually consists of treatment of the underlying cause/s, lifestyle management changes and exogenous insulin therapy. Almost all dogs with Diabetes mellitus require insulin treatment. Most dogs are stabilised on one or twice daily lente or ultralente preparations. Depending on the underlying cause/s of the Diabetic state, insulin therapy may be needed for only a few weeks or months or more commonly may be required for the rest of the animal’s life. If a known contributor to the condition is known then it may be practical to treat and reduce/remove this influence (*e.g. withdrawal of exogenous steroid therapy, treatment of hyperadrenocorticism*) which may reduce or remove the requirement for exogenous insulin therapy. Appropriate therapy in the early stages can potentially avoid development of permanent DM, depending on the underlying cause. A crucial and often underestimated aspect of treating DM cases is adherence to lifestyle management changes, especially ensuring consistency of feeding and exercise patterns. This is also important during the initial stabilisation procedure (*see Axiom Fact sheet 4.1*).

Therapeutic Monitoring

Long term therapeutic monitoring consists of clinical evaluation and biochemical monitoring. Regular circulating fructosamine is useful, typically every 6 weeks once initial stabilisation has been achieved and specifically timed glucose concentrations can be useful. The timing of blood sampling in relation to insulin administration is critical and for worthwhile interpretation samples should usually be collected 5-6 hours post insulin (*see Axiom Fact sheet 4.1*).