

Popular Article

Diabetes: A Secret Foe

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Introduction

Diabetes is a serious long-term metabolic disorder. Diabetes Mellitus occurs when the body is unable to utilize the insulin that is produced, either due to insufficient insulin synthesis or other factors. An estimated 537 million persons globally, aged 20 to 79, have diabetes (10.5% of all adults in this age range). Worldwide, 643 million individuals will have diabetes by 2030, and by 2045, that number will rise to 783 million.

Diabetes in pets

Diabetes mellitus is a common disease in dogs and cats. The most common form of diabetes in dogs resembles type 1 diabetes in humans. The most common form of diabetes in cats resembles type 2 diabetes in humans. Diabetes mellitus is classified into two types: type 1 diabetes and type 2 diabetes.

Type 1 diabetes is because of beta cell destruction (mostly immune-mediated) and absolute insulin deficiency, onset is most common in young ones. In most cases, type 1 diabetes occurs as a result of cellular-mediated autoimmune destruction of pancreatic beta cells, causing an absolute deficiency of endogenous insulin. Markers of the immune destruction of the beta cells include islet cell autoantibodies,

autoantibodies to insulin, glutamic acid decarboxylase, and antibodies to the tyrosine phosphatase IA-2 and IA-2 beta. Common histological abnormalities in dogs include a reduction in the number and size of pancreatic islets, a decrease in the number of B-cells within islets, and B-cell vacuolation and degeneration.

Type 2 diabetes is the most common type of various degrees of beta cell dysfunction and insulin resistance, commonly associated with overweight and obesity. Type 2 diabetes is characterized by a relative insulin deficiency, although there is insulin secretion, this is insufficient to overcome insulin resistance. Approximately 80% of diabetic cats suffer from type 2-like diabetes mellitus. Cats have an amyloidogenic amino acid structure of IAPP with the potential to form amyloid depositions within the islets of the pancreas during periods of sustained insulin resistance, as occurs with obesity. Obese cats also develop other derangements that promote the development of diabetes; hence type 2 diabetes is predominant in this species. Environmental as well as genetic factors are thought to play a role in the development of both defects.

Diabetes mellitus is characterized by polyuria, polyphagia, loss of condition, and development of cataracts. Diabetes could progress through several clinical stages from normoglycaemia to ketoacidosis.

Clinical signs do not develop until hyperglycaemia reaches a concentration that results in glycosuria, typically at blood glucose concentrations of 180–220 mg/dl in dogs and 220–270 mg/dl in cats. A subclinical or prediabetic state as occurs in humans is uncommonly recognized in dogs and cats. The diagnosis of diabetes is based on the presence of appropriate clinical signs and persistent hyperglycaemia and glycosuria. Hypercholesterolemia and hypertriglyceridemia are common and ketonuria and ketoacidosis may develop if the owner fails to recognize early signs.

Treatment options are similar to those for human diabetics and include insulin injections (usually administered twice a day at 12 h intervals), dietary modifications, correction of obesity, exercise in dogs, and oral hypoglycaemic medications in cats. The treatment approach differs between dogs and cats, in part, because the underlying aetiologies differ.

A syndrome resembling gestational diabetes in humans occurs in older female dogs but not in cats. Female dogs ovulate at 7-month intervals and serum progesterone concentration is increased for 2 months after ovulation and formation of corpora lutea. Progesterone stimulates growth hormone secretion from the canine mammary gland and both hormones cause insulin resistance and carbohydrate intolerance in the dog. Older female dogs are frequently diagnosed with diabetes during diestrus or pregnancy when serum progesterone and growth hormone concentrations are increased

Diabetes insipidus occurs due to a deficiency of anti-diuretic hormone (ADH) which is synthesized by the neurons of the supra-optic nucleus of the pituitary (posterior). Deficiency of ADH is due to pituitary neoplasm, cyst, or traumatic

injury. Common clinical signs include polyuria, decreased specific gravity of urine, decrease in osmolarity of urine, and even concurrent signs of dehydration can be seen. Clinical examination may provide important clues to possible underlying diagnoses.

Conclusion

The intricate interplay between genetic, lifestyle factors, and environmental influences underscores the complexity of diabetes, thus optimizing prevention and management strategies can result in improved health outcomes.