Emergency endocrine cases: glucose gone wrong

2. Pragmatic approach to managing an insulinoma

Carmel T. Mooney

Insulinomas are uncommon in dogs and rare in cats. Insulinomas are usually malignant in dogs with evidence of metastases (local lymph nodes and liver) apparent in approximately 50% of dogs at diagnosis. Clinical signs relate to hypoglycaemia (collapse, weakness, ataxia, disorientation, mental dullness, visual disturbance and seizures) or increased adrenergic tone induced by hypoglycaemia (tremors, hunger, nervousness). In many cases, when hypoglycaemia is demonstrated, insulinoma is only one of many possible differentials. Occasionally affected dogs are euglycaemic at presentation; low circulating fructosamine concentration may support hypoglycaemia but a period of starvation may be required in some cases. Certain features increase the likelihood of insulinoma compared to other causes of hypoglycaemia. These include older age, certain breeds (often larger breeds), polyphagia with weight gain, peripheral neuropathy and episodes counterintuitively associated with feeding or rapid increases in blood glucose concentration. Serum biochemistry may reveal hypokalaemia and hypophosphataemia associated with hyperinsulinism.

A diagnosis is achieved by demonstrating inappropriate insulin concentration with hypoglycaemia; as such, insulin concentrations may remain within reference interval. Absolute values are used in interpretation; insulin:glucose ratios are unhelpful. Abdominal ultrasonography depicts a pancreatic mass in just over 50% of cases. Computed tomography is more sensitive. Evidence of abdominal metastases may not be apparent even if present with either imaging modality. However, neither the failure to identify a pancreatic mass nor the presence of metastatic spread should preclude surgical intervention. In a few cases, a serum insulin concentration is not supportive of insulinoma. Several possibilities exist; the insulin assay used may not be suitable for dogs, insulin-like growth factor II rather than insulin may be involved or another disease process is present. In cases with equivocal insulin results, repeat testing may provide a more definitive diagnosis.

In dogs suffering overt clinical signs of hypoglycaemia, immediate treatment is required. The standard

intravenous replacement glucose dose is 1 ml/kg of 50% dextrose diluted to a 25% solution and administered slowly over 10–15 minutes. Extreme caution is required to ameliorate clinical signs but avoid rapid increases in glucose that can stimulate further insulin secretion. Intravenous infusions of 2.5–5% dextrose can be used for maintenance. In refractory cases, glucagon infusion may be required. Treatment with anticonvulsant drugs should be avoided until the effects of glucose supplementation are properly assessed. In dogs with neurological signs that fail to respond to glucose supplementation, other potential causes of those signs should be considered. In some dogs hypoglycaemia results in irreversible neurological damage.

Palliative management includes frequent feeding with or without oral prednisolone therapy. Surgery is preferred for definitive treatment and can be followed by streptozocin administration if hypoglycaemia persists or recurs. The prognosis is guarded but more prolonged survival is attainable with more definitive treatment options.

KEY LEARNING OBJECTIVES

- Be able to prioritize differential diagnoses for hypoglycaemia in individual cases
- Have enhanced knowledge of risks of emergency treatment of hypoglycaemic insulinomas
- Be able to discuss treatment options confidently with owners

MULTIPLE CHOICE QUESTIONS

1. A dog with status epilepticus has a blood glucose concentration of 3.0 mmol/l (reference interval 3.5–6.5 mmol/l). A corresponding insulin concentration is 10 μ U/ml (reference interval 5–40 μ U/ml). What is your interpretation of these results in this case?
(A) The results are indicative of insulinoma
(B) The results are suggestive of insulinoma
(C) The results rule out insulinoma
(D) The results are equivocal for insulinoma
2. Insulinomas in dogs are commonly associated with which of the following?
(A) Limited metastatic disease
(B) Local metastatic spread
(C) Distant metastatic spread
(D) Local invasion
3. After frequent feeding, what is the next best palliative option for insulinoma?
(A) Prednisolone at 0.2 mg/kg/day
(B) Prednisolone at 2 mg/kg/day
(C) Diazoxide
(D) Octreotide