

## CUVS CASE FILE: Feline Insulinoma

A 9-year old, neutered male Bengal cat was presented to us for evaluation of twitching and limping. Past pertinent history included an episode of twitching of one of his eyes approximately 3 months prior. This resolved after several days although he continued to blink one eye more than the other.

On presentation, the cat exhibited lateralized twitching that responded to midazolam sedation. Chemistry profile and blood gas analysis revealed mild hypoglycemia (67 mg/dl), as well as mild hyperlactatemia, hyperglobulinemia and hypernatremia. Complete blood count, thoracic radiographs and blood pressure were all within normal limits.

Based on the observed signs and the sedation-responsive twitching, focal seizure activity was suspected. Differentials included intracranial causes (epilepsy, neoplasia, thromboembolic, inflammatory, infectious, trauma, or hypertensive event) and extracranial causes (toxin, metabolic, endocrine, electrolyte, other). Given the presence of seizure activity with cranial nerve deficits, together with the history of prior similar but less severe signs, an intracranial lesion was considered most plausible. We suspected that his hypoglycemia was secondary to increased muscular activity, rather than causative, given the small magnitude of defect as well as the clinical manifestations.

Brain MRI and CSF tap were performed by a neurologist and revealed no structural abnormalities or concern for infection or inflammatory conditions. The cat was tentatively diagnosed with epilepsy, despite his age, and antiepileptic therapy was initiated. He had 2 seizures thereafter. At the first, blood glucose concentration was 65 mg/dl. At the second, it was 45 mg/dl. This raised concern for the possibility of an extracranial cause of seizures. Abdominal ultrasonography was performed and revealed a small (0.6 cm x 0.6 cm), left-sided pancreatic nodule. Given the presenting hypoglycemia, this was considered highly suspicious for a pancreatic islet cell tumor (insulinoma).

The patient was transferred to our Surgery Service for abdominal exploratory surgery and mass resection. At surgery, a left-sided partial pancreatectomy was performed; all other abdominal structures were considered to be within normal limits. The patient's blood glucose increased to 340 mg/dl within 3 hours of surgery, consistent with the removal of an insulin-secreting neoplasm. Histopathology confirmed a **pancreatic islet cell neoplasm (insulinoma)** with complete excision. This patient was transiently diabetic, but returned to normoglycemia within 4 weeks of surgery. He has had no further seizures and is off all oral medications.

Insulinoma is exceedingly rare in cats.<sup>1-3</sup> Fewer than 10 cases have been well-documented in the literature, and very few with long-term follow up. Insulinoma is also very uncommon in dogs; these dogs typically present with seizures or collapse and marked hypoglycemia (below 60 mg/dl). The confirmatory test is paired insulin and glucose concentrations that demonstrate hyperinsulinemia despite hypoglycemia.

The diagnosis was initially missed in this cat – likely because of the somewhat unusual presenting signs, the rarity of the disease in this species, and the absence of marked hypoglycemia. In retrospect, the mild hypoglycemia was inappropriate for his level of stress and for post-seizure activity, and should have been considered and monitored.

While insulinoma or other insulin-secreting tumors (e.g. liver neoplasms) are rare, it is important to keep metabolic causes of seizures on our differential lists, regardless of the species, to look for evidence of these, and to reevaluate the differential list should the patient not respond as expected.

CUVS Services involved in this case: Critical Care/Emergency, Surgery, Internal Medicine

1. Greene SM, Bright RM. Insulinoma in a Cat. *J Small Anim Pract* 49(1):38-40, 2008.
2. Schaub S, Wigger A. Ultrasound-aided diagnosis of an insulinoma in a cat. *Tierarztl Prax Ausg K Kleintiere Heimtiere* 41(5):338-42, 2013.
3. Jackson TC, Debey B, Lindbloom-Hawley S, et al. Cellular and molecular characterization of a feline insulinoma. *J Vet Intern Med* 23(2):383-7, 2009.

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