DIAGNOSTIC APPROACH TO HYPOGLYCEMIA

PACIFIC COAST VETERINARY SPECIALISTS

Our mission is to redefine and elevate your pet's health through collaborative, minimally-invasive, and compassionate care that supports the well-being of your pet and peace of mind for your family.

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APPROACH TO HYPOGLYCEMIA

Fasting glucose concentration

- Declining insulin concentrations
- Gluconeogenesis
- Glycogenolysis

APPROACH TO HYPOGLYCEMIA

Fasting glucose concentration

70 mg/dl

Counterregulatory Hormones

- Epinephrine
- Glucagon
- Cortisol
- Growth hormone

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Clinical signs and severity of hypoglycemia

Rate of fall

Glucose concentration

Duration of hypoglycemia

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Adrenergic signs

- Restlessness; Muscle fasciculations

Neuroglycopenic signs

- Hunger
- Weakness/collapse
- Ataxia
- Seizures
- Blindness

ETIOLOGY OF HYPOGLYCEMIA

Laboratory error

Juvenile (puppy)

Glycogen storage

Hunting dog

Ketotic hypoglycemic

Hypoadrenocorticism

Sepsis

Hepatic disease

Neoplasia (non-pancreatic)

Islet cell tumors

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May produce a variety of hormones

Insulin
Pancreatic polypeptide
Somatostatin
Glucagon
Gastrin

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Signalment

- Median age 10 yrs (3.5 to 14)
- No sex predilection
- Breed predisposition
  - Boxer
  - German shepherd
  - Irish setter
  - Golden retriever

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Clinical signs

Seizures	(68%)	Depression/lethargy	(19%)
Collapse	(34%)	Ataxia	(19%)
Generalized weakness	(33%)	Exercise intolerance	(10%)
Posterior weakness	(33%)	Weight gain	(8%)

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Physical examination

- Usually unremarkable
- Geriatric abnnormalities
- Status epilepticus
- Comatose

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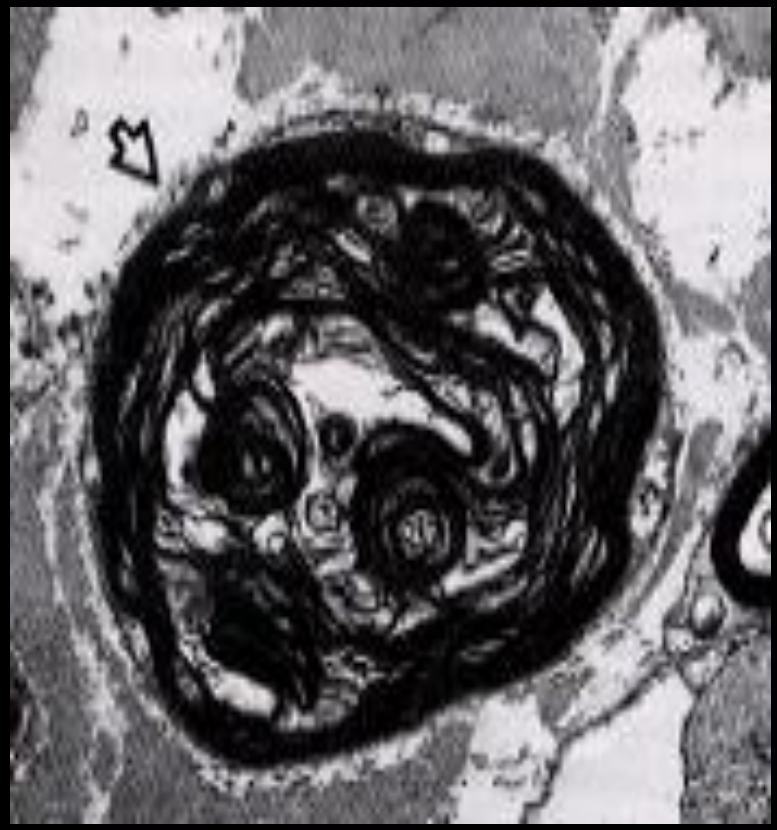
Peripheral Polyneuropathy

- Hindlimb paresis
- Quadriparesis
- Proprioceptive deficits

EMG's

- Fibrillation potentials
- Positive sharp waves



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Diagnosis

Whipple's Triad

- Fasting hypoglycemia
- Clinical signs of hypoglycemia
- Response to glucose administration

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Diagnostic approach

Blood glucose < 60 mg/dl

Multiple samples

Close monitoring

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Diagnostic approach

- Insulin/glucose ratio
- Glucose/insulin ratio
- Amended insulin/glucose ratio

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Diagnostic approach

Insulin/glucose pairs

Normal to elevated insulin
Hypoglycemia

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Diagnostic approach

CBC, SMA and UA

Radiography

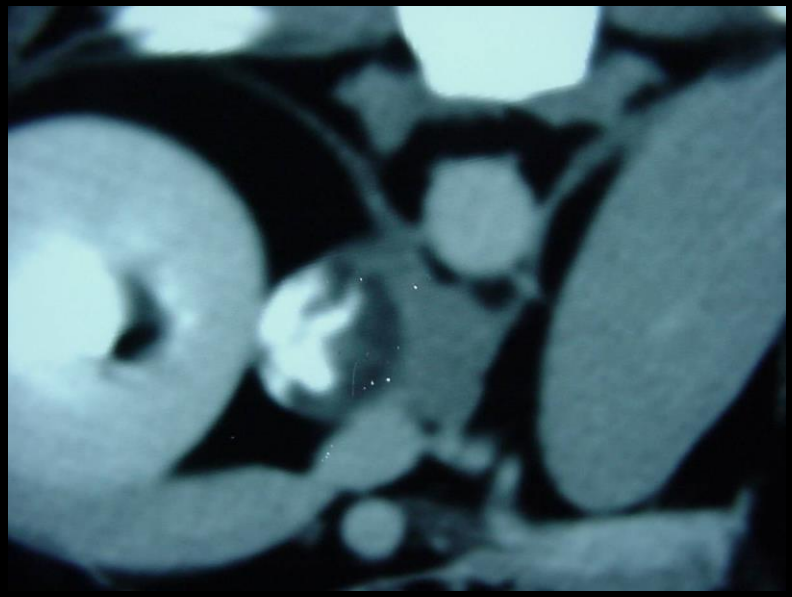
- Thorax and abdomen

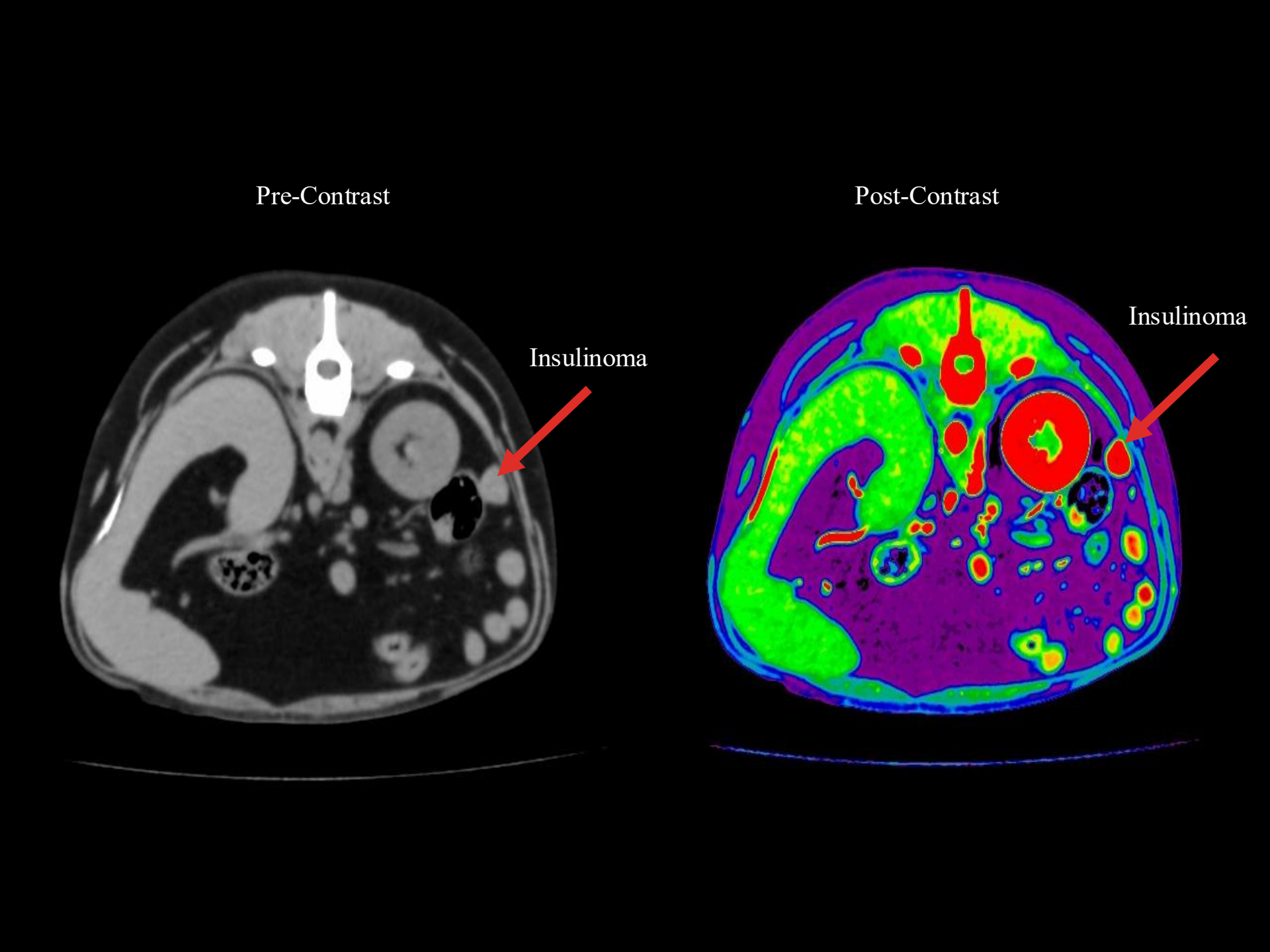
Ultrasonography

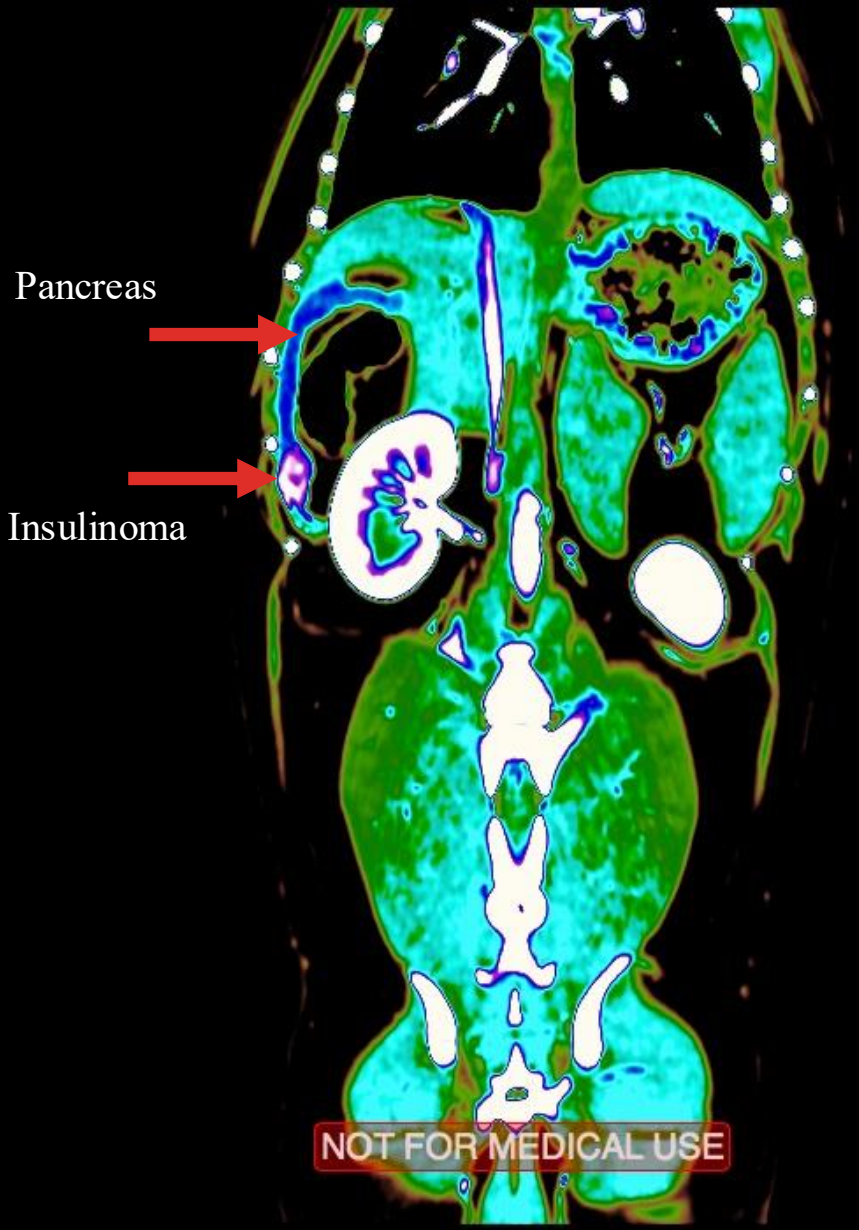
- Pancreatic mass

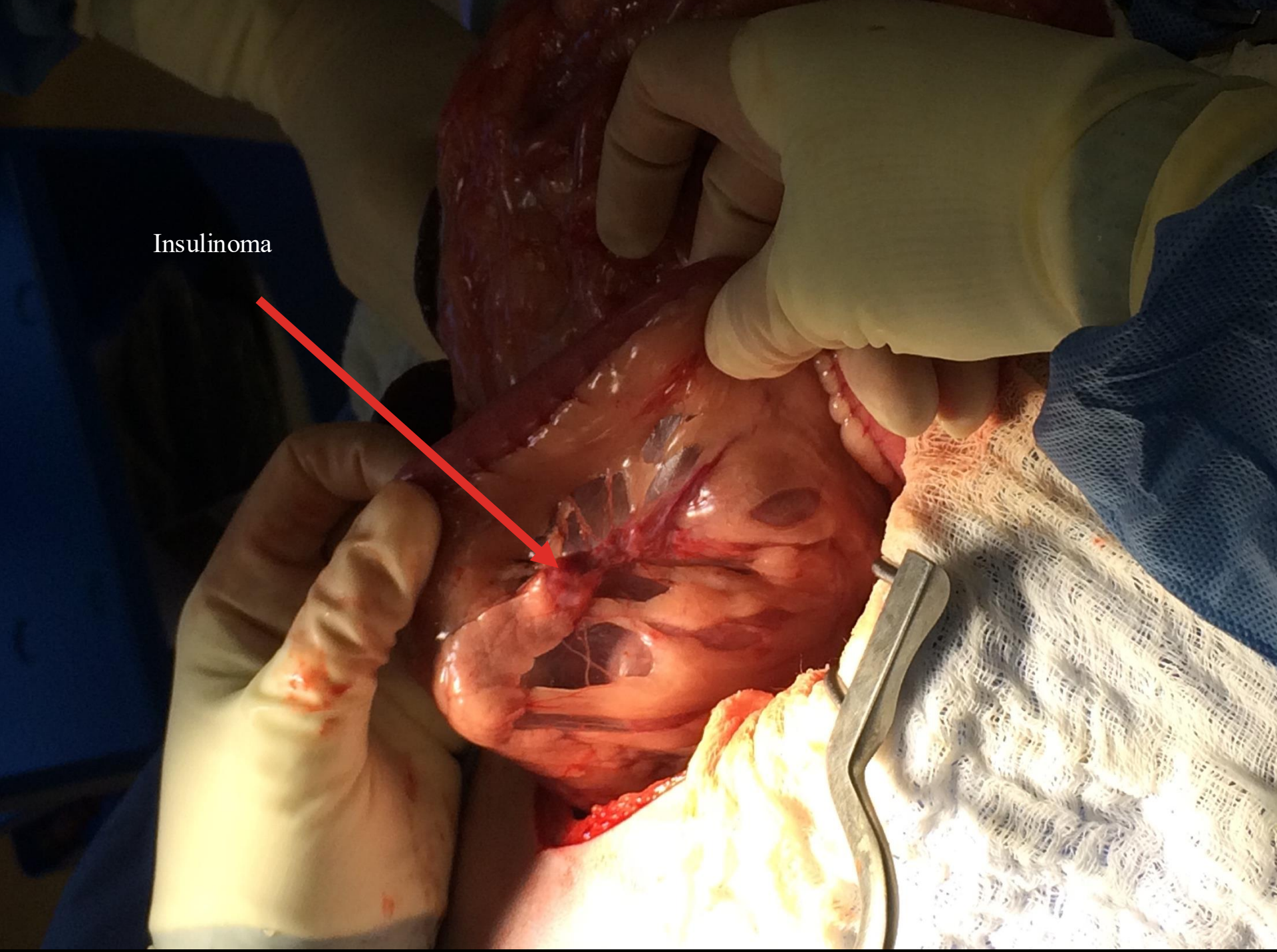
Lymphadenopathy

Metastasis




Pre-Contrast
Insulinoma
Post-Contrast
Insulinoma


Pancreas
Insulinoma
NOT FOR MEDICAL USE


Insulinoma

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Emergency Treatment

- IV Dextrose (50%)
  - 0.5 ml/kg
  - Followed by 5 % dextrose infusion

- Cerebral edema
  - Mannitol
  - Glucocorticoids

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Treatment

- Surgery
  - Confirmation
- Staging
  - 51 % have visible metastasis
    - 22 % hepatic
    - 15 % lymph node
- Removal

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Surgery

Localization

Right lobe	(36 %)
Left lobe	(38 %)
Body	(7 %)
Multiple	(14 %)
No mass	(20 %)

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Surgical Procedure

- Suture fracture technique
- Dissection technique
- Similar complication rates
- Post-operative pancreatitis

No mass ???

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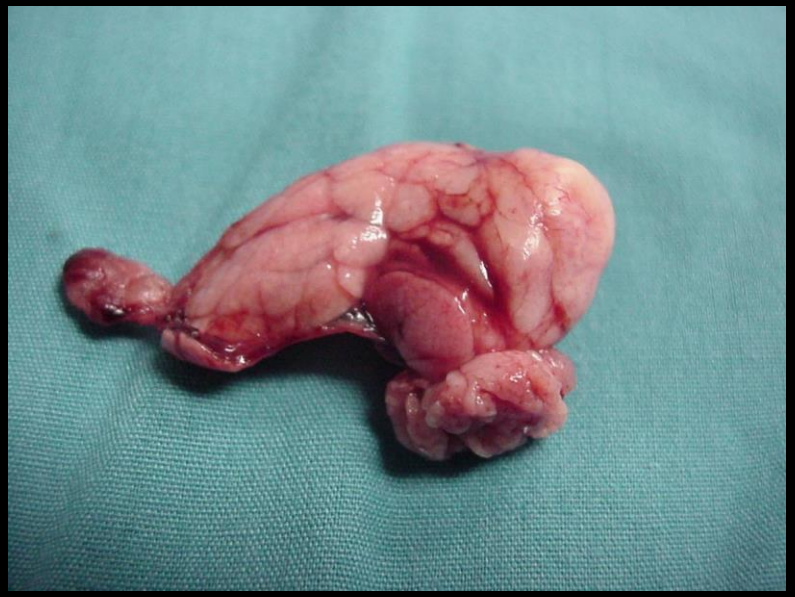
Pathology and Natural Behavior

Small, tan nodules

14 % have multiple masses

Diffuse hyperplasia is rare



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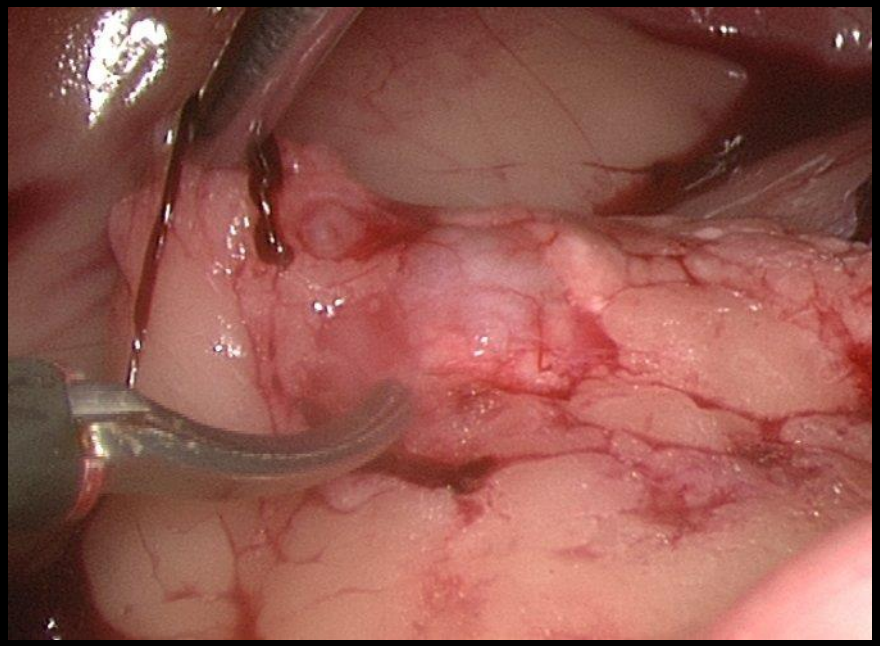
Pathology and Natural Behavior

Normal appearing islets

Irregular nests

Stromal proliferation



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Medical Therapy

Frequent feedings

Owner awareness of hypoglycemia

Prednisone

0.25 to 2.0 mg/kg BID

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Medical Therapy

- Diazoxide
  - Benzothiadiazene
  - Inhibition of insulin release
  - Hepatic gluconeogenesis
  - Decreased glucose uptake

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Medical Therapy

Diazoxide

5.0 to 30.0 mg/kg BID

In conjunction with thiazide diuretic

2.0 to 4.0 mg/kg BID

Vomiting, diarrhea, anorexia

Administer with meals

Availability

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Somatostatin

Octreotide acetate

50 - 100 mcg SC or IV TID to QID

Limited use in dogs

3/5 responded for 9 – 12 months

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Streptozotocin

- 500 mg/m^2 IV infusion
- Selective beta cell toxin
- Limited renal toxicity with diuresis
- Treatments q 3 weeks; 5 treatments

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Prognosis

Median survival

11.5 months (114 dogs)

With metastasis 8.4 months

No metastasis 14.5 months

Diabetes is a good prognostic indicator