

# HEMANGIOSARCOMA

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“Partnering with our Referring Practices”



## BIOLOGIC BEHAVIOR

- Hemangiosarcoma
  - Represents approximately 20% of canine soft tissue sarcomas and 5% of all canine neoplasms
  - More prevalent in dogs than in people
- Etiology unknown in dogs and cats aside from sunlight exposure for some cases of cutaneous and conjunctival HSA

### Canine Studies

Of 104 cases of canine hemangiosarcoma

- 62% splenic
- 17% soft tissue
- 6% liver
- 3% cardiac\*
- 3% long bones

\*Other references list cardiac as third most prevalent primary site

- One half - 2/3 of splenic lesions in dogs are neoplastic
  - Of neoplastic tumors, 1/2 - 2/3 will be hemangiosarcoma
  - Multifocal masses are more likely associated with neoplasia
  - When splenic disease and rupture are present, 95% of diagnoses were malignant in 1 study
- In one study, dogs with hemoabdomen, splenic lesions, anemic enough to require transfusions
  - 76% malignant; of malignant tumors, 93% HSA
- Conjunctival
- Non-pigmented sites (solar-induced)
  - 11/20 treated with surgery locally recurrent, however 7 with incomplete resection did not recur

### **Feline Studies**

n = 53; Skin and SQ majority

- Local recurrence in 6/12 SQ that received surgery
- 6/13 SQ cases developed metastasis

Conjunctival n = 2

- Non-pigmented sites
  - 2/2 local recurrence, cured by second surgery

Visceral; n = 26

- Multifocal in 77% of cases
- 33% pulmonary metastasis
- 71% euthanized w/in one day of diagnosis
- Median survival 77 days (23 – 296 days)

## **DIAGNOSTICS**

### **Ultrasound**

- 3 dogs with splenic HSA
- No hepatic lesions on routine ultrasound; however, nodules identified on **contrast** ultrasound, all histologically confirmed as HSA

## **Thoracic Ultrasonography**

- Pericardial effusion
  - R atrial mass; identification can be operator dependent; 64% negative predictive value
- Pleural effusion
- Fractional shortening prior to doxorubicin chemotherapy?

## **Cytology**

- Effusions, mass fine needle aspiration, subcutaneous masses, cutaneous nodules
- Often hemo-dilute and non-diagnostic
- Use of immunocytochemistry (Factor VIII staining) may help differentiate between hemangiosarcoma and other mesenchymal neoplasms

## **Pericardial Lesion Diagnostics**

- Pericardial pH
  - One study indicated that pH was higher in neoplastic effusions than in idiopathic effusions but significant overlap in these 2 groups
- Cardiac Troponins
  - May prove useful with further study to differentiate between hemangiosarcoma vs. idiopathic vs. other neoplastic lesions

## **Diagnostics (other)**

- CT scan to differentiate benign from malignant splenic lesions
- CT or MRI for SQ lesions for definitive surgical planning
- Urine basic fibroblast growth factor
  - Levels were higher in dogs with HSA vs. normal controls; not commercially available
- Plasma and serum vascular endothelial growth factor
  - 13/17 dogs with HSA had detectable plasma levels vs. 1/17 healthy dogs
  - Correlated with tumor burden in one study



## **THERAPY**

### **Surgery – Canine Studies**

#### Splenic/cardiac

- Median survival following splenectomy alone has been reported to range from 19 days – 3 months; less than 10% survive one year
- Mean survival following resection of R atrial masses has been reported as 64 days - 4 months
- MS following resection of pericardial masses was 16 days

#### Renal

- n = 14
- All dogs nephrectomized, 4/14 received chemotherapy
  - Median survival 278 days (0-1005 days)

#### Dermal/SQ

- Median survival following resection of tumors confined to superficial dermis was 780 days
- Median survival of tumors in subcutis was 172 days and in muscle was 307 days (approximately 20% complete resection in these cases)

### **Surgery – Feline Studies**

#### Visceral

- Post-surgery intra-abdominal mean survival was 4 ½ months (3 weeks – 9 mo; n = 5 cats) in one study
- 3/3 cats with visceral sites (mediastinum, mesenteric, splenic) were metastatic at the time of diagnosis in another study

#### Cutaneous/SQ, variable reports

- 60-80% local recurrence rates; mean time to recurrence 16 weeks
- Mean survival of 44 weeks (13-112+ wks) for 5 cats that died; no evidence of metastasis in these patients and 5 cats alive 18-112 wks post-op
- In another report, 5/5 cats with cutaneous/SQ sites died of complications of metastatic dz with a mean survival of 48 days

### **Chemotherapy**

#### Doxorubicin-based protocols

#### Post-splenectomy

- Doxorubicin-based protocols; MS of 5-6 months

#### Post-resection of SQ masses

- n = 2 dogs, died at 6 and 8 months of unknown causes

#### Protocols and survival not published for cats

- Doxorubicin-cyclophosphamide chemo post-amputation of primary bone tumor; n = 2 dogs died w/in 5 months of metastasis

- Epirubicin; splenic hemangiosarcoma
  - n = 41 surgery alone, MS 86 days; n = 18 epirubicin + surgery, MS 144 days
  - Authors felt more GI signs than doxorubicin
- Pegylated (avoids immune detection) liposomal (can be delivered preferentially via leaky cancer vasculature) doxorubicin
  - Delivered intraperitoneally
    - Decreased omental, serosal metastasis
- Alternating low dose cyclophosphamide and etoposide (metronomic chemotherapy) + constant piroxicam
  - MS 178 days
- Palliative chemotherapy; can consider instead of surgical excision of primary tumor
  - Reported for dogs with cardiac HSA resulting in tumor response/palliation for up to 5 months
- Mean survival of 164 days following R atrial HSA resection + chemotherapy.

### **Immunotherapy**

- Dogs treated with surgery + AC chemotherapy + liposome encapsulated MTP-PE had a median survival of 9 months
  - MTP-PE is not commercially available
- Tumor vaccine + chemotherapy
  - MS 182 days

### **Radiotherapy**

- Reported to provide tumor regression with non-resectable cutaneous HSA
- Palliative RT in 20 dogs with non-visceral HSA
  - Several responses, 4/20 complete response

### **Other Therapy**

- Minocycline
  - Evaluated in dogs for splenic, SQ, and “other” sites following surgery + AC; no improvement over historical controls treated with surgery + AC alone
- SAHA (suberoylanalide hydroxamic acid); histone deacetylase inhibitor
  - Histones act as spools around which DNA winds. This enables the compaction necessary to fit the large genomes of eukaryotes inside cell nuclei.
  - Histone deacetylation removes acetyl groups from histone tails, causing the DNA to wrap more tightly around the histones and interfering with the transcription of genes by blocking access by transcription factors. The overall result of histone deacetylation is a global (non specific) reduction in gene expression (i.e. tumor suppressor genes).
  - Valproic acid (old anti-convulsant drug) is an HDAC-I.
- Theorized that exposure to SAHA generates hyperacetylated chromosomal histones, which, in turn facilitates the expression of tumor suppressor genes turned off by during neoplastic transformation of the endothelium

- Case report of one dog treated with this histone deacetylase inhibitor (HDAC)
  - Post splenectomy, oral administration; no evidence tumor recurrence > 1000 days later

- VCS 2007 report (Overly *et al*) of 7 dogs treated for stage II or III splenic hemangiosarcoma with a SAHA compound called Vorinostat (Zolinza®) following surgery

- Median duration of remission was 109 days (range of progression-free survival 21-450 days)

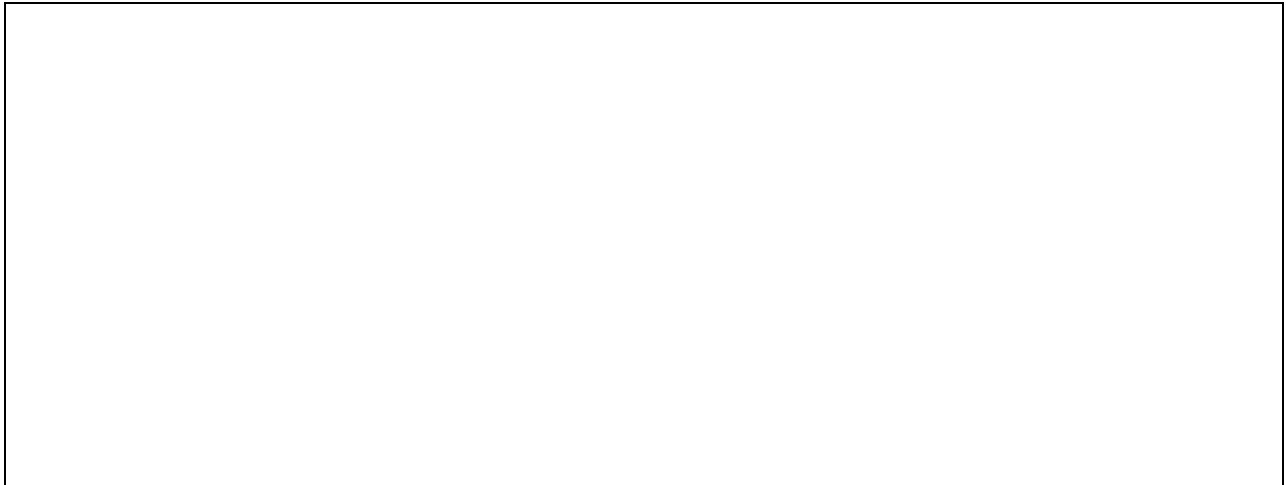
- Median overall survival time 218 days

- Dose-limiting toxicity was GI

- VCS 2007 (Thamm *et al*) report of exposure to valproic acid may potentiate anti-proliferative effects of Adriamycin against *osteosarcoma* in mouse model

- Tyrosine Kinase inhibitors

- In VCS 2007 abstract (Helfand *et al*) Gleevec® used to decrease growth of canine hemangiosarcoma in xeno-grafted mouse model; down-regulates surface expression of c-kit, PDGFR-β, and VEGFR-2



# SUMMARY

## Canine

- 50-66% of canine splenic lesions are malignant
- 50-93% of malignant splenic lesions are HSA
- If splenic lesions are multiple, or associated with hemoabdomen, then more likely malignant
- Not all hepatic, mesenteric, nodal lesions in splenic hemangiosarcoma patients are associated with metastatic disease
- Median survival post-splenectomy is approximately 2 months; early stage disease may provide longer survival
- Median survival post-splenectomy + doxorubicin-based protocols is approximately 6 months
- Dermal HSA solar-induced lesions generally have a good prognosis with adequate excision
- Dermal HSA in *non-solar regions* have guarded to poor prognosis due to common etiology as metastatic site from visceral primary site

## Feline

- SQ and visceral sites are associated with short survival due to local recurrence and metastatic potential

## Both Canine and Feline

- Conjunctival sites associated with good survival if adequate local control

## Novel diagnostic strategies

- CT scan of splenic lesions
- Contrast ultrasound of hepatic lesions

## Novel therapeutics

- HDAC inhibitors
- Metronomic chemotherapy
- MTP-PE
- Anti-viral agents
- Radiotherapy for SQ sites
- Tyrosine kinase inhibitors

# Maropitant (Cerenia™): A New Class of Antiemetics

Keith Richter, DVM, Diplomate ACVIM

## **Introduction:**

Maropitant (Cerenia™) is a recently approved antiemetic for use in the dog. It is a neurokinin-1 (NK-1) receptor antagonist. Its corresponding neurotransmitter is substance P. Maropitant is absorbed through the intestinal tract via the surface membrane pump P-glycoprotein (PgP), and undergoes principally hepatic metabolism through the cytochrome P450 system. Following hepatic metabolism, oral bioavailability is 24%.

## **Efficacy Studies:**

Several studies were conducted for registration purposes (FDA/EMA) and were therefore randomized, controlled, blinded, conducted to GCP and considered statistically significant at  $P < 0.05$ . The objective of one study in normal dogs was to evaluate the efficacy of injectable maropitant in the prevention of emesis induced by apomorphine or syrup of ipecac compared to other anti-emetics (metoclopramide, chlorpromazine, and ondansetron). Apomorphine induces vomiting primarily through stimulation of receptors in the chemoreceptor trigger zone (CRTZ), whereas ipecac acts on peripheral receptors in the stomach. In this study, only maropitant demonstrated efficacy against both emetic agents. Both metoclopramide and chlorpromazine only prevented vomiting from apomorphine (thus only acting centrally in the CRTZ), and ondansetron only prevented vomiting from ipecac (thus only acting peripherally). This suggests a broader spectrum effect of maropitant compared with the other antiemetics studied.

In a U.S. field study, maropitant was compared with placebo in dogs with acute vomiting from a variety of causes. The study findings demonstrated that maropitant administered SQ at 1 mg/kg or orally at 2 mg/kg was highly effective in reducing emesis in dogs presenting to veterinary hospitals with a recent history of vomiting. In addition, oral administration of maropitant at 2 mg/kg as a follow-up to an injectable dose was shown to be effective against ongoing vomiting.

In a European field study, maropitant was compared with metoclopramide in dogs with acute vomiting from a variety of causes. This study showed that maropitant efficacy was significantly superior to metoclopramide when vomiting was evaluated by either videotape or by direct observation.

Another study evaluated the efficacy and safety of the injectable formulation of maropitant for both prevention and treatment of cisplatin-induced vomiting in canine cancer patients undergoing cisplatin chemotherapy at 11 US veterinary practices. In this study, saline or maropitant was administered 1-hour prior to cisplatin and either was administered as soon as possible after an emetic event was observed. The results showed

that 83% (34/41) of the dogs pretreated with saline vomited, whereas only 5% (2/39) of the dogs pretreated with maropitant vomited following cisplatin. This demonstrated superiority of maropitant for the prevention of vomiting. Once vomiting occurred (in either group), 56% (22/39) of the saline treated group had ongoing vomiting and needed to be “rescued”, whereas only 5% (2/39) of the maropitant treated group were withdrawn for ongoing vomiting and needed to be “rescued”. This demonstrated superiority of maropitant for the treatment of vomiting.

Maropitant was also evaluated for the prevention and safety in puppies or older dogs with a history of motion sickness in three separate studies. In these studies, maropitant or placebo was administered to dogs 1-10 hours prior to a car ride. Only 7-16% of dogs vomited after maropitant administration, compared with 52-68% of dogs that received a placebo, thus demonstrating significant protection from motion sickness-induced emesis.

In summary, maropitant has been demonstrated to have a broad spectrum of efficacy in prevention studies with oral tablets and injectable solution against both central and peripheral emetogens. This includes challenge by apomorphine (central), ipecac (peripheral), and cisplatin (central and peripheral). In addition, maropitant has been shown to have efficacy for treatment of vomiting with the injectable solution only (since it is difficult to administer oral tablets to vomiting dogs). Finally, maropitant provides significant protection from motion sickness-induced emesis.

#### **Safety Studies:**

The most common adverse events in dogs > 16 wks of age were vomiting, diarrhea, hypersalivation, lethargy, depression, inappetence, weight loss, and injection site reactions. Many of these were not distinguishable from the disorders that resulted in vomiting. In general, though, maropitant was safe and well-tolerated when administered at the oral and injectable label dose to dogs with a wide range of clinical illnesses and when on a variety of concurrent medications. Caution should be used in puppies younger than 11 weeks of age, as histological evidence of bone marrow hypoplasia was seen at higher frequency and greater severity in puppies treated with maropitant than in control puppies. In puppies 16 weeks and older, bone marrow hypoplasia was not seen. Caution should also be used in dogs with hepatic dysfunction since maropitant undergoes hepatic metabolism.

#### **Clinical Use of Maropitant:**

For the treatment and prevention of acute emesis, the injectable solution should be administered at 1 mg/kg once daily (for up to 5 days). For prevention of acute emesis, the tablets should be given orally at 2 mg/kg once daily (for up to 5 days). For the prevention of emesis due to motion sickness, maropitant should be given orally at a dosage of 8 mg/kg once daily (for up to 2 days). Dogs should be fasted 1 hour prior to administration and dosed 2 hours prior to travel. Tablets may be given with a small amount of food, but not wrapped tightly in fatty food (which may affect dissolution).

The oral dose of 2 mg/kg is generally interchangeable with the injectable dose of 1 mg/kg. A maximum concentration is achieved in 45 minutes after SQ administration,

and in 2 hours after oral administration. Feeding has no effect on oral pharmacokinetics. It should be noted that drug accumulation occurs with chronic dosing due to non-linear pharmacokinetics (clearance is not constant or proportional to the amount of drug administered), presumably due to saturation of transport processes and metabolizing enzymes. Therefore, after 5 days of 2 mg/kg orally, maropitant should be stopped for 1 day, and after 2 days of 8 mg/kg orally, maropitant should be stopped for 2 days.

# **Total Elbow Replacement**

## **May 22, 2008**

Joshua Jackson, DVM, Diplomate ACVS

Severe osteoarthritis of the elbow is one of the most common orthopedic conditions seen in all veterinary patients. This can be from fragmentation of the coronoid process, osteochondrosis, asynchronous growth between the radius and ulna, ununited anconeal process, intraarticular fracture and luxation and may account for up to 8% of all appendicular joint disease. Treatment of this problem is often challenging. Many patients will exhaust medical management in this painful and debilitating disease. Historically, we have been limited in our ability to manage end stage elbows. NSAIDs, narcotics, weight loss, physical therapy, nutraceuticals, special diets and even acupuncture have all been used to try to alleviate the clinical signs.

Total elbow replacement (TER) has been attempted in dogs for the last 2 decades. There are many challenges to overcome with replacement of the elbow. Dogs place close to 60% of their weight on the front limbs, which make the elbow a much bigger challenge in dogs than in people. TER must address three bones instead of just two as in total hip or total knee replacement. The elbow has much less soft tissue support and covering than the hip, making it more prone to dislocation or infection. Total elbow replacements to date have required an aggressive surgical approach and have lacked appropriate equipment and instrumentation to allow repeatable and predictable results. Past TER has required a cementing technique which is costly, time consuming and prone to loosening with time. Success rates of ~80% (16/20 dogs) have been published with the TER systems that have historically been used.

A new TER designed by Dr. Randy Acker and manufactured by Biomedtrix is now available. The technique is considered a minimally invasive arthroplasty technique as joint luxation is not required. In addition, the implants are cementless and thus rely on a press fit that strengthens with time as bone grows in to the implants porous coating. A medial approach has been employed to decrease the risk of elbow dislocation. A tremendous amount of work has gone in to the engineering of instrumentation, jigs and implants associated with the procedure. While the new TER system from Biomedtrix has only just hit the market, the preliminary results are very promising. The risk of infection, fracture, dislocation and implant failure have been very low in the first cases performed. Long term evaluation of the implant will be important to determine ultimate success of the implant.

The new total elbow replacement is available at the Veterinary Specialty Hospital for medium to large breed dogs. April. Please contact us if you have questions or would like us to review radiographs of a potential TER candidate.

## **Update on the Diagnosis of Pancreatitis**

### **May 22, 2008**

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#### **Introduction: Pancreatitis – Clinical Significance.**

A recent study looked at the frequency of pancreatic pathology in 101 dogs presented for necropsy for any reason (J Vet Diagn Invest. 2006 Jan;18(1):115-8). Of these dogs 92% had histologic lesions in the exocrine pancreas: 80.2% had hyperplastic nodules (questionable pathologic significance); 52.5% lymphocytic inflammation, 49.5% fibrosis, 46.5% atrophy (fibrosis and atrophy are indicators of prior inflammation and damage); 31.7% neutrophilic infiltrates; 25.7% pancreatic fat necrosis; 16.8% pancreatic necrosis and 9.9% edema. It is unknown how many of these lesions were significant but exocrine pancreatic lesions were much more common than expected.

Pancreatitis is a common clinical disorder that can be either acute or chronic. Clinical, clinicopathologic, radiographic, and ultrasonographic abnormalities in dogs with fatal acute pancreatitis were reported in 70 case (J Am Vet Med Assoc. 1998 Sep 1;213(5):665-70). There was anorexia in 91% of the cases, vomiting in 90%, weakness in 79%, abdominal pain in 58%, dehydration in 46%, diarrhea in 33%, icterus 26%, and fever in 21%. A definitive diagnosis of pancreatitis can be difficult because clinical signs, exam findings, and clinicopathologic abnormalities are non-specific. In dogs with acute pancreatitis a history of dietary indiscretion is common and vomiting and abdominal pain are common presenting complaints. In people with pancreatitis the most common symptoms are abdominal pain (95-97%) and fever (75%). Abdominal pain is expected in all cases of pancreatitis and in many dogs and cats with pancreatitis abdominal pain probably goes unrecognized.

#### **Diagnostic Imaging:**

##### **Radiography:**

Radiographic changes include decreased serosal detail, dilated intestinal loops, transposition of organs. Radiographs have a reported sensitivity of 24% in dogs with histologically confirmed acute pancreatitis (J Am Vet Med Assoc. 1998 Sep 1;213(5):665-70). Although radiographs have limited diagnostic value for pancreatitis they are a valuable diagnostic tool to rule out primary gastrointestinal disease such as obstruction and foreign body.

##### **Ultrasonography:**

Common ultrasound findings in patients with pancreatitis are an enlarged irregular hypoechoic/heterogeneous pancreas, hyperechoic peripancreatic mesentery, peripancreatic fluid, and/or a pancreatic mass effect. Ultrasound for pancreatitis has a reported sensitivity of 68% in dogs (J Am Vet Med Assoc. 1998 Sep 1;213(5):665-70).

Abdominal ultrasound was both sensitive in cats with moderate to severe pancreatitis (80%) and specific in healthy cats (88%) (J Vet Intern Med. 2004 Nov-Dec;18(6):807-15). In another study the sensitivity of ultrasound in cats was reported to be 24% (J Vet Intern Med. 2001 Jul-Aug;15(4):329-33). Ultrasound is very operator and machine dependent. With more advanced equipment and more experience the sensitivity of ultrasound is improving.

### **Computed Tomography (CT):**

Computed tomography is the diagnostic test of choice in humans with pancreatitis having a sensitivity of 75 to 90%. In two feline studies CT was not shown to be very useful for the diagnosis of pancreatitis (10 cats, only 2 had CT changes suggestive of pancreatitis, sensitivity of 20%). Similar studies in dogs have failed to show CT to be useful for the diagnosis of pancreatitis, although CT has been successful in isolated cases. (J Vet Intern Med. 2004 Nov-Dec;18(6):807-15; J Vet Intern Med. 2001 Jul-Aug;15(4):327-8; Proc 18th ACVIM Forum 2000; 485-87; Vet Radiol Ultrasound 2003;44: 72-9).

### **Serum Amylase and Lipase:**

Serum amylase and lipase activity are commonly relied upon for the diagnosis of pancreatitis. They are of no clinical value for the diagnosis of pancreatitis in the cat and they have limited clinical utility in the dog. In dogs the specificity and sensitivity of serum lipase activity is 55.2% and 73.3% and serum amylase activity is 57.1% and 62.1% (J Vet Intern Med 2000;14: 346). Serum amylase and lipase activity should only be used for the diagnosis of canine pancreatitis until more definitive tests can be performed.

### **Serum Trypsin-like Immunoreactivity (TLI):**

Serum TLI is pancreatic-specific, and elevations are expected with acute pancreatitis but due to rapid clearance from the circulation serum TLI has limited diagnostic value for the diagnosis of pancreatitis. In dogs with pancreatitis the sensitivity and specificity have been reported at 36% and 65% respectively for values of > 50% ug/L. For both dogs and cats the sensitivity of serum TLI is between 30 and 60% making it a suboptimal test for the diagnosis of pancreatitis. Serum TLI is the clinical gold standard for the diagnosis of exocrine pancreatic insufficiency (EPI). (J Vet Intern Med. 2001;15:274; J Am Vet Med Assoc 2000;217:37-42; J Vet Intern Med. 2001 Jul-Aug;15(4):329-33; J Vet Intern Med. 2004 Nov-Dec;18(6):807-15)

### **Canine Pancreatic Lipase Immunoreactivity (cPLI):**

This assay was developed by Drs. Jörg Steiner and David Williams at the Gastrointestinal Laboratory at Texas A&M University (Can J Vet Res 2003;67:175-182). Canine pancreatic lipase immunoreactivity (PLI) is an immunoassay (polyclonal antibody system) utilizing anti-pancreatic lipase antibodies. Pancreatic lipase is the antigen that is specifically being recognized by the test. This assay is not testing for enzyme activity.

In 9/11 dogs with histologically confirmed pancreatitis cPLI was above the cut-off for pancreatitis and 11/11 dogs had elevated cPLI levels. Sensitivity was calculated at 82% for the diagnosis of pancreatitis (J Vet Intern Med 2001;15:274). Canine pancreatic lipase immunoreactivity is 96% specific for the diagnosis of pancreatitis. In dogs with

gastritis 24/25 had cPLI concentrations below the cut-off for pancreatitis. No dog with chronic renal failure had a cPLI above the pancreatitis cut-off and 2.2 mg/kg of prednisone daily did not change the cPLI concentrations.

**Canine Pancreas Specific Lipase (Spec cPL):**

IDEXX collaborated with Drs. Steiner and Williams to develop the canine pancreas-specific lipase (Spec cPL) assay. This assay relies on the same concept as the cPLI. The Spec cPL is an immunoassay that measures the concentration of pancreatic lipase in the bloodstream. The assay was developed from recombinant antigen and monoclonal antibody technology. Correlation of cPLI and Spec cPL results are extremely good (relative agreement 94%). In a recent study 30/31 dogs with a histologically normal pancreas had a Spec cPL below the cut-off for pancreatitis and 29/31 had a Spec cPL in the normal range (data to be presented at ACVIM 2008).

**Snap Canine Pancreas Specific Lipase (Snap cPL):**

The Snap cPL is a point-of-care test that uses the same technology as Spec cPL and is optimized to match the performance of Spec cPL. The test results are semi-quantitative and are visually read as either normal or abnormal. Serum is used and the test has a read time of 10 minutes. The abnormal range captures Spec cPL levels >200 (i.e. elevated and consistent w/ pancreatitis zones). Correlation to the Spec cPL ~95%.

**Multicenter Clinical Study: Diagnosis of Clinical Acute Canine Pancreatitis using the cPL Assay**

This is a Comparative Gastroenterology Society (CGS) members and IDEXX collaborative prospective study evaluating the usefulness and accuracy of the serum Spec cPL and Snap cPL assays for the clinical diagnosis of canine acute pancreatitis that VSH is currently participating in. The goal is to identify 50 total cases of likely acute pancreatitis and 50 control subjects (patients that have a need for an abdominal ultrasound but are not suspected of having pancreatitis). Diagnostic tests required are a CBC, chemistry, urinalysis, full abdominal ultrasound, and abdominal radiographs (not required by highly recommended) which are paid for by the owner. Serum amylase and lipase activity, Snap cPL, Spec cPL (at admission and again prior discharge or within a week of discharge), and C-reactive protein are paid for by IDEXX Laboratories.

The clinical findings will be evaluated by a panel of CGS members blinded to the IDEXX test results to determine the accuracy of the Spec cPL and the Snap cPL. Although the diagnosis of pancreatitis is often difficult to make without the benefit of histopathology we believe it is possible to determine if pancreatitis is likely or not. This is supported by the American Gastroenterological Association Position Statement on Acute Pancreatitis (Gastroenterology 132:2019, 2007) where our human medicine counterparts believe a reliable diagnosis of acute pancreatitis can be made using clinical features, laboratory testing and imaging. The information gathered may provide further perspectives in the diagnosis, treatment or prognostic factors in acute pancreatitis.