

VITICUSGROUP™
WVC ANNUAL CONFERENCE
FEBRUARY 18 - 21, 2024 | LAS VEGAS, NV

Gut Feeling – Clinical Approach to Feline Chronic Enteropathy

Celeste Clements, DVM, DACVIM (SAIM)

Nancy Sanders, DVM, DACVIM (SAIM), DACVECC

Monday, February 19, 2024

Financial Disclosure

Financial Disclosure

Celeste Clements and Nancy Sanders are full-time employees of IDEXX Laboratories, Inc; the relationship **will not** influence the presentation.

Disclaimer: The information contained herein is intended to provide general guidance only. As with any diagnosis or treatment, you should use clinical discretion with each patient based on a complete evaluation of the patient, including history, physical presentation, and complete laboratory data. With respect to any drug therapy or monitoring program, you should refer to product inserts for a complete description of dosages, indications, interactions, and cautions. Diagnosis and treatment decisions are the ultimate responsibility of the primary care veterinarian.



Learning Objectives

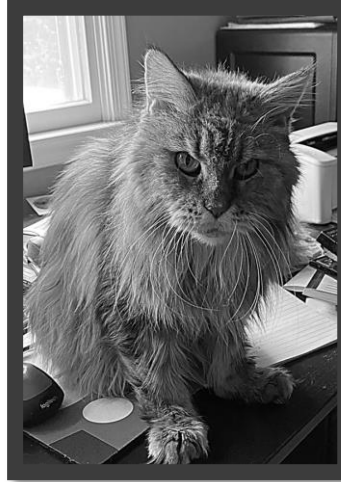


After participating in this session, attendees should be able to:

- Define and discuss feline chronic enteropathy (CE)
- Summarize the diverse etiologies of chronic feline gastrointestinal signs
- Develop and justify an evidence-based plan to diagnose CE
- Plan management of feline patients for a spectrum of care
- Locate expert resources and research novel approaches to improve feline gut health



A TALE OF
TWO
KITTIES



Discovery



OC



Discovery, 18 yo, FS, Maine coon

CC: Vomiting, lethargy, anorexia for ~2d

HX:

- **Vomited watery fluid 2-3 times**
- **Stopped eating and drinking ~36 hours ago**
- No D/C/S/PU/PD
- No toxins or exposure to other cats
- Diet consistent, commercial canned and dry
- **Moved from FL 4 days ago**
- **Weight loss over years**
- **Occasional sporadic cough**

PE:

- Wt. 10.47#
- T 101°F, HR 140 bpm, RR 32/m
- BARH, MM moist, CRT <2s
- **BCS 5/9; MCS moderate muscle loss**
- **Oral: Moderate dental tartar**
- Normal retinal and cervical exam
- CV: Normal auscultation, no murmur or gallop
- RESP: Normal bronchovesicular sounds bilaterally, eupneic
- ABD: Soft, nonpainful, no masses, organomegaly or fluid wave
- LN: WNL



Discovery, 18 yo, FS, Maine coon

Problems:

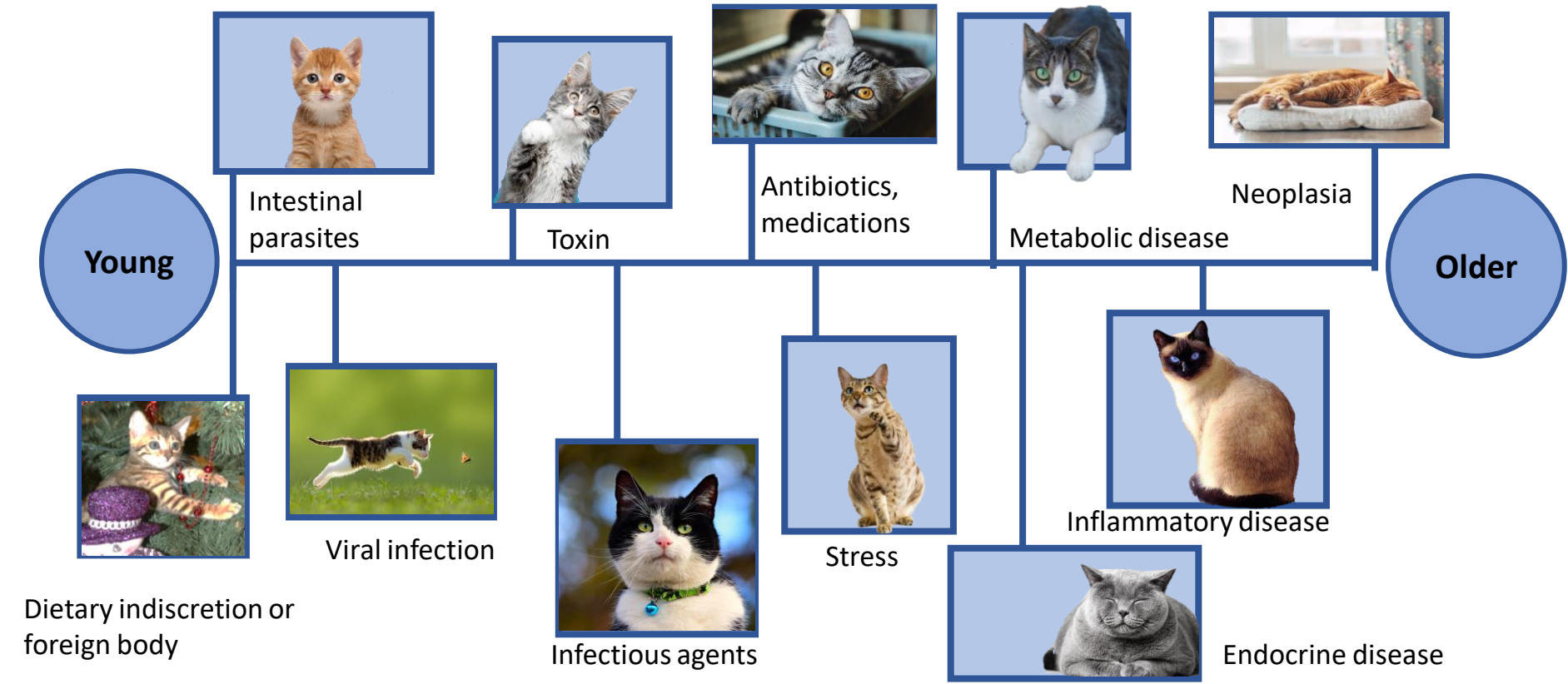
- Vomiting, anorexia, lethargy
- Weight loss, 2 pounds over 2 years
- Sporadic cough
- Reduced MCS

**Discovery, 18 yo, FS,
Maine coon**

Differentials?



Prioritization of differential list for *GI signs* changes with age





Discovery, 18 yo, FS, Maine coon

Differentials:

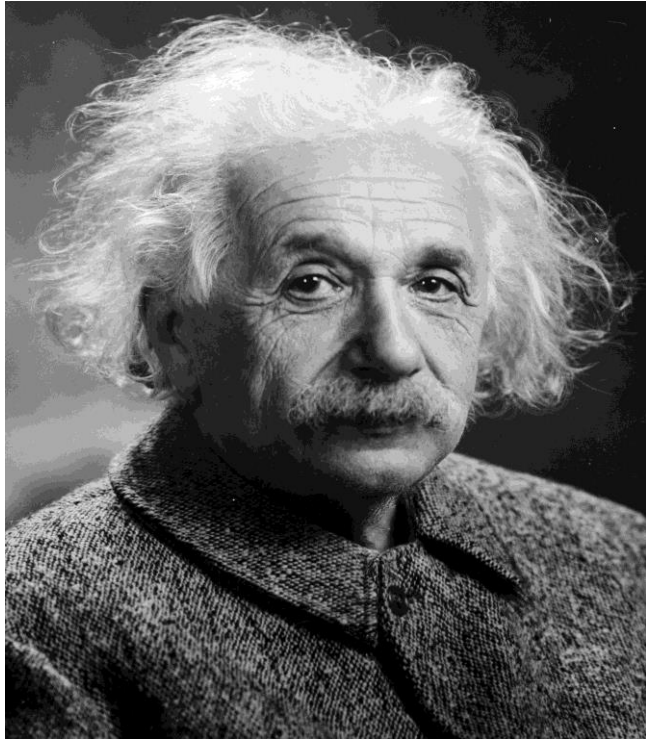
- Vomiting, anorexia
 - GI
 - Hairball
 - Food-related
 - Foreign body/toxin
 - Gastroenteritis (*IBD*)
 - Pancreatitis
 - Cancer (*SCL*)
 - Constipation
 - Parasites
 - Extra-GI
 - Hyperthyroidism
 - Kidney or liver disease
 - Diabetes mellitus
 - Cardiomyopathy
- Lethargy ∞
- Weight loss
 - GI
 - Pancreatitis
 - Gastroenteritis (*IBD*)
 - Exocrine pancreatic insufficiency
 - Cancer
 - Constipation
 - Parasites
 - Extra-GI
 - Hyperthyroidism
 - Kidney or liver disease
 - Diabetes mellitus
 - Cardiomyopathy



Discovery, 18 yo, FS, Maine coon

Differentials, continued:

- Sporadic cough
 - Feline asthma/bronchitis
 - Cardiomyopathy
 - Heartworm disease
- Reduced muscle condition
 - Sarcopenia (age related)
 - Cancer cachexia
 - Hyperthyroidism
 - Cardiac cachexia
 - Kidney or liver disease



“Everything should be made
as simple as possible, but not
simpler.”

--Albert Einstein

[This Photo](#) by Unknown Author is licensed under [CC
BY-SA](#)

Feline Chronic GI Disease

Inflammatory Bowel Disease (IBD)

Cancer

Food
Allergy

Zebras

Feline Chronic GI Disease

Inflammatory
Bowel Disease
(IBD)

Cancer

Food
Adversity

Zebras

Feline Chronic Enteropathy

Chronic inflammatory enteropathy (CIE)

Small cell lymphoma
(SCL)

Other

Immunosuppressant
responsive
(IRE/IBD)

Food
responsive
(FRE)

1. Marsilio, JSAP, 2021
2. Bandara et al., JSAP, 2023;
3. Marsilio et al., JVIM, 2023
4. Guilford et al., JVIM 2001

Feline chronic enteropathy (CE) ...



“... chronic (at least 3 weeks' duration) signs of gastrointestinal disease where extra-gastrointestinal, metabolic, and infectious causes have been ruled out.”

Marsilio et al., JVIM, 2023



Feline Chronic Enteropathy

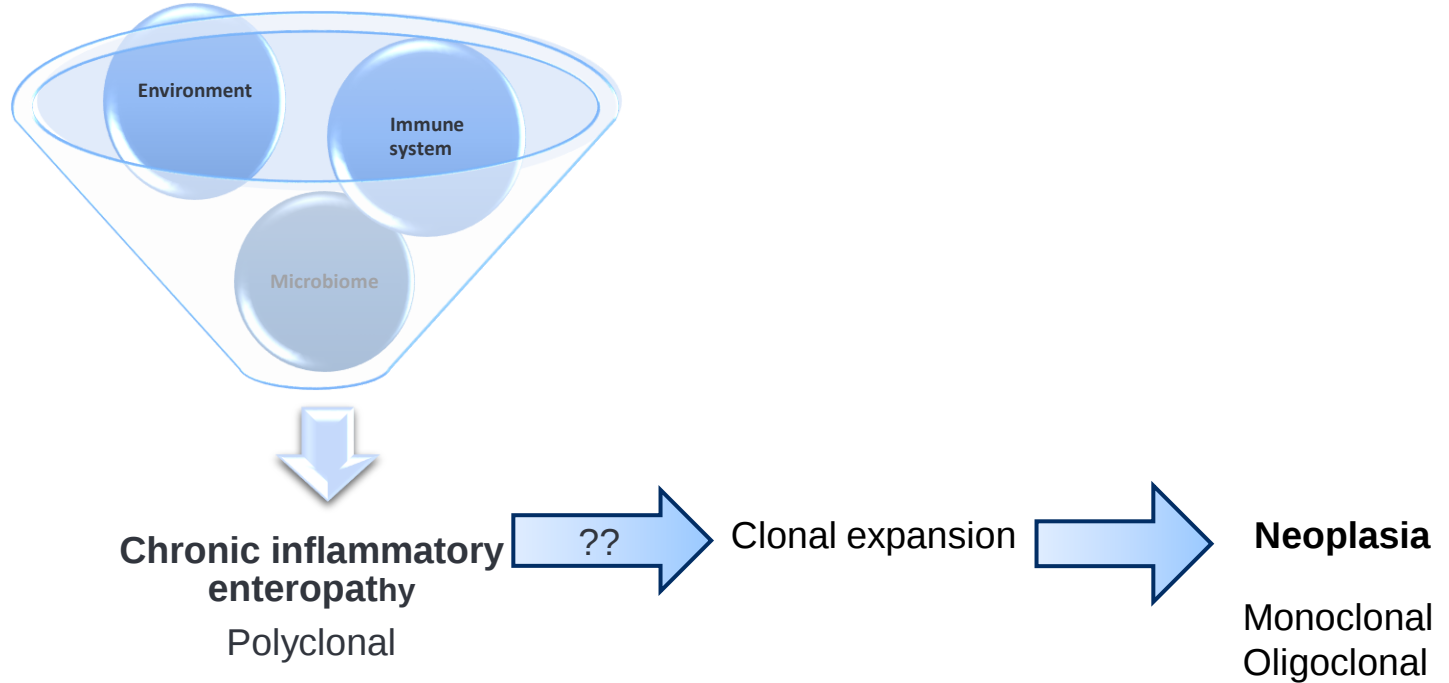
Lymphoplasmacytic enteritis
(LPE)

Low-grade
intestinal T-cell
lymphoma (LGITL)

Marsilio S, Freiche V, Johnson E, et al.

ACVIM consensus statement guidelines on diagnosing and distinguishing low-grade neoplastic from inflammatory lymphocytic chronic enteropathies in cats. *J Vet Intern Med.* 2023; 37(3): 794-816. doi:[10.1111/jvim.16690](https://doi.org/10.1111/jvim.16690)

Etiopathogenesis



- 1 Marsilio, JSAP, 2021
2. Marsilio et al., JVIM, 2023
3. Freiche et al., Lab In, 2021

Clinical presentations overlap

- Signalment ¹
 - DSH +/- Siamese
 - Age overlaps
 - LPE 1.3-16 yrs, Median 8 yrs
 - LGITL 4-20 yrs, Median 12.5 yrs
- Clinical signs
 - Weight loss > vomiting > anorexia > diarrhea¹
 - One or two clinical signs is common²



1. Marsilio, JSAP, 2021,
2. Bandara et al., JSAP, 2023.

Physical exam findings can be normal

- Most will be underconditioned¹
- Intestinal thickening or ropiness
- Nodules or masses
- Mesenteric lymphadenopathy
- Normal PE



[This Photo](#) by Unknown Author is licensed under [CC BY-ND](#)

1. Bandara et al., JSAP, 2023

Laboratory findings and biomarkers don't differentiate between LPE and LGITL

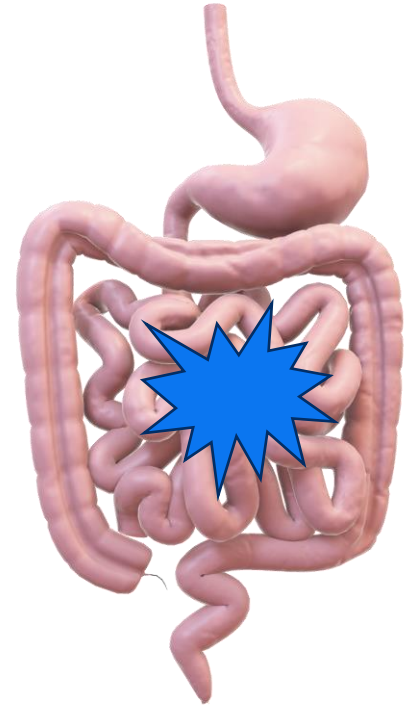
Albumin	N to decreased
Globulins	N to increased or decreased
Cobalamin	N to decreased
Folate	N to increased or decreased
PLI	N to increased
TLI	N to decreased



Marsilio et al., JVIM, 2023

Anatomic distribution of CE

- Any GI segment affected
- Decreasing involvement
 - Jejunum
 - Ileum
 - Duodenum
 - Stomach
 - Colon



Marsilio et al., JVIM 2023



Routine workup for chronic GI signs?

Tier 1

- Minimum data base: CBC, Chemistry, UA
- Fecal testing (deworming?)
- Retrovirus testing
- Thyroid hormone (T4) (> 6yrs)
- Pancreatitis- fPLI
- EPI- fTLI
- Cobalamin/folate

Tier 2

- Food elimination trial
- Diarrhea RealPCR Panel™
- Regional infectious disease
- Diagnostic imaging
- Dysbiosis Index?

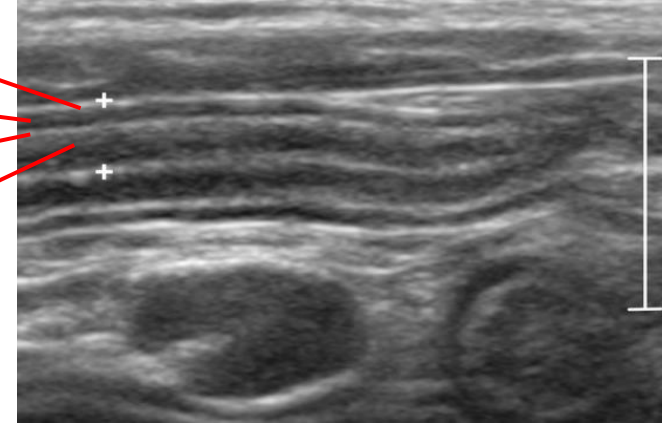
Tier 3

- GI biopsy

Diagnostic imaging

- Radiographs have limited diagnostic utility ¹
 - Obstructive pattern
 - Mineralization
- Abdominal ultrasound (AUS)
 - Cross sectional evaluation, esp. thickness
 - Anatomic location
 - Mural architecture
 - Mesenteric lymph node ²
 - Other organs, esp. pancreas, liver
 - Effusion ²
 - Assist sampling

Serosa
Muscularis
Submucosa
Mucosa



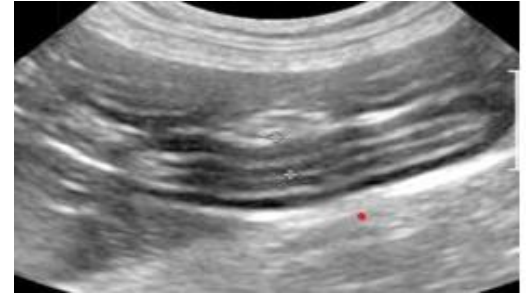
Normal jejunum, 2.7 mm

Figure adapted from: Paulin et al., BMC Vet Res, 2018
<https://creativecommons.org/licenses/by/4.0/>

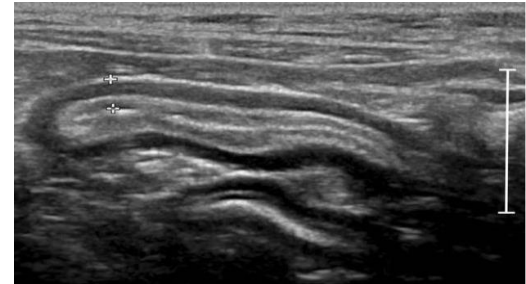
1. Marsilio et al., JVIM, 2023
2. Freiche et al., JVIMJ, 2021 a
3. Di Donato et al., JFSM, 2014

Abdominal sonography useful but not discriminatory

- Cross sectional evaluation
- Anatomic location
- Mural architecture
- Mesenteric lymph node ²
- Other organs, esp. pancreas, liver
- Effusion ²
- Hypomotility
- Assist sampling



Diffuse thickening with eos. enteritis, 3.9 mm.



Marked muscularis thickening with LGAL [LGITL].
Overall thickness normal 2.5 mm.

Figures adapted from: Paulin et al., BMC Vet Res, 2018
<https://creativecommons.org/licenses/by/4.0/>

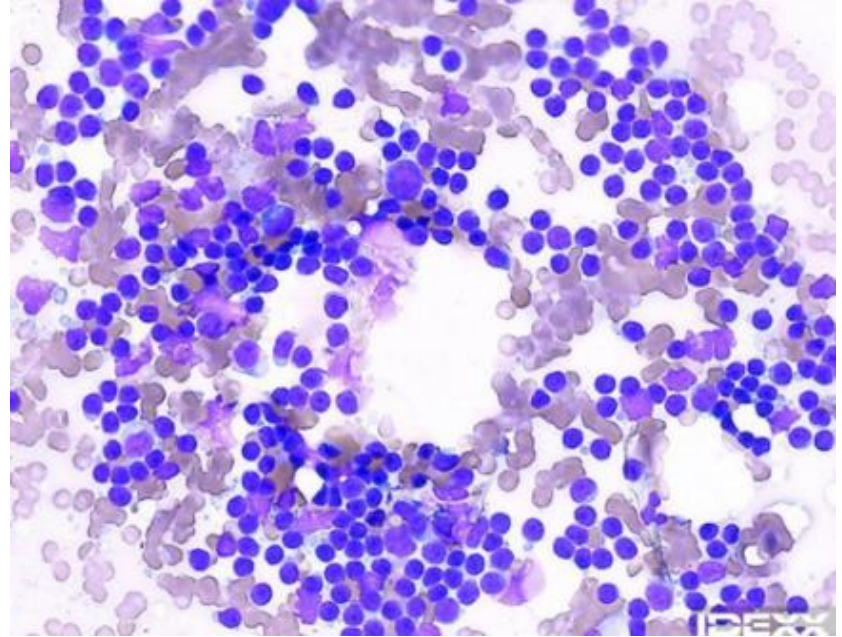
1. Marsilio et al., JVIM, 2023

2. Freiche et al., JVIM, 2021a

3. Zwingenberger et al., JVIM, 2010

Cytology – helpful for GI disease?

- Abdominal masses
- Lymphadenopathy
- Organomegaly
- Effusion
- Cystic structures
- Bloody diarrhea





Discovery, 18 yo, FS, Maine coon

Diagnostic plan and results



Discovery

Complete Blood Count

Result Details ▾

<

Discovery

Chemistry
IDEXX SDMA®
Electrolytes
Spec fPL®
Total T4

Phosphorus	5.3	2.9 - 6.3 mg/dL	
Calcium	8.9	8.2 - 11.2 mg/dL	
Sodium	152	147 - 157 mmol/L	
Potassium	4.5	3.7 - 5.2 mmol/L	
Na: K Ratio	34	29 - 42	
Chloride	116	114 - 126 mmol/L	
TCO2 (Bicarbonate)	23	12 - 22 mmol/L	
Anion Gap	18	12 - 25 mmol/L	
Total Protein	6.3	6.3 - 8.8 g/dL	
Albumin	2.6	2.6 - 3.9 g/dL	
Globulin	3.7	3.0 - 5.9 g/dL	
Albumin: Globulin Ratio	0.7	0.5 - 1.2	
ALT	26	27 - 158 U/L	
AST	40	16 - 67 U/L	
ALP	10	12 - 59 U/L	
GGT	<1	0 - 6 U/L	
Bilirubin - Total	0.1	0.0 - 0.3 mg/dL	
Bilirubin - Unconjugated	0.0	0.0 - 0.2 mg/dL	
Bilirubin - Conjugated	<0.1	0.0 - 0.2 mg/dL	
Cholesterol	121	91 - 305 mg/dL	
Amylase	1,365	623 - 2,239 U/L	
Lipase	bh. 44	0 - 45 U/L	

TCO2
(Bicarbonate)

23

12 - 22 mmol/L

ALT

26

27 - 158 U/L

ALP

10

12 - 59 U/L

Spec fPL

bk.

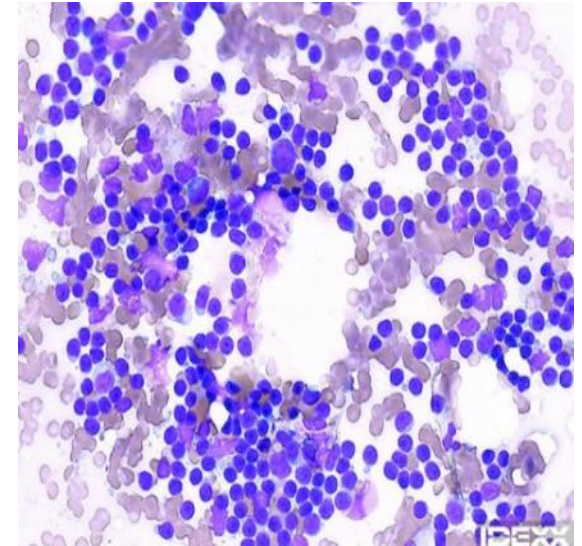
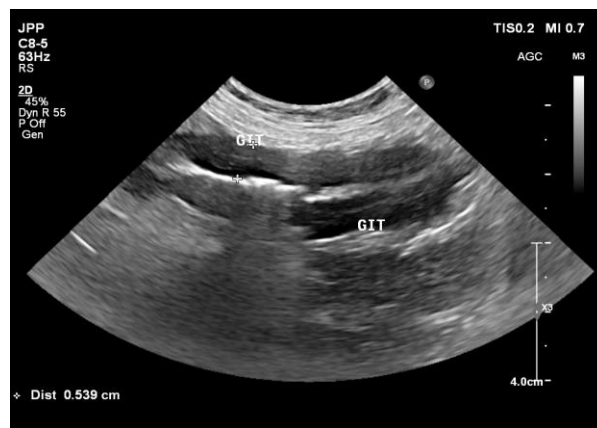
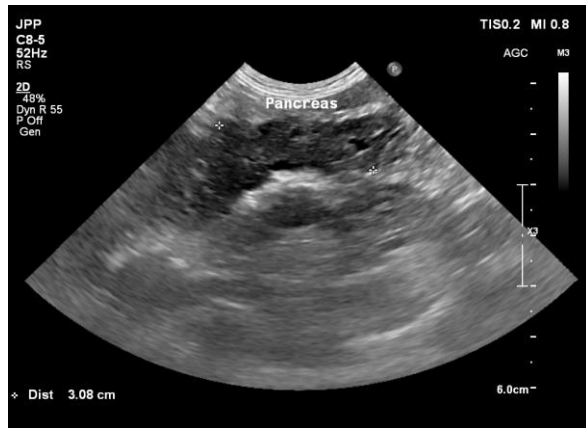
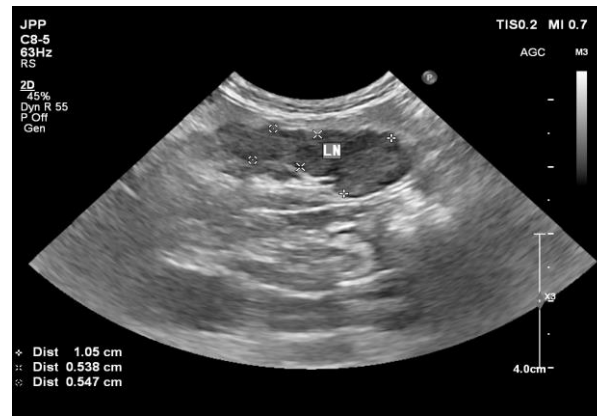
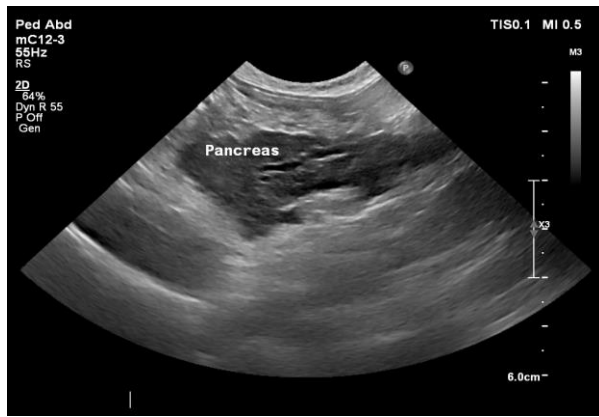
18.4

0.0 - 3.5 µg/L

Total T4

j. 1.6

0.8 - 4.7 µg/dL



Cytology of FNA of mesenteric lymph node

AUS images courtesy of Atlantic Veterinary Internal Medicine & Oncology, Annapolis, MD



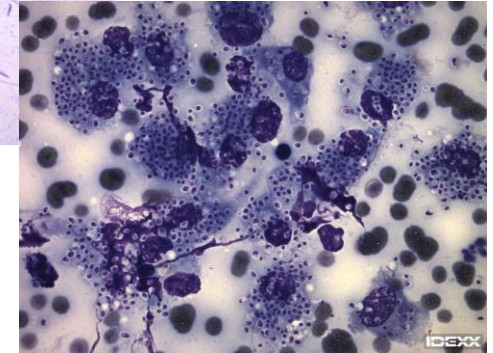
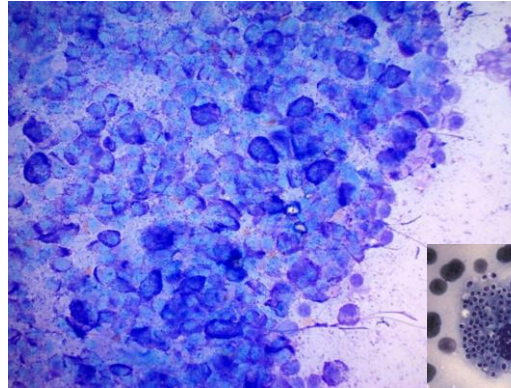
Discovery, 18 yo, FS, Maine coon

Assessment and Management

- Diagnoses
 - Probable small cell lymphoma
 - Pancreatitis
 - Mild nonregenerative anemia
 - Mild monocytosis
- Plan
 - Prednisolone 5mg q24 hrs
 - Chlorambucil 20mg/m² q 14d (compounded to 5.8 mg for 0.283m²)
 - Maropitant 8mg qd prn for nausea and vomiting
 - (Mirtazapine for appetite)
 - Recheck with CBC 3 weeks, sooner if needed

BUT...cytology **cannot** differentiate LPE from LGITL

- Can be diagnostic for
 - High grade LSA
 - Mast cell neoplasia
 - Plasma cell tumor
 - Fungal infection



Marsilio et al., JVIM, 2023

Histopathology as gold standard

- Laparotomy vs endoscopy
 - Duodenoscopy
 - Ileocolonoscopy
- Sample variables affecting quality
 - Source
 - Number
 - Processing
- Pathology assessment



Marsilio et al., JVIM, 2023

Histologic criteria

- Villi
- Epithelium
- Lamina propria
- Crypts
- Monomorphism
- Depth of infiltration
- Fibrosis

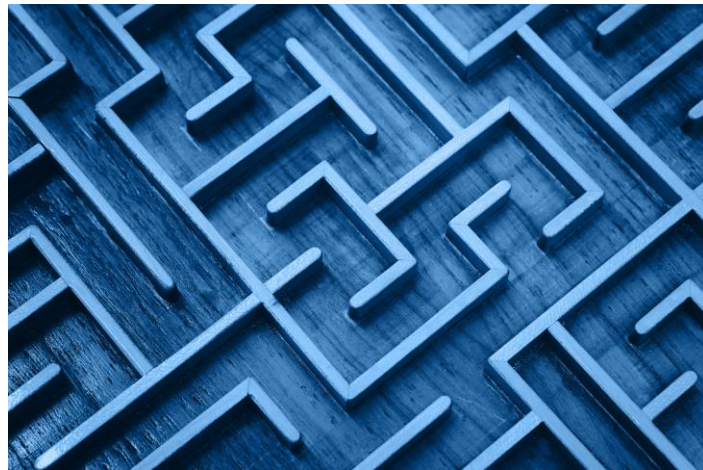
LGITL

- Marked infiltration of epithelium and LP with small monomorphic T-cells
- Lymphocytic cryptitis
- Villous atrophy
- Apical to basal gradient
- Deep fibrosis
- **Concurrent LPE (45%)**

Freiche et al., JVIM, 2021

Ancillary testing for ambiguous cases

- Immunohistochemistry (IHC)
- PCR Amplification Receptor Rearrangement (PARR)
- Histology guided mass spectrometry¹
- Fecal microbiome²
- Fecal calprotectin³



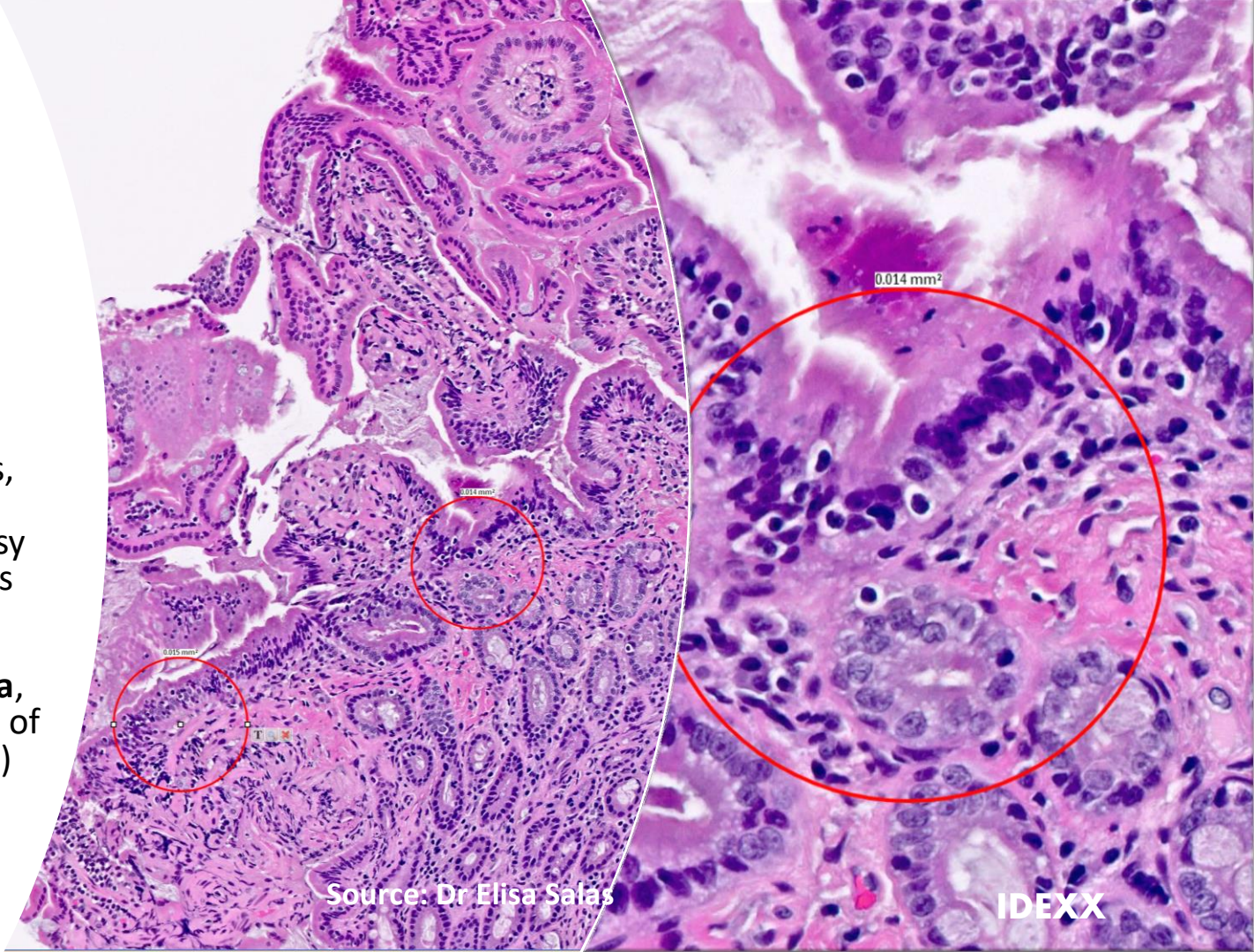
1. Marsilio et al., JVIM, 2020
2. Marsilio et al., SciRep, 2019
3. Riggers et al., Vet Sci, 2023

Clive, 14 yo, FS, DSH

CC: vomiting & diarrhea

PARR testing – Clonal with
strong polyclonal
background

Molecular clonality results,
in conjunction with the
provided history and biopsy
report, support a diagnosis
of very early **emerging
epitheliotropic small cell
small intestinal lymphoma**,
arising from a background of
chronic inflammation (IBD)



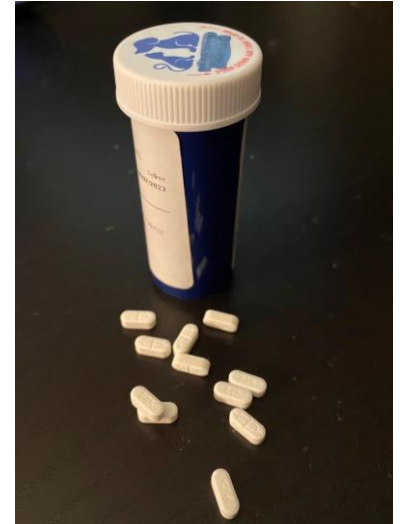


What about Discovery?

- Findings consistent with LGITL +/- chronic pancreatitis
 - Geriatric cat with chronic course
 - AUS and lymph node cytology
- Missed opportunities
 - Diet trial
 - Cobalamin
 - Fecal testing or deworming
 - TLI for EPI
 - Retrovirus testing
 - GI biopsies
- Responded well to treatment for 2 + years !

Management of CE

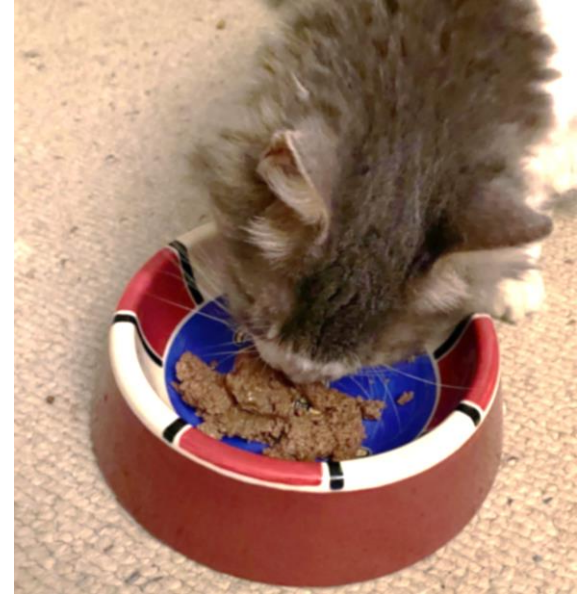
- Discriminating between LPE and LGITL may not drive primary treatment
 - Diet
 - Corticosteroids
 - Prednisolone
 - Budesonide
 - Dexamethasone
 - Chlorambucil



Marsilio, Vet Clin NA, 2021

Dietary management of CE

- Novel ingredient (protein)
- Hydrolyzed diet
- Highly digestible
- Home-prepared



1. Guilford et al., JVIM, 2001
2. Perea et al., Fr Vet Sci, 2017

Adjunctive treatment of CE

- Antiemetics
- Appetite stimulants
- **Cobalamin**
- Folate
- Probiotics
- Feeding tube?
- Fecal transplantation



Texas A&M University Veterinary Medicine & Biomedical Sciences, Gastrointestinal Laboratory. *Cobalamin Information*. GI Lab website. Accessed January 2, 2023. <https://vetmed.tamu.edu/gilab/research/cobalamin-information>.

Prognosis good for LPE and LGITL

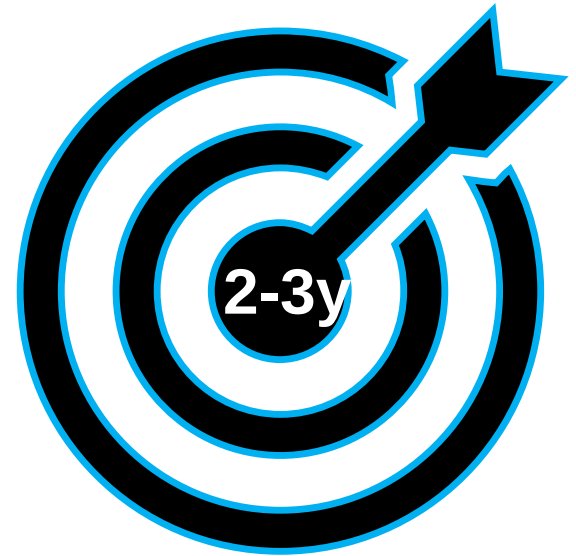
- Prospective cohort of 44 client-owned cats that failed food trials
- Laparotomy for surgical biopsy in most (41)
 - 3 of 44 cats died due to postop complications
- Treatment
 - 22 LPE treated with pred + diet
 - 22 LGITL treated with pred + chlorambucil + diet
- LGITL had shorter survival but not statistically
 - Median survival 719 days (range 4-1272)
 - Median not available for LPE
- **In both more deaths from other conditions than recurrence**



Freiche et al., JVIM, 2021b

LGITL median survival of 2-3 years

- Median survival 1148 days ~3 years
 - (15-2479d)¹
- Median survival 2 years²
- Median survival 719 days ~2 years
 - (4-1272d)³



1.Pope et al., Vet med Sci., 2015

2.Paulin et al., BMC , 2018

3.Freiche et al.,JVIM 2021b

Spectrum of care

- Filter available, evidence-supported care options with client-specific lens
 - Goals and expectations
 - Limitations
- Patient factors
- Veterinarian factors
- Open communication
- Human-animal bond is a focus



1. Brown et al., JAVMA, 2021
2. Englar, JFMS, 2023 a,b



OC, 10 yo, FS, DLH

CC: Chronic hyporexia, weight loss, sporadic watery diarrhea, and vomiting

HX:

- Hyporexia and weight loss for 6 + months
- Constipation, sporadic watery diarrhea, yellow to tan, no blood or mucus, goes 1-2X daily
- Rare vomiting, partially digested food
- Chronic nasal dc and sneeze- antibiotic responsive
- No C/PU/PD
- No toxins
- Diet consistent- commercial canned and dry
- Sole cat for 3 months
- Allergy immunotherapy; selamectin/sarolaner

PE:

- Difficult to examine, unthrifty
- Wt. 7.4#
- T 101°F, HR 200 bpm, RR 30
- BARH, MM moist, CRT <2s
- Oral: Many missing teeth, gingivitis
- BCS 5/9; MCS moderate muscle loss
- CV: Soft 1-2/6 left systolic murmur
- RESP: Nasal dc, inspiratory effort, normal bronchovesicular sounds
- ABD: Soft, doughy, no masses, organomegaly or fluid wave
- PLN: WNL



OC, 10 yo, FS, DLH

Problems:

- Hyporexia, constipation, diarrhea, vomiting
- Weight loss 2# over 6 + months
- Heart murmur
- Chronic nasal discharge and sneeze, recent worsening
- Chronic gingivitis
- Allergic dermatopathy responsive to allergy drops
- High Fear Anxiety Stress (FAS)



OC, 10 yo, FS, DLH

Differentials:

- Hyporexia, constipation, diarrhea, vomiting
 - GI
 - **Feline chronic enteropathy**
 - Pancreatitis
 - Exocrine pancreatic insufficiency (EPI)
 - Parasites
 - Extra-GI
 - Hyperthyroidism
 - Kidney or liver disease
- Weight loss
 - GI
 - **Feline chronic enteropathy**
 - Pancreatitis
 - EPI
 - Parasites
 - Extra-GI
 - Hyperthyroidism
 - Kidney or liver disease
 - Diabetes mellitus
 - Cardiomyopathy



OC, 10 yo, FS, DLH

Differentials, continued:

- Heart murmur
 - Cardiomyopathy
 - Trivial
- Chronic upper respiratory signs
 - Allergic
 - Infectious
 - Cancer
 - Polyp
- Reduced muscle condition
 - **Feline chronic enteropathy²**
 - Cancer cachexia
 - Cardiac cachexia
 - Hyperthyroidism
 - Kidney or liver disease

1. Xifra et al., 2022
2. Marsilio et al., 2023



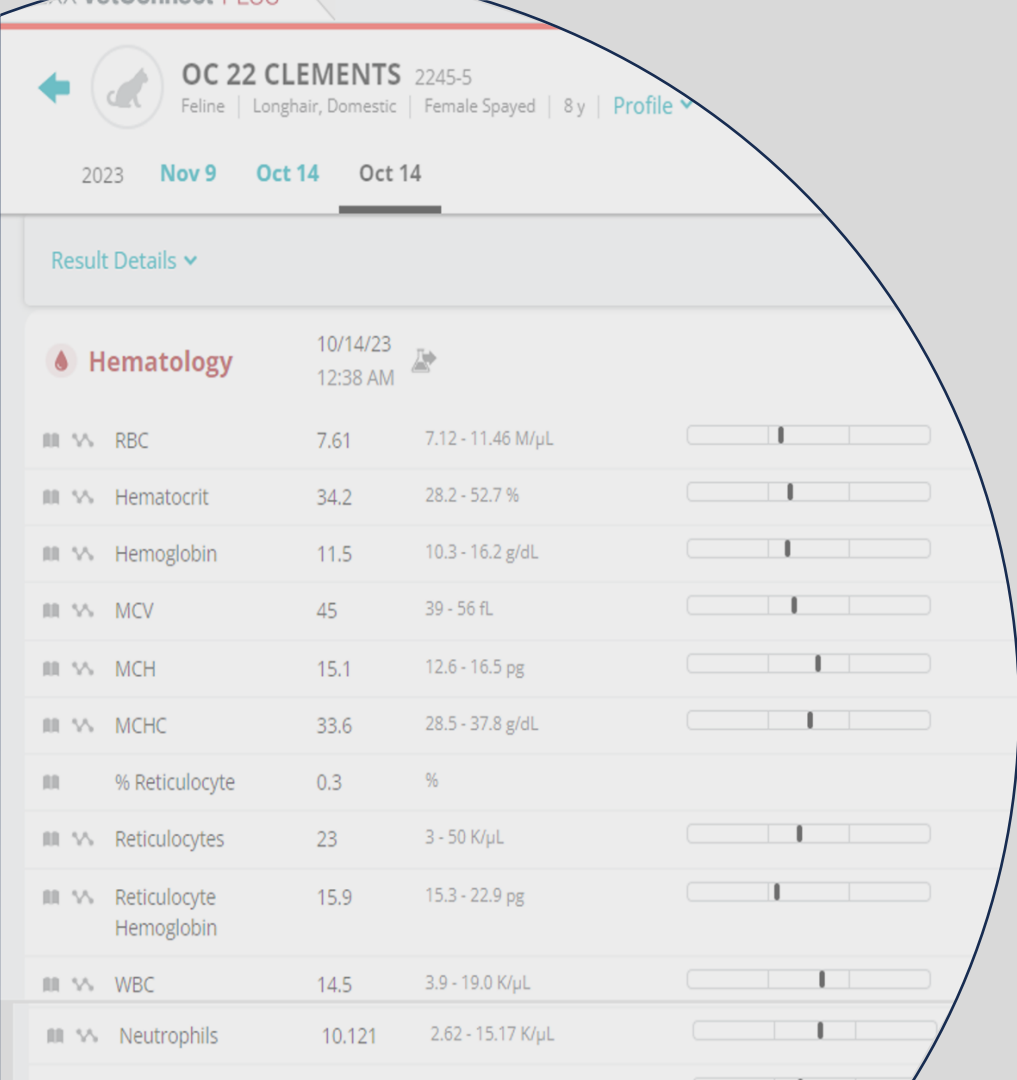
OC, 10 yo, FS, DLH

Diagnostic plan and results



OC

Complete Blood Count

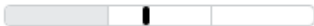


Chemistry		12:38 AM		
Glucose	86	72 - 175 mg/dL		
IDEXX SDMA	a. 18	IDEXX SDMA	a. 18	0 - 14 µg/dL
Creatinine	1.7	0.9 - 2.3 mg/dL		
BUN	31	16 - 37 mg/dL		
BUN: Creatinine Ratio	18.2			
Phosphorus	5.3	2.9 - 6.3 mg/dL		
Calcium	9.3	8.2 - 11.2 mg/dL		
Sodium	151	147 - 157 mmol/L		
Potassium	4.4	3.7 - 5.2 mmol/L		
Na: K Ratio	34	29 - 42		
Chloride	114	114 - 126 mmol/L		
TCO2 (Bicarbonate)	21	12 - 22 mmol/L		
Anion Gap	20	12 - 25 mmol/L		
Total Protein	9.6	6.3 - 8.8 g/dL		
Albumin	2.6	2.6 - 3.9 g/dL		
Globulin	7.0	3.0 - 5.9 g/dL		
Albumin: Globulin Ratio	0.4	0.5 - 1.2		
ALT	61	27 - 158 U/L		
AST	33	16 - 67 U/L		
ALP	24	12 - 59 U/L		
GGT	1	0 - 6 U/L		
Bilirubin - Total	0.1	0.0 - 0.3 mg/dL		

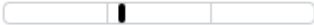
OC

Chemistry
Electrolytes
IDEXX SDMA®

OC

 Spec fPL	1.8	0.0 - 4.4 µg/L	
 Cobalamin (B-12)	d. 209	276 - 1,425 ng/L	
 Folate	e. >24.0	8.9 - 19.9 ug/L	
 Cardiopet proBNP (Feline)	f. 103	0 - 100 pmol/L	

Spec fpl®
Cobalamin
Folate
Cardiopet® proBNP
Total T4

 Endocrinology	10/14/23 12:38 AM		
 Total T4	a. 1.3	0.8 - 4.7 µg/dL	
 Free T4 (ng/dL)	0.9	0.7 - 2.6 ng/dL	
 Free T4 (pmol/L)	b. 11.6	9.0 - 33.5 pmol/L	

Urinalysis

2:50 PM

Collection

CYSTOCENTESIS

Color

DARK YELLOW

Clarity

TURBID

Specific Gravity

1.039 ≥ 1.035

pH

6.0 6.0 - 7.5

Urine Protein

1+

Glucose

NEGATIVE

Ketones

NEGATIVE

Blood /
Hemoglobin

3+

Bilirubin

NEGATIVE

Urobilinogen

NORMAL

White Blood Cells

0-2

Red Blood Cells

50-75

Bacteria

NONE SEEN

Microbiology

11/9/23

2:50 PM



Source:

CYSTOCENTESIS

Culture Results:

Status: FINAL

No Growth

OC

Urinalysis Urine culture

Urine Protein

1+

Blood /
Hemoglobin

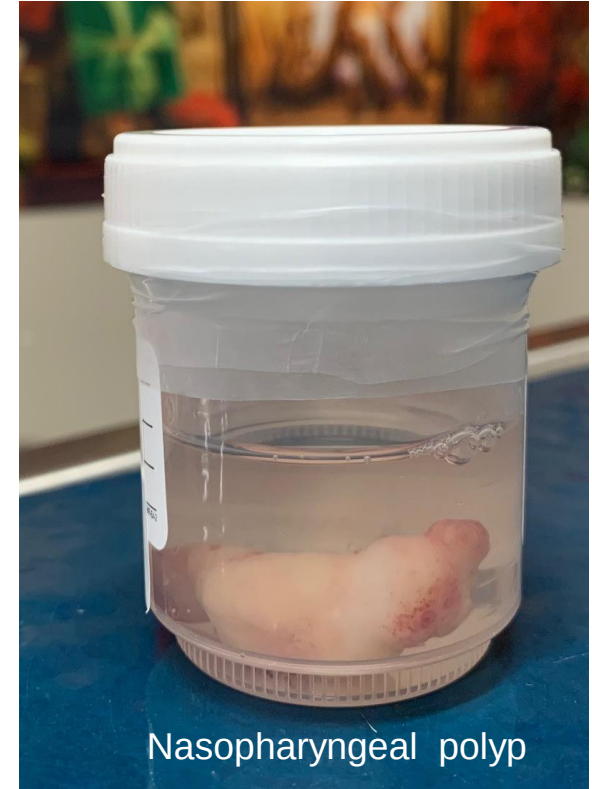
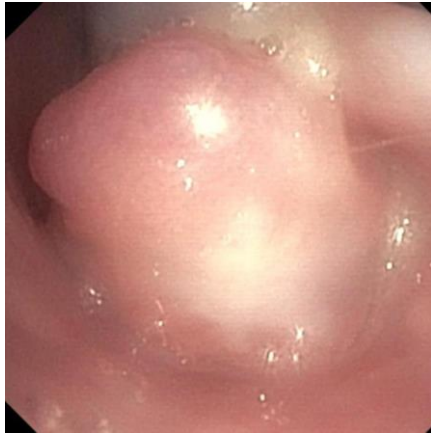
3+

Red Blood Cells

50-75

Imaging and Endoscopy

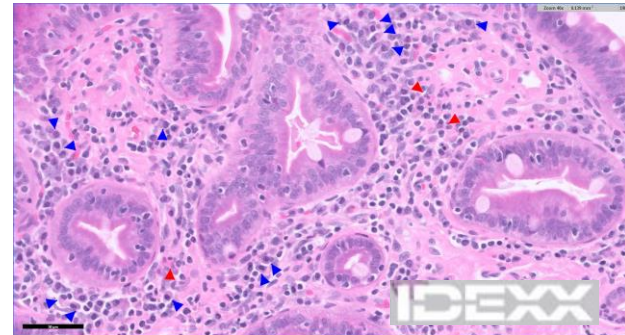
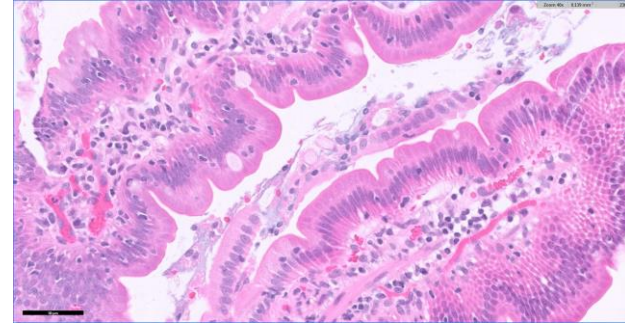
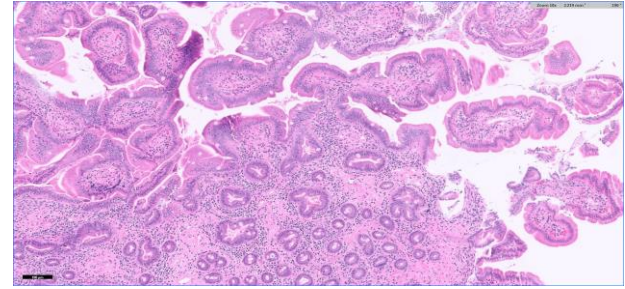
- AUS: No significant findings
- Nasopharyngoscopy



Images courtesy of Atlantic Veterinary Internal Medicine & Oncology, Annapolis, MD

Gastroduodenoscopy and Biopsy

- Grossly normal
- Histopathology
 - Stomach: Mild to moderate lymphoplasmacytic & mild eosinophilic gastritis with superficial spirochete bacteria
 - Duodenum: Mild plasmacytic and eosinophilic enteritis



OC - Assessment and Management

- Diagnoses
 - LPE- possibly food responsive
 - Hypocobalaminemia
 - Nasal polyp- incompletely removed

OC - Assessment and Management

- Plan
 - Prednisolone at tapering dose
 - Cobalamin supplementation SQ
 - Elimination diet
 - Monitor signs and weight
 - Consider additional diagnostics
 - PCR for *Tritrichomonas* - Negative
 - fTLI
 - Nasal imaging & rhinoscopy?
 - More GI biopsies?
 - Dental consultation
 - Top-loading carrier



Takeaways:

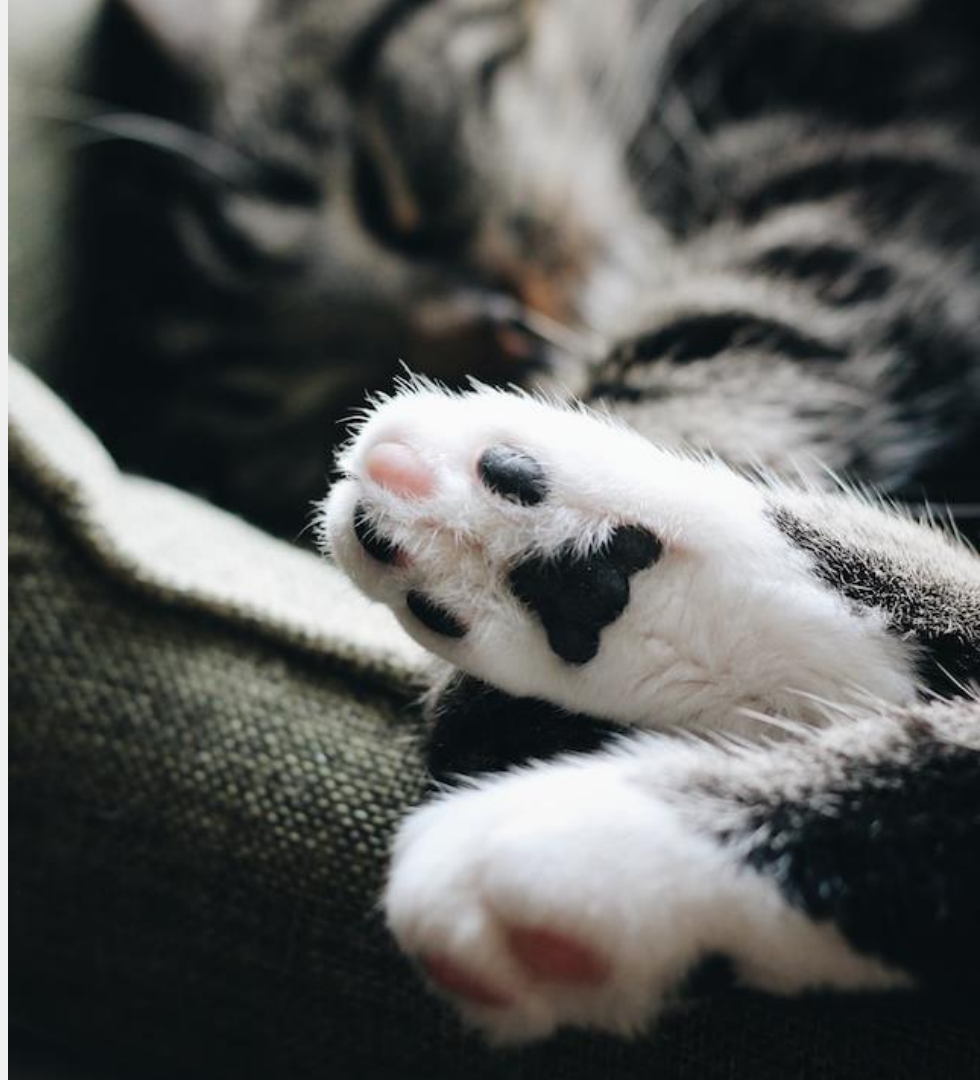
- + Feline CE is common and weight loss may be the only sign
- + Dietary management should be a priority
- + Intestinal biopsy and histopathology is gold standard dx; even ancillary test results may be ambiguous
- + Prognoses are similar for LPE and LGITL
- + Providing a spectrum of care may support human-animal bond and your patient

Thank you!

Questions?

Celeste-Clements@IDEXX.com

Nancy-Sanders@IDEXX.com





Don't just keep up. Stay ahead with the IDEXX Education Newsletter.

Scan the code to stay in the know and receive updates about:

- Upcoming live events
- Recently archived content and exciting on-demand education
- Articles and tips from peers and industry experts



VITICUSGROUP™
WVC ANNUAL CONFERENCE

References

- Jergens AE, Crandell JM, Evans R, Ackermann M, Miles KG, Wang C. A clinical index for disease activity in cats with chronic enteropathy. *J Vet Intern Med.* 2010 Sep-Oct;24(5):1027-33. doi: 10.1111/j.1939-1676.2010.0549.x. Epub 2010 Jun 24. PMID: 20584141. Marsilio S, Freiche V, Johnson E, et al. ACVIM consensus statement guidelines on diagnosing and distinguishing low-grade neoplastic from inflammatory lymphocytic chronic enteropathies in cats. *J Vet Intern Med.* 2023;37(3):794-816. doi:10.1111/jvim.16690816
- Cline MG, Burns KM, Coe JB, Downing R, Durzi T, Murphy M, Parker V. 2021 AAHA Nutrition and Weight Management Guidelines for Dogs and Cats. *J Am Anim Hosp Assoc.* 2021 Jul 1;57(4):153-178. doi: 10.5326/JAAHA-MS-7232. PMID: 34228790.
- Marsilio, S. (2021), Feline chronic enteropathy. *J Small Anim Pract*, 62: 409-419. <https://doi.org/10.1111/jsap.13332>
- Bandara, Y., Priestnall, S.L., Chang, Y.M. and Kathrani, A. (2023), Outcome of chronic inflammatory enteropathy in cats: 65 cases (2011-2021). *J Small Anim Pract*, 64: 121-129. <https://doi.org/10.1111/jsap.13569>
- Guilford WG, Jones BR, Markwell PJ, Arthur DG, Collett MG, Harte JG. Food sensitivity in cats with chronic idiopathic gastrointestinal problems. *J Vet Intern Med.* 2001 Jan-Feb;15(1):7-13. doi: 10.1892/0891-6640(2001)015<0007:fsicwc>2.3.co;2. PMID: 11215916.
- Freiche, V, Fages, J, Paulin, MV, et al. Clinical, laboratory and ultrasonographic findings differentiating low-grade intestinal T-cell lymphoma from lymphoplasmacytic enteritis in cats. *J Vet Intern Med.* 2021; 35(6): 2685-2696. doi:[10.1111/jvim.16272](https://doi.org/10.1111/jvim.16272)
- Paulin MV, Couronné L, Beguin J, Le Poder S, Delverdiere M, Semin MO, Bruneau J, Cerf-Bensussan N, Malamut G, Cellier C, Bencheikroun G, Tired L, German AJ, Hermine O, Freiche V. Feline low-grade alimentary lymphoma: an emerging entity and a potential animal model for human disease. *BMC Vet Res.* 2018 Oct 11;14(1):306. doi: 10.1186/s12917-018-1635-5. PMID: 30305106; PMCID: PMC6180644.
- Freiche V, Paulin MV, Cordonnier N, Huet H, Turba ME, Macintyre E, Molina TJ, Hermine O, Couronné L, Bruneau J. Histopathologic, phenotypic, and molecular criteria to discriminate low-grade intestinal T-cell lymphoma in cats from lymphoplasmacytic enteritis. *J Vet Intern Med.* 2021 Nov;35(6):2673-2684. doi: 10.1111/jvim.16231. Epub 2021 Aug 10. PMID: 34374109; PMCID: PMC8692189
- Washabau RJ, Day MJ, Willard MD, et al. Endoscopic, biopsy, and histopathologic guidelines for the evaluation of gastrointestinal inflammation in companion animals. *J Vet Intern Med.* 2010;24:10-26
- Freiche V, Cordonnier N, Paulin MV, Huet H, Turba ME, Macintyre E, Malamut G, Cerf-Bensussan N, Molina TJ, Hermine O, Bruneau J, Couronné L. Feline low-grade intestinal T cell lymphoma: a unique natural model of human indolent T cell lymphoproliferative disorder of the gastrointestinal tract. *Lab Invest.* 2021 Jun;101(6):794-804. doi: 10.1038/s41374-021-00581-x. Epub 2021 Mar 10. PMID: 33692440.

References, continued

- Di Donato P, Penninck D, Pietra M, Cipone M, Diana A. Ultrasonographic measurement of the relative thickness of intestinal wall layers in clinically healthy cats. *J Feline Med Surg*. 2014 Apr;16(4):333-9. doi: 10.1177/1098612X13509080. Epub 2013 Oct 30. PMID: 24174500.
- Zwingerberger AL, Marks SL, Baker TW, Moore PF. (2010), Ultrasonographic Evaluation of the Muscularis Propria in Cats with Diffuse Small Intestinal Lymphoma or Inflammatory Bowel Disease. *J Vet Intern Med*, 24: 289-292. <https://doi.org/10.1111/j.1939-1676.2009.0457.x>.
- Jergens AE, Crandell JM, Evans R, Ackermann M, Miles KG, Wang C. A clinical index for disease activity in cats with chronic enteropathy. *J Vet Intern Med*. 2010 Sep-Oct;24(5):1027-33. doi: 10.1111/j.1939-1676.2010.0549.x. Epub 2010 Jun 24. PMID: 20584141.
- Marsilio S, Newman SJ, Estep JS, et al. Differentiation of lymphocytic-plasmacytic enteropathy and small cell lymphoma in cats using histology-guided mass spectrometry. *J Vet Intern Med*. 2020; 34: 669–677. <https://doi.org/10.1111/jvim.15742>
- Marsilio S, Pilla R, Sarawichitr B, Chow B, Hill SL, Ackermann MR, Estep JS, Lidbury JA, Steiner JM, Suchodolski JS. Characterization of the fecal microbiome in cats with inflammatory bowel disease or alimentary small cell lymphoma. *Sci Rep*. 2019 Dec 16;9(1):19208. doi: 10.1038/s41598-019-55691-w. PMID: 31844119; PMCID: PMC6914782.
- Riggers DS, Xenoulis PG, Karra DA, Enderle LL, Köller G, Böttcher D, Steiner JM, Heilmann RM. Fecal Calprotectin Concentrations in Cats with Chronic Enteropathies. *Vet Sci*. 2023 Jun 28;10(7):419. doi: 10.3390/vetsci10070419. PMID: 37505825; PMCID: PMC10385529.
- Moore PF, Woo JC, Vernau W, Kosten S, Graham PS. Characterization of feline T cell receptor gamma (TCRG) variable region genes for the molecular diagnosis of feline intestinal T cell lymphoma. *Vet Immunol Immunopathol*. 2005 Jul 15;106(3-4):167-78. doi: 10.1016/j.vetimm.2005.02.014. PMID: 15963816
- Marsilio S. Differentiating Inflammatory Bowel Disease from Alimentary Lymphoma in Cats: Does It Matter? *Vet Clin North Am Small Anim Pract*. 2021 Jan;51(1):93-109. doi: 10.1016/j.cvsm.2020.09.009. PMID: 33187624.
- Pope, K.V., Tun, A.E., McNeill, C.J., Brown, D.C. and Krick, E.L. (2015), Outcome and toxicity assessment of feline small cell lymphoma: 56 cases (2000–2010). *Vet Med Sci*, 1: 51-62. <https://doi.org/10.1002/vms3.9>
- Perea SC, Marks SL, Daristotle L, Koochaki PE, Haydock R. Evaluation of Two Dry Commercial Therapeutic Diets for the Management of Feline Chronic Gastroenteropathy. *Front Vet Sci*. 2017 May 10;4:69. doi: 10.3389/fvets.2017.00069. PMID: 28540291; PMCID: PMC5423899.
- Brown CR, Garrett LD, Gilles WK, Houlihan KE, McCobb E, Pailler S, Putnam H, Scarlett JL, Treglia L, Watson B, Wietsma HT. Spectrum of care: more than treatment options. *J Am Vet Med Assoc*. 2021 Oct 1;259(7):712-717. doi: 10.2460/javma.259.7.712. PMID: 34516261.
- Englar RE. [Recasting the gold standard - part I of II: delineating healthcare options across a continuum of care](#). *J Feline Med Surg*. 2023 Dec;25(12):1098612X231209855. doi: 10.1177/1098612X231209855. PMID: 38131211.
- Englar RE. [Recasting the gold standard - part II of II: communicating healthcare options along a continuum of care](#). *J Feline Med Surg*. 2023 Dec;25(12):1098612X231215639. doi: 10.1177/1098612X231215639. PMID: 38131202

FCEIA (FCE activity index)

- + Numerical measure of inflammatory activity in cats with CE, including IBD and FRE
 - + initial assessment of disease severity
 - + measure of clinical response
- + Retrospective IBD data (n=59), Prospective IBD, FRE (n=23)
- + Variables
 - + GI signs of activity/ attitude, appetite , vomiting, diarrhea, wt loss
 - + Endoscopic lesions
 - + Laboratory changes of TP, ALT/ALP, phosphorus (albumin, WBC, PCV)
 - + Pretreatment, prescoping scores did not differ between IBD, FRE
 - + All 17 IBD patients (100%) complete remission after 3 weeks $\geq 75\%$ reduction FCEIA

Jergens et al., JVIM 2010