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Gastrointestinal Signs in a Cat



A 9-year-old, 3.6-kg spayed female domestic shorthair cat was presented for evaluation of a 1-month history of poor appetite, weight loss, and intermittent vomiting.

History. Three weeks earlier the patient had been examined by another veterinarian, who prescribed an antibiotic (amoxicillin trihydrate/clavulanate potassium, 62.5 mg PO Q 12 H) and a gastroprotectant (famotidine, 2.5 mg PO Q 24 H). No improvement was reported, and clinical signs had gradually worsened since that time. The patient lives in a single-cat household, is current on all vaccinations, and does not spend time outdoors. The owner reported no history of exposure to toxins or ingestion of foreign material.

Physical Examination & Laboratory Results. The patient was bright and alert; approximately 5% dehydrated; and had moderate, diffuse muscle wasting. Oral mucous membranes were pink and tacky. Findings on thoracic auscultation were unremarkable. Abdominal palpation revealed thickened, ropey small intestinal loops and a midabdominal mass effect. The **Table** lists the laboratory results.

Table. Laboratory Results

	Result	Reference Range
Complete Blood Count		
Hematocrit	22%	29%–45%
Neutrophils	16,650 cells/mcL	2500–12,500 cells/mcL
Serum Biochemical Profile		
Albumin	2 g/dL	2.3–3.9 g/dL
Globulin	2.9 g/dL	3–5.6 g/dL
Potassium	3.6 mEq/L	3.9–5.3 mEq/L
Urinalysis	No abnormalities	
Serum ELISA for FeLV/FIV	Negative	

ELISA = enzyme-linked immunosorbent assay; FeLV = feline leukemia virus; FIV = feline immunodeficiency virus

Diagnostic Imaging.

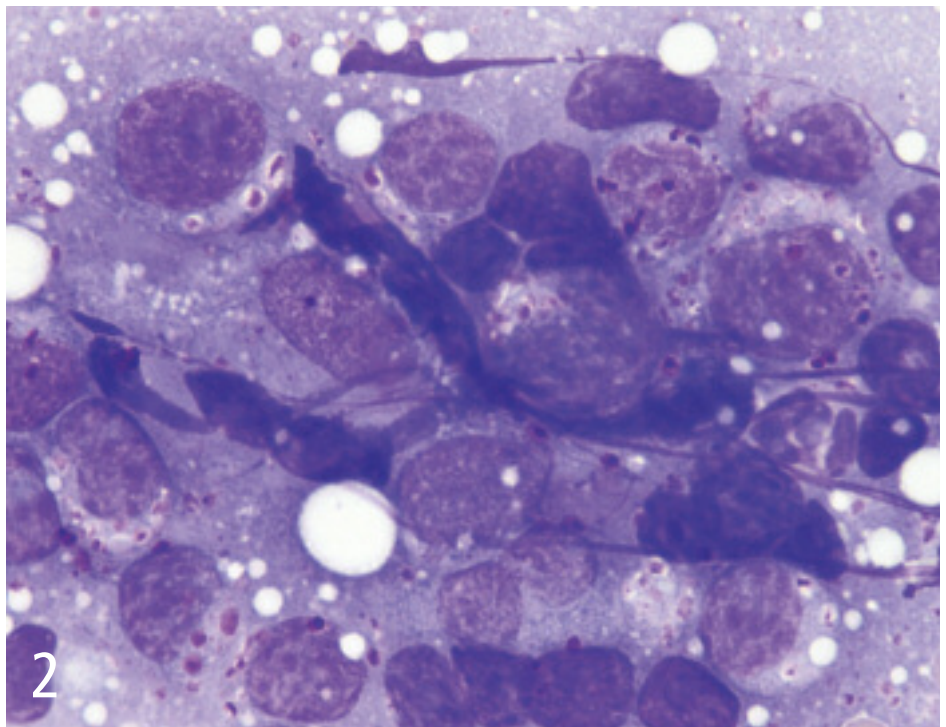
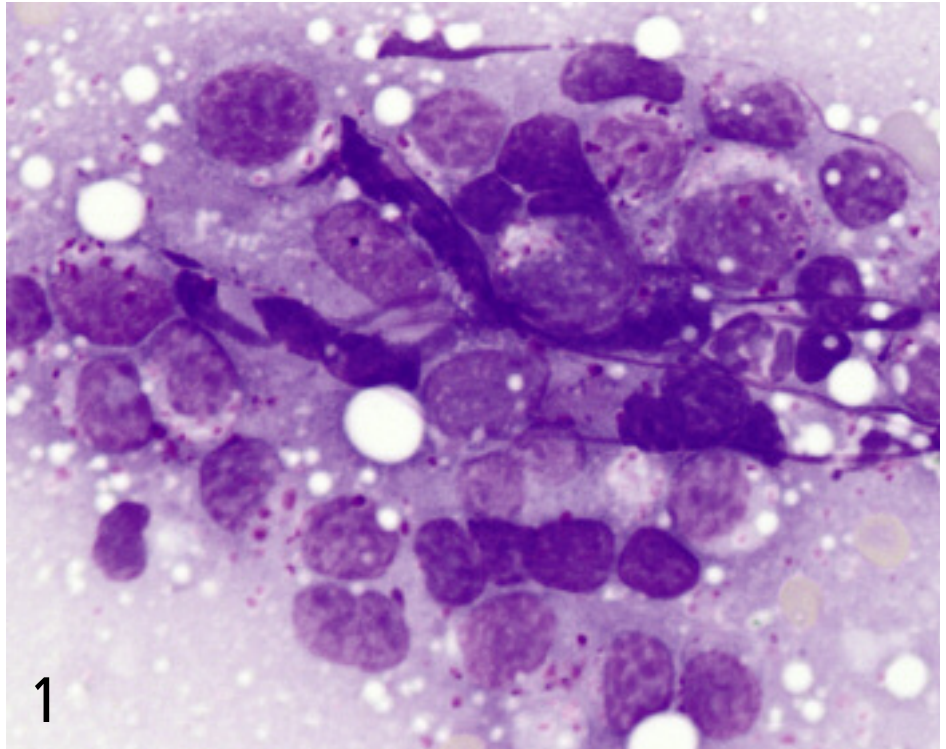
Thoracic radiography: Cardiac and pulmonary structures unremarkable

Abdominal ultrasonography: Multiple thickened segments of small intestine with loss of normal wall layering; multiple large, round, hypoechoic masses in midabdomen (presumed mesenteric lymph nodes)

Cytology. Differential diagnoses were neoplasia (lymphoma, intestinal adenocarcinoma, mast cell tumor), inflammatory bowel disease, and infectious enteritis. Multiple ultrasonography-guided fine-needle aspirates were collected from the abdominal masses (**Figures 1 and 2**).

ASK YOURSELF...

- Describe morphologic characteristics of the cells.
- Does the sample represent a neoplastic or reactive cell population?
- What is your final diagnosis, and what is the origin of the abnormal cells?



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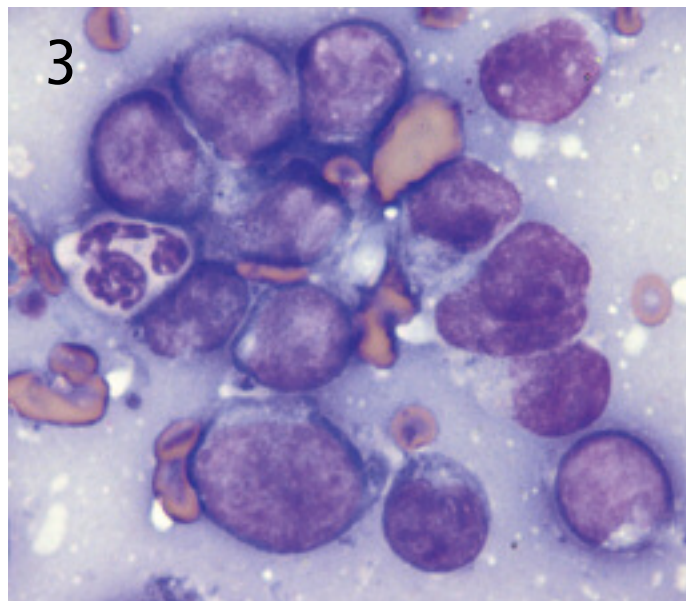
Fine-needle aspirate samples from abdominal mass (Original magnification, 500×)
Courtesy Dr. Tracy Stokol

Diagnosis: Lymphoblastic Lymphoma (Large Granular Cell Type)

Lymphoma of large granular lymphocytes (LGLs) is an uncommon form of lymphoma. It has been described retrospectively in several small series of cats^{1,2} and less commonly in dogs.³

Discussion. Clinically, LGL lymphoma is an aggressive, rapidly progressive disease. Patients typically have a clinical history of abnormal clinical signs lasting only a few weeks to months. The distribution of affected organ systems can mimic that of other forms of lymphoma; in cats, however, the gastrointestinal tract is the most commonly involved primary site because cells are most commonly derived from intraepithelial lymphocytes.⁴ In dogs, LGL neoplasia can present as acute leukemia or chronic lymphocytosis.³

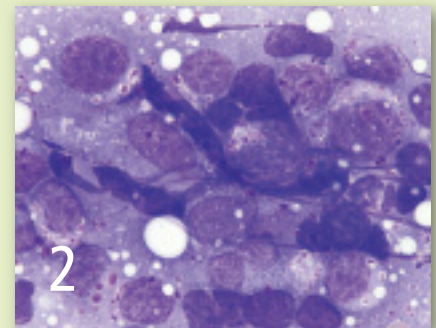
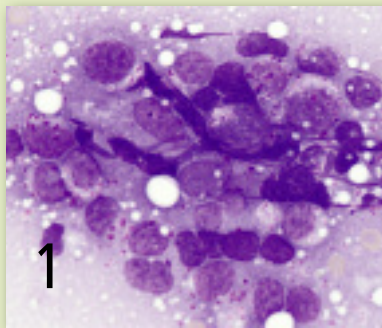
Immunohistochemistry has determined that LGL lymphocytes are typically derived from CD8+ cytotoxic T cells or natural killer (NK) cells. CD8+ T cells will also stain positive for CD3 (a pan-T-cell marker). In contrast, NK cells do not demonstrate CD3 or CD8 and instead are characterized by expression of CD56.²



Cytology sample of high-grade lymphoblastic lymphoma (small intestines). Neoplastic cells are round, discrete, and large (2–3 × the size of erythrocytes). Cells have round nuclei, multiple nucleoli, and a rim of intensely basophilic cytoplasm. (Original magnification, 1000×) Courtesy Dr. Tracy Stokol

DID YOU ANSWER...

- The sample demonstrates a mostly homogenous population of discrete, round cells. Cells are large (2–3 × the size of erythrocytes), with well-defined borders, and a high nuclear–cytoplasmic ratio. Cells have prominent round to ovoid nuclei—most with several nucleoli: and a moderate amount of basophilic cytoplasm. Most cells contain intensely staining magenta cytoplasmic granules. Moderate anisocytosis and anisokaryosis are present (Figures 1 and 2).
- The monomorphic, homogenous cell population strongly supports a neoplastic process, especially in the absence of obvious inflammation.
- The cellular characteristics support a diagnosis of high-grade lymphoblastic lymphoma of large granular cell type.



Cytologically, the primary morphologic feature that distinguishes LGL lymphoma from other forms of lymphoma (Figure 3) is the presence of obvious cytoplasmic granules. These granules probably represent preformed elements used in cell-mediated cytotoxicity (granzymes, perforin proteins), and appear as an intense azurophilic-magenta color on routine Wright–Giemsa stains.⁵

Small Cell Lymphoma. An equally uncommon form of lymphoma is low-grade small-cell lymphoma (SCL). This disease is characterized by well-differentiated cells that resemble normal lymphocytes (Figures 4 and 5). As with LGL lymphoma, this disease is sporadically reported in dogs and is well-described in cats. It primarily affects the gastrointestinal tract in the latter species.⁶

In stark contrast to the high-grade lymphomas, SCL tends to be an indolent, slowly progressive disease. Clinical signs can develop over several months, and cats are often treated empirically with various medical regimens before tissue sampling is pursued. Cytologically, samples consist of a monomorphic population of small, differentiated lymphocytes. Cells are similar in size to erythrocytes and neutrophils, have intensely basophilic nuclei, and have scant amounts of basophilic cytoplasm. It can mimic inflammatory bowel disease and can therefore be difficult to diagnose on the basis of cytology alone. Instead, tissue biopsy (endo-

LGL = large granular lymphocyte; SCL = small-cell lymphoma

vetsulin®

(porcine insulin zinc suspension)

PRODUCT INFORMATION

CAUTION

Federal law restricts this drug to use by or on the order of a licensed veterinarian.

INDICATION

vetsulin® (porcine insulin zinc suspension) is indicated for the reduction of hyperglycemia and hyperglycemia-associated clinical signs in dogs and cats with diabetes mellitus.

CONTRAINDICATIONS

Dogs and cats known to have a systemic allergy to pork or pork products should not be treated with vetsulin®. vetsulin® is contraindicated during periods of hypoglycemia.

WARNINGS

User Safety: For use in animals only. Keep out of the reach of children. Avoid contact with eyes. In case of contact, immediately flush eyes with copious amounts of water for 15 minutes. Accidental injection may cause clinical hypoglycemia. In case of accidental injection, seek medical attention immediately. Exposure to product may induce a local or systemic allergic reaction in sensitized individuals.

Animal Safety: Owners should be advised to observe for signs of hypoglycemia (see Owner Information Sheet). Use of this product, even at established doses, has been associated with hypoglycemia. An animal with signs of hypoglycemia should be treated immediately. Glucose should be given orally or intravenously as dictated by clinical signs. Insulin should be temporarily withheld and, subsequently, the dosage should be adjusted, if indicated.

Any change in insulin should be made cautiously and only under a veterinarian's supervision. Changes in insulin strength, manufacturer, type, species (animal, human) or method of manufacture (rDNA versus animal-source insulin) may result in the need for a change in dosage.

Appropriate diagnostic tests should be performed to rule out endocrinopathies in pets that are difficult to regulate (e.g., hyperadrenocorticism in dogs and hyperthyroidism in cats).

PRECAUTIONS

Animals presenting with severe ketoacidosis, anorexia, lethargy, and/or vomiting should be stabilized with short-acting insulin and appropriate supportive therapy until their condition is stabilized. As with all insulin products, careful patient monitoring for hypoglycemia and hyperglycemia are essential to attain and maintain adequate glycemic control and prevent associated complications. Overdosage can result in profound hypoglycemia and death. Progestogens, certain endocrinopathies, and glucocorticoids can have an antagonistic effect on insulin activity. Intact bitches should be ovariectomized. Progestogen and glucocorticoid use should be avoided.

Drug Interactions:

In the US clinical effectiveness studies, dogs and cats received various medications while being treated with vetsulin® including antimicrobials, antivirals, antifungals, antihistamines, analgesics, anesthetics/tranquilizers, diuretics, bronchodilators, corticosteroids (cats), NSAIDs, thyroid hormone supplementation, hyperthyroid medication (methimazole), internal and external parasiticides, anti-emetics, dermatological topical treatments and oral supplements, ophthalmic preparations containing antimicrobials and antiinflammatories, and various vaccines. No medication interactions were reported. This drug was not studied in dogs receiving corticosteroids.

Reproductive Safety: The safety and effectiveness of vetsulin® in breeding, pregnant, and lactating dogs and cats has not been evaluated.

Use in puppies and kittens: The safety and effectiveness of vetsulin® in puppies and kittens has not been evaluated.

ADVERSE REACTIONS

Dogs

In the field effectiveness and safety study, 66 dogs were treated with vetsulin®. Sixty-two dogs were included in the assessment of safety. Hypoglycemia (defined as blood glucose <50 mg/dL) with or without associated clinical signs occurred in 35.5% (22/62) of the dogs at various times during the study. Clinical signs of hypoglycemia were generally mild in nature (described as weakness, lethargy, stumbling, falling down, and/or depression). Disorientation and collapse were reported less frequently and occurred in 16.1% (10/62) of the dogs. Two dogs had a seizure and one dog died during the seizure. Although never confirmed, the presumptive diagnosis was hypoglycemia-induced seizures. In the rest of the dogs, hypoglycemia resolved with appropriate therapy and adjustments in insulin dosage.

Seven owners recorded the following observations about the injection site on the home monitoring forms: swollen, painful, sore, and a bleb under the skin.

The following clinical observations occurred in the field study following treatment with vetsulin® and may be directly attributed to the drug or may be secondary to the diabetic state or other underlying conditions in the dogs: hematuria, vomiting, diarrhea, pancreatitis, non-specific hepatopathy/pancreatitis, development of cataracts, and urinary tract infections.

Cats

In a field effectiveness and safety study, safety data was reported for 78 cats receiving vetsulin®. Hypoglycemia (defined as blood glucose <50 mg/dL) was reported in 61 cats (88 total incidences). Fifteen of the occurrences (involving 13 cats) were associated with clinical signs described as lethargy, diarrhea, decreased appetite/anorexia, vomiting, and hypothermia. One cat had seizures following accidental overdosing by the owner and again during the subsequent dose adjustment period. The cat responded to supportive therapy and had no further hypoglycemic episodes. In all cases of hypoglycemia, the clinical signs resolved following symptomatic treatment and/or dose adjustment.

Polyneuropathy was reported in 4 cats. Two injection site reactions were reported: one as a mildly thickened subcutaneous tissue reaction and the second as a mild bruising.

The following clinical observations occurred in the field study following treatment with vetsulin® and may be directly attributed to the drug or may be secondary to the diabetic state or other underlying conditions in the cats: vomiting, lethargy, diarrhea, decreased appetite/anorexia, pancreatitis, dermal events, respiratory disease, urinary tract disorder, renal disease, dehydration, weight loss, polydipsia, polyuria, behavioral change, and ocular discharge/conjunctivitis.

In a smaller field effectiveness and safety study, 14 cats were treated with vetsulin®. Hypoglycemia was reported in 6 cats (8 total occurrences). Lethargy not associated with hypoglycemia was reported in 4 cats (6 total occurrences). The following clinical observations occurred in the field study following treatment with vetsulin® and may be directly attributed to the drug or may be secondary to the diabetic state or other underlying conditions in the cats: foul odor to stool, diarrhea, dull coat, rapid, shallow breathing, stiff gate in rear, gallop rhythm, and pruritus with alopecia.

During the 1998-2007 period, the following adverse events in 50 cats treated with porcine insulin zinc suspension were reported to Intervet International and Intervet Inc.: Death, seizures, lack of effectiveness/dysregulation, hypoglycemia, allergic or skin reaction, lethargy, vomiting/diarrhea, injection pain, hyperthermia, nystagmus, PU/PD, and abnormal behavior.

To report adverse reactions, call 1-800-345-4735.

Additional information about vetsulin® and diabetes mellitus can be found at www.vetsulin.com

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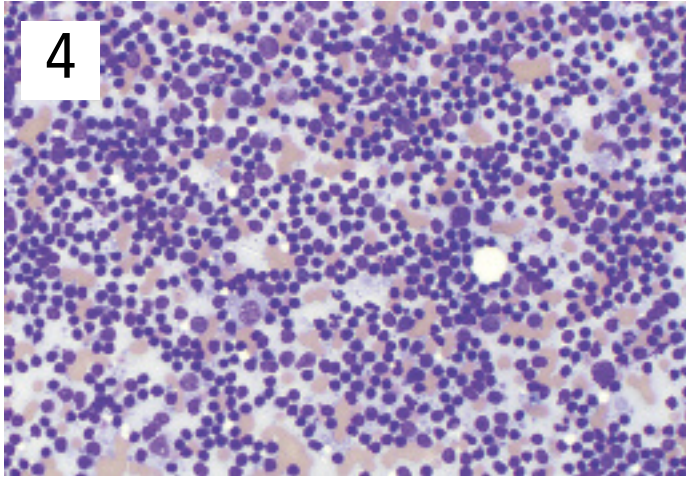
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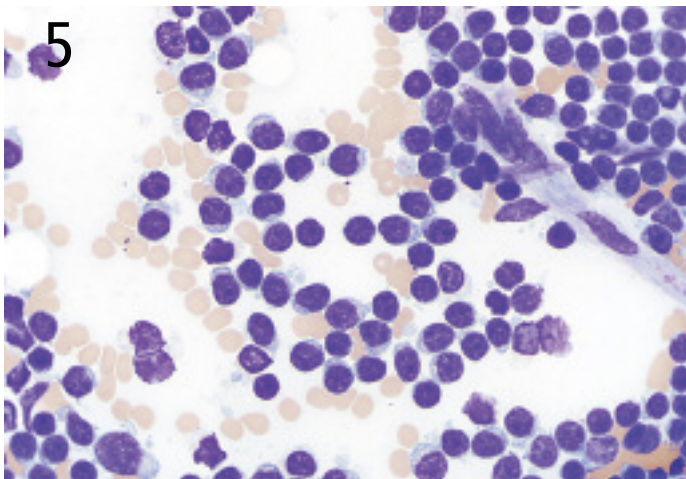
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Cytology sample of low-grade lymphocytic lymphoma (small intestines). The sample is hypercellular and predominated by a homogenous population of small, intensely basophilic round cells. Scattered erythrocytes and occasional larger lymphoblast cells are also present. (Original magnification, 500x)

Courtesy Dr. Sonjia Shelly



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Cytology sample of low-grade lymphocytic lymphoma (small intestines). Neoplastic cells are small (1–1.5 × the size of erythrocytes) and resemble normal lymphocytes. Cells have intensely basophilic nuclei and a very thin rim of light blue cytoplasm. (Original magnification, 1000x)

Courtesy Dr. Sonjia Shelly

scopic, or preferably surgical full-thickness) is the preferred diagnostic approach because depth of tissue invasion is a key feature for distinguishing SCL from inflammatory bowel disease. ■

See Aids & Resources, back page, for references, contacts, and appendices.

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