

# *Pacific Tide*

*An informational newsletter*

Pacific Veterinary Specialists & Emergency Service  
1980 41<sup>st</sup> Avenue  
Capitola, CA 95010  
Specialty 831-476-2584 -Emergency 831-476-0667

Pacific Veterinary Specialists Monterey  
2 Harris Court Suite A-1  
Monterey, CA 93940  
Monterey Office 831-717-4834 or Capitola 831-476-2584

[www.pacificveterinaryspecialists.com](http://www.pacificveterinaryspecialists.com)



**February 2013**  
Volume 2, Issue 1

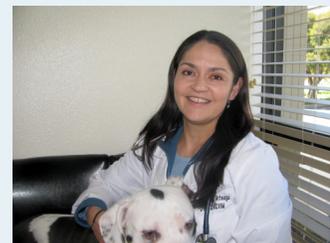


## About our Author

### **Theresa Arteaga, DVM, DACVIM (Oncology)**

Dr. Arteaga received a B.S in Biochemistry and Environmental Toxicology from UCLA. She received her DVM from Cornell University Veterinary Medical School in 2003. Dr. Arteaga did her internship in Medicine and her residency in Oncology at Animal Medical Center in New York City and obtained Board Certification from the American College of Veterinary Internal Medicine, (Oncology) in 2009.

Dr. Arteaga continues to speak locally and nationally and participate in clinical trials including the USDA DNA Melanoma vaccine with Memorial Sloan Kettering. She introduced emerging immuno and targeted therapies including the melanoma vaccine, palladia, metronomic and bisphosphanate therapy to the Monterey community. Her goal is to educate, collaborate with veterinarians and owners and offer a full spectrum of treatment with her patients living normal lives with cancer. Dr. Arteaga is available for consultations Monday through Friday and look for her most recent scientific article, "Feline Colonic Adenocarcinoma with Carboplatin" in the upcoming Journal of American Animal Hospital.



**Theresa Arteaga,  
DVM, DACVIM  
(Oncology)**

# Canine Multicentric Lymphoma

There are many types of malignant lymphoma and it is one of the most common neoplasms in dogs. They can arise in any tissue in the body however the most common is the large, diffuse lymphoblastic form/multicentric lymphoma. It is generally seen in a middle aged to older dog with Golden Retrievers, Boxers, Matiffs, Scotties, Airdales and Bassetts being predisposed. The etiology is likely unknown and like most cancer, multifactorial.

Typically most dogs present with painless swelling of the lymph nodes, hepatosplenomegaly and occasionally bone marrow involvement. Most dogs are not ill (*substage a*), but some dogs are anorexic, are pu/pd (probably hypercalcemics), have weight loss, ascites, dyspnea (possible mediastinal mass or pleural effusion) or are septic, anemic, febrile from bone marrow infiltration (*substage b*). **Important note: on in house cbc machines a leukemia/lymphocytosis/unclassified cells can look like a monocytosis. An in house cbc machine cannot distinguish or count unclassified cells therefore a cbc should be sent out to an outside laboratory and if there is a significant cytopenia or cytosis then there should be an accompanying cytology report.**

There are four main ways to get a **diagnosis of lymphoma**, 1)cytology of tissue/blood 2)histopathology of tissue 3)flow cytometry 4)PARR(PCR for antigen receptor rearrangement). Cytology of a lymph node is least invasive and expensive. If a biopsy is performed it is important to take the entire node as often times a punch or even wedge is not diagnostic. Flow cytometry is excellent

in particular for a lymphocytosis, as not only will you get the cell type that is neoplastic but other markers that have prognostic information. Flow cytometry can be performed on any tissue, and has been particularly helpful in distinguishing between thymoma and lymphoma in mediastinal masses and unequivocal cytologies of lymphoid hyperplasia/reactive disease. PARR is an assay based on clonality (a neoplastic population of lymphocytes are clones of the original mutated lymphocyte) and is sensitive to catch 1/1,000 neoplastic lymphocytes in a population. I often use PARR if a dog is pretreated with prednisone before a definitive diagnosis of lymphoma was made. Baseline diagnostics is a cbc/chemistry/ua but full staging would include an abdominal ultrasound and bone marrow aspirate/flow cytometry.

## The WHO (World Health Organization) staging for lymphoma is as follows:

- Stage 1 – a single lymph node
- Stage 2 – regional nodes (restricted to one side of the diaphragm)
- Stage 3 – generalized lymphadenopathy (enlargement of all nodes)
- Stage 4 – liver or spleen involvement
- Stage 5 – Bone marrow, CNS, or extranodal sites

It is important to remember with staging that stage 2,3,4 have exactly the same survival and response rate. Meaning that it does **not** change the protocol and if the owners are financially constrained I do not full stage and spare the money for treatment.

## Treatment

Without treatment most dogs die within 4-6 weeks. Dogs treated with prednisone typically survive 2 months. It is important to use

the immunosuppressive dose of prednisone as the anti-inflammatory dose will just select for resistant cells. Typically veterinarians call me about starting prednisone with the concern for downstaging or getting a diagnosis. For me the main concern is RESISTANCE. Dogs have a 90-95% response rate in lymphoma however what dictates survival time is do dogs eventually become resistant to chemotherapy. The main resistance mechanism for the CHOP based drugs is up-regulation of p-glycoprotein, this includes vincristine, doxorubicin and prednisone. So once a dog starts prednisone I do think they can get multi-drug therapy, however I do get concerned for resistance and recommend the 2 mg/kg dose daily of prednisone as you want to eliminate as many cancer cells as possible to not select for resistant clones.

### **Treatment Protocols – Frontline Therapy Median Survival Times**

*Prednisone – 2mg/kg SID*

*2 months*

*CHOP (cytoxan, vincristine, doxorubicin  
and prednisone)*

*11-13 mo, 30% multiple years*

*5 doxorubicin*

*9-12 months*

*Lomustine*

*4 months*

Median survival times are based on a bell shaped curve, with the 50% on the poor side of the curve based on immunophenotype (t-cell being more aggressive than b-cell), substage ( b worse than a), hypercalcemia, lung disease, leukemia and other prognostic factors. However it is important to know that there are several subtypes and often a leukemic can live multiple years. Once a dog comes out of remission and becomes resistant to a protocol

then other protocols are used. These are termed *rescue protocols* such as lomustine, MOPP, DTIC, DMAC and targeted small molecule inhibitors.

Side effects of treatment are varied depending on the agent used, however less than 20% of dogs have side effects with the CHOP based drugs. If seen they are of the “BAG” variety B=bone marrow, A=alopecia G=gastrointestinal. Typically intestinal effects are seen within 3-5 days of chemotherapy and the “nadir” or myelosuppression is seen at day 7 post chemotherapy. All of these can be controlled with antibiotics, gastroprotectants, antiemetics or anti-diarrheals.

New treatments for lymphoma include half body radiation, bonemarrow transplants, autologous vaccines and immunotherapy. At several academic institutions there are promising clinical trials extending survival times and elucidating new techniques for better selection of treatment plans.

Lymphoma is the cancer veterinary oncologists treat the most simply because it is treatable at a very high quality of life. It is performed on an outpatient basis and dogs go to the beach, hike, vacation and play with other dogs while under treatment. There are several treatment options tailored to age, stage, type, finances and owner schedule which can give the patient and owner wonderful time together.

# Our Doctors

## Internal Medicine

Kelly Akol, DVM, DACVIM  
Merrienne Burtch, DVM, DACVIM  
Michelle Pressel, DVM, DACVIM  
Ryan Garcia, DVM, DACVIM

## Surgery

Lisa Metelman, MS, DVM, DACVS  
Tom LaHue, DVM, DACVS

## Critical Care

Colleen Brady, DVM, DACVECC  
Lillian Good, DVM, DACVECC

## Oncology

Theresa Arteaga, DVM, DACVIM  
(Oncology)

## Cardiology

Mandi Kleman, DVM, DACVIM  
(Cardiology)

## Radiology (VRS)

Larry Kerr, DVM, DACVR  
Mark Lee, DVM, DACVR

## Emergency

Christian Robison, DVM  
Kim Delkener, DVM  
Mark Saphir, DVM  
Jessica Kurek, DVM

## Behavior

Jan Brennan, DVM (practice  
limited to behavior)

## About Our Hospitals

PVSES was founded to provide high quality, specialized medical care to companion animal patients. Our practice is dedicated to serving the veterinary community as a partner in total patient care. We offer comprehensive specialized services including endoscopy, Doppler ultrasound, surgery, 24-hour ICU care, and emergency and critical care. Our staff is committed to providing compassionate and thorough medical care that meets the needs of the patient, client, and referring veterinarian. In September 2011 we opened PVSM and offer internal medicine, oncology, and cardiology Tuesday through Thursday in Monterey. Behavior consultation by appointment is available on Mondays.

### Pacific Veterinary Specialists

1980 41st Avenue  
Capitola, CA 95010

Phone: 831-476-2584  
Fax: 831-476-8499  
Emergency: 831-476-0667  
E-mail: pvses@pacbell.net



Adobe Animal Hosp.-Los Altos  
Medical Director / DVM  
4470 El Camino Real  
Los Altos, CA 94022

PLEASE  
PLACE  
STAMP  
HERE