

Pacific Tide

An informational newsletter

Pacific Veterinary Specialists & Emergency Service
1980 41st 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



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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 has continued to publish scientific articles and participate in research projects and clinical trials, the most recent being her USDA trial for DNA Melanoma Vaccine with Memorial Sloan Kettering Cancer Center. She is a true advocate for her patients and goes above and beyond for them. She enjoys time with her dogs and spending time outdoors. Dr. Arteaga joined Pacific in June of 2010 and is available for appointments Monday through Friday in Capitola and Monterey.



**Theresa Arteaga,
DVM, DACVIM–
oncology**

Canine Transitional Cell Carcinoma

Although urinary bladder cancer only comprises 2% of canine cancer, I am currently treating over twenty dogs. Why so many cases if it is not that common? Because canine bladder cancer is very treatable, with multiple treatment options at a high quality of life for months to years. The most common cancer of the canine bladder is transitional cell carcinoma (TCC) followed by leiomyosarcoma. Because TCC is so much more common we will focus on this disease.

TCC is a malignant cancer that develops from the transitional epithelial cells that line the bladder. As the cancer enlarges it can cause obstruction of the flow of urine from the kidneys to the bladder or the bladder to the urethra. It also in high grade, aggressive forms has the ability to spread to other organs in the body (lymph nodes, prostate, liver, lungs, bones). TCC is most frequently found in the bladder, but can be found in the kidneys, ureters, prostate and urethra.

The cause of TCC in dogs is multi-factorial with genetic predisposition and environmental factors being at the forefront in current studies. Scottish Terriers have an 18-20 fold higher risk of TCC than other dogs, followed by Westies, Shelties, Beagles and Wire Fox Terriers (3-5 times more likely to develop tcc). In Knapp et al, Scotties exposed to herbicides and insecticides were at an increased chance of developing TCC by seven times the control group of Scotties. This indicates that predisposed breeds should be restricted from lawns treated with herbicides and pesticides.

AT RISK BREEDS; SCOTTIES › WESTIES › SHELTIES › BEAGLES › WIRE FOX TERRIERS › AUSSIES

The most common *clinical signs* for TCC is hematuria, stranguria and pollakiuria which are also the most common signs for an urinary tract infection . Less commonly, dogs are lame or down in the hind due to metastasis to the bones. If a urinalysis is performed occasionally malignant transitional cells will be seen. However typically TCC requires a tissue biopsy because other types of growths in the bladder, infection, stones can cause “masses” to be seen on radiographs or ultrasounds and also cause abnormal cells in the urine. A tissue biopsy can be performed by traumatic catheterization or surgery but the gold standard is cystoscopy (insertion of a fiberoptic scope into the bladder and biopsy through the scope). Once a diagnosis is found, TCC *tumor staging* should include thoracic radiographs and an ultrasound (or CT scan) of the abdomen to look for metastasis and to assess any changes in the kidneys that result from obstructed urine flow (hydronephrosis and hydroureters), and imaging of the bladder to determine the exact location and size of the tumor within the bladder. This is needed to help plan treatment for cancer as well as evaluating the effectiveness of treatment. The only time surgery is indicated in TCC is when it is contained within the bladder at the apex. However because most canine TCC’s are trigonal (the junction with ureters, urethra and urethral sphincter) surgery with margins is not attainable. Also most TCC’s invade through all three layers of the bladder and surgical excision requires complete full thickness sectioning of the bladder wall. Even if a dog does have an apical TCC that is removed with surgery I warn owners that due to “field carcinogenesis” that often a TCC will recur other places in the bladder. “Field carcinogenesis” is when an entire area has an increased chance of cancer (vaccine associated sarcomas in cats or colonic cancer in humans) often due to chronic inflammation.



A TCC visualized with a fiberoptic scope via cystoscopy. Multiple biopsies will be performed avoiding vessels as the tissue can be vascular and friable.

Most dogs with TCC are treated with medical therapy. *Frontline therapy* is a non-steroidal anti-inflammatory (nsaids) that block the cyclooxygenase enzyme (COX 2) these include piroxicam, previcox, deramaxx, rimadyl, meloxicam and others. Previously piroxicam was used exclusively and typically caused some intestinal toxicity however recent studies from the Purdue group have seen similar efficacy with other more COX 2 selective nsaids. The median survival time for dogs treated with nsaids alone is 195 days. Dogs treated with a combination of nsaids and mitoxantrone (a very well tolerated anthracycline) have a median survival of 250-300 days. Vinblastine, another well tolerated chemotherapeutic has a survival of 172 days with ongoing studies combining nsaids and vinblastine in the future. The most recent literature shows that metronomic therapy with chlorambucil can have survivals of a year and a half. In the case of metronomic therapy the expected outcome is that the tumor will not shrink but stabilize in growth for an extended period of time. If a dog is completely obstructed on presentation establishing urethral patency with catheter then mitoxantrone and nsaids. If there is not a significant tumor burden nsaids or metronomic can be tried. Another possible treatment is the targeted therapy Palladia, which has shown efficacy in all carcinomas, even in the face of distant pulmonary metastasis. Typically with medical therapy in cancer the concern is that the tumor mutates and becomes resistant to the therapy. However with so many options that have different mechanisms of action it is possible to treat TCC for years maintaining quality of life.

When a dog is obstructed a urethral or ureteral stent procedure can be performed to buy the dog time. This is considered a salvage procedure as 25% of the time the dogs are incontinent and only showed a survival advantage if the procedure was followed up with chemotherapy (Weisse, Berent et al). It should also be noted that TCC dogs are very susceptible to urinary tract infections and frequent urinalysis/cultures should be performed via free catch urine samples as cystocentesis may contribute to tumor seeding.

RISK FACTORS; BREED › PESTICIDES/HERBICIDES › OVERWEIGHT › CHRONIC UTI'S

Ultimately what can you do to guide owners with predisposed breeds? As a preventative avoid older generation flea control/dips, avoid lawns with herbicides/pesticides and feed green leafy vegetables three times a week. You can also begin to screen at risk breeds as they age with a urinalysis/bladder ultrasounds every six months to help in early detection. Most importantly you can encourage your clients to participate in a clinical trial in hopes of identifying the gene/genes that predispose these breeds, risk factors for TCC, methods to detect TCC and methods to more effectively treat TCC.

Current Clinical Trials:

Purdue University Teaching Hospital – contact Ms. Patty Bonney 765-494-1130

Matthew Breen Lab cytogenetics – pure breed shelties, westies, Scotties and aussies. To elucidate the TCC gene and create an affordable “screening test”...which I am told is very, very close! 919-513-1466 or www.breenlab.org

Our Doctors

Internal Medicine

Kelly Akol, DVM, DACVIM (SAIM)
Merrienne Burtch, DVM, DACVIM(SAIM)
Michelle Pressel, DVM, DACVIM (SAIM)

Surgery

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

Oncology

Theresa Arteaga, DVM, DACVIM(Oncology)

Critical Care

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

Cardiology

Mandi Kleman, DVM, DACVIM(Cardiology)

Dermatology

Katherine Doerr, DVM, DACVD

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

Pacific Veterinary Specialists 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, dermatology and cardiology Tuesday through Thursday in Monterey. Behavior consultations by appointment are available on Mondays.

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