New Treatments for Osteosarcoma Aim to Extend Life and Save Limbs

Angie Johnson, D.V.M., of Kodiak, Alaska, knew immediately when she felt a bulge on her 8-year-old fawn Great Dane’s lower right foreleg last May that it could be bone cancer. As a veterinarian at the Kodiak Veterinary Clinic, Johnson was aware that the bump warranted having a radiograph taken.

Her Great Dane, CH MeadowWood’s Humble Knight’s Baxter, RN, CGC, TDI, was a blood donor at the veterinary clinic, a tracking dog for Alaska Search and Rescue Dogs, and an agility and obedience competitor in fun trials. “Baxter,” who often joined Johnson on hikes and runs in the Alaskan bush, saved her last year from a near attack by a grizzly bear.

Baxter’s radiograph showed a distinctive starburst lesion in the radius formed from needle-like fragments of bone, indicating a diagnosis of osteosarcoma. “The radius looked awful,” Johnson says. “There were spicules around it that come from the cancer simultaneously eating and growing bone.”

The fast-spreading, painful cancer affects about 9 percent of giant breeds like Great Danes. Comparatively, 1 percent of large breeds and 0.1 percent of toy breeds develop the cancer. There is no cure for bone cancer, so owners and veterinarians work together to provide the best treatment possible using surgery, chemotherapy, radiation therapy and medications for palliative care. Usually, amputation of the affected limb followed by chemotherapy is recommended to increase survival, but owners of Great Danes and other giant breeds often are reluctant to amputate, particularly a forelimb, because it can make walking difficult and may compromise quality of life.

Since osteosarcoma generally occurs in the leg bones, lameness and difficulty going up and down stairs are the most common signs that owners notice. Last July, two months after Baxter was diagnosed with the cancer, he began limping and having difficulty sleeping due to pain. His condition improved after Johnson gave him Rimadyl, a nonsteroidal anti-inflammatory drug (NSAID); tramadol, a drug that blocks receptors that transmit pain; and amantadine, a pain reliever commonly given to dogs with osteosarcoma.

While the conventional therapies for treating osteosarcoma aim to increase survival, research veterinarians are investigating promising new treatments. These include a recombinant bacteria vaccine and a powerful limb-sparing stereotactic radiosurgery that kills tumor cells and spares healthy tissue.

The Most Common Cancer

Osteosarcoma mostly occurs in dogs over the age of 8, long after they have been bred, but dogs as young as 1 or 2 years old can develop the cancer. The most common cancer in Great Danes, osteosarcoma arises from mutated cells that stop bone-matrix remodeling and the production of bone cells. “Normally, a dog’s body makes new, healthy bone as old cells die,” explains Brian Saunders, D.V.M., Ph.D., DACVS, assistant professor of orthopedic surgery at Texas A&M University College of Veterinary Medicine & Biomedical Sciences. “Osteosarcoma turns off the rebuilding function, and the bone matrix is destroyed without being properly remade.”

A definitive diagnosis is made from a bone biopsy, but characteristic lesions on radiographs are a strong indicator of osteosarcoma. As in Baxter’s case, tumors are depicted in radiography as a starburst pattern of needle-like fragments of bone. In 90 to 95 percent of dogs, osteosarcomas have microscopic metastasized at the time of diagnosis. Micrometastasis is not clinically evident on radiographs but will eventually lead to large metastatic tumors usually in the lungs or other bones.

During a bone biopsy, a small core of bone tissue is extracted using a bone biopsy needle for analysis of cells and tissues that may indicate cancer. A biopsy can help rule out fungal disease, but the puncture from the aspiration also can fracture weakened bone.

Dogs diagnosed with osteosarcoma suffer from pain that is complicated by fractures in the weakened bone. Sensory receptors, called nociceptors, send nerve signals of severe pain to the brain, and destroyed bone cells cause inflammation. Reducing pain is of primary importance.

Amputation combined with chemotherapy is considered the standard of care, but Great Dane owners often opt for limb-sparing surgery. Fifty percent of dogs that receive amputation and chemotherapy survive one year. Less than 30 percent survive two years, and less than 10 percent survive three years.

A variety of limb-sparing surgeries involving bone replacement techniques, mostly offered at university veterinary teaching hospitals or large specialty practices, are available that reduce...
Treatments for Osteosarcoma continued from page 1

pain and help to provide a functioning limb. Limb-sparing surgery followed by chemotherapy results in survival times that are similar to dogs receiving amputation and chemotherapy. Palliative radiation provides pain relief for two to four months in 70 to 90 percent of dogs by reducing inflammation and promoting bone recalciﬁcation. Among the medications given to dogs with osteosarcoma are NSAIDs, which help reduce pain from inflammation; narcotics, which block the nociceptor sensory receptors; and bisphosphonates, which relieve pain by decreasing bone loss.

In dogs with osteosarcoma, osteolysis, or destruction of the mineral matrix of bone, causes pain and fractures. “Bisphosphonates inhibit osteolysis,” explains Sarah Charney, D.V.M., DACVIM, DACVR, adjunct professor of radiation oncology at the University of Illinois College of Veterinary Medicine and staff radiation oncologist at Animal Specialty Center in Yonkers, N.Y. “As a result, bone pain and fractures are reduced.”

Pamidronate disodium is a bisphosphonate that provides pain control and extends life span about eight months for about 30 percent of dogs. A newer bisphosphonate, zoledronate, costs more but may attack cancer cells and protect bones. Both drugs can be used with radiation to help alleviate pain. “I suggest that Great Dane owners work with their veterinarians and follow the studies of zoledronate combined with palliative radiation therapy,” Charney says. “Early preliminary reports suggest a nine- to 10-month median survival time.”

Treatment of osteosarcoma is challenging partly because the cancer is likely to metastasize, or spread, particularly to the lungs. Metastasis in the lungs usually is the ultimate cause of death for dogs with bone cancer. It is not known deﬁnitely whether osteosarcoma is an inherited condition in dogs. Nicola Mason, B.Vet.Med., Ph.D., DACVIM, the Pamela Cole Chair in Companion Animal Medicine at the University of Pennsylvania School of Veterinary Medicine, says, “Large and giant breeds may be predisposed to osteosarcoma because of genetic influences, but other factors may also be involved. Rapidly proliferating cells tend to be more susceptible to cancer-forming events, therefore dogs whose bones grow rapidly, such as large and giant breeds, or dogs that experience bone trauma and damage that requires cellular proliferation for repair may be at higher risk for developing osteosarcoma.

“Chronic inﬂammation is known to be associated with the development of other cancers, although it is unknown whether persistent bone inﬂammation predisposes to bone cancer. Most likely the cause of osteosarcoma, like other tumors, is multifactorial, involving both genetic and as-yet unknown environmental factors that together can create the perfect situation for bone cancer to develop.”

Alternative Treatment Approaches

Alternative approaches to treating osteosarcoma are being investigated. Charney is part of a team that has pioneered a limb-sparing CyberKnife® radiosurgery technique for dogs where amputation is not possible or desired. Combined with chemotherapy, this radiosurgery, also known as stereotactic surgery, has a survival time that is similar to the standard of care with amputation and chemotherapy for good candidates. Unfortunately, not all dogs are good candidates. The viability of radiosurgery is best assessed by a CT (computed tomography) scan. The beneﬁt of radiosurgery is that it saves the limb.

“With this procedure, a radiation oncologist uses a high-tech, image-guided and computerized robotic control system to deliver radiation with submillimeter accuracy,” Charney explains. “The CyberKnife radiation beams are sculpted to conform tightly to complex masses and deliver multiple radiation beams from many points outside the dog’s body to the targeted tumor. The beams kill tumor cells yet spare healthy tissue. When the beams converge on the tumor mass, they deliver high-energy, pinpointed radiation with astounding power.”

Compared to conventional radiation therapy, the precision of CyberKnife radiosurgery allows higher doses of radiation to be delivered to the tumor while minimizing damage to healthy tissue. One to three treatments are the same as 15 to 20 treatments of conventional radiation. The beneﬁts include fewer hospital visits, fewer anesthetic episodes and reduced stress. Treatment is based on how much bone destruction has occurred as seen on a CT scan.

Meanwhile, at the University of Pennsylvania, Mason is testing a vaccination that will provide a glimpse of future treatment possibilities for osteosarcoma, Great Dane owners today continue to struggle to determine the best treatment that will extend longevity for their individual dog. Johnson, whose Great Dane Baxter was diagnosed last May, knew that amputation was not an option. “Baxter’s favorite thing in the world was hiking in the Alaskan woods,” she says. “I could not, in good conscience, take his leg away. It would take away the things he loved best in this world.”

Baxter lived four months after being diagnosed with osteosarcoma. “He had a wonderful, pain-free summer,” Johnson says. “In September, high doses of anti-inﬂammatory and pain medications were no longer working, and he couldn’t go on hikes anymore. I made the decision that it was time. I was so blessed to have had the time I did with him.”
Purina ONE beyOnd packaging now has weight circles

Purina ONE beyOnd brand dog food, the super-premium natural food plus vitamins and minerals introduced in 2011, now includes Weight Circles on the packaging. Starting in January 2013, Purina Pro Club will no longer accept UPC codes for Purina Point credit. Purina ONE beyOnd has a point per pound, the same as other Purina ONE products. The Purina ONE beyOnd portfolio includes: Chicken & Whole Oat Meal Recipe, with real white meat chicken as the No. 1 ingredient and accented with carrots, tomatoes and apples, and Lamb & Whole Barley Recipe, with real lamb as the No. 1 ingredient and accented with blueberries, sweet potatoes and spinach. Both have a 26 percent protein to 17 percent fat ratio and are made without corn or wheat, added fillers or artificial preservatives. They offer complete and balanced nutrition for adult dogs.

Pro Club dog food checks change to match new packaging sizes

One of the benefits of being a member of Purina Pro Club is receiving dog food checks to offset the costs of Purina brand dog food. The $7 dog food checks now can be used toward the purchase of any 14-pound or larger bag of Purina brand dog food. New packaging sizes for Purina brand dog foods prompted the change.

Purina Points accrue when members submit Weight Circles, the colored circles on packages of Purina brand dog food. Weight Circle submissions are processed as Purina Points that can be redeemed for items from the Purina Pro Club. One submittal per issue is allowed. Your Weight Circles expire in one year and cannot be reissued. Members should allow 3 to 5 weeks for processing and delivery of checks.

How to reach Purina Pro Club

To view your Purina Point balance, Pro Club members should visit www.purinaproclub.com or call 1-877-PRO-CLUB (1-877-776-2582) between 7 a.m. and 5 p.m. Central time Monday through Friday.

Purina dog food checks expire in one year and cannot be reissued. Members should protect dog food checks like cash. Purina is not responsible for replacement in the event of loss, theft or destruction after issuance.

When submitting Weight Circles, Pro Club recommends that you mail them to certified first-class mail or other traceable delivery method. This helps to ensure proof of delivery in the event Pro Club does not receive your Weight Circles. Pro Club is not responsible for Weight Circles not in its possession.

Reminders from Pro Club

Pro Club members should be aware of the following:
- Purina Pro Club is not a program for institutional organizations, such as rescue groups, humane societies or animal shelters.
- Any retail sale or purchase — including Internet transactions — of Purina and Pro Club materials is a violation of program terms and conditions. This includes, but is not limited to, the selling or buying of Puppy Starter Kits and weight circles.
- Pro Club is not responsible for fraudulent weight circles. Submitting fraudulent weight circles is a violation of the Pro Club program terms and conditions.
- Purina reserves the right to terminate membership or remove or disqualify earnings for any violation of account or program terms.

11th Annual National Dog Show Will Be Broadcast on Thanksgiving Day

The National Dog Show Presented by Purina, hosted by the Kennel Club of Philadelphia, will be broadcast on NBC from noon to 2 p.m. Central time on Thanksgiving, Nov. 22, following the "Macy's Thanksgiving Day Parade."

In its 11th year, The National Dog Show, which features Group and Best in Show judging, has become an American Thanksgiving Day tradition with about 20 million people tuning in. Co-hosts John O'Hurley, of "Seinfeld" and "Dancing with the Stars" fame, and David Frei, of the Westminster Kennel Club and an expert analyst, have provided commentary since the program began in 2002.

Held at the Greater Philadelphia Expo Center at Oaks, The National Dog Show is filmed during the Saturday, Nov. 17 Kennel Club of Philadelphia Dog Show. Judging Best in Show is Vicki L. Abbott of McKinney, Texas. One of only five bench dog shows held in this country, the Kennel Club of Philadelphia and its predecessor clubs have presented dog shows since 1879. Today, the show draws more than 40,000 entries on Saturday and Sunday and more than 100,000 spectators.

Purina-sponsored dog shows* | November 2012 to January 2013

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* This table lists some, but not all, upcoming Purina-sponsored dog shows.
Westminster Best in Show Dogs Remembered for their Achievements, Ambassador Roles

The recent passing of three Westminster Kennel Club Best in Show winners has left a void in the hearts of their owners and dog enthusiasts around the world. “J.R.,” “Stump” and “Rufus” will be remembered for the records they set but also for how they endeared all who knew them.

Owner-handler Scott Sommer of Houston lost his beloved house dogs, J.R. and Stump, over six days in September. J.R. (CH Special Times Just Right), the Bichon Frise who won the Garden in 2001, died Sept. 20 at 15 years of age. On Sept. 26, Stump (CH Clussexx Three D Grinchy Glee), the Sussex Spaniel who at age 10 became the oldest Westminster winner in 2009, passed away at 13 years of age.

After retiring as show dogs, J.R. and Stump had a daily ritual of taking a 10-minute ride with Sommer to the boarding/show kennel where they lived when they were being campaigned. Stump would get out of the car, walk into the kennel and take his place in the first run — the same that was his when being shown. J.R. liked to sit on a grooming table, where he would bark hello to all who entered.

The top-winning Bichon in breed history, J.R. won the Garden as a 3-year-old. Sommer continued to show the Bichon at select shows, and J.R. captured his 101st show at the first AKC National Championship. Best known for his bouncy, energetic temperament, J.R. also had a calm, empathetic side that came out when Scott took him to visit patients at children’s hospitals.

Stump, the 2004 Sporting Group winner at the Garden, came out of retirement to win Westminster, his 51st Best in Show and a first for the rare English breed. Though Stump was entered for Westminster, it was not until the Wednesday before that Sommer decided to bring him due to concerns that he was older and would have to fly in the cargo section because he was too large to meet the size requirement to fit under the seat. On the return trip from New York, Stump flew first class with Sommer.

Barbara and Tom Bishop of Holmdel, N.J., lost their beloved Rufus (CH Rocky Top’s Sundance Kid), the 2006 Westminster winner, Aug. 9 at 12 years of age. The first Colored Bull Terrier to win the Garden, Rufus accumulated 35 Bests in Show, including “The National Dog Show Presented by Purina” and the Morris and Essex Kennel Club Dog Show. Rufus went on to become a therapy dog and breed ambassador.

The passing of these Westminster champions, “James” (CH Felicity’s Diamond Jim), the English Springer Spaniel who won the Garden in 2007, died in May 2011 at 11 years old. Owned by Teresa and Allen Patton of Fairfax Station, Va., and handled by Kellie Fitzgerald of Bear, Del., James later visited children at cancer centers and Ronald McDonald houses with Teresa Patton. He became the only canine celebrity to be recognized by the Alzheimer’s Association as a Champion for Alzheimer Awareness.

J.R., Stump, Rufus and James, along with “Uno,” the Beagle and “Sadie,” the Scottish Terrier, helped christen the Purina Event Center at Purina Farms in Gray Summit, Mo., in August 2010. Along with their owners and handlers, these Westminster Best in Show winners walked the red carpet and were the first dogs to enter the facility. Their names are engraved on brick pavers lining the Walk of Champions going into the building.

Purina joins the owners of these special dogs in commemorating their lives. Their accomplishments and their shining personalities will be remembered for many years to come.