bark&whiskers™

Dog Tips

The Canine Cancer Surprise of the Decade — A 50% Cure Rate for 'Fatal' Cancer

This canine cancer is usually fatal within two years. Yet during the past decade, 100+ dogs have been cured with this treatment. But you'll have to cough up a lot of money, and will likely have to travel for treatment.

Reviewed by Dr. Becker

STORY AT-A-GLANCE

- In the past decade, over 100 dogs with lymphoma have been cured with bone marrow transplants. This represents a 50% cure rate for a form of canine cancer that is typically fatal — even with chemotherapy — within two years of diagnosis
- The bone marrow transplant is a multi-step procedure, requiring chemotherapy to put the patient into clinical and molecular remission, harvesting of hematopoietic cells, a double session of full-body radiation, transplantation of the hematopoietic cells, and a two-week recovery period in isolation
- There are only a handful of U.S. veterinary hospitals that do bone marrow transplants, and the procedure is costly — $13,000 to $16,000
- Some dogs aren't candidates for the procedure, including those under a certain weight, dogs with organ dysfunction, and dogs with uncontrolled infections or who are at high risk for infection
- If you have a dog with cancer, investigating the right holistic, integrative or traditional protocol for your pet is a part of your job as his guardian, and picking a protocol that resonates with your personal viewpoints is important

Editor's Note: This article is a reprint. It was originally published February 11, 2015.

Lymphoma is a very common cancer in dogs. All breeds are affected, but Golden Retrievers, Labrador Retrievers, Boxers, and Boston Terriers are the most frequent sufferers. Only 50% of dogs who receive chemotherapy for lymphoma are alive a year later, and just 15% survive past two years.

However, in the last 10 years, more than 100 dogs with lymphoma have been cured with a procedure that has historically been reserved for treatment of human cancer — bone marrow transplants. Those 100 dogs represent an impressive 50% cure rate for a typically fatal form of canine cancer.

As you might guess, the procedure is complex. The following is a general outline of the steps involved.

Steps Involved in a Canine Bone Marrow Transplant

This information is taken from Hematopoietic Cell Therapy: An Owner's Guide.[1]

- First, the dog must undergo chemotherapy to achieve complete clinical remission. Several diagnostic tests will follow, including a complete blood count, chest X-rays, and abdominal ultrasound to detect any remaining cancer cells. If none are found, the dog has achieved complete clinical remission (CR) and can proceed to the next step, "consolidation therapy."
- Consolidation therapy is designed to further reduce the presence of any hidden cancer cells in the body or bone marrow, and to insure no cancer cells can contaminate the stem cell (bone marrow) preparation. To achieve this goal, high-dose chemotherapy is given. For the next week, blood samples are DNA-tested to detect even minute numbers of remaining cancer cells in the blood. If none are found, the dog has achieved molecular remission (MR) as well, which is the best-case scenario for a successful bone marrow transplant.
- Oral antibiotics are started at this point to lower the bacteria count in the GI tract, which reduces the chance that bacteria will enter the bloodstream after radiation therapy, resulting in sepsis (a systemic bacterial infection). Dogs remain on the antibiotics until they are ready to leave the hospital after the full treatment and recovery period are complete.
- The next step in the process involves harvesting the dog's hematopoietic cells using an apheresis machine that isolates those cells from other red blood cells and retrieves them, while cycling the rest of the blood components back into the patient. This procedure involves hospitalizing the dog the night before so that a drug can be administered to stimulate the release of hematopoietic cells from the bone marrow into the blood.
- About six hours after the drug is administered, the apheresis machine is attached to the dog via catheter. The apheresis process takes several hours, but according to the veterinarians who perform the procedure, there is no discomfort for the dog. Occasionally, a mild sedative is given to calm restless patients.
- A sample of the collected hematopoietic cells is sent overnight for analysis to determine if an adequate number have been collected. A second sample is sent for DNA analysis to insure the hematopoietic cells aren't contaminated with tumor cells. The dog remains in the hospital overnight in case a second round of apheresis is necessary (it typically is not), or to proceed to the next step — radiation therapy.
- A day or two after apheresis, the dog will receive two 60- to 70-minute courses of gamma-radiation therapy, with a three-hour rest in between. Patients must be sedated or anesthetized during radiation therapy to insure they remain perfectly still, and for proper positioning of their bodies.
- Immediately following the second radiation session, the hematopoietic cells harvested during apheresis are returned to the dog via IV. The cells travel to the bone marrow, engraft, and begin to divide and create new blood cells.

Post-Treatment Recovery Period

After radiation therapy and the infusion of hematopoietic cells, dogs are placed in an isolation unit to recover. This is a critical period that lasts about two weeks. The isolation unit is designed to provide maximum comfort for the dogs, and their human family members are allowed to visit.

About 7 to 10 days into the recovery period, the dog's white blood cell and platelet counts will be at their lowest levels. The immune system will be extremely weak, and there is a danger of spontaneous bleeding up to about 14 days post-treatment. Once a dog passes the two-week mark, white blood cells and platelet levels rebound and the immune system is restored.

During the initial recovery period, dogs receive IV fluids, but no food or water orally for several days. Radiation therapy damages the GI tract, so for the first few days after treatment, most dogs don't have much of an appetite. Recovering patients' vital signs and other health measures are checked several times each day, and daily blood testing is performed to monitor organ function.

Dogs are typically in isolation for about 10 days, or until their white blood cell count reaches a safe level. Family is usually allowed to visit, but they must follow a strict sterile technique. If a dog develops a fever or other signs of infection during the recovery period, aggressive additional antibiotic therapy will be administered. If spontaneous bleeding occurs as a result of a low platelet count, blood transfusions may be necessary.

Common side effects of the treatment include diarrhea and mild nausea. Less common complications include anemia, bacterial infections, and prolonged nausea. Rare side effects include severe cystitis (bladder irritation), formation of blood clots in the lungs or brain, and fungal or parasitic infections.

Once a dog's white blood cell count is returning to normal, it takes a few additional days for platelet counts to start bouncing back. Since platelets control blood clotting, dogs must be kept calm and quiet, and they must be carefully monitored.

During the period when there are adequate white blood cells but a low platelet count, patients can be moved out of isolation into a regular patient care area. Once the patient's platelet count reaches an acceptable level, usually 14 days after radiation, he can leave the hospital.

Once the dog is back home, he will need periodic blood tests for several weeks. Clinical remission is monitored once monthly with a physical exam, and once every three to four months via chest X-rays and abdominal ultrasound. Molecular remission is monitored every three to four months through blood tests. If the treatment is successful, the dog will require no further maintenance chemotherapy or other conventional tumor treatments.

Additional Considerations

According to a comment by Dr. Edmund Sullivan of Bellingham Veterinary, one of the pioneers of the canine bone marrow transplant procedure, over 120 dogs with cancer have received a transplant. About 30% to 40% of dogs that received an autologous transplant (their own bone marrow was used) have been cured, and over 60% of dogs who received a transplant using the bone marrow of a related dog have been cured.[2]

Dr. Sullivan encourages anyone with questions about the procedure to contact one of the treating hospitals as early as possible after a dog has been diagnosed with lymphoma, leukemia, multiple myeloma, or another systemic hematopoietic disease (including systemic mast cell tumor and histiocytosis).

At the present time, it appears the procedure is being done in only three locations in the U.S.:

- **Bellingham Veterinary** in Bellingham, WA
- **Veterinary Specialty Hospital** in San Diego, CA
- **North Carolina State Veterinary Hospital** in Raleigh, NC

Dogs that are currently excluded from treatment are those under 30 to 35 pounds (this appears to be an issue with the size of the apheresis machine), those with organ dysfunction (heart, kidney, liver), dogs with uncontrolled infections or who are at high risk to develop infections secondary to another disease (e.g., diabetes or Cushing's), and dogs who can't maintain a clinical remission before or after consolidation therapy.

The cost of the procedure at NC State reportedly ranges from $13,000 to $16,000. It may be more expensive at other facilities.

Final Thoughts

Learning that your precious dog has lymphoma is absolutely devastating. How you choose to handle the situation is a very personal decision. Even if your pet is a potential candidate for a bone marrow transplant, the cost of the procedure can be prohibitive — especially if you have to travel to one of the facilities that offers it. Additionally, the stress of the procedure may be too much for certain dogs, not to mention the protocol itself, which many pet owners may be averse to offering.

Obviously a bone marrow transplant isn't the answer for every dog for a variety of reasons. What this study demonstrates is how much more we still have to learn about how and why abnormal cell growth occurs, and the fact that vastly different treatment protocols can offer some success. It also shows that there is no one cookie-cutter approach to treating any disease process. What works for one patient may not work for the next.

If you love a dog that has been cured by a bone marrow transplant, you probably have some emotional opinions on the subject, as well. If you have a dog with cancer, investigating the right holistic, integrative or traditional protocol for your pet is a part of your job as his guardian, and picking a protocol that resonates with your personal viewpoints is important.

Prevention is always the best medicine. Abnormal cell growth (cancer) can be multifactorial, having its roots in genetic aberrations, as well as environmental factors. Keeping your pet's life free from carcinogens on a day-to-day basis is really important, including:

- Providing nontoxic, smoke-free air
- Providing organic, non-GMO foods
- Providing chlorine-, heavy metal-, and fluoride-free drinking water
- Feeding unprocessed, fresh, species-appropriate food free from acrylamides and heterocyclic amines found in dry food
- Reducing or eliminating refined carbohydrates in the diet (go grain-free)
- Eliminating the potential for vaccine damage by titering
- Removing environmental exposure to known chemicals (lawn fertilizers and herbicides, toxic household cleaners, and topical pesticides)

Sources and References

Save An Angel, Canine Bone Marrow Transplants (BMT) (Archived)

[1] Veterinary Specialty Hospital (Archived)

[2] Dog Cancer Blog, June 28, 2018