

Neurotoxin effectively relieves bone cancer pain in dogs, researchers find

October 23 2013, by Katherine Unger Baillie

By the time bone cancer is diagnosed in a pet dog, it is often too late to save the animal's life. Instead, the goal of treatment is to keep the dog as comfortable and free of pain as possible for as long as possible.

A study out this week in the journal *Anesthesiology* by University of Pennsylvania veterinarians Dorothy Cimino Brown and Kimberly Agnello has identified a new way of accomplishing this goal. Their trial, conducted in 70 pet dogs with bone cancer, demonstrated that a single spinal injection of a neurotoxin provided more relief from pain than the pain-relieving drugs that are typically used.

Because of the similarities between bone cancer in dogs and the disease in humans, these findings suggest that a similar approach could provide effective pain relief in human [bone cancer](#) patients, Brown said.

"Dogs are a really good model for testing these kinds of drugs, so showing that it worked in dogs provides strong evidence that it could be safe and effective in people too," she said. "This study is the direct predecessor to a human clinical trial."

The research focused on a neurotoxin called substance-p saporin, or SAP. Previous work had suggested that SAP could selectively destroy neurons that carry pain signals to the brain, but the compound hadn't been tested in a pet dog population. Brown and Agnello wanted to determine if SAP, which had been subject to toxicology tests in the past, would offer relief from the pain that comes when cancer affects the

bone in client-owned dogs.

Bone cancer tends to afflict middle-age and older large-breed dogs. The first sign an owner may notice in their pet is a limp or change in gait. If the pain appears to persist, a veterinarian may perform an orthopedic exam and take an X-ray.

"At the point at which you identify a cancerous lesion on an X-ray, there's already known to be metastatic disease," said Brown.

Treatment at this stage is unlikely to save a dog's life.

"We don't talk about curing them, we just talk about increasing their longevity while maintaining a good quality of life," Brown said.

The most aggressive [treatment](#) for this type of cancer involves amputating the affected leg and administering chemotherapy. But surgery and regular visits to the veterinarian's office for chemotherapy is a large financial, logistical, and emotional commitment for a pet owner. For some, it's too much, and they favor a different approach.

"There are a lot of owners who will say, 'I know my dog is terminal so I'm just going to try to keep him as comfortable as I can for as long as I can,'" Brown noted.

It is from this group of owners that Brown and Agnello drew their 70 research subjects, who were divided evenly into two groups. Dogs in one group received standard pain-relieving medications while dogs in the other group each received a single injection of SAP into the fluid around their spinal cords. The owners were "blinded" and did not know which group their pet belonged too, as all the dogs stayed the night in the hospital and had the fur around their necks clipped, as though they received a spinal delivery of the neurotoxin.

To evaluate the pain-relieving effectiveness of these interventions, the researchers asked owners to complete questionnaires about their pets' comfort level. Dogs also wore monitors to track their level of activity, and were in some cases videotaped. In addition, owners brought their dogs back to the vet two weeks after the procedure (or pseudo-procedure) and then once a month for rest of their pets' lives.

The ultimate measure of the treatment's effectiveness, however, was when the owner asked to be "unblinded," and learn whether or not they had received SAP or only traditional pain relieving drugs. For those owners whose pets had not previously gotten the SAP injection, they were offered the treatment at that point.

"Basically we just kept following these dogs until the owners said, 'My dog's comfort level is not what it was before,'" Brown said.

By this gauge, SAP's ability to reduce pain was clear, the researchers found. While 74 percent of dogs in the control group had owners request to be unblinded within six weeks of the procedure, only 24 percent of dogs that received SAP had their owners request unblinding within that time frame. When taken as a whole, dogs treated with the standard-of-care pain relievers required unblinding significantly earlier than dogs that received the SAP injection.

Researchers noted only one major side effect: Some of the [dogs](#) with tumors in one of their front legs, who had thus received SAP injections higher in the spine, had wobbly, uncoordinated gaits. Lowering the dose of SAP injected corrected the problem.

Though receiving a SAP injection does require anesthesia, it offers an alternative treatment approach for pet owners who want a middle ground between simple pain-relieving drugs and the more aggressive approach of amputation plus chemotherapy, the researchers said.

"I could see this in wide application in veterinary medicine," Brown said. "For us this is a whole new realm of possibility of treatment."

If found to be effective in humans, spinal injections of SAP would offer an alternative to more extreme measures some [cancer patients](#) take, such as surgically severing nerves to alleviate [pain](#), an intervention that can trigger serious side effects.

"People have talked about these neurotoxins as being a molecular neurosurgery," Brown said. "When patients get to the point where medical management isn't working anymore, this might be something for them to consider."

More information: [journals.lww.com/anesthesiolog ...
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Provided by University of Pennsylvania

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