



UC DAVIS
VETERINARY MEDICINE

Veterinary Medical Teaching Hospital

Transnare Cryoablation: Information for Clients

Thank you for your interest in the transnare cryoablation procedure for the treatment of intranasal tumors (tumors inside the nose) offered here at UC Davis. This is some very general information that may help you in making a decision regarding treatment options for your pet.

At this point, we advise all of our clients that radiation therapy is still considered the gold standard treatment for nasal cancer in veterinary patients, and this experimental treatment should be considered palliative at this time (our goal is to slow down progression and improve quality of life, but we are not expecting a cure). At this time, patient accrual for the initial formal clinical trial has been filled and there is no longer financial subsidy available, but because the initial responses have been good and because of continued client interest, Dr. Steffey is continuing to offer this procedure as a treatment option through the UC Davis Veterinary Medical Teaching Hospital. **Please note, if your dog has invasion/loss of integrity of the cribriform plate (the bony plate separating the nasal cavity from the brain), cryoablation may not be an optimal treatment option for your pet. Depending upon the individual extent, he/she either may not be a candidate for the procedure, or may be at higher risk for either brain complications or quicker recurrence of the tumor.**

The cryoablation procedure is currently recommended as a single treatment. It is performed minimally invasively, without surgical incisions, under general anesthesia, using CT guidance. It utilizes special needle-shaped cryoprobes and special medical gasses to achieve a controlled deep freeze to kill the tumor; similar procedures are done with this system in human medicine, most commonly for kidney tumors and prostate tumors, and palliation of pain associated with bone cancer. Most of our canine patients are admitted the day before the procedure, and then monitored for an additional night after the procedure to ensure that recovery is smooth and to be able to address any immediate problems if they should occur. None of the patients to date have experienced any significant bleeding secondary to the procedure, but as the nose is a very vascular organ, minor to severe bleeding is a potential complication in any patient undergoing this procedure. Additionally, because other potential complications may occur, if you are coming from far away, we would encourage you to plan to stay in the area for at least a day after the treatment to allow us to recheck your dog if any complications do occur. The average patient is able to be discharged from the hospital the morning following the procedure, but each dog is an individual, and we endeavor to make the best medical recommendations based on their individual responses. At this time a general estimate of cost for the treatment procedure is around \$3,500, although this may vary from dog to dog, and also depends on the presence of other underlying disease processes, etc. The nasal cavity is a difficult area of the body to monitor, so if you wish to have the response to the treatment assessed, this is usually

done by a repeat CT scan 2-4 weeks after the procedure. This is not included in the treatment estimate and would also be your financial responsibility if you should choose to pursue it. Otherwise, we can only assess for response or complication very generally based on clinical signs.

Dogs will usually have worsening nasal discharge and/or intermittent bloody noses in the 2-3 weeks after the procedure, and may even sneeze out chunks of dead tumor tissue, as the tumor dies back. They will never have a normal nasal cavity as the tumor has destroyed much of the internal structure of the nose that is responsible for humidifying/warming the air we breathe, so when the tumor is removed, they may be prone to chronic nasal discharge and/or minor nosebleeds. In concept, this is likely similar to visiting a cold/high-altitude northern environment in winter – the cold dry air can make minor nosebleeds more frequent. They may also be more prone to intermittent secondary infections (bacterial and/or fungal) for the rest of their lives, although we do not yet have a lot of long-term data on this.

We have treated 20 dogs to date (as of December 2015), with tumor types including chondrosarcomas (3) and carcinomas (17). Overall most dogs that have been treated to date are tolerating this treatment very well, with variable tumor response, and clients report being pleased with their pet's quality of life. Outcome for each individual patient is difficult to predict, as it does depend a lot on the size and location of each individual tumor (how close is it to important normal structures that may limit treatment) as well as the individual biologic behavior of each tumors (some tumors are inherently more aggressive in behavior than others). Some dogs have had unfortunately short response times (tumor recurrence within a few months) despite an initially good response to the cryoablation, while others are currently alive and well two years after their treatment, with a wide variety of response in between. At this time the average survival following transnare cryoablation in dogs with a nasal carcinoma is around one year.

There have been a few immediately noted complications, from minor to more significant, which often have to do with the specific anatomy of the individual dogs and the individual tumors. Complications have ranged from facial swelling and nose bleeds immediately after the procedure (these are more or less expected), general malaise for around 1-2 weeks after treatment (think about how you feel with a really bad head cold), temporary hair loss over the bridge of the nose (one dog), temporary but significant swelling around the eyes that necessitated the patient staying in hospital for several days longer than originally anticipated and administration of eye medications (one dog), an oro-nasal fistula (hole in the hard palate between the oral cavity and nose), and devitalization of a tooth/teeth (tumors may grow too close to the teeth making impossible to exclude them from the treatment area), secondary bacterial infections, and malodorous breath. The likelihood of specific complications in your particular dog can only be discussed after reviewing imaging to understand the size and location of your dog's tumor.

In the long term, it is appearing that these patients are at increased risk for nasal fungal infections (eg, Aspergillus, an organism that is present everywhere in the environment, and

takes advantage of the dying tumor tissue and abnormal nasal anatomy). They will never have normal nasal anatomy because of the damage caused by the tumor, so it is quite possible that this could be a recurrent problem. In the original study population of dogs, about 50% of the dogs developed a fungal infection after treatment with cryoablation. Once we recognized this as an issue, in order to try to minimize this risk in future patients, we began recommending a minimally-invasive rhinoscopic debridement of any residual devitalized tissues approximately 2-3 weeks after cryoablation treatment. We may also recommend a course of oral medications after debridement to minimize infection risk during this healing period. This is an additional cost (rhinoscopic debridement = approximately \$2,000-2,500 at our hospital; medication cost depends on the size of the dog as it is dosed by body weight). If your pet should develop an established Aspergillus infection later, treatment is possible. Traditionally this is done with a topical infusion of an antifungal medication into the nose under general anesthesia.

It is always our goal to improve our patients' quality of life, and we do everything that we can to minimize the risk of complications, **but this should still be considered a novel procedure in early stages of development**, and we do not yet have long term follow-up and outcome statistics on a large population of dogs. You should be aware it is impossible to predict all potential risks and adverse outcomes. If complications occur, you should be aware that the financial responsibilities for treating them are yours.

At this time we have treated one dog with cryoablation that had radiation therapy one year before coming to see us, with subsequent recurrence of the tumor after radiation. This dog developed an oronasal fistula (hole in the roof of the mouth) after treatment with cryoablation one year after radiation. We believe that because of long-term changes to the health of the bone in the roof of the mouth as a result of prior radiation (an expected effect), the hard palate is at more risk in these dogs than dogs who have not had prior radiation, and the tissues just do not tolerate the additional insult provided by cryoablation. Dogs that have had previous radiation therapy are likely at much higher risk for an oronasal fistula complication after cryoablation, and therefore this situation (RT followed by cryoablation) likely will not be the right choice for your dog.

The above information describes our experiences to date with a single-treatment, palliative cryoablation procedure intended to improve quality of life and slow disease progression. If you are interested in pursuing more aggressive combination therapy, this may be possible, but we are very early in assessing the effects of combination therapy. In general, radiation therapy does its best work in the situation where there are very small amounts of disease. A likely safer combination of cryoablation and radiation is to do cryoablation first to remove bulky disease, and then “clean up” small volume/microscopic disease with radiation afterward – this combination order better minimizes the possible additive negative impacts of each type of treatment and mimics the way we often treat cancer elsewhere in the body. This is a multi-step treatment that entails a cryoablation procedure first, a CT-rhinoscopic debridement procedure and assessment of the health of the nasal cavity 2-3 weeks after cryoablation, and then planning for intensity-modulated radiation therapy approximately 2-4 weeks after that. We have had one dog undergo this protocol to date, and he is doing well approximately nine

months out from treatment at this point, with no complications, although we do not yet have long-term outcome information. Because this type of aggressive treatment must be highly individualized to each dog, it is more difficult to predict general risks of complications or costs, but the overall cost of this combination of treatments would likely be in the range \$12,000-15,000.

If you would like to pursue treatment of your pet with the transnare cryoablation procedure, please have your pet's medical records (especially the cytology or biopsy report with the diagnosis of the specific type of cancer) sent to Dr. Steffey for review. If your dog has previously had a CT scan performed for diagnosis of the nasal tumor, please have a copy of the CT scan sent on DVD to Dr. Steffey for review at the address below. In general, for optimal treatment planning, we need CT scans with and without IV contrast, and obtained with thin CT slices (approximately 1mm) so that we may accurately evaluate delicate structures and plan the procedure. If you are strongly interested, we would encourage you to contact our scheduling coordinators (Conni, Caleb, or Theresa) at 530-752-1393 to schedule an appointment (our schedule does fill up quickly, so waiting to schedule may mean postponing treatment – we can cancel the appointment if the procedure is determined to be unsafe for your dog after reviewing the medical records/images) – please let them know that this appointment is for a cryoablation treatment with Dr. Steffey so that an appropriate reservation for the CT time needed to perform the procedure may be made. This is a very specialized procedure, requiring a great deal of coordination between specialists, so it is not something that can be squeezed in on any day.

Medical records may be sent to:

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