Tibetan Mastiffs and General Anesthesia
Our Experience

Tibetan Mastiffs are uniquely individual

The assumption that a TM's response to anesthetics would be similar to other dog breeds has resulted in the deaths of numerous Tibetan Mastiffs. We have been conditioned to believe that human beings are biologically very similar to one another. For example, patients from 50 pounds to 500 pounds receive the same dose of a vaccine or the same dose of Tylenol. Because of this conditioning, our first instinct is to believe that everyone reacts similarly to the same drug, even though we know from personal experience that there are major differences between the way different people may react to the same medication. Humans are indeed biologically very similar to one another; however, similar is not the same as identical. In this same way, individual Tibetan Mastiffs can react differently to the same medication as well as having a different response compared to other dog breeds.

Drug metabolism is more closely correlated to body surface area than to body weight, so calculating the dose based on lean body mass or body surface area may be more appropriate than on actual body weight. As an example, giant breeds generally require lower relative anesthetic dosages than smaller dogs to achieve the same desired effect. Your Tibetan Mastiff may be even more sensitive to an anesthetic depending upon their particular genetic makeup. Even littermates can have very different sensitivities to the same anesthetic.

Because Tibetan Mastiffs are a fairly rare breed, it is not uncommon to take a TM to a veterinarian only to find out that this is their first Tibetan Mastiff patient. Even if they have had Tibetan Mastiff patients in the past, they may have limited experience with anesthetizing them. We ran into this early on with our first female, Jessie, when we took her in for her OFA hip & elbow x-rays. We had a great vet at the time with over 25 years of experience, but Jessie was her first TM patient. We almost lost her. Our vet used ketamine as the anesthesia drug, and we were completely unaware that the breed had a known sensitivity. She almost could not get Jessie to wake up, and told us that in all her years of practice, this was the worse reaction she had ever seen to anesthesia. We did not understand even then that there was a connection between the reaction and the fact that she was a Tibetan Mastiff. Only later, as we got to know more TM owners and learned of their experiences with anesthesia did we make the connection. It has been suggested to us to tell our veterinarian to "dose your Tibetan Mastiff like a sighthound", and we have taken that advice to heart ever since. Using this terminology should alert a veterinarian that your Tibetan Mastiff metabolizes some anesthetics more slowly than your average dog breed. It should also alert them that the rate at which they introduce the anesthetic, the amount of anesthetic required, and their response to certain anesthetics can be very different from other breeds. Unfortunately, this terminology only covers some of the potential problems when anesthetizing Tibetan Mastiffs.

Potential problems with anesthetics

To date there have been two genetic mutations identified related to dogs being sensitive to certain medications. Sighthounds, more specifically greyhounds, have been found to metabolize some drugs more slowly than others. They lack the cytochrome P450 enzyme needed for the metabolism of barbiturates. Lack of this enzyme can prolong recovery following administering the anesthetic thiopental up to four times. In the case of greyhounds, a ketamine/benzodiazepine combination, alfaxalone, or propofol are considered safer choices as an aesthetics. Even though propofol is considered safe for sighthounds, greyhounds metabolize it slower compared to other breeds. This can delay recovery and requires the slow administration of propofol only to affect. This example for sighthounds is used for illustration purposes only and is not intended to recommend any of these anesthetics for Tibetan Mastiffs. A ketamine/benzodiazepine combination may work well for sighthounds, but ketamine may present an undue risk to

Tibetan Mastiffs. PLEASE NOTE: The anesthetic ketamine has been known to cause death of several Tibetan Mastiffs that we are personally aware of. In some of these cases, the dogs seemed to recover from the anesthetic, but died within the next 48 hours.

Some herding dogs have been found to have a genetic mutation in the ABCB1 gene that affects their ability to transport certain substances across cell membranes. This can lead to a toxic accumulation of some drugs in their central nervous system. Two anesthetic agents, acepromazine and butorphanol, have been found to produce exaggerated sedation and respiratory depression in dogs with this mutation. In dogs where the genetic mutation is slightly different between the DNA strands that make up the gene (heterozygous), recommended anesthetics can be used with caution at a dose at least 25% below recommended levels. If the dog has the genetic mutation where it is identical between the two DNA strands that make up the gene (homozygous) these anesthetics should not be used. Unfortunately, to date there have been no studies to research or identify a genetic link to adverse reactions to anesthetics in the Tibetan Mastiff. The only way to determine if a mutation is present is to have your TM genetically tested.

In the same way that coat color may differ for dogs within the same breed or within the same litter, differences in response to medications can also exist due to genetic variations, not only in the same breed, but even between littermates. We have two littermates, Gemma and Candy, that have had very different reactions to butorphanol. They were both given a mixture of Dolorex® (butorphanol) and Dormitor® (medetomidine) to sedate them for OFA x-rays. The veterinarian was aware of their potential sensitivity to anesthetics and our recommendation to "dose them like sighthounds", but considered these drugs sedatives, not anesthetics. Dormitor® has a reversing agent that can be used to counteract the effects of this particular component of the mixture. Gemma recovered from the effects of the anesthetic within half an hour of administration of the reversal agent. Candy only partially recovered 8 hours after the reversal agent was administered. This particular veterinarian has carried out this procedure using this same anesthetic protocol thousands of times and had never seen this type of delayed recovery from these agents. This is a clear example that even litter mates can have dramatically different responses to medications. It further illustrates that even a veterinarian with extensive experience in administering anesthetics may not have come across a Tibetan Mastiff with a serious sensitivity to an anesthetic. Having made a note in HUGE letters on our chart regarding this incident, when we took Cosy (a half-sibling to Gemma and Candy) in for her x-rays, this same vet dosed lightly until he got a response. Cosy handled it better than Candy had, but it was still several hours before she was back to normal. This emphasized to us that it was not just about dosage, but administration played a part as well: TMs may be slower to respond to the anesthetic, so slow administration and allowing time to evaluate the response before increasing the dose is imperative. The close familial relation of these girls suggests to us a shared genetic sensitivity; their grandfather died from a reaction to anesthesia following a simple neutering procedure.

Minimizing the risks

Once administered, oral or IV medications are in the body until they can be broken down and eliminated from the body by means of various biochemical mechanisms taking place in the liver and kidneys. The amount of time oral and intravenous anesthetics need to be expelled depends on the individual's ability to process the chemicals, which in turn can be affected by the health and efficiency of the liver and/or kidneys, and this process can take multiple hours, or sometimes, days. Oral and intravenous anesthetics may come with risks but have been used successfully with Tibetan Mastiffs, although based on our personal experiences, we avoid them whenever possible. Instead, we have sought out veterinarians, both the veterinarian we use for routine care and procedures and our reproduction specialist, who use gas inhalation anesthetics. Gas inhalation anesthetics are more quickly expelled, and is the route we have chosen to go whenever possible. Isoflurane, Nitrous Oxide, Sevoflurane, and Desflurane are the most common inhalation anesthetics used for animals. The anesthetic is administered through the lungs by ventilating your dog and introducing the anesthetic gas mixed with oxygen. When the gas is removed, the body can expel it through the lungs using the normal breathing process. This process is fairly rapid and recovery times for inhalation anesthetics usually takes less than half an hour. We have so far never had a negative reaction.

I'm going to close by emphasizing several key points. There is a huge plethora of anecdotal evidence that the Tibetan Mastiff as a breed has a sensitivity to certain oral and intravenous anesthetics, specifically ketamine and its derivatives.

It is only anecdotal at this point, no scientific studies have been done to verify what so many TM owners have observed, but making your veterinarian aware allows him/her to choose the best anesthetic based on full knowledge of breed history and the potential for an adverse reaction. The recommendation we were given to "dose them like sighthounds" rather than simply base the dosage on body surface or body weight calculation has served us well, and may be helpful to you also as you discuss the potential for complications with your veterinarian. The greatest care should be taken the first time your dog is exposed to an anesthetic. Until you know how your TM will respond to a specific anesthetic, proceed with caution.

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ATMA Gazette