



# Peak Veterinary Specialists

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## **HYPERTENSION (High blood pressure)**

### **WHAT CAUSES HYPERTENSION IN PETS?**

Pets tend to get high blood pressure with age. There are numerous diseases in pets that are associated with high blood pressure as well:

- **Chronic kidney failure:** In one study, 93% of dogs with chronic kidney failure and 61% of cats with chronic kidney failure also had systemic hypertension.
- **Hyperthyroidism:** In one study, 87% of cats with untreated hyperthyroidism had systemic hypertension. (Note: hyperthyroidism is a feline disease only.)
- **Hypothyroidism** (dogs)
- **Cushing's Disease** (an adrenal cortisone excess)
- **Diabetes Mellitus** (inability to properly reduce blood sugar)
- **Acromegaly** (growth hormone excess)
- **Glomerular Disease** (a disease of the kidney filtration system)
- **Polycythemia** (an excess in red blood cells)
- **Pheochromocytoma** (an adrenaline secreting tumor of the adrenal gland)

In humans, high blood pressure is frequently considered primary, meaning there is no other disease causing it. In animals, primary hypertension is unusual; there is almost always another disease causing it and if routine screening does not identify the problem, more tests may be indicated.

### **WHAT PROBLEMS RESULT FROM HYPERTENSION?**

Problems from high blood pressure arise when a blood vessel gets too small for the high pressure flow going through it. Imagine attaching a garden hose to a fire hydrant. The pressure would cause the garden hose to explode; that is what happens to a blood vessel too small for the pressure going through it and bleeding results. Since these vessels are small, the bleeding may not be noticeable but a lot of little bleeds and a lot of blood vessel destruction can create big problems over time. Hemorrhages in the brain may lead to progressive neurologic dysfunction or a stroke.

The retina of the eye is especially at risk, with blindness (either sudden or gradual) being the first sign of latent high blood pressure. The kidneys are also targets, as they rely on tiny vessels to filter toxins from the bloodstream. Kidney disease is an important cause of high blood pressure and also progresses far more rapidly in the presence of high blood pressure.

### **HOW IS HYPERTENSION IDENTIFIED?**

To find high blood pressure, we screen for it. If a pet has one of the above disease conditions, blood pressure is checked. It has recently been recommended that older pets

have their blood pressure checked whenever they have a physical examination. If you own a pet over 9 years old, be sure to ask for a blood pressure check if one has not been recommended to you.

The other time high blood pressure is discovered is when it makes its presence known. This usually means some degree of blindness or some other obvious eye problem. The retina of a hypertensive patient develops twisted-looking retinal blood vessels. Vessels may even break, showing smudges of blood on the retinal surface. Areas of the retina can simply detach, and sometimes the entire retina detaches. With early identification, some vision may be restored. Do not let minor vision changes go unreported. Let your veterinarian know if you think your pet's vision is not normal. Retinal changes can be complicated to interpret. Do not be surprised or alarmed if your veterinarian recommends referral to a veterinary ophthalmologist.

### **HOW DO WE MEASURE BLOOD PRESSURE IN PETS?**

Blood pressure measurement is performed similarly to the way it is in humans. An inflatable cuff is fit snugly around the leg of the pet; sometimes the base of the tail can be used. The cuff is inflated so as to occlude blood flow through the superficial artery. In a person, as the cuff is slowly deflated a stethoscope is used to listen for the point when the blood pressure is adequate to pump through the partially occluded vessel. This point on the pressure gauge is the systolic blood pressure. The cuff is further deflated until the vessel is open far enough to allow unrestricted blood flow and no more sounds are made. This point represents the diastolic blood pressure.

In animals, the stethoscope is not sensitive enough and an ultrasonic probe must be taped or held over the artery. Using ultrasound, the sound of the systolic pressure is converted into an audible signal. In pets, the systolic measurement should not exceed 160. It is not possible to measure diastolic pressure in a pet with ultrasound. However, using specialized blood pressure equipment, we are able to measure the systolic, diastolic, and mean arterial pressure (MAP) also with an inflatable cuff.

Because some pets are nervous at the vet's office, this factor must be taken into account when reading blood pressure. It is possible for a pet to have high blood pressure at the vet's office and normal pressure at all other times. It may seem that this would be the most common situation, but most pets are able to maintain normal pressure despite being surrounded by hospital staff.

### **WHAT TREATMENT IS AVAILABLE FOR HYPERTENSION?**

When ocular disease is present, special eye drops may be required depending on how much bleeding is present in the eye and whether or not return of vision is likely. (This is an area where an ophthalmology specialist may be especially able to help.)

When hypertension is identified, a search for the underlying cause is indicated. It may be that controlling the underlying disease totally reverses the hypertension (especially true for hyperthyroid cats).

Beyond these methods, medication to lower blood pressure is often in order. This typically involves some type of pill that dilates peripheral blood vessels, effectively making them larger so as to accommodate the high pressure blood flow going through them.

- Amlodipine, a calcium channel blocker, is the first choice for dogs and cats. It is typically given once daily.
- Benazapril, an angiotensin converting enzyme inhibitor, is sometimes used when kidney disease is present. It is typically given once or twice daily.

Salt restriction in the diet is a good idea. This generally means a dry or canned formula prescription diet if the pet will eat it or a diet limited to dry food if the pet will not accept prescription food. Appropriate home cooked diets may be designed through a veterinary nutritionist.

Hypertensive patients should be rechecked every 2 to 4 months to keep their blood pressure in a healthy range.