

SYSTEMIC HYPERTENSION

(HIGH BLOOD PRESSURE THROUGHOUT THE BODY)

BASICS

OVERVIEW

- “Systemic” refers to the entire body versus individual parts of the body; “hypertension” is high blood pressure
- “Systemic hypertension” is a sustained elevation in systolic or diastolic (or both) arterial blood pressure; if no other disease process is identified to cause hypertension, it is called “primary hypertension,” “essential hypertension” or “idiopathic hypertension—“idiopathic” refers to “unknown cause;” if the hypertension is due to another disease process, it is termed “secondary hypertension”
- Secondary hypertension is more common in veterinary medicine; cause of primary hypertension is not fully understood, but some cases have a hereditary component
- Elevations in blood pressure may be related to a measurement artifact (stress-induced or “white-coat” effect [that is, being in the animal hospital and being nervous around the veterinary staff]) or disease
- The heart of the dog or cat is composed of four chambers; the top two chambers are the right and left atria and the bottom two chambers are the right and left ventricles; heart valves are located between the right atrium and the right ventricle (tricuspid valve); between the left atrium and the left ventricle (mitral valve); from the right ventricle to the main pulmonary (lung) artery (pulmonary valve); and from the left ventricle to the aorta (the main artery of the body; valve is the aortic valve)

GENETICS

- Colonies of dogs with high blood pressure have been produced by mating dogs with primary (essential or idiopathic) hypertension; mode of inheritance is not known

SIGNALMENT/DESCRIPTION of ANIMAL

Species

- Dogs and cats

Mean Age and Range

- Dogs—mean age, 8.9 years; range, 2 to 14 years of age
- Cats—mean age 15.1 years; range, 4 to 20 years of age

SIGNS/OBSERVED CHANGES in the ANIMAL

- Sudden (acute) blindness
- Bleeding within the eye
- Dilated pupils
- Separation of the back part of the eye (retina) from the underlying, vascular part of the eyeball (known as the “choroid;” condition known as “retinal detachment”); the “retina” contains the light-sensitive rods and cones and other cells that convert images into signals and send messages to the brain, to allow for vision
- Swollen or shrunken kidneys
- Blood in the urine (known as “hematuria”); presence of protein in the urine (known as “proteinuria”)—protein in the urine is detected by diagnostic tests (such as dipstick, microalbuminuria testing, and urine protein-to-creatinine ratio) performed as part of the urine evaluation
- Bleeding in the nose and nasal passages (known as “epistaxis” or a “nosebleed”)
- Seizures; disorientation; wobbly, incoordinated or “drunken” appearing gait or movement (known as “ataxia”); circling; weakness or partial paralysis; short, rapid movements of the eyeball (known as “nystagmus”)
- Heart murmurs and sequence of three heart sounds (known as a “gallop rhythm”), when listening to the heart with a stethoscope; gallop rhythm is heart beats that sound like a galloping horse instead of normal “lub-dub”
- Pet may be in congestive heart failure; signs include cough; difficulty breathing (known as “dyspnea”); bluish discoloration of the skin and moist tissues of the body caused by inadequate oxygen levels in the red-blood cells (discoloration known as “cyanosis”); “congestive heart failure” is a condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs
- Enlarged thyroid gland may be present in cats, when increased levels of thyroid hormone (known as “hyperthyroidism”) is cause of high blood pressure (hypertension)

CAUSES

Primary or Essential Hypertension

- Not known

Secondary Hypertension

- Accounts for over 80% of cases
- Kidney disease
- Increased levels of steroids produced by the adrenal glands (known as “hyperadrenocorticism” or “Cushing’s disease”)

- Increased levels of thyroid hormones (hyperthyroidism)
- Diabetes mellitus (“sugar diabetes”)—uncommon cause of high blood pressure (hypertension)
- Pheochromocytoma—rare tumor of the adrenal gland
- Increased levels of aldosterone, the hormone that regulates sodium and potassium in the body (condition known as “hyperaldosteronism”)—rare condition, usually due to a tumor in the adrenal gland
- Central nervous system disease—rare cause

TREATMENT

HEALTH CARE

- If possible, treat as an outpatient
- Hospitalization may be stressful to the patient
- Inpatient care may be necessary depending upon the underlying condition (such as the need for fluid therapy in a pet with kidney failure) or serious complications related to high blood pressure (hypertension), such as nervous system signs

ACTIVITY

- Depends on condition and underlying cause

DIET

- Influenced by underlying cause; salt (sodium) restriction considered controversial and, if used alone, is unlikely to lower blood pressure
- Avoid high salt intake

SURGERY

- Dictated by underlying cause; may be indicated for some underlying causes

MEDICATIONS

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive.

- Treat underlying cause
- Dogs—medications to decrease blood pressure, such as angiotensin-converting enzyme (ACE) inhibitor (example, enalapril or benazepril) or calcium channel blocker (example, amlodipine or diltiazem)
- Cats—medications to decrease blood pressure, such as calcium channel blocker (example, amlodipine) or angiotensin-converting enzyme (ACE) inhibitor (example, benazepril)
- β -blocker (example, propranolol or atenolol) or α -adrenergic blocker, if no response to ACE inhibitor or calcium channel blocker
- In emergency management, hydralazine or enalaprilat can be used in dogs; continuous direct blood-pressure monitoring is recommended
- Medications to enlarge or dilate blood vessels, such as hydralazine (dogs and cats) or phenoxybenzamine (cats)

FOLLOW-UP CARE

PATIENT MONITORING

- Blood pressure measurements of less than 150/95 may be considered the goal blood pressure
- Blood pressure and complications of high blood pressure (especially changes in the back of the eye [retina; changes known as “retinopathy”]) checked weekly until blood pressure is controlled
- Laboratory tests to measure side effects of medications and clinical disease response

POSSIBLE COMPLICATIONS

- Congestive heart failure, a condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs
- Kidney disease
- Kidney failure
- Degeneration of the retina (back part of the eye) due to high blood pressure (known as “hypertensive retinopathy”)
- Bleeding in the retina or separation of the back part of the eye (retina) from the underlying, vascular part of the eyeball (retinal detachment)
- Bleeding or blockage of blood flow in the brain (known as a “cerebral vascular accident”) leading to various central nervous system signs

EXPECTED COURSE AND PROGNOSIS

- Dictated by underlying cause

- Blood pressure can be controlled with appropriate therapy in most patients, but therapy does not necessarily improve survival time

KEY POINTS

- Unless underlying cause is curable or controllable, patient is likely to be on medications to control blood pressure (known as “antihypertensive medication”) indefinitely
- Uncontrolled high blood pressure (hypertension) can lead to various medical conditions (such as bleeding in the back of the eye [retina]; separation of the back part of the eye from the underlying, vascular part of the eye ball (retinal detachment); progressive kidney damage; heart disease; or nervous system signs)

