

Heart Murmurs in Dogs and Cats

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In most normal animals, blood flow through the heart is laminar; laminar blood flow is silent and so no murmur is audible. It is turbulent blood flow that produces a heart murmur that is audible on thoracic auscultation. When more pronounced turbulence is present, the heart murmur is accompanied by a “thrill”, a vibration which is palpable on the thoracic wall. Valvular insufficiencies, stenoses and shunts produce turbulent blood flow and murmur detection is often the first clinical indication of this underlying pathology.

However, occasionally turbulent blood flow will develop for physiologic reasons and in these patients, the presence of a heart murmur is not indicative of cardiac disease. An accurate characterization and localization of the murmur, together with a knowledge of breed and age, limits the differential diagnoses for the cardiac auscultation finding and allows the veterinary clinician to provide informed alternatives to the pet owner regarding the pursuit of further diagnostics and likely safety/ risks of ignoring a heart murmur in an asymptomatic pet.

Cardiac auscultation technique:

1. Place hands over left & right cranioventral thorax & identify the presence of any thrill (the palpable vibration created by turbulent blood)
2. Use hands to find the apex beat (the point where the heart “hits” the thoracic wall, usually around the 5th intercostal space on the left)
3. Place stethoscope over the apex beat & listen
4. Count heart rate
5. Evaluate rhythm: regular, regularly irregular or irregularly irregular?
6. Murmur present?
7. Move stethoscope craniodorsally & identify how murmur intensity changes. If the murmur gets softer, murmur is apical in origin, if murmur gets louder, the murmur origin is basilar.
8. Repeat on the right side of the thorax.

Heart murmurs are described according to intensity, location and timing in the cardiac cycle. Intensity of the murmur is described on a scale of I to VI: a grade I/ VI murmur is only audible after careful and prolonged auscultation in a quiet environment, a grade III/VI murmur is a murmur which is immediately audible, a grade V/ VI murmur is a murmur for which a thrill is palpable on the thoracic wall. Murmur intensity allows some interpretation of disease severity. For example, any murmur that is grade IV or greater will not be innocent but will instead be attributed to cardiac pathology.

Increasing murmur intensity is roughly and positively correlated with severity of mitral regurgitation in dogs with myxomatous mitral valve degeneration, and conversely, increasing murmur intensity is inversely correlated with the size of a ventricular septal

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defect whereby a small VSD produces a loud murmur and a large VSD may not produce any murmur.

Murmur timing in the cardiac cycle can be described as systolic, diastolic, systolic and diastolic (to and fro murmurs), or continuous. The timing of a murmur indicates the possible mechanisms of murmur generation. For example, a murmur that is ausculted over the left apex during systole is likely due to mitral regurgitation, while a murmur at the same location that is audible during diastole is likely attributable to mitral stenosis. A murmur that has any diastolic component, that is, solely diastolic, systolic and diastolic or continuous, is never innocent and is always associated with cardiac disease.

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Murmur Location	Murmur Timing	Murmur Intensity	Differential Diagnosis	Common Signalment	Outcome	Benefit of definitive diagnosis while asymptomatic
Left Base	Systole	Any	Subaortic stenosis	Boxer, GSD, Rotweiler, Golden Retriever, Newfoundland, other large breeds	Syncope/ sudden death, left congestive heart failure, aortic endocarditis	Beta-blockade aims to reduce syncope/ sudden death risk and delay onset of congestive failure, prophylactic antibiotics for bacteraemic events (dental, castration) Cutting balloon valvuloplasty for severe SAS may be beneficial
			Pulmonic stenosis	Bull Dog, Beagle, Pomeranian, other small breeds	Syncope/ sudden death, right congestive heart failure	Balloon-valvuloplasty palliation significantly improves clinical outcome, beta-blockade aims to reduce syncope/ sudden death risk and delay onset of congestive failure.
			Tetralogy of Fallot	Keeshonds, rare in cats & dogs	Syncope/ sudden death, cyanosis & polycythemia	Optimize clinical outcome by preventing severe polycythemia (phlebotomy/ hydroxyurea) Transvenous correction possible
Left Apex	Continuous	Usually >III/VI	Atrial septal defect	Standard poodle, Boxer, Doberman Young or athletic dogs	Right congestive failure	
			Innocent murmur		No adverse effects	
			Patent ductus arteriosus	Poodle, Border Collie, GSD, Maltese, Pomeranian, others	Left congestive heart failure, pulmonary hypertension/ cyanosis & polycythemia	Early correction curative
Right	Systole	Any	Myxomatous mitral valve degeneration	Small breed, old aged dogs	Left congestive heart failure, pulmonary hypertension	Congestive failure delayed by pimobendan for dogs with advanced disease
			Dilated cardiomyopathy	Large breed, middle-old aged dogs	Syncope/ sudden death, left &/or right congestive heart failure	Antiarrhythmics aim to reduce risk of syncope/ sudden death, pimobendan & ACE inhibitors delay onset of congestive failure
			Congenital mitral valve dysplasia	Large-breed young dogs	Syncope, left congestive failure	Transvenous balloon valvuloplasty aims to palliate stenotic dysplasia
Right	Systole	Any	Myxomatous tricuspid valve degeneration	Small breed, old aged dogs	Right congestive failure	Congestive failure delayed by pimobendan for dogs with

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<V/VI	Dilated cardiomyopathy	Large breed, middle-old aged dogs	Syncope/ sudden death, left &/or right congestive heart failure	Antiarrhythmics aim to reduce risk of syncope/ sudden death, pimobendan & ACE inhibitors delay onset of heart failure
Any	Congenital tricuspid valve dysplasia	Labrador retriever, Borzoi	Right congestive failure	Transvenous balloon valvuloplasty aims to palliate stenotic dysplasia
Any	Ventricular septal defect	Cats, Springer spaniels, Keeshounds	Left congestive failure, pulmonary hypertension/ cyanosis & polycythemia	Antihypertensives may delay onset of congestive failure, pulmonary artery banding may prevent development of congestive heart failure.

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