

TREATMENT OF VALVE DEGENERATION (ENDOCARDIOSIS)

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Disease and stage must be assessed and determined by signalment, symptoms, and diagnostics (auscultation, blood pressure, chest radiographs, natriuretic peptides, and possibly echocardiogram).

Asymptomatic (Stage A) no structural disease but at risk due to breed or age. Currently I do not prescribe medications and will recommend auscultation every 6-12 months. If murmur develops consider chest radiographs or echocardiogram to assess heart size.

Asymptomatic patient (Stage B1) with no chamber enlargement (primarily left sided) based upon chest radiographs or echocardiogram and normal blood pressure. Currently I do not prescribe medications and will recheck radiographs or echocardiogram in 6 months to assess for significant chamber enlargement.

Asymptomatic patient (Stage B1) with no chamber enlargement (primarily left sided) based upon chest radiographs or echocardiogram but elevated blood pressure. Elevated blood pressure based upon non-invasive monitoring is not a clear cut positive or negative. We currently use Doppler most commonly for non-invasive systolic blood pressure monitor. Other monitors such as petMap and Oscillometric are being used and add mean and diastolic estimates of blood pressure.

- Doppler readings below 140 mmHg I generally consider normal in our hospital patients. - Doppler readings of 140-160 mmHg could be considered normal in the anxious patient and without any diseases that would predispose to systemic hypertension (Cushings or renal disease). 140-160 mmHg may need to have a recheck blood pressure on a different leg or even consider minor pharmacologic manipulation if anxious (butorphanol as this should not falsely lower blood pressure). Another possibility is to recheck the patient at separate visit in the future.
- Doppler readings of 160-180 mmHg is very difficult to interpret but concurrent disease(s) and disposition still need to be considered. If patient has renal disease or Cushings I would be very concerned that this range could be indicative of systemic hypertension and would likely treat with ACE inhibitor. If no renal disease or Cushings I would certainly want to recheck the patient's blood pressure the same day on different legs and even consider butorphanol if anxiety is occurring.
- Doppler reading >180 mmHg I consider to be hypertensive and would want to start ACE inhibitor and may need to consider additional anti-hypertensive therapy such as amlodipine. Also if not previously performed blood work and urinalysis should be performed to look for underlying cause of the hypertension. Don't forget about looking for proteinuria as glomerular disease may not always have elevated BUN or Creatinine.

Asymptomatic patient (Stage B2) with moderate to severe chamber (primarily left sided) enlargement indicates indirectly Renin Angiotensin Aldosterone System (RAAS) is activated. Activation is being assessed by volume retention (left sided chamber enlargement). I currently start patient on ACE inhibitor and pimobendan. Consider dietary modification that includes moderate sodium restriction.

Symptomatic patient with cough (Stage B2) not caused by pulmonary edema but left main stem bronchus compression that is due to severe left atrial enlargement. This is going to be a diagnosis made by chest radiographs which I think radiographs should be the first diagnostic test when presented with a coughing patient. This stage of disease I consider to be an intermediate stage with left sided congestive heart failure likely to occur in the near future. I currently start ACE inhibitor and add additional after load reduction such as amlodipine to achieve systolic Doppler of 120-130 mmHg. Start pimobendan at normal 0.25-0.3 mg/kg twice daily. If patient continues to cough I will add cough suppressant or antitussive such as hydrocodone or butorphanol.

Symptomatic patient with dyspnea or cough (Stage C) caused by left sided congestive heart failure on chest radiographs. If patient is stable and able to be treated as outpatient I currently start furosemide, ACE inhibitor, and pimobendan (vetmedin), spironolactone, moderate sodium restriction.

Symptomatic patient with dyspnea or cough (Stage D) caused by left sided congestive heart failure on chest radiographs, potentially hypotensive, and that is clinically unstable. This is difficult to provide parameters to assess clinically unstable but some would include; 1) SPO₂ <90%, 2) blood gas (venous or arterial) CO₂ > 60, 3) blood gas (arterial) PaO₂ < 60, 4) dyspnea at rest, and 5) severe alveolar infiltrates on radiographs.

-Initial assessment should be done with as little stress as possible.

Provide supplemental oxygen. Add sedation (Butorphanol 0.2 – 0.3 mg/kg) when needed. Therapy that I currently provide for hospitalized left sided congestive heart failure is oxygen, nitro paste (1/4-1/2 inch in the ear), furosemide, and vetmedin when patient is stable enough to give oral medication. No IV fluids should be administered. Free choice water. ACE inhibitor can be added when patient is discharged.

-Furosemide dosing is highly variable. I typically use 2-4 mg/kg boluses to effect based upon clinical signs (auscultation of crackles, respiratory rate, and respiratory effort). Following boluses to stabilize furosemide can be given as CRI or as set bolus dosing.

-Other test/procedures should ideally be performed CBC/Profile/T4, blood pressure, ECG if arrhythmias ausculted, and IV catheter. Testing should be spread out and dog put back in O2 between test/procedures.

-I typically do not perform repeat chest radiographs until 12-24 hours after starting therapy. There is certainly a delay or lag that is seen with clinical improvement versus radiograph changes. I do not expect complete resolution but want to see improvement on 12-24 hour repeat radiographs. Clinical signs are very important (especially respiratory rate and effort) to determine improvement and treatment success. I also like to check renal values and electrolytes if large doses of diuretics are need on the first day.

Diet: moderate sodium restriction should be instituted for stage B2, C, and D. This could include a cardiac diet or senior diet. Treats can be higher in sodium, especially jerky or rawhides.

Follow up monitoring after patient is discharge from hospital with congestive heart failure would include blood pressure, renal blood values, electrolytes, and chest radiographs one week later. I find that having owners monitor resting respiratory rate is very useful resolution or even recurrence of left sided congestive heart failure.

Surgical options include open heart surgery and non-invasive interventional procedures.

-Currently open heart surgery is being performed by in Japan, England, and University of Florida.

-Colorado State is currently performing Valve Clamp surgery.

References:

Atkins C, et al. Guidelines for the Diagnosis and Treatment of Canine Chronic Valvular Heart Disease. J Vet Intern Med 2009;23:1142–1150

Boswood A, Häggström J, Gordon SG, et al. Effect of Pimobendan in Dogs with Preclinical Myxomatous Mitral Valve Disease and Cardiomegaly: The EPIC Study-A Randomized Clinical Trial. J Vet Intern Med. 2016 Nov;30(6):1765-1779. doi: 10.1111/jvim.14586. Epub 2016 Sep 28.

Uechi M, et al. Mitral valve repair under cardiopulmonary bypassin small-breed dogs: 48 cases (2006–2009). JAVMA, Vol 240, No. 10, May 15, 2012