CARDIOLOGY UPDATE, WHAT’S BEEN HAPPENING IN THE LAST 5-10 YEARS??

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THERAPY UPDATES

- EPIC Study
- QUEST study
- Protect study
- ACE inhibitor to delay
- FAT Cat
- Interventional cardiology
EPIC

• Evaluation of pimobendan in pre-clinical mitral valve disease

• Double blinded, placebo controlled, multicenter study

• Inclusion criteria (360 dogs entered)
  • Degenerative MVD, dogs 4.1-15kg, no previous CHF, murmur III/VI or higher
  • LA/AO >1.6, normalized LV size >1.7 (echo parameters)
  • Radiographic evidence of cardiomegaly
• **Endpoints:** Left sided CHF, euthanasia for cardiac reason, death presumed to be cardiac in origin

• **Hypothesis:** Reduction in preload/afterload and increase contractility will increase time to end point in dogs with cardiomegaly secondary to DMVD
ECHO
ECHO
EPIC RESULTS

• Study terminated in 2015 at interim analysis
  • Criteria met for unblinding, showed clear favor of pimobendan in delaying time to primary endpoint

• Time to endpoint
  • 1228 with pimobendan
  • 766 with placebo
• Take home: Delays onset of clinical signs by ~15 months compared to placebo
TAKE HOME MESSAGE

- Dogs with defined echo parameters will typically benefit from chronic pimobendan
- Ideally echo is performed
  - Drug not justified for all patients with murmur
    - Without significant cardiomegaly, could have detrimental effects in the long term

- Unanswered questions
  - Life expectancy after CHF diagnosed when pre-treated with pimo
  - Effect with additional meds (ACEI, etc)
  - Increased risk of sudden death?
    - Not statistically significant in study per authors
QUEST STUDY

- Pimobendan added to conventional therapy vs. benazepril added to conventional therapy will extend time to primary endpoint (DMVD)
  - Cardiac death
  - Euthanasia for heart disease
  - Treatment failure
- Multicenter study (Australia, Europe, Canada)
  - 260 dogs
  - 190 reached primary endpoint
    - 267 days pimobendan
    - 140 days benazepril
TAKE HOME POINTS

- Increased time to endpoint by ~4-5 months vs. benazepril

- Limitations
  - Does not evaluate combination pimobendan/ACEI
  - Composite endpoint (death d/t euthanasia or sudden death vs. treatment failure)
  - Single blinded (owners knew what med patient was on)
  - All dogs <20 kg
PROTECT STUDY

- Dilated cardiomyopathy (DCM) in Doberman Pinschers
  - Occult (preclinical) disease
  - 25-60% will develop in their lives
- Hypothesis: Will delay onset of congestive heart failure or time to sudden death
- 76 client owned dogs (UK, North America)
- Multicenter, blinded, placebo controlled
DCM ECHO
PROTECT STUDY

• Results
  • 718 days to reach endpoint with pimobendan
  • 441 days without pimobendan
  • 9 month benefit to reaching endpoint with pimobendan over placebo
TAKE HOME POINTS

• Pimobendan delays onset of CHF or sudden death on average of 9 months vs. no therapy
• No statistically increased risk of sudden death
• Highlights importance of screening echos for Dobermans
• Can it be translated to other breeds?
ACE INHIBITOR IN PRE-CLINICAL MITRAL VALVE DISEASE

- Use of benazepril (Pouchelon et al 2008)
  - Dogs with moderate/severe disease, no previous CHF, normal LA size
  - RETROSCPECTIVE
  - Large numbers of Cavalier King Charles Spaniels (CKCS) and other breeds (OB)
  - 66 in benazepril group, 75 untreated
  - Dogs in benazepril group had more severe disease
ACE INHIBITOR IN PRE-CLINICAL MITRAL VALVE DISEASE

• Results
  • No difference in time to CHF in any breed (though in OB, did increase time to all causes of “cardiac event”, i.e. death from CHF, sudden death, etc)
  • Many alive in both groups at the end of the study (65%)
    • Of those that died, many d/t non-cardiac causes
    • Only 17% developed CHF in study
  • In CKCS, no survival benefit
  • In OB, survived 3.3 years vs. 1.9 years for all cause mortality
• Use of enalapril (VETPROOF study, Atkins et al 2007)
  • PROSPECTIVE
  • 124 client owner dogs (<20kg, moderate/severe mitral regurgitation, LA dilation)
  • 0.5 mg/kg q24 given vs. placebo, 5 year study
ACE INHIBITOR IN PRE-CLINICAL MITRAL VALVE DISEASE

• VETPROOF results
  • 49% treated dogs and 57% UT dogs reached primary endpoint
  • No significant difference to time to CHF b/t groups
  • Significantly longer time to combined all cause death/CHF in treated (851 days) vs. UT (534 days)
  • Relatively few side effects
TAKE HOME POINTS

- Questionable efficacy of ACEI in delaying onset of CHF
- Likely benefit in all cause mortality
- Tolerated very well in most situations
- I will use with significant heart enlargement as long as it is tolerated
- I do not use with normal heart size or mild cardiomegaly
  - NOT NECESSARY IN ALL DOGS WITH MURMURS
- Unknown benefit in combo with pimobendan
FAT CAT STUDY

- Feline arterial thromboembolism (Plavix vs. aspirin)

- Inclusion criteria
  - Had survived cardiogenic embolic event and survived 1-3 months after

- Multicenter, blinded study

- Primary endpoint recurrent ATE, secondary all cause mortality/cardiac death/adverse reaction
FAT CAT STUDY
FAT CAT STUDY
SPONTANEOUS CONTRAST
THROMBUS
• Results
  • Primary endpoint (recurrent ATE)
    • Aspirin 116 days
    • Plavix 443 days
  • Secondary endpoint
    • Aspirin 128 days
    • Plavix 346 days
TAKE HOME POINTS

- Plavix associated with significant survival benefit over aspirin
- Therapy tolerated well

Limitations
- Does not evaluate combined efficacy (shown to be superior in people)
- Survival times cannot be extrapolated to general population of ATE case
  - These already had survived 1-3 months after initial event
INTERVENTIONAL CARDIOLOGY/RADIOLOGY

- PATENT DUCTUS ARTERIOSUS
- PULMONIC STENOSIS
- MITRAL STENOSIS
- BALLOON PERICARDOTOMY
- PACEMAKER
Amplatz canine ductal occluder (ACDO)
PDA
PDA ANGIOGRAM
ACDO
ACDO
TRANSVENOUS COIL
TRANSVENOUS COIL
TRANSVENOUS COIL
BALLOON PERICARDIOTOMY

- Minimally invasive, palliative therapy for recurrent pericardial effusion
- Requires fluoroscopy
- Palliative
- Risks
  - Pneumothorax
  - Hemorrhage
  - Arrhythmias
TAMPONADE
TAMPONADE
BALLOON PERICARDIOTOMY
DOUBLE BALLOON
PULMONIC STENOSIS
• JSAP 2011
  • Presence of concurrent tricuspid regurgitation and severe stenosis were independent predictors of sudden death
  • Pressure gradient >60 mmHg was associated with higher risks of sudden death
• JSAP 2013
  • 172 cases, compared treated (BV) vs. untreated dogs
  • Younger dogs, dogs with clinical signs, and dogs with type B form (hypoplasia of annulus) did worse
  • Balloon valvuloplasty reasonable reasonable treatment with severe pulmonic stenosis
RIGHT VENTRICULAR ANGIOGRAM
PULMONIC STENOSIS
BALLOON VALVULOPLASTY