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What's the Protocol? Managing Dogs with Severe Heartworm Disease

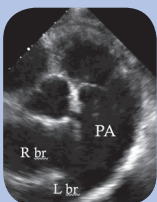
Fortunately, most infected dogs have no clinical signs or only mild signs of heartworm disease (HWD) and tend to undergo adulticide therapy with few major complications. The likelihood of complications associated with HWD increases with the chronicity of infection. Prognosis is dependent on stabilization, the ability to administer subsequent adulticide therapy and the ability of the family to commit to treatment of chronic conditions.

Following is a brief overview of these complications, including clinical signs, diagnosis and treatment. For information on drug dosages, please visit www.heartwormsociety.com/treating-severe-HWDisease.

PULMONARY HYPERTENSION (PH)

What it is: Increased pulmonary vascular resistance and obstruction
Cause: Chronic, untreated HWD leads to pulmonary vascular endothelial injury, remodeling, and dysfunction; physical obstruction by worms also contributes
Common clinical signs: Lethargy, shortness of breath, cyanosis and/or syncope
How to diagnose: Echocardiographic evidence of right-heart remodeling ± estimation of pulmonary pressures if tricuspid or pulmonary valve insufficiencies present

Treatment: Sildenafil, rest and oxygen as needed; anticoagulant therapy when there is high suspicion of heartworm-pulmonary thromboembolism (HW-PTE) and no contraindications



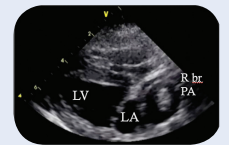
PNEUMONITIS

What it is: Inflammation in the pulmonary parenchyma due to HWD
Cause: Death of microfilaria and/or the presence of adult worms
Common clinical signs: Cough, tachypnea
How to diagnose: Radiographs typically show unstructured interstitial infiltrate
Treatment: Steroid therapy, rest and oxygen as needed



HW-PTE

What it is: Thrombus formation from dead and dying worms; thrombi and worm fragments may stay in place or embolize
Cause: Worm death, which may occur 3-21 days after adulticide administration or spontaneously
Common clinical signs: Lethargy, shortness of breath, cyanosis and/or syncope
How to diagnose: Echocardiographic assessment for PH, which is usually present (see above); rarely may see thrombus in pulmonary trunk or branches
Treatment: Sildenafil, rest, corticosteroids and oxygen if needed; anticoagulant therapy when there is high suspicion of HW-PTE (e.g. cyanosis and collapse 3-21 days after adulticide or visualization of thrombus) and no contraindications



RIGHT-SIDED HEART FAILURE (R-HF)

What it is: PH puts chronic pressure load on the right heart, leading to right ventricular failure
Common clinical signs: Lethargy, abdominal distension, shortness of breath, jugular venous distension and/or pulsation, syncope
How to diagnose: Echocardiography shows right-sided heart remodeling; presence of transudate or modified transudate cavitory effusions
Treatment: Mechanical removal of effusions, diuretic, pimobendan, and sildenafil (to treat underlying PH); also consider spironolactone and/or angiotensin-converting-enzyme inhibitor



CAVAL SYNDROME

What it is: PH and decreased right ventricular function allow worms to relocate to the right heart and caavae
Cause: Worms cause disruption of the tricuspid valve and/or caavae, decreasing venous return to the right heart, reducing stroke volume and cardiac output; worm mass can also lead to microangiopathic anemia and pigmenturia
Common clinical signs: Lethargy, right-sided systolic murmur, syncope, collapse, pallor and pigmenturia
How to diagnose: Clinical signs of above in dogs known to be heartworm+
Treatment: Stabilization (IV fluids, vasopressors, blood products), worm extraction, and management of specific related issues (e.g. pneumonitis, PH or R-HF)

