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POCUS application in the management and monitoring of congestive heart failure (VECCUS)

POCUS examination of the heart, lungs and pleural space are well accepted for the rapid diagnosis of congestive heart failure in dogs and cats. In this lecture, we will further expand on how POCUS of the thorax together with other clinical assessments can assist with the in-patient and out-patient monitoring of the heart failure patient, optimizing medical management and patient care.

Learning objectives:

1. To be knowledgeable of the common POCUS findings associated with left-sided congestive heart failure: left atrial enlargement, diffuse bilateral numerous B-lines (vertical artifacts) and that the resolution of these vertical artifacts can lag behind clinical improvement.
2. To be knowledgeable that dogs and cats with large volume cavitary effusions due to right-heart failure have distended caudal vena cava with diminished distensibility.
3. To understand that the majority (60-80%) of cats with congestive heart failure typically have at least a scant or small volume of pericardial and pleural effusion identified via POCUS.
4. To understand that POCUS provides useful and stress-free assessments for the in-patient and out-patient monitoring of the dog and cat with congestive heart failure.

Management of acute heart failure: introduction (Main Stream)

The immediate goals of heart failure therapy are to reduce abnormal fluid accumulations and restore comfort in breathing while providing an adequate or improved cardiac output. In this lecture, we will review specific dosing recommendations and timing of initial treatments, including sedation, oxygen, diuretics, vasodilators, inotropic drugs and centesis of large volume cavitary effusion, if needed.

Learning objectives:

1. To be review the common drugs used for the acute management of heart failure and to be knowledgeable about the expected timing and how to monitor for clinical improvement after giving initial doses of these drugs (furosemide and pimobendan).
2. To be knowledgeable about when a patient may need additional therapies or dose escalation in a case of initially refractory heart failure.
3. To understand how to optimally titrate the dose of furosemide (or diuretics) while in-hospital and to estimate the to-go-home dose.
4. To understand the pros and cons of pimobendan in the management of cats in congestive heart failure.

Management of arrhythmias: introduction (Main Stream)

In general, the approach to the management of arrhythmias involves understanding and treating the underlying cause of the arrhythmia as well as suppressing the arrhythmia with medical therapy, if specific anti-arrhythmic therapy is needed. In this lecture, we will review the common arrhythmias encountered in emergency settings and their management.

Learning objectives:

1. To be knowledgeable about the common cardiac and non-cardiac conditions commonly associated with arrhythmias.
2. To understand the treatment considerations and indications for using ant-arrhythmic therapy to suppress an arrhythmia.
3. To review the common drugs used to manage important ventricular and supraventricular tachyarrhythmias.

Multidisciplinary approach to pulmonary hypertension: introduction (Advanced Stream)

Pulmonary hypertension is caused by a wide variety of cardiovascular, respiratory, and systemic diseases thus a comprehensive approach is recommended to diagnose and treat pulmonary hypertension and its underlying conditions. In this lecture, we will review the latest ACVIM consensus statement outlining the classification and treatment strategies for managing pulmonary hypertension.

Learning objectives:

1. To understand that a comprehensive clinical assessment is indicated for the diagnosis of pulmonary hypertension.
2. To review the utility and clinical findings of imaging (radiographs, echocardiography, CT angiography) and laboratory tests for the diagnosis pulmonary hypertension.
3. To review the proposed ACVIM clinical classification scheme for pulmonary hypertension in dogs.
4. To review the current and promising treatments strategies for the management of pulmonary hypertension.

Echo Lab

Focused echocardiography or focused cardiac ultrasound is a useful diagnostic tool performed in symptomatic small animal patients in the acute care setting. Focused echo is helpful in the timely diagnosis of pericardial effusion, structural heart diseases and to provide estimates of fluid responsiveness. Importantly, it should be part of a more comprehensive and integrated thoracic ultrasound including interrogation of the pleural space, and lungs. In this lab, we will provide hands-on “probe time” practicing acquisition and interpretation of echo images in various patient positions and transducer positions. We will work with the live dogs in sternal/standing and lateral recumbency.

Learning objectives:

1. To perform and optimize the acquisition of the basic echocardiographic views: short- and long-axis views of the heart from the right parasternal site in lateral and sternal recumbency.

2. To recognize normal heart anatomy (atria, ventricles, AV and semilunar valves, caudal vena cava, pulmonary artery, aorta).
3. To measure left ventricular (LV) wall thickness, LV lumen in systole and diastole, and left atrial (LA) and aortic (Ao) dimensions using a combination of M-mode and 2-D Echo.
4. To determine and estimate cardiac systolic function, specifically using the echo parameters of fractional shortening (FS %) and TAPSE.