

THE APPROACH TO THE DIAGNOSIS OF HEART DISEASES IN DOGS

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The purpose of the physical examination is to detect disease, diagnose, assess the severity of disease and give the prognosis. In the case of heart disease, the commonest signs that dogs will show are; pallor, coughing, lethargy or weakness, fainting, exercise intolerance, dyspnea and/or abdominal distension. On occasion, occult disease may be detected by a practitioner during routine examination. As in all cases, a thorough history from the client may be very helpful in discerning the cause of an illness. In addition to the history, the physical examination will play a key role in assessing the problem and defining the problem as specifically as possible.

Keywords: Cardiomyopathy, Electrocardiogram, Endocardiosis, Femoral pulse, Pulmonic.

The determination of the origin of disease will begin with clinical signs that result in the patient being presented to the clinician. The purpose of the physical examination is to detect disease, diagnose, assess the severity of disease and give the prognosis. In the case of heart disease, the commonest signs that dogs will show are; pallor, coughing, lethargy or weakness, fainting, exercise intolerance, dyspnea and/or abdominal distension. On occasion, occult disease may be detected by a practitioner during routine examination. As in all cases, a thorough history from the client may be very helpful in discerning the cause of an illness. In addition to the history, the physical examination will play a key role in assessing the problem and defining the problem as specifically as possible. Portions of the physical examination that relate to the heart include observing the mucous membranes. They should be pink in color. The jugular vein should be checked for evidence of distension. Femoral pulse quality should also be assessed. The pulses should be strong, not bounding and should closely follow each heart beat. The auscultation portion of this physical examination will focus on listening

to the heart on both the left and right sides of the thorax. The objective of auscultation is to appreciate the heart rate and rhythm as well as to identify any murmurs as well as timing and location and grade of the murmurs. Identification of extra heart sounds as well as lung sound and quality will also be evaluated during this period. Dogs presenting with congestive heart failure will have a cough that is moist but non-productive. They may also have ascites as a result of backward heart failure. When this clinical finding is appreciated, a sample of the fluid should be removed and analyzed cytologically.

Conditions that cause murmurs can be divided into three broad categories: Structural or pathologic these result from stenosis (pulmonic or sub-aortic) Shunts (atrial septal defects, ventricular septal defects or patent ductus arteriosus) and acquired (dilated cardiomyopathy (DCM) or atrioventricular valve endocardiosis). The innocent murmur is a soft murmur that radiates poorly and varies in loudness with heart rate. This should be gone by four to six months of age. Functional murmurs may be due to fever which causes an increased flow velocity. Anemia also results in a functional murmur

due to decreased blood viscosity and increased flow velocity. The pulmonic, aortic and mitral valves are auscultated on the left side. The tricuspid valve is auscultated on the right side. Any continuous or diastolic murmurs are significant. High grade systolic murmurs are significant. Low grade systolic murmurs may be innocent. Once a murmur has been identified or a physical examination reveals other evidence of heart disease further diagnostic tests should be undertaken. An electrocardiogram (ECG) is used to identify arrhythmias and to detect chamber enlargement. Thoracic x-rays are also very helpful in the characterization of heart disease. Two views of the chest should be evaluated. The dog should have a lateral film and a film in ventral dorsal recumbency. This means that the dog will be on their back and the beam will penetrate through the ventrum first. It is IMPERATIVE the both views be

evaluated so that any lesion identified can be corroborated on the second view. Some structures are best evaluated in one view versus the other. For example, the pulmonary vasculature and cardiogenic pulmonary edema are better appreciated in the lateral film but the pulmonary artery, aortic arch and atria are appreciated in the VD view. The final non-invasive diagnostic step for heart disease is echocardiography. It requires expensive equipment and expertise in interpretation. It is wonderful and the only means to assess actual myocardial function in real time. Echocardiography allows measurement of each of the four heart chambers and chamber wall thickness. Velocity across valves can also be measured. Lesions on valves and valve leaflets can be identified. Response to therapy may also be measured over time using echocardiography.

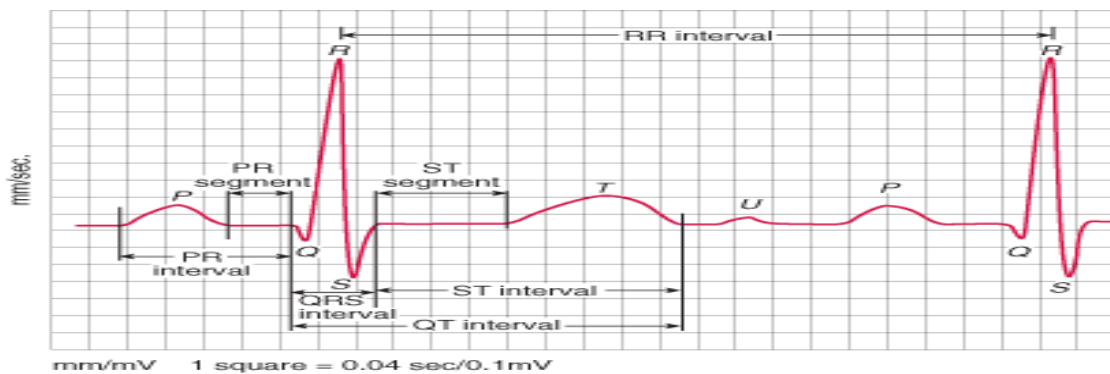
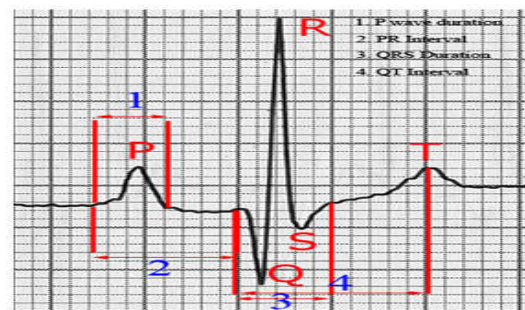


Diagram of Normal ECG with Location of Routine Measurements



P amp = amplitude of the P wave; **P dur** = duration of the P wave; **PR int** = PR interval; **R amp** = amplitude of the R wave; **QRS dur** = duration of the QRS complex; **QT int** = QT interval; **T amp** = amplitude of the T wave.

There are three common methods of calculating the MEA in the frontal plane. All of these are merely approximations. Individuals should use whichever method they feel comfortable with.

a. The Vector Method: Using leads I, II or III and the frontal plane diagram, calculate the algebraic sum of the QRS deflections in any two leads (this does not include the P wave or the T wave). Let us for example consider using the complexes of leads I and III. Plot the algebraic sum of lead I on its axis on the frontal plane diagram. Similarly plot the algebraic sum of the QRS complex of lead III on its axis on the frontal plane diagram. Draw lines perpendicular to the their respective axes at the points plotted on the lead axes I and III. Note the point of intersection of these two perpendicular lines. A line drawn from this intersect to the center of the diagram describes the MEA. See the example below:

b. The Isoelectric Method: Find the lead, of the 6 leads in the frontal plane, that is the most isoelectric (the algebraic sum of all the deflections of the QRS in that lead comes closest to zero) (again omit the T wave). Next, find the lead on the frontal plane diagram that is perpendicular to this isoelectric lead (the MEA will lie along this perpendicular lead). Note the net polarity of the complexes in this perpendicular lead. If the net polarity of these complexes is positive, the MEA is toward the positive pole of the perpendicular lead; if the net polarity of these complexes is negative, the MEA is toward the negative pole of the perpendicular lead.

c. The Largest Net Deflection Method: Find the lead, of the 6 leads in the frontal plane, that contains the QRS complex with the largest net deflection (the algebraic sum of all the deflections of the QRS in that lead is the largest value [positive or negative]). The MEA will lie along this lead. If this largest net deflection is positive, the MEA is toward the positive pole of this lead with the largest net deflection; if this largest net deflection is negative, the MEA is toward the negative pole of this lead with the largest net deflection.

Conclusions

✓ Mitral Valve Disease (MMVD) is the most prevalent acquired cardiac disease in small to medium size dogs breeds with male predominance and has been estimated to account for 75% of canine cardiac diseases. Whereas dilated cardiomyopathy (DCM) is more common in large and giant breed dogs and has been estimated to account for 15% of canine cardiac diseases.

✓ Hypertrophic cardiomyopathy (HCM) is the most important and prevalent cardiac disease in cats.

✓ An echocardiogram, or ultrasound of the heart, is considered the best diagnostic tool, as it can determine the ventricle wall thickness, pressures within the heart, valve conformation and ability and presence of clots. **It is the only method to differentiate the different types of heart disease.**

✓ Advanced imaging techniques, such as cardiac MRI, are providing previously unavailable information about myocardial fibrosis and paving the way for enhanced diagnostic capabilities and risk-stratification in cats with HCM.

✓ Though the western style of medicines are being used with wonderful results, their prolonged use is not without danger.

✓ Herbal Medicine is therefore gaining popularity for use in companion animal practice for the therapeutic management of acquired heart diseases in dogs.

✓ Recent studies suggested that phytoextracts and nutraceuticals along with standard treatment prolong the survival time of dogs with CHF related to MMVD and DCM.

✓ Herbal medicine and Dietary intervention with a blend of nutrients designed to address metabolic changes associated with MMVD in dogs were able to slow or reverse cardiac changes in dogs with early preclinical MMVD.