

ECG Quiz

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History

An 8-month-old male French bulldog was referred to the Small Animal Teaching Hospital, Chulalongkorn University, on June, 2018, with a history of exercise intolerance, respiratory discomfort and frequent ascites since February, 2018. Previous physical examination showed that the dog had heart murmur and hepatomegaly. Thoracic radiograph revealed severe cardiomegaly with pulmonary edema and ascites. The congenital cardiac disease was suspected. Since then the dog had been treated with diuretics (i.e. furosemide and hydralazine). The abdominocentesis was performed for a period of 4 months prior to hospital visit while frequency of fluid removal was escalated up to once a week.

The physical examination after visit revealed that the dog was depressed and had pale mucous membrane. The systolic murmur heart sound with

normal lung sound was audible. Blood profiles indicated the dog had anemia (PCV = 20%) and high level of ALT. The abdominal ultrasound showed hepatomegaly with passive hepatic congestion and ascites. The electrocardiogram was performed and was shown in Figure 1. Further echocardiography was performed and the results showed all heart chambers were enlarged with thin wall especially both ventricles. The systolic function was impaired with low fractional shortening (22%). Functional mild regurgitation of both mitral and tricuspid valves were seen. The small amount of pericardial effusion was also found. The tentative diagnosis was canine dilated cardiomyopathy (DCM). The dog was prescribed with diuretics (furosemide and spironolactone) and positive inotrope (pimobendan). The dog still had signs of congestive heart failure with ascites. The prognosis was guarded.

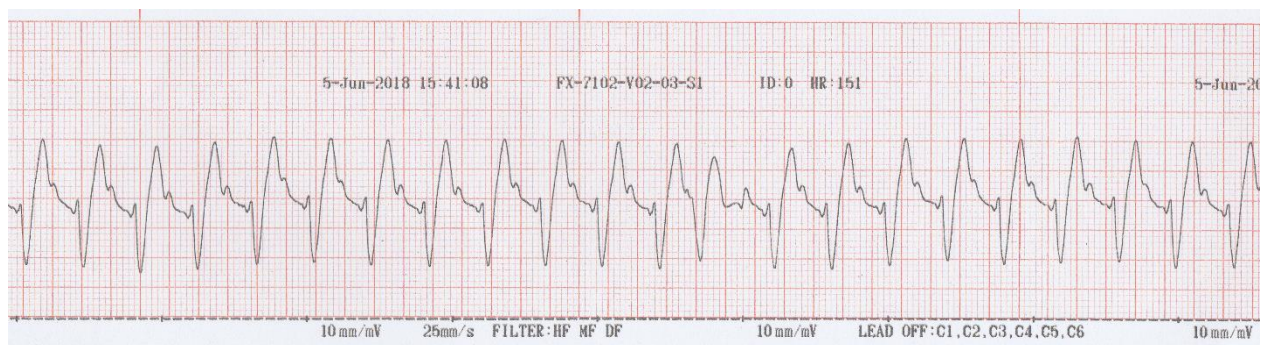


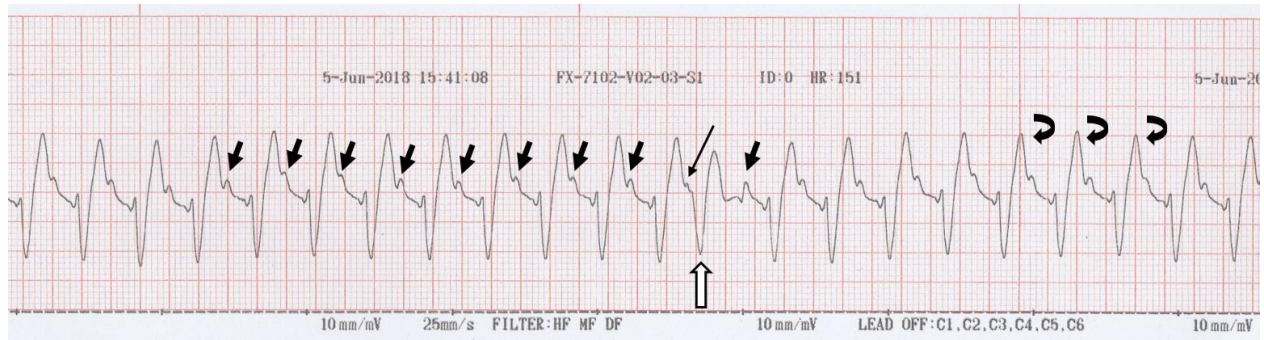
Figure 1 The ECG tracing recorded from a dog that came with respiratory discomfort and a presence of ascites.

Please answer before turning to the next page.

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Interpretation

Figure 1 - Sinus rhythm with p-mitrale, right axis deviation and a presence of premature complex.



The ECG tracing was obtained from a dog with history of difficult breathing and abdominal distention because fluid was attained in the abdomen. The murmur heart sound during systole was audible at many locations of the thorax. The heart rate was approximately 150 beats per minute at rest which indicates high heart rate. Since ascites was seen in concomitant of the present of right axis deviation from ECG tracing, therefore, the right side-congestive heart failure was suspected. The dog's age is still young with clinical signs of heart failure make the diagnosis of congenital heart disease as a priority. Although the shape of all QRS complexes was bizarre with negative deflection (curved arrows), the presence of preceding p-waves was seen (solid short arrows). Thus, these QRST complexes were depolarized after receiving impulses from natural sinus pacemaker, not a ventricular in origin. The R-R interval was constant except one beat that the complex was seen prematurely (open arrow). The premature complex may be

supraventricular because the shape is similar to the sinus complexes. The p-wave or atrial depolarization (long thin arrow) was closely couple with premature complex behind and may not be able to conduct impulse normally through the ventricular conducting system which was in refractoriness due to ectopic depolarization. The p-wave duration is prolonged in duration (0.12 seconds) suggesting delayed impulse propagation due to severe atrial dilation. The dilation of both ventricular chambers may be a cause of wide-QRS complexes. The right axis deviation also corresponded to either the existent of right bundle branch block or severe right ventricular enlargement.

The dilated cardiomyopathy was rarely seen in young small breed dog. The causes of disease may be due to genetic or nutritional factors or prior myocardial infection. The treatment option is limited due to severity of the disease progression. Both biventricular failure will make animal suffered from pulmonary edema and ascites. The prognosis is guard.