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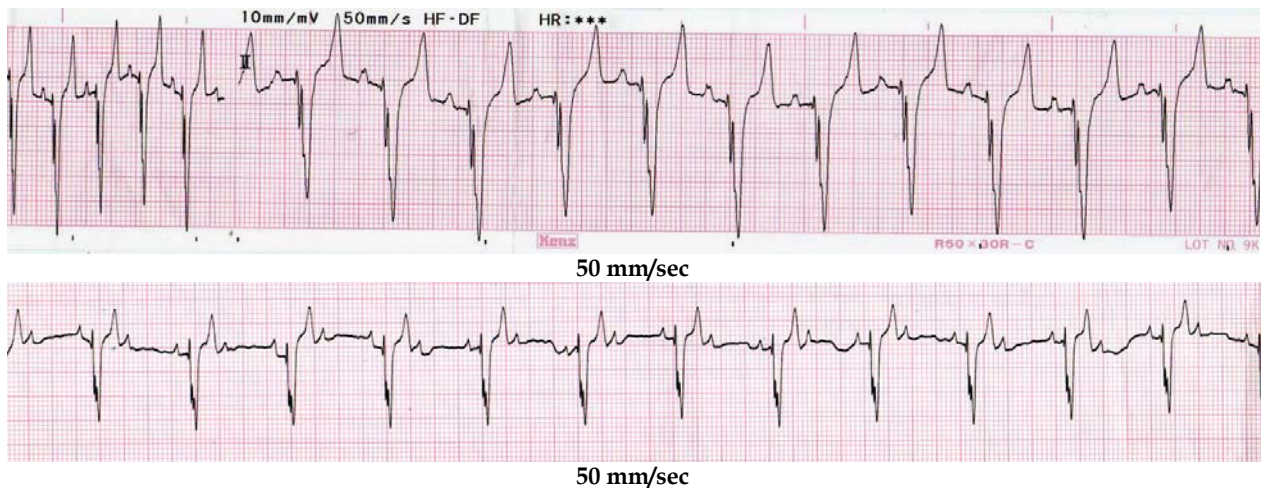
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ECG Quiz

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History

A fifteen year old female spayed cocker spaniel dog with the weight of 11 kilograms was presented at the Small Animal Hospital, Faculty of Veterinary Science, Chulalongkorn University with a history of acute abdominal enlargement after being fed the last meal 5 hours earlier. Dog showed severe depression and abdominal pain with sternal recumbency. Physical examination showed normal hydration status and normal heart and lung sound. The abdomen was distended with the hollow sound when percussion. The gastric puncture was performed and gas was aspirated by approximately 100 milliliters. The naso-gastric tube was introduced to perform gastric lavage. The blood tests showed leukocytosis. The red blood cell counts including liver and kidney panels were within normal limits. Biochemical profiles revealed mixed metabolic and

respiratory acidosis. Radiographic determination revealing severe gas accumulation in the stomach and the spleen was seen on the left lateral abdominal cavity. The right side of the heart was enlarged (VHS = 9) with moderate bronchointerstitial lung pattern. The gastric-dilatation (+/-) volvulus was diagnosed. The electrocardiography was recorded which was shown in tracing I. Laparotomy to perform gastropexy was done. The intramural pyloric mass was removed which may be the primary cause for partial obstruction and gas accumulation. Supportive treatments with antibiotics and pain reliever were prescribed. The ECG recording was repeated the day after surgery and the results were shown in tracing II. Unfortunately, the dog had cardiac arrest at the same day of ECG recording.

Please answer before turning to the next page.

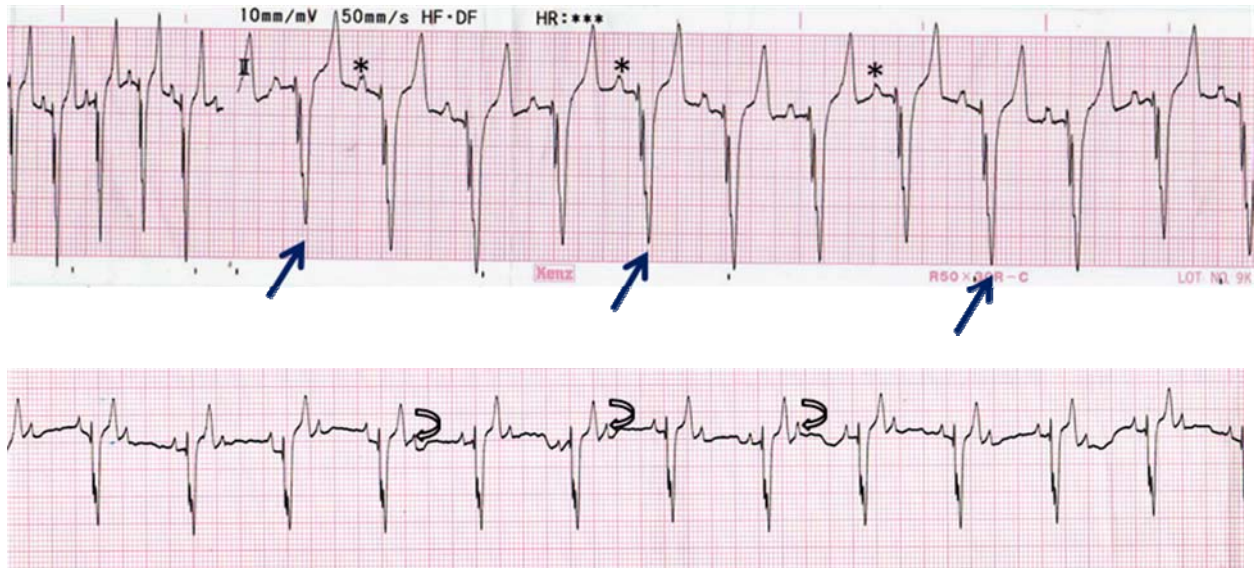
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Interpretation

Tracing I - Sinus tachycardia with right bundle branch block

Tracing II - Right bundle branch block with second degree AV block



(Note that the paper rate in the first strip was changed from 25 to 50 mm/second.)

The heart rate of this dog was approximately 160 beats/minute. Since the dog had a history of gastric dilation volvulus, the ventricular ectopic complexes were suspected. However, on tracing I, the p-waves (star) appeared before each bizarre QRS complexes. In each QRS complex, the R had positive deflection only slightly while the S waves had negative deflection deeply (arrow). The widening of QRS waves with different morphology and markedly discordant T-wave (opposite in polarity to the major deflection of the QRS) can be interpreted as ventricular ectopic depolarization. However, the presence of P-wave followed by constant PR-interval indicated that these waves were not ventricular in origin but instead the impulse was delayed and the vector was deviated by blocking of the impulse at the right bundle branch. The clinician may be confused since the rate is high and the antiarrhythmic drug

may be given without improvement. The right bundle branch block was considered benign although in this case the heart rate was abnormally high. Tachycardia in this case should be related to pain associated with gastric dilation volvulus.

One day after surgery, the ECG was recorded again (tracing II) which showed 2 consecutive P-waves before QRS complexes. The first P-wave (open curve arrow) was non-conducted P-wave in which some of them showed Ta wave at the end. The atrial rate was almost 300 beats/minute while the ventricular rate was 150 beats/minute. The 2:1 Mobitz type II second degree atrioventricular block was found. This phenomenon may be related to ischemic heart during GDV which usually causes low cardiac output. In this case, the dog may die from underlying GDV with mass after intensive surgery rather than the fatal arrhythmogenic heart.