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Chollada Buranakarl

Anusak Kijawornrat

Thanusorn Phakhawambodee

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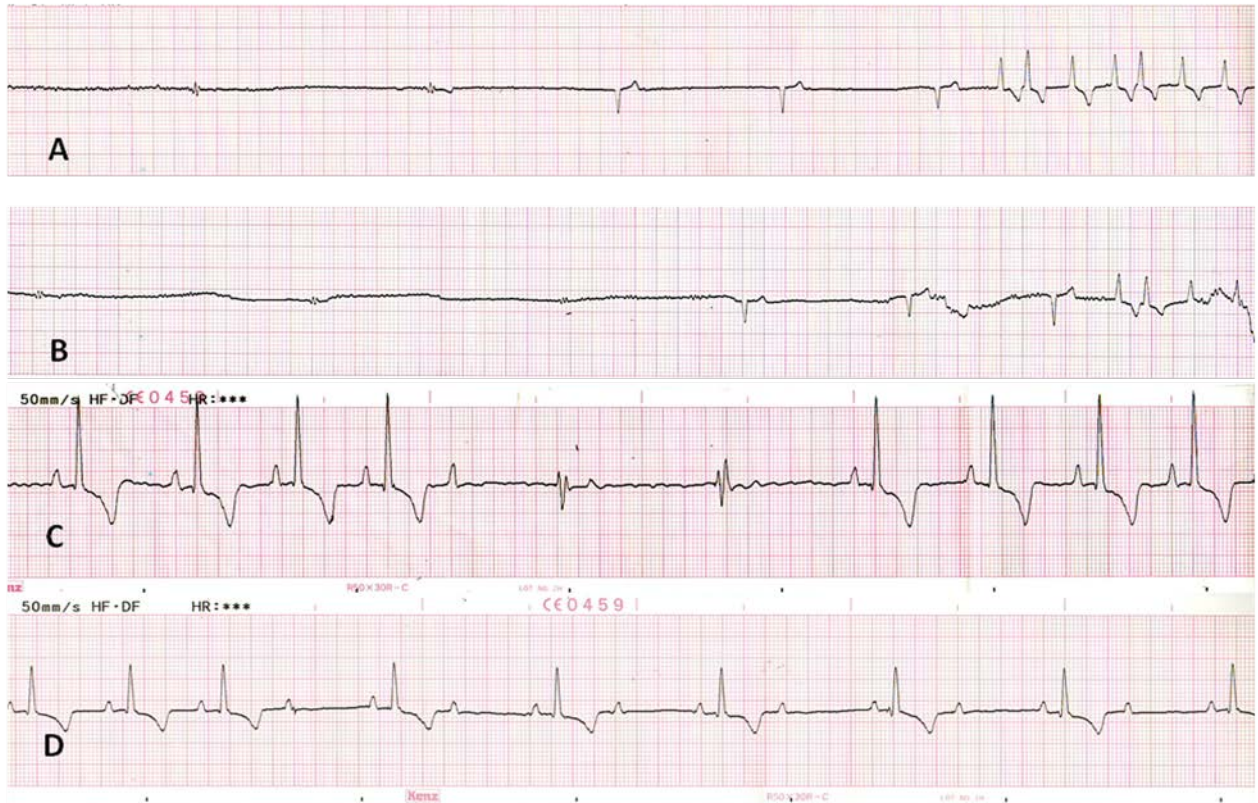
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ECG Quiz

Chollada Buranakarl^{1*} Anusak Kijawornrat¹ Thanusorn Phakhawambodee²



The leads I ECG recordings were performed in 16 years old English cocker spaniel after the dog was admitted in a private veterinary clinic with the history of weakness, inability to walk and neck stretching 3 to 4 times a day for the past few weeks. Some episodes of neck stretching were coincided with the temporary loss of consciousness. The owner also noticed that during this symptom the heart seemed to stop beating. From physical examination, the dog laid down on lateral recumbency with good sensation and regained full consciousness. Heart sound was loud with normal lung sound. During examination, the sign of stretching occurred twice while ECG could be recorded simultaneously as shown in strip A and B. The duration between the 1st and 2nd episodes was

around 30 seconds. The dog was referred to cardiology unit, Small Animal Teaching Hospital, Chulalongkorn University to evaluate the heart function. Blood collection was performed; complete blood count, biochemical profiles and plasma electrolyte concentrations were normal. The lead II ECG was re-performed 2 days after the first two strips, which was shown in strip C and D. Echocardiography was evaluated; left ventricular wall thickening with aortic valve insufficiency. The fractional shortening was 33.8% while the LA/Ao ratio was 1.44. Systolic blood pressure was 200 mmHg. The holter was attached and recorded for 24 hours period thereafter.

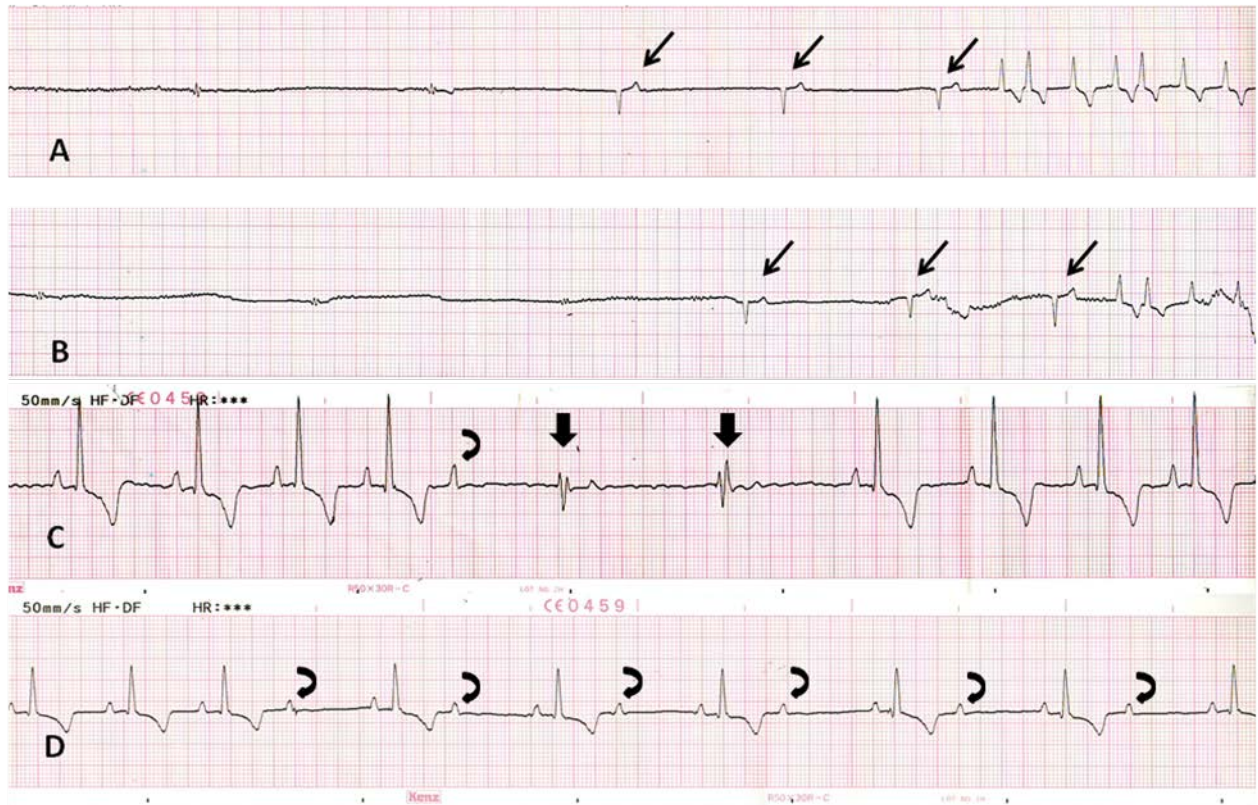
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Interpretation

Strip A and B - Heart block with ventricular escape beats

Strip C - Atrioventricular block with escape beats

Strip D - 2:1 Mobitz type II second degree atrioventricular block



The lead I Strips in A and B showed long pauses which correspond to the period when the dog loosed consciousness. Normally, if the arrest was at the level of sinus node, the P-wave should not be seen during the period of pause in all leads. However, if the P-waves existed without the following QRS complexes, the AV block would be an answer. Since the P-wave in lead I could not be seen for the entire recording, it made the origin of a block undetermined. The high grade AV block may occur in this dog because the P-waves were detected in other leads. The first pause was lasted about 10 seconds while the second one was almost 20 seconds. During these long pauses, the ventricular escape beats with bizarre shape were found (thin arrows). Ventricular rate was as low as 40 beats per minutes. There were supraventricular premature complexes at the end of strip A and B as well. The heart rate was irregular with electrical instability. The strip C that was recorded 2 days later, however, did not show long pause. Nice P-QRS complexes from lead II revealed the heart rate of 120 beats per minute. The non-conducted P-wave was seen (curve arrow) followed

by two strange complexes of lower rate (big arrows). These complexes may be the escape beats of AV origin. In strip D with half sensitivity, the Mobitz type II second degree AV block was seen. The non-conducted P-waves without the following QRS complexes (curve arrows) were seen with a fixed ratio of P and QRS of 2:1. The holter recording was performed for 24 hours in this dog and the second degree AV block was confirmed with intermittent period of sinus tachycardia. No medication was given; signs of body stretching and syncope were disappeared. However, periodic monitoring of ECG is required in order to evaluate the AV node disease and the progression of arrhythmia. The positive inotrope was not prescribed according to normal fractional shortening. The angiotensin converting enzyme inhibitor was given to control high blood pressure. Thyroid profiles were measured to rule out possible causes of arrhythmia. If very long pause was still persisted or occurred more frequently, the cardiac pacemaker implantation may be an answer in this case.