ECG Quiz

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A 2-year-old male Golden Retriever weighting 37 kilograms was presented to the Small Animal Teaching Hospital, Chulalongkorn University for health check up. The owner's chief complaints were exercise intolerance and a one-week episode of panting with productive coughing during excitement or exercise especially at the night time. Further history taking revealed that the dog had regular weekly swimming exercise since he was four month old. The dog had serous nasal discharge while previous thoracic radiograph of cardiomegaly with interstitial lung pattern were reported. Digitalis glycoside, angiotensin converting enzyme inhibitor and diuretics were previously prescribed.

Upon first visit at the Small Animal Teaching Hospital, Chulalongkorn University, the dog had vital signs within normal limit but still had episode of panting and productive cough. The thoracic and abdominal radiographic were normal appearances of both heart and lung, as well as, other abdominal visceral organs. Echocardiographic reports exhibited unremarkable finding of both cardiac function and structures with slightly limited interventricular septum wall motion. The ECG examination was performed and showed in Figure A. The results of blood test using Snap 4DX test® was positive for antibody against blood parasite both ehrlichiosis and anaplasmosis. The previous cardiac medications were discontinued while doxycycline was presbribed to treat blood parasites. All dog's symptoms were resolved within one week of treatment.

On the eight-month appointment, the dog returned with no clinical sign, and normal physical examinations. The ECG was recorded as shown in Figure B. The ultrasonography examination was examined and showed splenomegaly with generalized reactive abdominal lymph nodes. The reinfection of blood parasite was suspected and dogs came home with repeated doxycycline therapy.



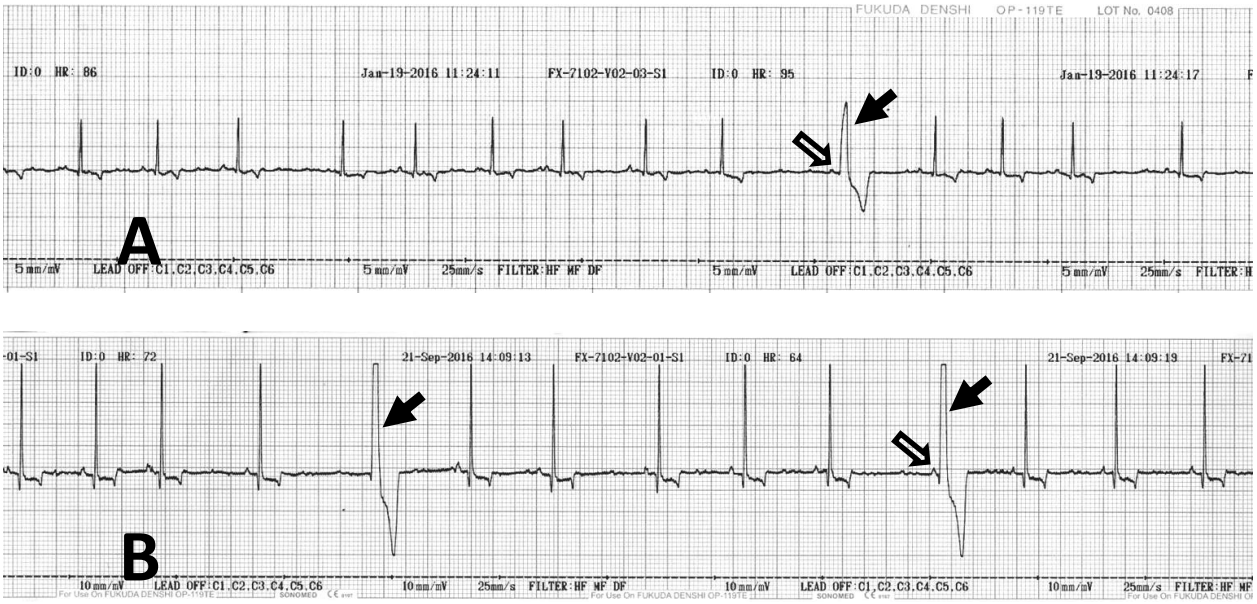
Figure 1 The ECG recording during first examination (Figure A) and after 8 month monitoring (Figure B)

Please answer before turning to the next page.

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Interpretation

Figure A and B **Respiratory sinus arrhythmia along with ventricular escape depolarization with left bundle branch block contour.**



Both A and B tracings were presented with normal sinus arrhythmia which impulses were originated from sino-atrial node. The arrhythmia is likely due to respiratory in origin. The heart rates in tracing A and B were approximately 80 and 70 beats per minute, respectively. Please notice larged bizzared complexes with direction of T-wave was opposite to R waves (solid arrows). Moreover, these complexes occurred right after the long pause during phase of expiration. These complexes were ventricular escape depolarization which overrided the sinus node after a long pause. This pattern can be seen most often in dog with low heart rate and is likely become normal. The present of preceding P-wave (openned arrowed) before big upward deflection suggested the impulses from atrium were non-conduct P-wave. Since the impulses could not travel through the normal pathway due to blocking somewhere at the conducting system, therefore, the ventricular escape beats were arisen. The shape and contour of abnormal complexes suggested blocking of impulse may be at the level of left bundle branch. The left axis suggests that the ectopic origin may be located at the right side. Since the dog had no clinical signs related to the cardiac disease and echocardiographic results were mostly normal, no treatment is required. The ECG monitoring with cardiac checkup should still be performed on yearly basis to investigate the incidnece of occult dilated cardiomyopathy which occurs mostly in large breed dogs.