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ECG Quiz

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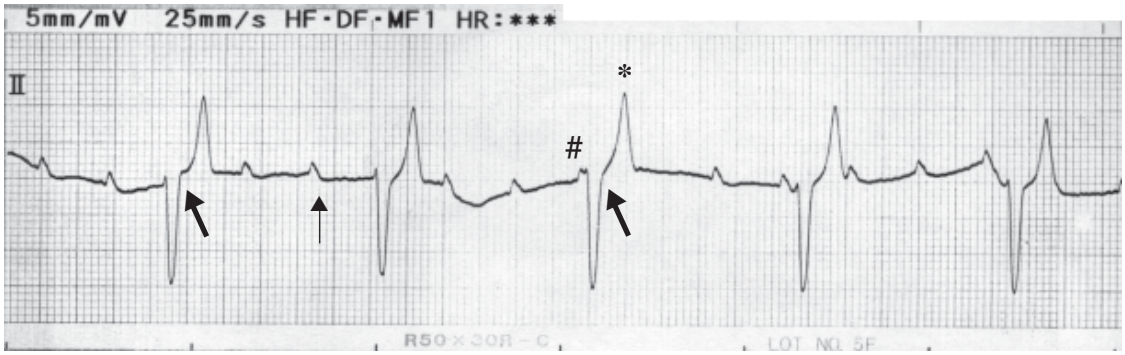

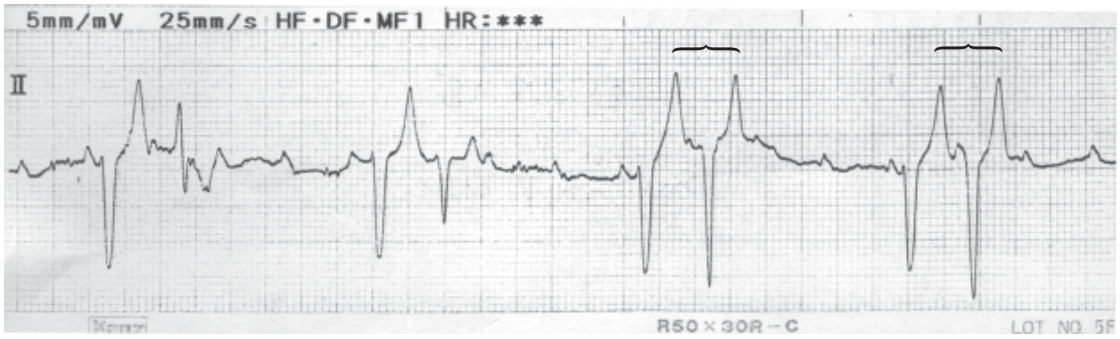

These lead II ECG strips (1, 2 and 3) were recorded from a 10 years old, male, mixed breed dog, weighing 24 kg. The dog came with a history of exercise intolerance. Auscultation of the chest revealed systolic murmur heart sound and bradycardia. The dog had increased respiration rate, pink mucous membrane and ascites. Serum chemistry profiles were within normal limit except a slight increase in SGPT. Complete blood count showed mild anemia and a slight decrease in platelet count. Tracing 1 was recorded at initial examination while tracings 2 and 3 were recorded 7 days after atropine therapy.

Please answer before turning to the next page.

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Complete 3rd degree heart block (complete AV dissociation)

From tracing 1, the atrial rate is 136 beats/min while the ventricular rate is 37 beats/min. The escape rhythm occurs when there is no impulse transmitted through AV node for a period of time. If the impulse was generated from ventricular origin, the heart rate would be slow and a subsequent clinical signs such as fainting, syncope or weakness developed. While the atrial rate was set by a natural pacemaker, the ventricular escape beats (big arrow) emerged with a slow rate and was not related to P wave. The aim of the treatment is to increase ventricular rate to achieve adequate cardiac output. The anticholinergic drug, atropine, was chosen in this case in order to increase ventricular rate. The dog symptoms seemed to be improved after 3 days of atropine treatment although ECG recordings 10 days after drug administration revealed the same pattern with higher ventricular rate (tracing 2) and sometimes a couple of ventricular ectopic beats called ventricular bigeminy (bracket) appeared (tracing 3). The variable intensity of heart sound (a canon sound) would be audible with beats as shown by # when the short interval that atrial contraction precedes ventricular contraction. The AV valve was in an open rather than passively closed position as ventricular pressure is rising, thereby amplifying the first heart sound. Thus, the 3rd heart sound can be easily diagnosed by auscultation. The arterial palpation is also needed to confirm heart beats. The atrial T waves (Ta waves) are also revealed (small arrow). The artifacts of P wave superposition on the QRS and T are nice examples of summation (*) as opposed to fusion. The sympathomimetic drug such as dobutamine or isoproterenol is another option to increase ventricular rate although there is no proof of success. If atropine cannot provide adequate) perfusion, cardiac pacemaker implantation is required.