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## ECG Quiz

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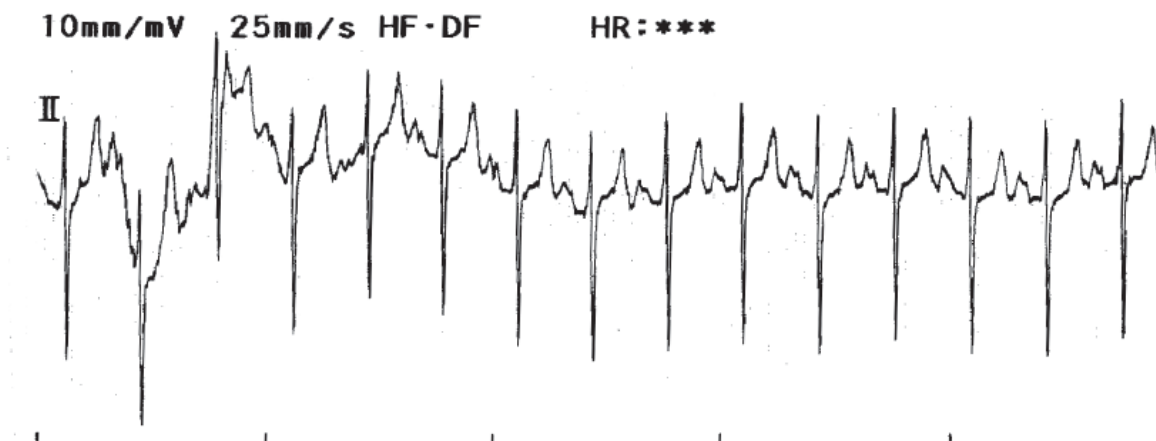
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## ECG Quiz

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This lead II ECG strip was recorded from a 1 year old, male cat weighing 5 kg that was referred to the Small Animal Hospital, Chulalongkorn University with having exercise intolerance and an enlarged abdomen. Physical examinations revealed systolic heart murmur sound and ascites. A thoracic radiograph showed severe whole heart

enlargement with interstitial lung pattern and mild pleural effusion. Complete blood counts were within normal limits while serum chemistry profiles showed slight increased creatinine (2.2 mg/dl) and SGPT concentrations (107 units).

Please answer before turning to the next page.

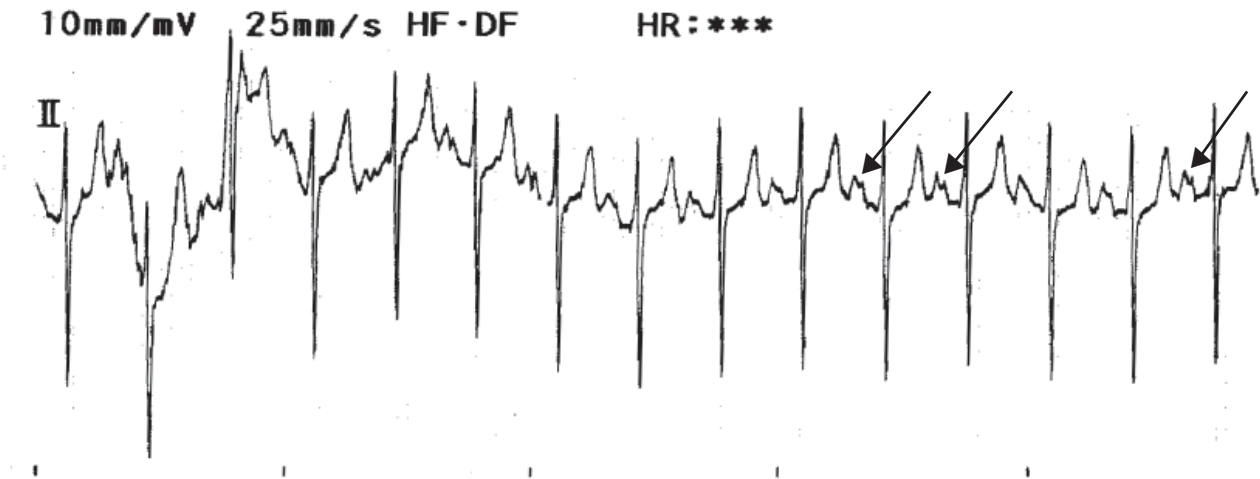
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## Interpretation

### Sinus rhythm with P-mitrale and deep S-wave



Heart rate is approximately 170 beats/minute. The P-waves are wide as compared to the reference range. Moreover, a notch on P-wave is noticeable (arrow) indicating true P-mitrale. This finding is consistent with the dilatation of both atrial chambers suggesting either volume or pressure overload to the heart. Please notice that all waveforms have high amplitude as being seen in a dog. The high negative deflection of S-wave in lead II is likely to be due to right axis deviation caused by right ventricular enlargement. The presence of ascites suggests that right side heart failure is encountered and is supported by thoracic radiograph. Since the murmur was audible in this case and the animal is still young, the echocardiography to evaluate heart chambers and valves is essential.

The echocardiography revealed interventricular septal defect and interatrial septal defect with marked

right atrial enlargement. The backflow of blood from the left atrium and left ventricle during systole into the right side of the heart which had lower pressure will cause pressure overload onto the right side. Moreover, the oxygenated blood will also mix to the unoxygenated blood from vena cava which entered the right side of the heart and flowed into the pulmonary circulation. Thus, the left side of the heart that had blood leaking through the septal apertures will not have enough blood to eject into the systemic circulation. Thus the heart has to increase frequency and strength at the beginning of the disease process to overcome the low cardiac output. Surgery is the treatment of choice in this case. Unfortunately, the procedure has limitation since the success depends on the surgeon's skill and a good patient's condition.