

## ECG Quiz

**Chollada Buranakarl\* Kris Angkanaporn\* Phiwipha Kamonrat\*\***

These ECG strips were recorded from a 11 year-old, male Dalmatian weighing 22 kg, with a history of weakness, anorexia, weight loss and exercise intolerance for one month. The dog was kept in a house and had received periodic heart worm preventive treatment of ivermectin at a dose rate of 500 µg/kg, every 3 to 6 months. The dog also had a history of mastitis on the left side of the last pair of mammary glands. The gland inflammation had resolved and the gland developed into a lump with a diameter of 3 inches. One week before the dog was presented at the hospital, the dog showed sign of hyperpnea and severe weakness. The dog had received kanamycin at a dose rate of 10 mg/kg every 12 hours over 2.5 days. Blood gas analysis showed a metabolic acidosis with a pH of 7.206 and a decrease in both  $\text{HCO}_3^-$  (6.8 mmol/L) and  $\text{pCO}_2$  (17.2 mmHg). Urinalysis showed a specific gravity of 1.042 with the presence of numerous granular and waxy casts. The blood chemical profile revealed azotemia with BUN = 59.3 mg% and creatinine = 3.7 mg%. The number of RBCs Hb and PCV were within normal ranges while the

WBC counts had increased to 59,500 cells per µl. The Witness® and SNAP® tests showed negative results for *Dirofilaria*. Thoracic radiographs showed right heart enlargement and the presence of pulmonary knob without any lung metastasis. The lung was congested showing interstitial and bronchiolar patterns. The ECG was recorded (paper speed = 5 mm/sec) and the result for all 10 leads are shown as follows,

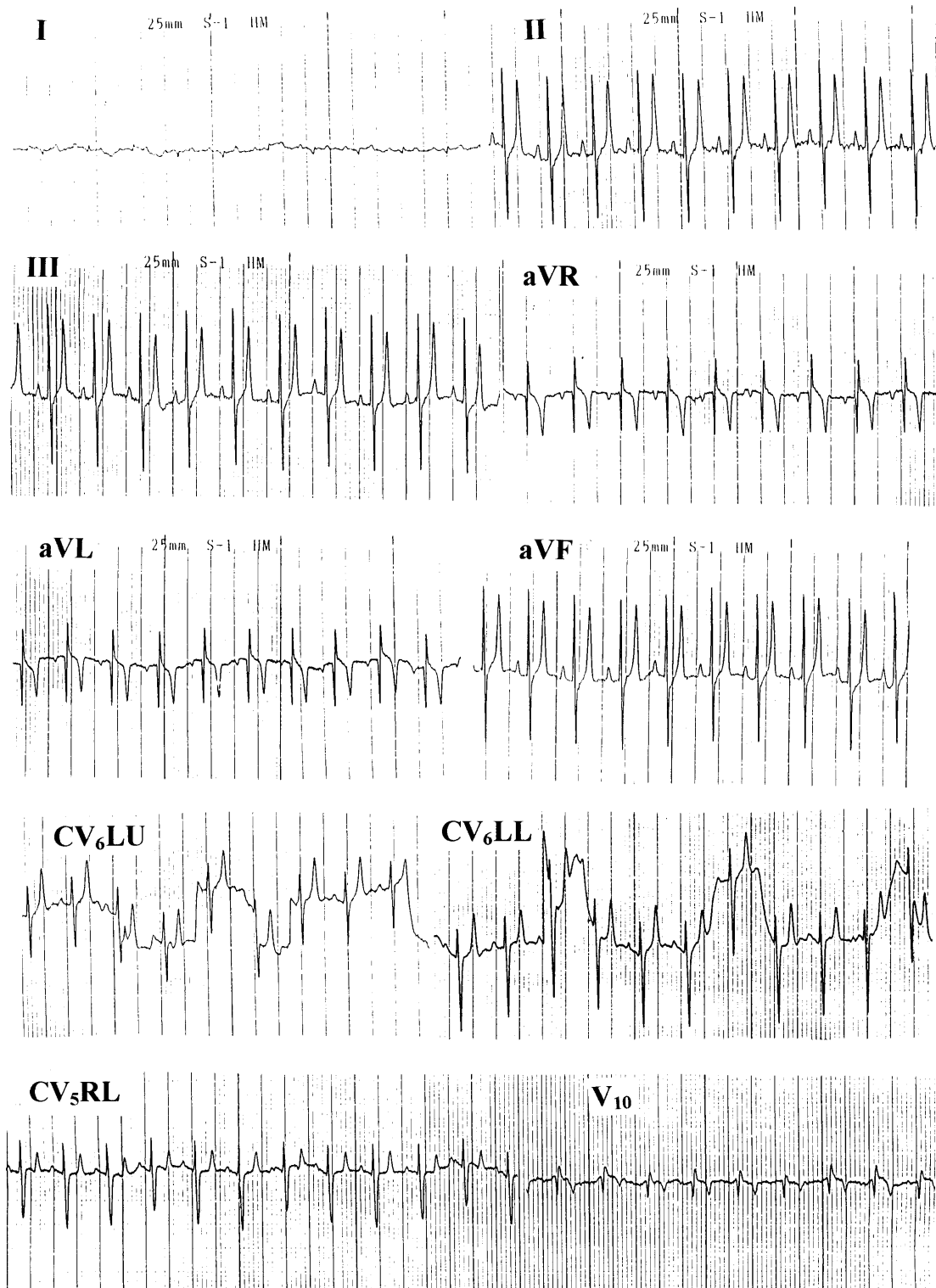
The lead II complexes were analyzed as follows,

P duration	=	0.06	sec
P amplitude	=	0.30	mV
QRS duration	=	0.06	sec
QRS amplitude	=	0.4	mV
(R amplitude = 1.8 mV, S = amplitude = 1.4 mV)			
PR interval	=	0.12	sec
QT interval	=	0.20	sec
Mean electrical axis (frontal)	=	+ 113°	
Mean electrical axis (transverse)	=	+ 130°	

Please make your interpretation before turning to the next page.

---

\*Department of Physiology \*\*Department of Surgery, Faculty of Veterinary Science, Chulalongkorn University, Bangkok 10330.



Paper speed = 25 mm/sec

### **Sinus rhythm with deep S wave and tall T wave**

The heart rate was 150 beats/minute. Right ventricular enlargement was diagnosed with the following features.

1. S waves were found in leads I, II, III and aVF
2. S wave in lead II was greater than 0.35 mV
3. S wave in  $CV_6LU$  was greater than 0.7 mV
4. S wave in  $CV_6LL$  was greater than 0.8 mV
5. R wave/S wave ratio in  $CV_6LU$  was less than 0.87

6. Positive T wave was found in lead  $V_{10}$

7. Right axis deviation (MEA in frontal plane was more than  $103^\circ$  and clockwise)

Since the negative result for SNAP<sup>®</sup> test, echocardiography needed to be confirmed. The dog received fluid therapy to control the azotemia. A systemic antibiotic (Augmentin<sup>®</sup>) was given to control the pneumonia. Since the dog had dyspnea, oxygen was provided continuously. However the dogs died several days later. Necropsy findings revealed severe right ventricular dilatation, left atrial enlargement, vegetative endocarditis of the mitral valve, fibrinolytic endocarditis and a consolidated lung severely inflamed.