ELECTROCARDIOGRAPHIC QUIZ

Lt Col RG PODUVAL*

Clinical Information

Sixteen year old girl a known case of systemic lupus erythematosus presented with breathlessness and precordial discomfort of 1 day duration. Cardiovascular examination revealed regular,

low volume and rapid pulse, blood pressure 90/70 mm Hg, pulsus paradoxus, raised jugular venous pulse, poorly felt apical impulse and distant heart sounds.

The resting electrocardiogram is shown below (Fig 1). What is your diagnosis?

Fig. 1 :

Answer to quiz on page 31

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Answer to Electrocardiographic Quiz

Electrical alternans

The ECG shows sinus tachycardia at a rate of 160/min and alternation in the amplitude, direction, and morphology of the QRS complex. The clinical findings and the ECG are those of pericardial effusion with cardiac tamponade.

Discussion

Electrical alternans is defined as beat to beat variation in one or more components of the ECG signal arising from the same pacemaker [1]. The most common form is alternation in the QRS complex (ventricular electrical alternans) and is seen in pericardial effusion. When there is alteration of P waves as well as the QRS complex (simultaneous alternans) it is characteristic of pericardial effusion with tamponade. More rarer forms, QRST and PQRST alternans (total electrical alternans) are also seen in cardiac tamponade.

Apart from pericardial effusion and cardiac tamponade electrical alternans is sometimes seen in severe acute myocardial ischaemia [2] and supraventricular tachycardias [3]. Electrical alternans is usually expressed as a ratio i.e. 2:1 or 3:1. The most common form is 2:1 in which for every two beats there is one alternation [4].

The mechanism of electrical alternans is related to the large pendulum like oscillations of the heart suspended in the pericardial fluid. A complete one oscillation takes more than one cardiac cycle and there is anatomical shifting of the axis by the time two cardiac cycles are complete. This gives rise to the ratio 2:1 i.e., for every two cycles one beat shows variations in morphology and amplitude [5].

REFERENCES

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