

ECG Quiz

KW Lam

Case

A 60-year-old patient presented to emergency department with chest pain for 3 hours. ECG showed acute myocardial infarction. Streptokinase was given. Cardiac monitor showed a rhythm change. An ECG was repeated and as shown in Figure 1. Treatment was given and ECG (Figure 2) was repeated.

Questions

1. What was the rhythm in Figure 1?
2. What was the treatment given which brought about the ECG changes in Figure 2?

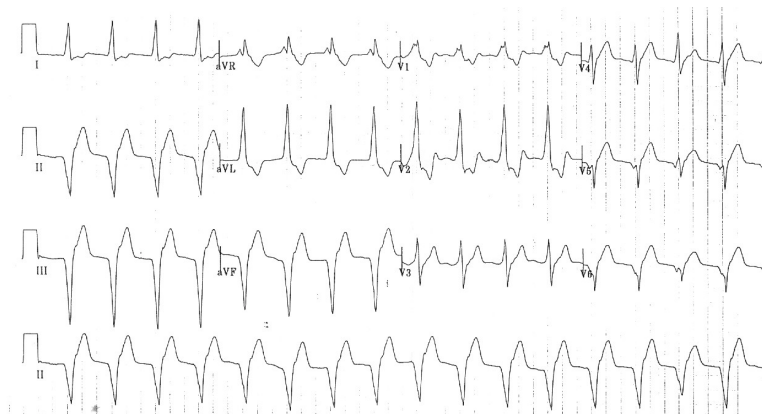


Figure 1.

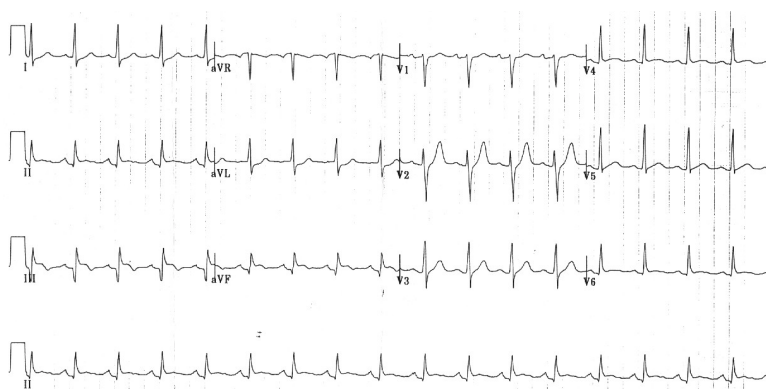


Figure 2.

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Answers

1. Accelerated idioventricular rhythm (AIVR).
2. Atropine.

Discussion

AIVR is defined as a ventricular rhythm (characterized by a wide QRS complex) with a variable rate between 60 and 125 bpm.¹ The ventricular rate rarely exceeds 100 beats/min.² and usually hovers within 10 beats of the sinus rate so that control of the cardiac rhythm is passed back and forth between these two competing pacemaker sites.³ (see Figure 3)

AIVR, well known as one the "reperfusion arrhythmias", is seen in up to 8 to 46% of patients with acute myocardial infarction. It is also a common manifestation of digitalis toxicity.²

AIVR occurs due to either the slowing of the sinus rhythm which permit the ventricular rhythm to escape or the acceleration of the ventricular rhythm which usurp control from the sinus node. AIVR commonly occurs when atrial fibrillation is accompanied by decreased AV nodal conduction. This combination of effects on the cardiac rhythm often results from digitalis toxicity.

It occurs somewhat more often in patients with early reperfusion, although it is neither sensitive nor specific enough to merit consideration as a marker of reperfusion.¹ Diagnostic accuracy can be improved by combining with other simple ECG changes. Sutton found that less than 50% resolution of the ST segment elevation in the worst lead and the absence of AIVR as the best

positive ECG test for <TIMI 3 in the infarct related vessel. This had a sensitivity of 81%, specificity of 88%, positive predictive value of 87%, negative predictive value of 83%, and overall accuracy of 85%.⁴

It should be noted that AIVR might mask the changes of acute myocardial infarction as in Figure 1. AIVR in conjunction with chest pain should heighten the suspicion for a myocardial infarction.⁵

Most episodes of AIVR are of short duration and terminate spontaneously.¹ Suppressive therapy is rarely necessary because the ventricular rate is generally less than 100 beats/min.³ and rarely cause haemodynamic compromise.¹

The following conditions exist during which therapy may be considered:³

1. when AV dissociation results in loss of sequential AV contraction and with it the haemodynamic benefits of atrial contribution to ventricular filling
2. when it occurs together with a more rapid ventricular tachycardia
3. R on T
4. when the ventricular rate is too rapid and produces symptoms
5. if ventricular fibrillation develops as a result of the AIVR. This last event appears to be fairly rare

Suppressive treatment may be used if there is unequivocal precipitation of more serious ventricular tachyarrhythmias. Often, simply increasing the sinus rate with atropine or atrial pacing suppresses the AIVR.³



Figure 3.

References

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3. Braunwald. *Heart Disease: A Textbook of Cardiovascular Medicine* 5th ed. W.B. Saunders 1997:683-4.
4. Sutton AG. Failure of thrombolysis by streptokinase: detection with a simple electrocardiographic method. *Heart* 2000;84(2):149-56.
5. Zimmers T, McKee KF. Cases in electrocardiography. *Am J Emerg Med* 1998;16(3):312-4.