

ECG Contest

Response to ECG, December 2018

Respuesta al ECG de diciembre de 2018

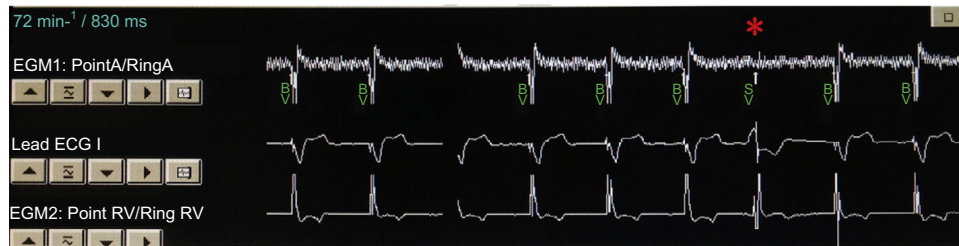
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Figure.

The correct answer is 3. There is no sensing malfunction (answer 2, incorrect): if the cardiac resynchronization therapy pacemaker (CRT-P) had not detected the ventricular extrasystole, this pacing pulse would have occurred as for the others at 840 ms; however, it comes earlier, at 700 ms. To maintain optimal biventricular pacing, CRT-Ps usually have a function denoted *ventricular sense response*. In the event of a conducted beat or extrasystole sensed in the right ventricle (RV), a pacing pulse is emitted.¹ The CRT-P telemetry (Figure) shows resynchronized beats (BV) with a sensed beat (SV), superimposed with resynchronization pacing. In the second channel of the Figure, corresponding to lead I of the ECG, 6 resynchronized beats are shown (biventricular [BV] pacing), whereas the seventh (Figure, asterisk) is an extrasystole (sensed ventricle [SV]) which the CRT-P paces automatically to attempt resynchronization (superimposed BV). The right bundle branch block morphology of the ventricular extrasystoles in the ECG indicates that they originate from the left ventricle. The ventricular sense response function uses RV sensing, and so there is a delay between onset of QRS in the left ventricle, RV sensing, and subsequent pacing: in the third channel, which shows the local RV electrogram, the extrasystole occurs later than the initial QRS in the surface ECG.

The first channel of the Figure shows the pacing channel and the atrial electrogram but, given that the atrial port is plugged, far-field activity can be observed.

It is likely that the CRT-P needs to be optimized (response 1 incorrect and response 3 correct) as baseline QRS is negative in V₁ and positive in D-I.² Finally, when the elective replacement indicator of the CRT-P is triggered, biventricular pacing is maintained at the lower rate limit,¹ which would not explain the early spikes (response 4, incorrect).

REFERENCES

1. Guía de Referencia de los Marcapasos Medtronic Consulta CRT-P. Minneapolis: Medtronic; 2010. Available from: <http://manuals.medtronic.com/>
2. Ganière V, Domenichini G, Niculescu V, Cassagneau R, Defaye P, Burri H. A new electrocardiogram algorithm for diagnosing loss of ventricular capture during cardiac resynchronisation therapy. *Europace*. 2013;15:376–381.

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