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## Images in Cardiology

# Regular cannon wave



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### ABSTRACT

A 52-year-old male with history of dilated cardiomyopathy was admitted with progressive dizziness and worsening dyspnea. His blood pressure was 100/60 with a regular pulse of 70 per minute. Jugular vein wave showed a prominent pulse like regular cannon waves. Cannon wave occurs in conditions with atrioventricular dissociation and right atrial contraction against a closed tricuspid valve. Large A waves are associated with reduced right ventricular compliance or elevated right ventricular end-diastolic pressure.

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A 52-year-old male with history of dilated cardiomyopathy was admitted with progressive dizziness and worsening dyspnea for 2 days. He was hospitalized before because of worsening dyspnea and has been on regular diuretic therapy. At admission, his blood pressure was 100/60 with a regular pulse of 70 per minute. Jugular vein wave showed a prominent pulse-like regular cannon waves (Fig. 1; Video 1). Electrocardiogram showed accelerated junctional rhythm with complete LBBB and corrected QT of 479 milliseconds (Fig. 2A).

On admission, serum sodium level was 122 mEq/L, serum potassium level was 2.6 mEq/L and magnesium level was 1.7 mg/dL. Serum creatinine level was 1.3 mg/dL. Hemoglobin was 11.5 gm/dL. Serum troponin-I and creatinine kinase levels were within normal range. Echocardiogram showed global left ventricular hypokinesia with severe systolic dysfunction. Pulmonary venous Doppler showed prominent 'a' wave reversal (Fig. 3). His dyselectrolytemia was corrected and his rhythm reverted to sinus (Fig. 2B).

Cannon wave occurs in conditions with atrioventricular dissociation and right atrial contraction against a closed

tricuspid valve. Large A waves are associated with reduced right ventricular compliance or elevated right ventricular end-diastolic pressure. Cannon waves may be regular or irregular. The differential diagnoses of irregular cannon wave are atrial, ventricular, or junctional premature beats, ventricular tachycardia, first-degree atrioventricular block with a markedly



Fig. 1 – Giant A wave in JVP indicated by arrow.

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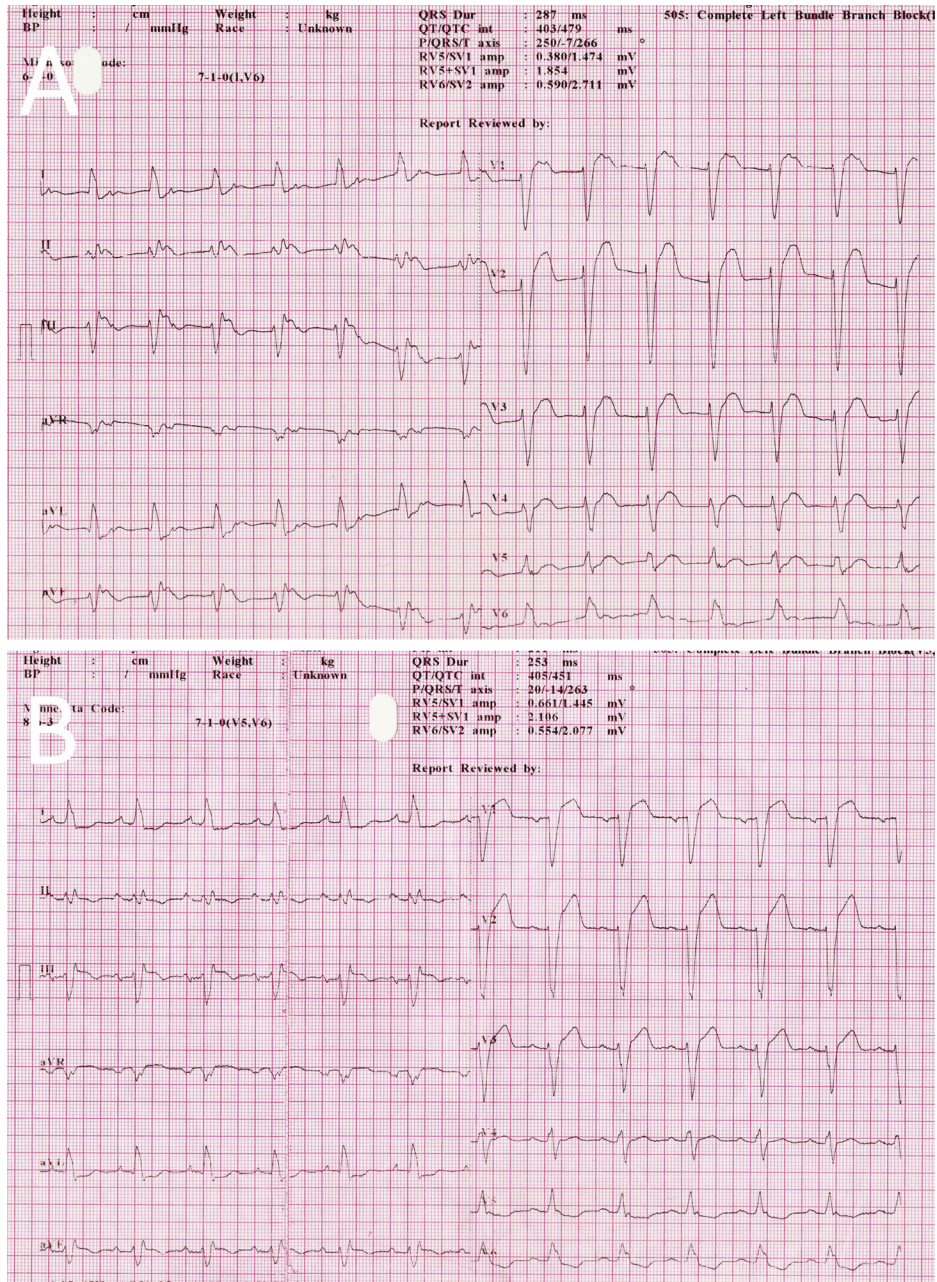


Fig. 2 – Panel A: ECG showing junctional rhythm, LBBB, and long QTc interval. Panel B: Repeat ECG showing normal sinus rhythm with LBBB.

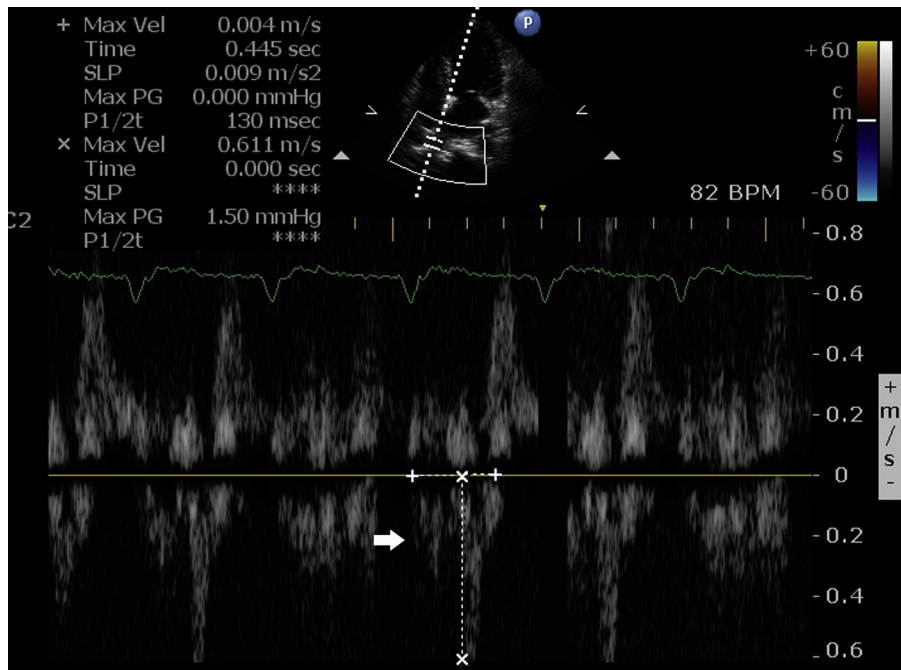


Fig. 3 – Pulmonary venous Doppler showing prominent 'a' reversal.

prolonged PR interval, high-grade atrioventricular block, ventricular pacing, and atrioventricular dissociation. Regular cannon wave occurs with junctional rhythm and isorhythmic atrioventricular dissociation.

### Conflicts of interest

The authors have none to declare.

### Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at [doi:10.1016/j.ihj.2015.07.037](https://doi.org/10.1016/j.ihj.2015.07.037).