

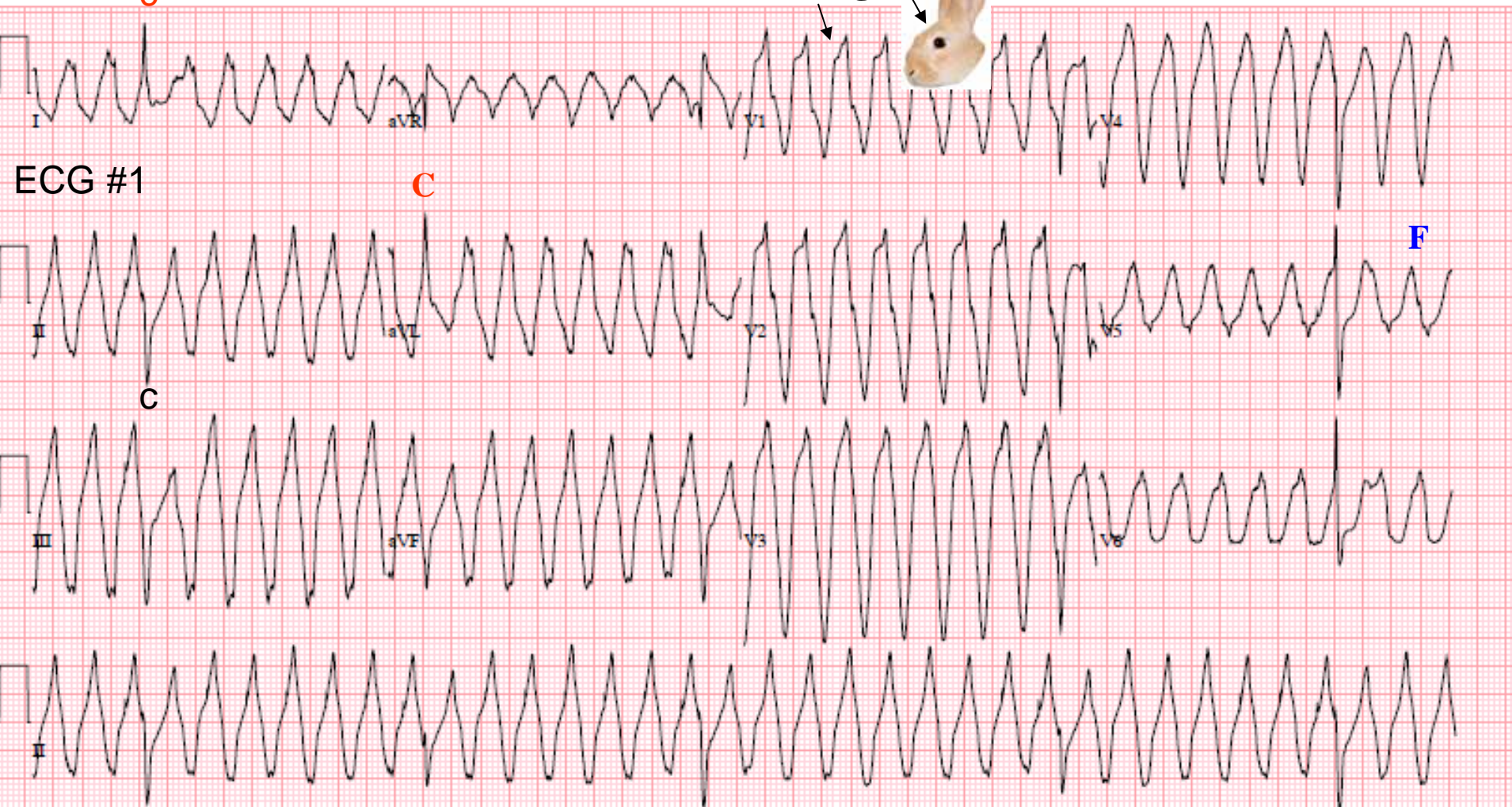
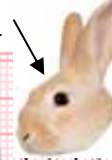
Young man with palpitations and near-syncope

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The "rabbit ear clue" sign



Sustained Monomorphic VT(S-VT) (those that present consecutive ventricular complexes (QRS) similar or with the same morphology in each of the twelve leads) QRSD: 200ms, HR 214bpm, **C**: Capture beat **F**: Fusion beat (intermediate pattern between "pure" sinus rhythm and extrasystolic event) MVT that originates in the LV posterobasal region: CRBBB morphology, SAQRS with extreme shift in the superior quadrants (negative QRS in inferior leads and positive in aVL and aVR), Concordant positive precordial pattern, a sign that can be also expressed as absence of RS (or even rs, Rs, rS) complexes in the precordial leads

1. Gozensky C, Thorne D. Rabbit ears: an aid in distinguishing ventricular ectopy from aberration. *Heart Lung*. 1974;3:634-636.



1. Hurst JW. Circulation 1998; 98: 1837-1942



Sinus Rhythm (SR), HR 83bpm, PR 20ms, QRS axis: -45° SIII>SII: Left Anterior Fascicular Block, rsR' in V1-V2, QR in Avr, broad final S wave in left leads and QRS duration >120ms: complete RBBB. In II Junctional premature contractions with bigeminy pattern (#). Tetrphasic QRS pattern in V3 RSR'S' suggestive of RVH. Epsilon waves located in the last portion of the QRS complexes Epsilon waves (ε): are potentials or low amplitude and short duration oscillations near the J point (before or immediately after): This is major criterion for ARVC/D. "Fontaine discovered and named the epsilon waves. He chose the epsilon because it follows delta in the Greek alphabet and is the mathematical symbol for smallness".(1)

Characteristic of epsilon waves

1. **Intrinsic features:** they are small notches or oscillations in variable quantities (1, 2, 3 or more).
2. **Location:** at the end of QRS in the J point or onset of ST segment (there is no consensus about this).
3. **Leads:** observed in right precordial leads; however Dr. Li Zhang et al, found the ϵ wave in the leads of the frontal plane, especially in inferior leads. In this particular case we observe in atypical location I and aVL indicative that could be a phenocopy.
4. **Frequency in ARVD:** approximately 15-30% of cases in 12-lead ECG. This percentage increases if we use the ECG with the modified protocol.
5. **Value of criterion:** considered to be a major criterion for diagnosis by the Task Force for ARVD diagnosis. (1;2)
6. **High resolution ECG:** observed more frequently with this method.
7. **Pathognomonic character:** in spite of the characteristics in ARVC/D, they are not pathognomonic, since they have been described in other diseases associated with myocardial damage: acute RV infarction(3), inferior or dorsal,(3) sarcoidosis,(5) Brugada syndrome(6) after surgery of Fallot Tetralogy(7) and sickle cell anemia,(8).
8. **Meaning:** late posterior potentials (PP) that occur in the RV free wall in patients with ARVC/D or rarely in others clinical circumstances.

1.McKenna WJ, et al. Br Heart J 1994;71:215-218

2.Fontaine G, et al. Annu Rev Med 1999;50:17-35

3.Zorio E, Arnau MA, Rueda J, The presence of epsilon waves in a patient with acute right ventricular infarction. Pacing Clin Electrophysiol. 2005 Mar;28:245-247

4.Santucci PA, Morton JB, Picken MM, Wilber DJ Electroanatomic mapping of the right ventricle in a patient with a giant epsilon wave, ventricular tachycardia, and cardiac sarcoidosis. J Cardiovasc Electrophysiol. 2004 Sep;15:1091-4

5.Letsas KP, Efremidis M, Weber R, Korantzopoulos P, et al . Epsilon-like waves and ventricular conduction abnormalities in subjects with type 1 ECG pattern of Brugada syndrome. Heart Rhythm.2011 Jun;8:874-8.

6.George BA, Ko JM , Lensing FD, Kiuper JJ, Roberts WC. "Repaired" tetralogy of fallot mimicking arrhythmogenic right ventricular cardiomyopathy (another phenocopy). Am J Cardiol Jul 15;108:326-9.

7.George BA, Ko JM , Lensing FD, Kiuper JJ, Roberts WC. "Repaired" tetralogy of fallot mimicking arrhythmogenic right ventricular cardiomyopathy (another phenocopy). Am J Cardiol Jul 15;108:326-9.

8.Hurst JW. Circulation 1998; 98: 1837-1942. .

FINAL DIAGNOSIS

ECG 1: Sustained monomorphic Left ventricular tachycardia with focus in posterobasal region: RBBB morphology, capture and fusion beats, positive concordance in precordial leads, and the rabbit ear clue

ECG2

1. LAFB
2. Complete RBBB
3. Right ventricular hypertrophy: Tetrphasic QRS pattern in V3 RSR`S. Inferior right paraseptal region: V3 and V4 is RV region predominantly hypertrophied
4. Junctional premature contractions with bigeminism pattern
5. Epsilon wave: Genuine Epsilon wave?: biventricular ARVC/D Epsilon wave phenocopy?(1)

1. George BA, Ko JM , Lensing FD, Kiuper JJ, Roberts WC. "Repaired" tetralogy of fallot mimicking arrhythmogenic right ventricular cardiomyopathy (another phenocopy). Am J Cardiol Jul 15;108:326-329.