

Brugada syndrome: Modified precordial leads: right precordial leads at higher intercostal space positions: V_{1H} - V_{2H} - V_{3H}

Dr. Andrés R. Pérez Riera

Several researches carried out conclude that 12-lead ECG sensitivity increases by applying accessory leads located in the high right precordial area ($V_{1H} - V_{2H}$), over the 3rd or 2nd intercostal space, just to the right (V_{1H}) or left (V_{2H}) of the sternum. In certain cases, Brugada sign that was not observed using only the 12 conventional leads, is now visualized. The procedure is founded on the fact that modified precordial leads on right precordial leads ($V_{1H} - V_{2H}$) or on anteroseptal wall (V_{1H} to V_{3H}) at higher intercostal space positions are located exactly opposite to the RVOT^{1;2;3;4;5;6;7;8}. Another method consist in to obtained by placing V_1 to V_3 electrodes on the first, second, and third right parasternal spaces, and V_4 to V_6 on the first, second, and third left parasternal spaces⁹. Recent manuscript shows that deep inspiration unmasks BrS the mechanism is identical to higher intercostals space position from V_{1H} - V_{2H} - V_{3H} ¹⁰. Govindam et al¹¹ studied the value of the high right precordial leads to detect the Type 1 Brugada ECG pattern in patients suspected of carrying BrS. Ajmaline testing using 15-lead ECGs was performed in 183 patients suspected of carrying BrS.

Standard 12-lead ECG with V_1 - V_3 recorded from the 4th intercostal space and an additional three leads placed over V_1 - V_3 recorded from the third intercostal space were analysed. ECGs were analyzed for a Type 1 ECG pattern in either the standard or high right precordial leads.

Of the 183 tests, 31 (17%) were positive, and 152 were negative. In all positive studies, at least one high right precordial leads became positive. In 13/31 (42%) cases, the Type 1 ECG pattern could be observed only in the high right precordial leads. Standard or high V_3 were never positive before standard or high V_1 - V_2 . In 7 patients, a Type 1 pattern was seen in one standard and one high right precordial leads. The authors concluded that the high right precordial leads are more sensitive than the conventional 12-lead ECG alone and initial observations suggest that they

remain specific for BrS, while standard and high lead V_3 offer redundant data. A vertical relationship of type 1 patterns may have a similar diagnostic value to that of a horizontal pair.

V_1 – over the 4th intercostal space, just to the right of the sternum.

V_2 – over the 4th intercostal space, just to the left of the sternum

V_3 – midway between V_2 and V_4 .

V_{1H} – over the 3rd or 2nd intercostal space, just to the right of the sternum.

V_{2H} – over the 3rd or 2nd intercostal space, just to the left of the sternum.

Men with a spontaneous type 1 Brugada ECG recorded only at higher leads V_1 and V_2 showed a prognosis similar to that of men with a type 1 ECG in using standard leads V_1 and V_2 ¹².

1. (Farre J. The Brugada syndrome: Do we need more than the 12-lead ECG? *Eur Heart J* 2000;21:264-265.
2. Sangwatanaroj S, Prechawat S, Sunsaneewitayakul B, Sitthisook S, Tosukhowong P, Tungsanga K. Right ventricular electrocardiographic leads for detection of Brugada syndrome in sudden unexplained death syndrome survivors and their relatives. *Clin Cardiol* 2001;24:776-781.
3. Sangwatanaroj S, Prechawat S, Sunsaneewitayakul B, et al. New electrocardiographic leads and the procainamide test for the detection of the Brugada sign in sudden unexplained death syndrome survivors and their relatives. *Eur Heart J* 2001;22:2290-2296
4. Nagatomo T, Abe H, Oginosawa Y, et al. Reproduction of typical electrocardiographic findings of the Brugada syndrome using modified precordial leads. *J UOEH* 2002;24:383-389.)
5. Nagase S, Kusano KF, Morita H, Fujimoto Y, Kakishita M, Nakamura K, Emori T, Matsubara H, Ohe T. Epicardial electrogram of the right ventricular outflow tract in patients with the brugada syndrome. Using the epicardial lead. *J Am Coll Cardiol* 2002;39:1992-1995.
6. Takagi M, Toda I, Takeuchi K, et al. Utility of right precordial leads at higher intercostal space positions to diagnose Brugada syndrome. *Pacing Clin Electrophysiol.* 2002;25::241-242.
7. Cabezon Ruiz S, Errazquin Saenz De Tejada F, Pedrote Martinez A, et al. Normal Conventional Electrocardiogram with Negative Pharmacological Stress Test does Not Rule Out Brugada Syndrome. *Rev Esp Cardiol* 2003;56:107-110.
8. Butz T, Vogt J, Vielhauer C, Wetzel U, Langer C, Horstkotte D. Detection of a type 1 Brugada ECG by ECG recording at a higher

intercostal space of leads V(1) and V (2). Herz. 2010 Mar;35(2): 112.

9. Márquez MF, Allende R, Cazares-Campos I, Cárdenas M. Utility of high parasternal electrocardiographic leads in the diagnosis of Brugada syndrome Arch Cardiol Mex. 2009 Dec;79 Suppl 2:40-243.
10. Vatasescu RG, Dan M, Dorobantu M. Deep inspiration unmasks Brugada syndrome. Heart. 2010 Oct 8. [Epub ahead of print]
11. Govindan M, Batchvarov VN, Raju H, Shanmugam N, Bizrah M, Bastiaenen R, et al. Utility of high and standard right precordial leads during ajmaline testing for the diagnosis of Brugada syndrome. Heart. 2010 Oct 20. [Epub ahead of print].)
12. [Miyamoto K](#), [Yokokawa M](#), [Tanaka K](#), [Nagai T](#), [Okamura H](#), [Noda T](#), [Satomi K](#), [Suyama K](#), [Kurita T](#), [Aihara N](#), [Kamakura S](#), [Shimizu W](#). Diagnostic and prognostic value of a type 1 brugada electrocardiogram at higher (third or second) v(1) to v(2) recording in men with brugada syndrome. Am J Cardiol. 2007; 99: 53-57.