

There was no statistically significant correlation between HRV parameters and 6-minute walking test, functional capacity, right ventricular systolic function, BNP and hs-troponin-I levels.

Most common cause of death in these patients is arrhythmia, and autonomic dysfunction may be triggering factor (2). HRV parameters are now being used for prognostic evaluation in PAH patients. There are also studies suggesting HRV reduction may be associated with mortality and need for transplant in children and poor prognosis in adults with idiopathic PAH (3). Considering the fact that our patients were clinically stable and were also under appropriate treatment, guideline-recommended prognostic markers were not severely affected, despite significantly reduced HRV parameters. As a result, HRV parameters may be an early marker of prognosis even before deterioration of currently suggested markers. These data suggest that HRV parameters can be utilized as an early marker of poor prognosis in ES patients, but additional prospective studies are needed.

The limited number of patients and lack of long-term follow up are the major limitations of this study. Frequency-domain parameters would also provide additional benefit.

Burak Sezenöz, Gülten Aydoğdu Taçoy¹, Serkan Ünlü¹, Belma Taşel², Sedat Türkoğlu¹, Yakup Alsancak³, Gökhan Gökalp¹, Atiye Çengel¹
Department of Cardiology, Gazi Mustafa Kemal State Hospital; Ankara-Turkey

¹Department of Cardiology, Faculty of Medicine, Gazi University; Ankara-Turkey

²Department of Cardiology, Mersin Anamur State Hospital; Mersin-Turkey

³Department of Cardiology, Atatürk Education and Research Hospital; Ankara-Turkey

References

- Galie N, Humbert M, Vachiery JL, Gibbs S, Lang I, Torbicki A, et al. 2015 ESC/ERS Guidelines for the diagnosis and treatment of pulmonary hypertension: The Joint Task Force for the Diagnosis and Treatment of Pulmonary Hypertension of the European Society of Cardiology (ESC) and the European Respiratory Society (ERS): Endorsed by: Association for European Paediatric and Congenital Cardiology (AEPC), International Society for Heart and Lung Transplantation (ISHLT). *Eur Respir J* 2015; 46: 903-75. [Crossref](#)
- Rich S, Dantzker DR, Ayres SM, Bergofsky EH, Brundage BH, Detre KM, et al. Primary pulmonary hypertension. A national prospective study. *Ann Intern med* 1987; 107: 216-23. [Crossref](#)
- Engelfriet PM, Duffels MG, Moller T, Boersma E, Tijssen JG, Thaulow E, et al. Pulmonary arterial hypertension in adults born with a heart septal defect: the Euro Heart Survey on adult congenital heart disease. *Heart* 2007; 93: 682-7. [Crossref](#)

Address for Correspondence: Dr. Burak Sezenöz
 Gazi Mustafa Kemal Devlet Hastanesi
 Kardiyoloji Bölümü, Yenimahalle, Ankara-Türkiye
 E-mail: drburaksezenoz@gmail.com

©Copyright 2017 by Turkish Society of Cardiology - Available online at www.anatoljcardiol.com

DOI:10.14744/AnatolJCardiol.2017.7424



CRT-D or CRT-P in CRT-indicated patients?

To the Editor,

Cardiac resynchronization therapy with defibrillator (CRT-D) has demonstrated advantages over implantable cardioverter defibrillator (ICD) in terms of morbidity, symptom reduction, and survival. But there is no exact data indicating benefit of adding an ICD in CRT-indicated patients, despite theoretically decreased risk of death due to arrhythmia with this combination (1). Despite the lack of evidence, CRT-D is preferred over cardiac resynchronization therapy with pacemaker (CRT-P) without any strict recommendation. Here we would like to share our experience, which also favors CRT-D over CRT-P, but for another reason: pacing site-dependent arrhythmia.

Pacing site-dependent arrhythmia, first described by Medina-Ravell et al. (2) in 2003, can be defined as an arrhythmia due to non-physiological, simultaneous pacing of right ventricle (RV) endocardium and left ventricle (LV) epicardium. Normal ventricle activation starts at the endocardium and spreads through the myocardium to the epicardium. Due to longer duration of action potential of endocardium; repolarization wave starts at the epicardium and ends in the endocardium. This sequence of activation and repolarization makes an upright T wave with the same polarity as the QRS (3). LV epicardial pacing alters ventricle activation and repolarization dynamics, which in turn ends up with prolongation of QT interval, leaving ventricle vulnerable to extrasystoles that result in R on T phenomenon, Torsades des Pointes (TdP), or non-sustained or sustained polymorphic ventricular tachycardia (VT). The basic mechanism of formation and progression of TdP and polymorphic VT is the same as long QT syndromes. The incidence of this condition was reported to be between 3.4% and 4% and most were ischemic cardiomyopathy patients (4).

As a tertiary cardiovascular hospital, our institution has performed more than 250 CRT implantations over the course of 10 years. During this time, we observed 1 incessant electrical storm in TdP patient (5), and 2 monomorphic ventricular tachycardia (MMVT) patients soon after starting biventricular pacing (BiVP) mode with CRT. The first patient was a 59-year-old woman, suffering from ischemic cardiomyopathy who went from functional class I to III (New York Heart Association) over time and had electrocardiogram of sinus rhythm with left bundle branch block morphology and QRS duration of 160 ms. Decreased ejection fraction (EF) to 20% with increased functional class led us to consider CRT for symptom relief and ICD for primary prevention (no prior episodes of syncope or tachycardia). When CRT was activated in the operating room, incessant electrical storm of TdP started. After failed anti-tachycardia pacing attempts, defibrillation was used to stop the TdP. Device was switched off and considered a possible cause since this patient had not experienced tachycardia attack before. Pacing from RV endocardium and right atrium did not trigger the arrhythmia, but every attempt to pace

BiVP or LV epicardial mode ended in TdP. Insertion of coronary sinus lead to another vein was recommended to the patient but she elected not to pursue it. She was followed with CRT switched off but ICD on and no tachycardia attack was observed. Second and third patients demonstrated MMVT after CRT-D activation.

CRT-D can be selected instead CRT-P when a patient meets CRT indications. First, nearly every CRT-indicated patient already has ICD indication for primary prevention due to CRT criteria of EF below 35%. Second, as we described in our paper, device-related tachyarrhythmia may occur as frequently as in 4% of cases. This means 4% of CRT implant patients could die soon after device implantation due to device-related arrhythmia if left untreated.

Adnan Kaya, Mustafa Adem Tatlısu*, Ahmet İlker Tekkesin, Ahmet Taha Alper****

Department of Cardiology, Suruç State Hospital; Şanlıurfa-Turkey

***Postdoctoral Research Associate, Texas A&M Institute for Preclinical Studies; Texas-United States**

****Department of Cardiology, Dr. Siyami Ersek Cardiovascular and Thoracic Hospital, İstanbul-Turkey**

References

1. Brignole M, Auricchio A, Baron-Esquivias G, Bordachar P, Boriani G, Breithardt OA, et al. 2013 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy: the Task Force on cardiac pacing and resynchronization therapy of the European Society of Cardiology (ESC). Developed in collaboration with the European Heart Rhythm Association (EHRA). *Eur Heart J* 2013; 34: 2281-329. **Crossref**
2. Medina-Ravell VA, Lankipalli RS, Yan GX, Antzelevitch C, Medina-Malpica NA, Medina-Malpica OA, et al. Effect of epicardial or biventricular pacing to prolong QT interval and increase transmural dispersion of repolarization: does resynchronization therapy pose a risk for patients predisposed to long QT or torsade de pointes? *Circulation* 2003; 107: 740-6. **Crossref**
3. Yan GX, Antzelevitch C. Cellular basis for the normal T wave and the electrocardiographic manifestations of the long-QT syndrome. *Circulation* 1998; 98: 1928-36. **Crossref**
4. Shukla G, Chaudhry GM, Orlov M, Hoffmeister P, Haffajee C. Potential proarrhythmic effect of biventricular pacing: Fact or Myth? *Heart Rhythm* 2005; 2: 951-6. **Crossref**
5. Kaya A, Sungur A, Tekkesin AI, Turkan C, Alper AT. Immediate electrical storm of Torsades de Pointes after CRT-D implantation in an ischemic cardiomyopathy patient. *J Arrhythm* 2015; 31: 177-9.

Address for Correspondence: Dr. Adnan Kaya

Suruç Devlet Hastanesi

Kardiyoloji Bölümü, Şanlıurfa-Türkiye

E-mail: adnankaya@ymail.com

©Copyright 2017 by Turkish Society of Cardiology - Available online at www.anatoljcardiol.com

DOI:10.14744/AnatolJCardiol.2017.7483

