

VES'ler ve Kalp Yetersizliđi

12. Atrial Fibrilasyon Zirvesi

8-9 Aralık 2023, Antalya

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Başkent Üniversitesi Tıp Fakültesi, Adana Hastanesi

- Kalp yetmezliđi hastalarında görölen VES'in klinik önemi
 1. VES'e bađlı kardiyomiyopati
 2. Düşük EF'li kalp yetmezliđinde sık VES sonucu EF'nin daha fazla düşmesi (progresyon)
 3. VT, VF, AKÖ öngördürücüsü
 4. CRT hastalarında efektif pacing yapılamaması

Suppression of Frequent Premature Ventricular Contractions and Improvement of Left Ventricular Function in Patients With

DOUGLAS F. DUFFY

• **Objective:** To evaluate the effect of radiofrequency catheter ablation (RFA) on the clinical course of frequent premature ventricular contractions (PVCs) associated with impaired left ventricular function in patients with preserved left ventricular function.

• **Design:** We conducted a retrospective, nonrandomized, observational study with statistical analysis of the effect of RFA on outcome.

• **Material and Methods:** An analysis of 14 patients with frequent PVCs (≥20% of 24-hour ambulatory monitoring and left ventricular ejection fraction <50%) and a history of premature ventricular contraction (PVC) on 24-hour ambulatory monitoring based on data obtained before and after RFA.

• **Results:** Of 14 patients with pathologic dilated car-

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Heart Rhythm Disorders

Radiofrequency Catheter Ablation of Premature Ventricular Complexes From Right Ventricular Outflow Tract Improves Left Ventricular Dilatation and Clinical Status in Patients Without Structural Heart Disease

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- OBJECTIVES** The present study evaluated clinical benefits of radiofrequency catheter ablation (RFA) for premature ventricular complexes from right ventricular outflow tract (RVOT-PVC) in patients without structural heart disease.
- BACKGROUND** It is unknown whether PVC causes left ventricular (LV) dilation, which is a well-recognized precursor of LV dysfunction and heart failure, and whether eliminating PVC by RFA produces clinical benefits in patients with RVOT-PVC.
- METHODS** Frequency of PVC per total heart beats by 24-h Holter monitoring, left ventricular ejection fraction (LVEF), left ventricular end-diastolic internal dimension (LVDd), mitral regurgitation (MR) by echocardiogram, cardiothoracic ratio (CTR) by chest radiogram, and New York Heart Association (NYHA) functional class of 40 patients with RVOT-PVC without structural heart disease were evaluated before and 6 to 12 months after RFA.
- RESULTS** Before RFA, a subgroup of patients with frequent (>20%) PVC demonstrated significantly enlarged LVDd and CTR, reduced LVEF, increased MR, and deteriorated NYHA functional class as compared to the subgroup with rare (<20%) PVC (54 ± 1 mm vs. 45 ± 1 mm, $52 \pm 2\%$ vs. $46 \pm 1\%$, $66 \pm 2\%$ vs. $73 \pm 2\%$, 1.2 ± 0.2 degree vs. 0.4 ± 0.1 degree, and 1.8 ± 0.2 vs. 1.3 ± 0.1 , respectively; $p < 0.05$). Furthermore, ablating RVOT-PVC readily produced the improvement of all these abnormalities (47 ± 1 mm, $41 \pm 1\%$, $72 \pm 2\%$, 0.3 ± 0.1 degree, and 1.0 ± 0.0 , respectively; $p < 0.05$ compared with before RFA).
- CONCLUSIONS** These findings suggest that frequent (>20%) RVOT-PVC may be a possible cause of LV dysfunction and/or heart failure, and RFA produces clinical benefits in these patients. (J Am Coll Cardiol 2005;45:1259–65) © 2005 by the American College of Cardiology Foundation

Patients With Repetitive Ectopy Originating From the Right Ventricular Outflow Tract

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and Bruce B. Lerman, MD; Suneet Mittal, MD

Repetitive monomorphic ventricular tachycardia is a well-defined clinical entity in patients with structural heart disease, such as in cardiomyopathy. We sought to examine a form of ventricular ectopy originating from the right ventricular outflow tract (RVOT) and its effect on left ventricular function.

We studied 14 patients with repetitive monomorphic ventricular tachycardia (VT) originating from the RVOT (mean age 58 ± 5 years) with repetitive monomorphic ventricular tachycardia (mean heart rate 150 ± 10 bpm, mean ejection fraction $\leq 45\%$). All patients underwent catheter ablation of the RVOT. The tachycardia was quantified through 24-hour Holter monitoring. The tachycardia burden was similar in patients with preserved left ventricular function (mean ejection fraction $50 \pm 5\%$) and in patients with depressed left ventricular function (mean ejection fraction $39 \pm 6\%$ to $62 \pm 6\%$; $P = 0.017$).

Successful ablation of the RVOT resulted in resolution of sustained ventricular tachycardia (VT) originating from the RVOT in all patients. Successful ablation of the RVOT resulted in improvement of left ventricular function. Patients with preserved left ventricular function, which suggests that the tachycardia is due to cardiomyopathy or that the cardiomyopathy has been improved by ablation. (J Am Coll Cardiol 2005;45:1092–1097.)

- Tüm popülasyonda VES prevalansı %4-%20 aralığında
- Semptomatik VES çoğunlukla genç, idiyopatik ve RVOT kökenli
- Özgeçmişinde KY, KAH, MI, KMP öyküsü olanlarda daha sık (24 saatlik holterde %97)

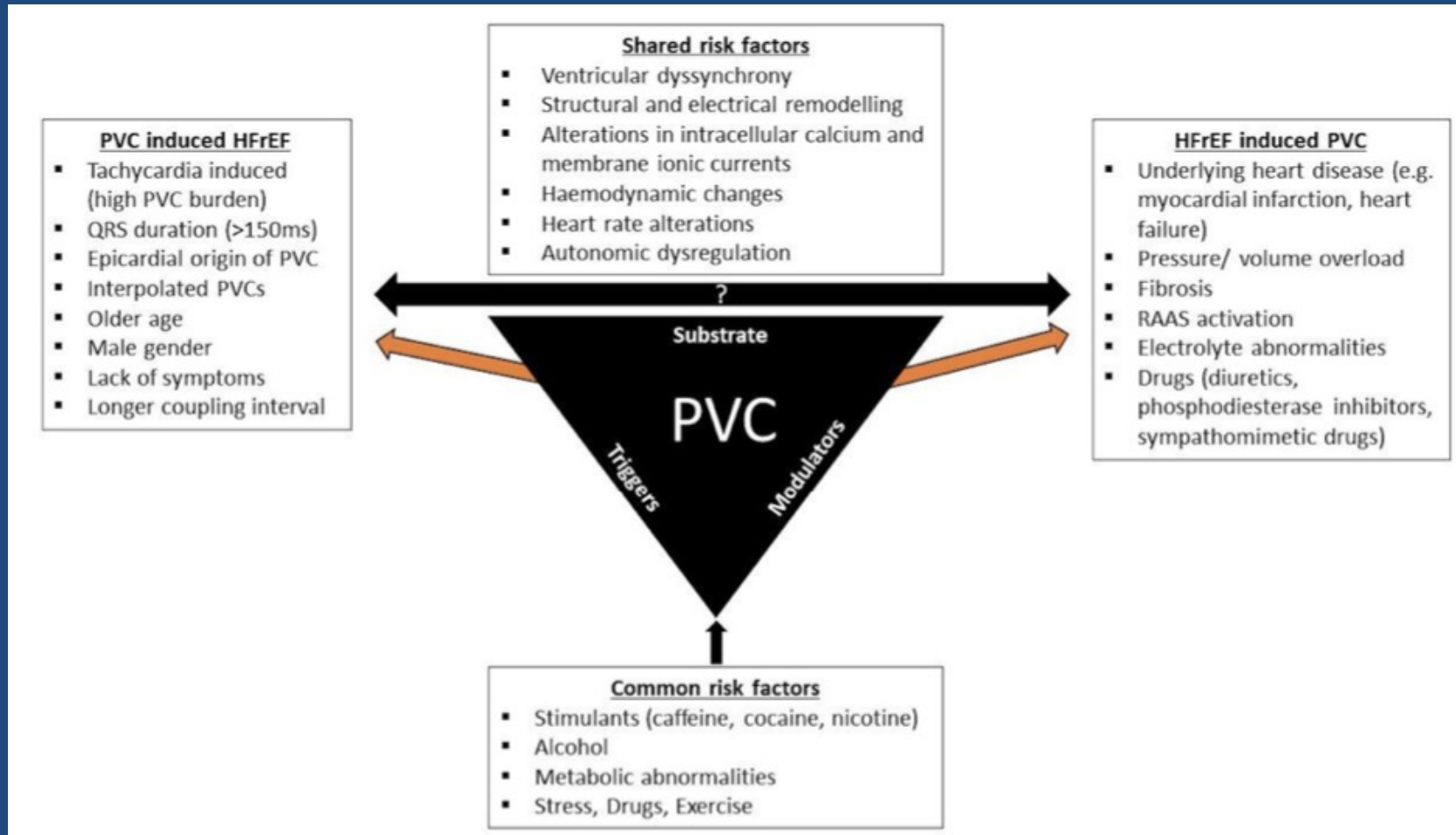
Mulder BA, et al. Evaluation and treatment of premature ventricular contractions in heart failure with reduced ejection fraction. Heart. 2021 Jan;107(1):10-17.

- 5 yıllık toplum kökenli prospektif bir çalışmada EF düşmesi %0.2 oranında görülmüş, VES'e atfedilen risk %8.1
- Prospektif bir başka çalışmada 24 saatlik holterinde >1000 VES olan 239 hastanın 13'ünde 5.6 yıllık takipte >%6 EF düşüşü gözlenmiş
- VES yükü > %10 olan hastalarda düşük EF (VES'e bağlı) prevalansı %5

- Dukes JW, et al. Ventricular ectopy as a predictor of heart failure and death. *J Am Coll Cardiol.* 2015;66:101–109.
- Niwano S, et al. Prognostic significance of frequent premature ventricular contractions originating from the ventricular outflow tract in patients with normal left ventricular function. *Heart.* 2009;95:1230–1237.

- Mekanizma

- Tetiklenmiş aktivite (çoğunlukla çıkım yolu VES'leri)
- Artmış otomatisite (skar ve düşük EF zemininde)
- Reentry (skar ve düşük EF zemininde)



Mulder BA, et al. Evaluation and treatment of premature ventricular contractions in heart failure with reduced ejection fraction. Heart. 2021 Jan;107(1):10-17.

- VES sebepli KMP risk faktörleri

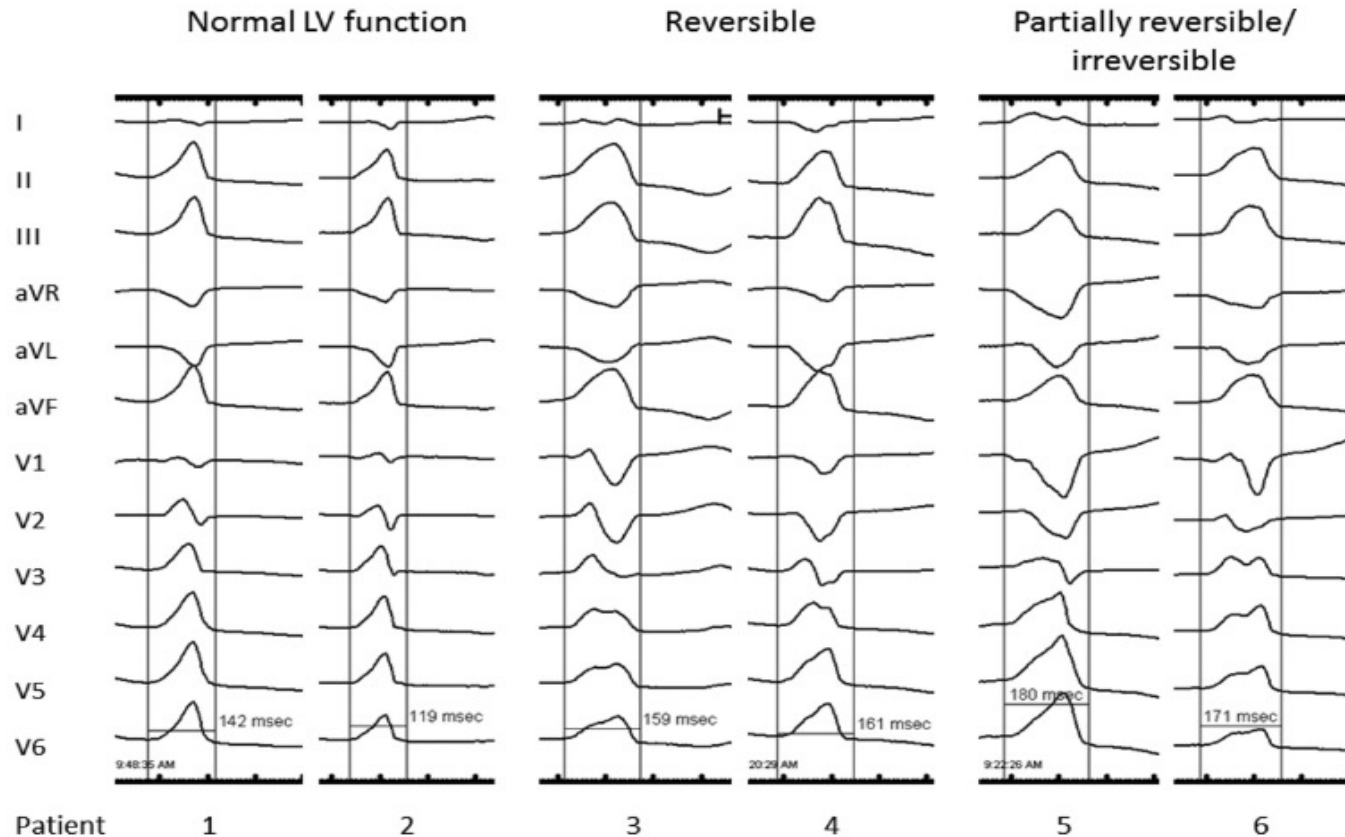
- VES yükü ile direkt ilişkili
- QRS süresi >150 msn
- Epikardiyal kaynaklı
- Polimorfik VES
- Retrograd atriyal aktivasyon
- İnterpole VES
- Çarpıntı olmayan asemptomatik kişiler
- Coupling intervalin değişkenlik göstermesi

- Sadron Blaye-Felice M. *et al.* Premature ventricular contraction- induced cardiomyopathy: related clinical and electrophysiologic parameters. *Heart Rhythm* 2016;13:103–10.
- Marcus GM. Evaluation and Management of Premature Ventricular Complexes. *Circulation*. 2020 Apr 28;141(17):1404-1418.

- VES sebepli KMP risk faktörleri (daha az kanıtlı)
 - Kısa coupling interval
 - Sürekli olmayan VT atakları
 - Erkek cinsiyet

Predictors of recovery of left ventricular dysfunction after ablation of frequent ventricular premature depolarizations

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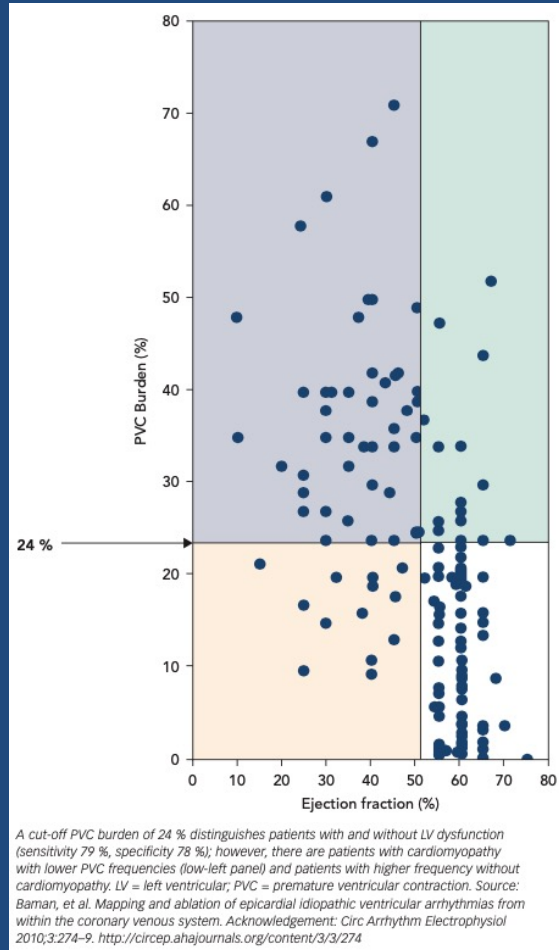


Philadelphia, Pennsylvania.

QRS < 158 msec geri dönüşlü, QRS > 178 msec geri dönüşsüz KMP

Deyell MW et al. Predictors of recovery of left ventricular dysfunction after ablation of frequent ventricular premature depolarizations. *Heart Rhythm*. 2012;9:1465–1472.

Figure 3 Sample VPDs originating from the same site of origin (left-right coronary cusp commissure) in patients with normal LV function and reversible or irreversible cardiomyopathy. Two VPD examples for each condition are shown. LV = left ventricular; VPD = ventricular premature depolarization.



- KMP gelişimi için eşik değer %24 alınırsa sensitivite %79, spesifite %78
- %10 VES yükü ile bile görülebilir
- Genel görüş en az %10, %20 sonrası risk çok artıyor
- Gerçek bir eşik değer yok

You CX, Liu CF. Premature Ventricular Contractions and Cardiomyopathy. Cardiol Rev. 2019 Nov/Dec;27(6):322-326.

- VES ile kötüleşen KMP öngördürücüleri (%85 sensitif, %98 spesifik)
 - İntrinsik QRS > 130 msn
 - LV diyastol sonu çap > 63 mm
 - VES yükü < %17

Penela D, et al. Clinical recognition of pure premature ventricular complex-induced cardiomyopathy at presentation. *Heart Rhythm*. 2017;14:1864–1870.

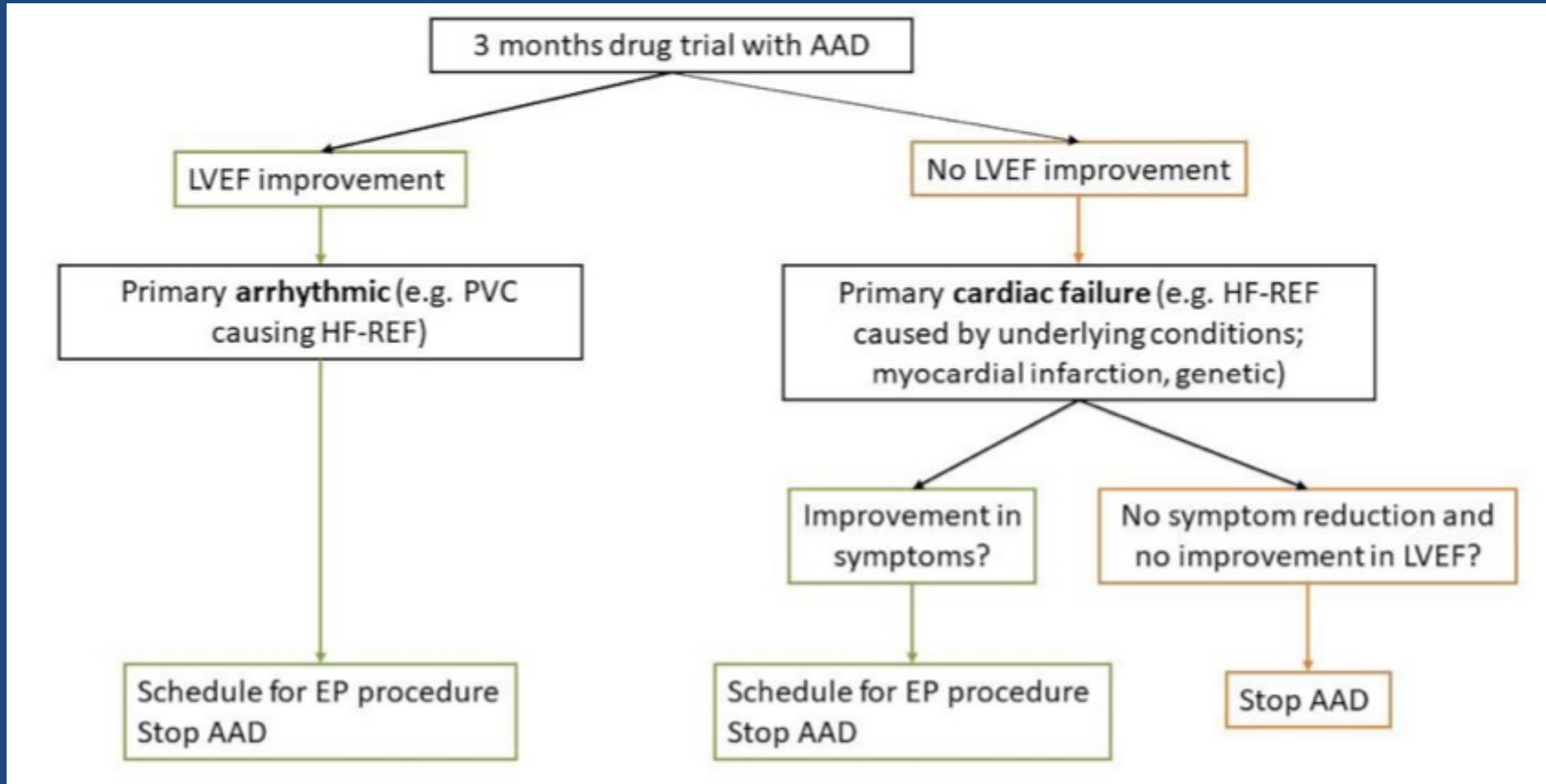
- Post-MI VES

- Holterde VES miktarı ve tekrarlaması direkt olarak düşük EF ve mortalite ile ilişkili
- Saatlik >10 VES direkt olarak mortalite ile ilişkili
- Polimorfik VES riski arttırıyor

Ephrem G, *et al.* The prognostic significance of frequency and morphology of premature ventricular complexes during ambulatory Holter monitoring. *Ann Noninvasive Electrocardiol* 2013;18:118–25.

- CRT hastalarında VES
 - <math><98\%</math> biventriküler pacing olan hastaların 1/5'inde sebep VES
 - %0.1 VES ile <math><97\%</math> biventriküler pacing olabilir
 - VES'e baęlı az biventriküler pacing daha fazla hospitalizasyon, daha az ters remodelling, daha yüksek ventriküler aritmi ve ölüm riski ile ilişkili

Ruwald AC, et al. Postimplantation ventricular ectopic burden and clinical outcomes in cardiac resynchronization therapy-defibrillator patients: a MADIT-CRT substudy. *Ann Noninvasive Electrocardiol.* 2018 Mar;23(2):e12491.



Mulder BA, et al. Evaluation and treatment of premature ventricular contractions in heart failure with reduced ejection fraction. *Heart*. 2021 Jan;107(1):10-17.

Table 9 Summary of the recommendations for the treatment of patients with frequent idiopathic premature ventricular complexes/ventricular tachycardia or premature ventricular complex-induced cardiomyopathy

	Ablation	Beta-blocker	CCB	Flecainide	Amiodarone
RVOT/fascicular PVC/VT: Symptomatic, normal LV function	Class I	Class IIa	Class IIa	Class IIa	Class III
PVC/VT other than RVOT/fascicular: Symptomatic, normal LV function	Class IIa	Class I	Class I	Class IIa	Class III
RVOT/fascicular PVC/VT: LV dysfunction	Class I	Class IIa	Class III ^a	Class IIa ^b	Class IIa
PVC/VT other than RVOT/fascicular: LV dysfunction	Class I	Class IIa	Class III ^a	Class IIa ^b	Class IIa
PVC: Burden >20%, asymptomatic, normal LV function	Class IIb				Class III

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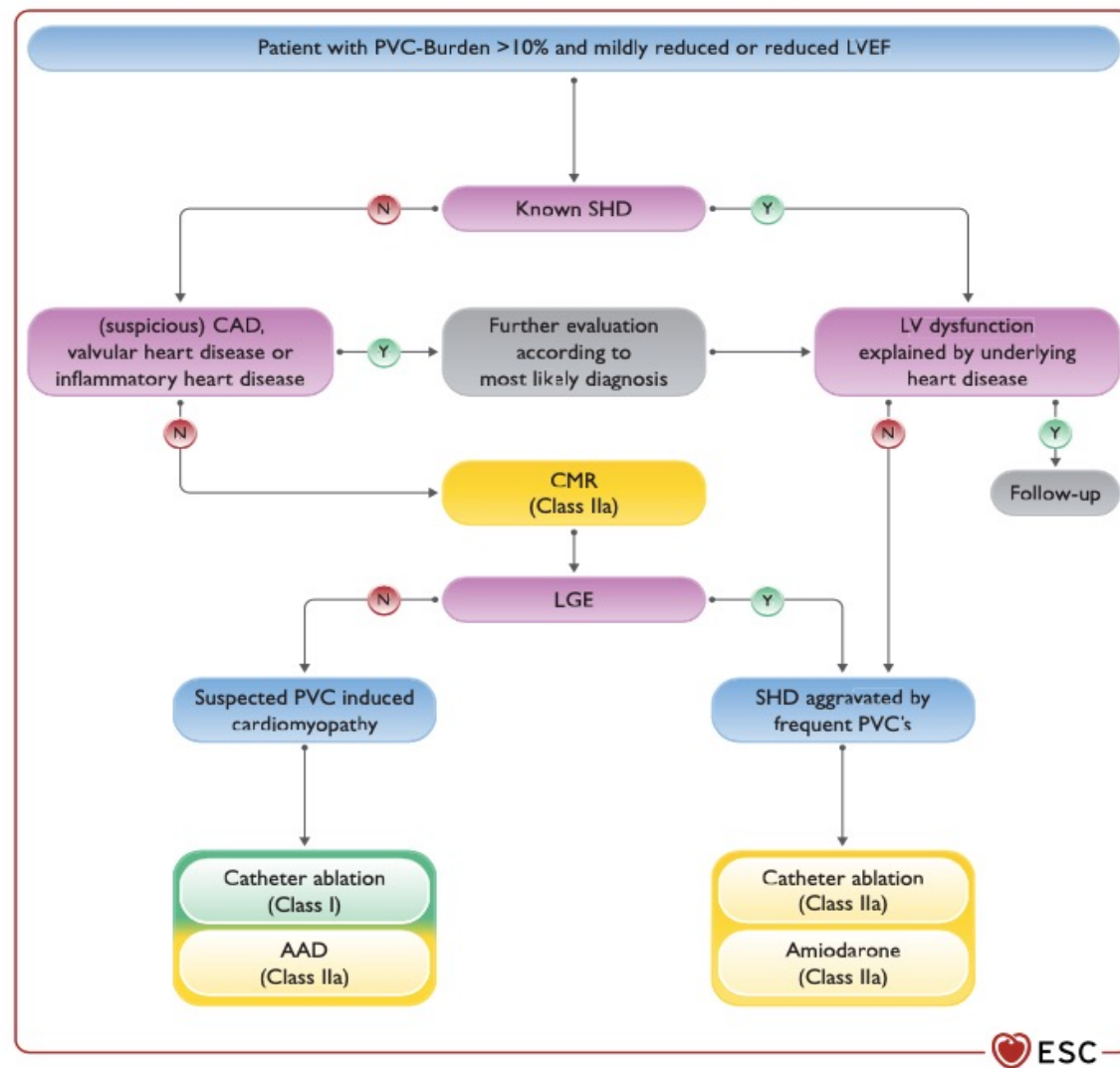


Figure 18 Algorithm for the management of patients with premature ventricular complex-induced/-aggravated cardiomyopathy. AAD, anti-arrhythmic drug; CAD, coronary artery disease; CMR, cardiac magnetic resonance; LGE, late gadolinium enhancement; LV, left ventricular; LVEF, left ventricular ejection fraction; N, No; PVC, premature ventricular complex; SHD, structural heart disease; Y, Yes.

Recommendation Table 27 — Recommendations for the management of patients with premature ventricular complex-induced or premature ventricular complex-aggravated cardiomyopathy

Recommendation	Class ^a	Level ^b
Diagnostic evaluation		
In patients with an unexplained reduced EF and a PVC burden of at least 10%, PVC-induced cardiomyopathy should be considered. ^{600,609,610}	IIa	C
In patients with suspected PVC-induced cardiomyopathy, CMR should be considered. ^{590,615}	IIa	B
Treatment		
In patients with a cardiomyopathy suspected to be caused by frequent and predominately monomorphic PVCs, catheter ablation is recommended. ^{535,600,609,612,617,618,620}	I	C

In patients with a cardiomyopathy suspected to be caused by frequent and predominately monomorphic PVCs, treatment with AADs ^c should be considered if catheter ablation is not desired, suspected to be high-risk, or unsuccessful. ^{624,626}	IIa	C
In patients with SHD in whom predominately monomorphic frequent PVCs are suspected to be contributing to the cardiomyopathy, AAD (amiodarone) treatment or catheter ablation should be considered. ^{617,621,622,624}	IIa	B
In non-responders to CRT with frequent, predominately monomorphic PVCs limiting optimal biventricular pacing despite pharmacological therapy, catheter ablation or AADs should be considered. ⁶²³	IIa	C

AAD, anti-arrhythmic drug; CMR, cardiac magnetic resonance; CRT, cardiac resynchronization therapy; EF, ejection fraction; ICD, implantable cardioverter defibrillator; LV, left ventricular; PVC, premature ventricular complex; SHD, structural heart disease.
^aClass of recommendation.
^bLevel of evidence.
^cFlecainide only in selected patients (ICD recipients, only moderate LV dysfunction).