Pediatric and Congenital Rhythm Congress VII
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Thessaloniki/GREECE
PEDIRHYTHM VII

Premature Beats in Children CURRENT GUIDELINES OF ABLATION IN ADULTS: ARE THEY APPLICABLE TO CHILDREN?

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NO CONFLICT OF INTEREST

Bambino Gesù
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I.	II.	III.	IV.
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SCORE: 0

NON FINANCIAL INTERESTS

CHILDREN?

What is the age of the patients we are talking about?

- Neonates
- Infants

} Not applicable

- VPCs in newborns with structurally normal hearts are typically benign and usually resolve without complications and intervention.
- About 18% of full-term infants have VPCs in the first day of life

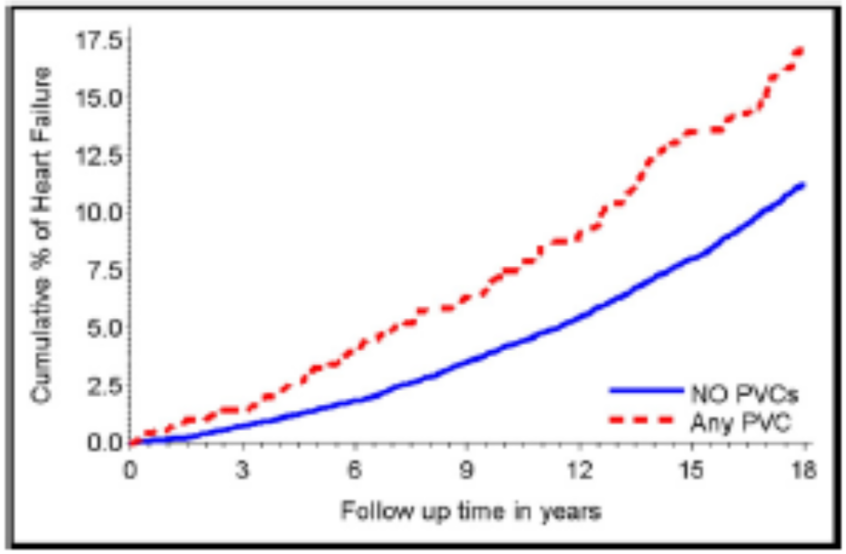
- Children
- Adolescents

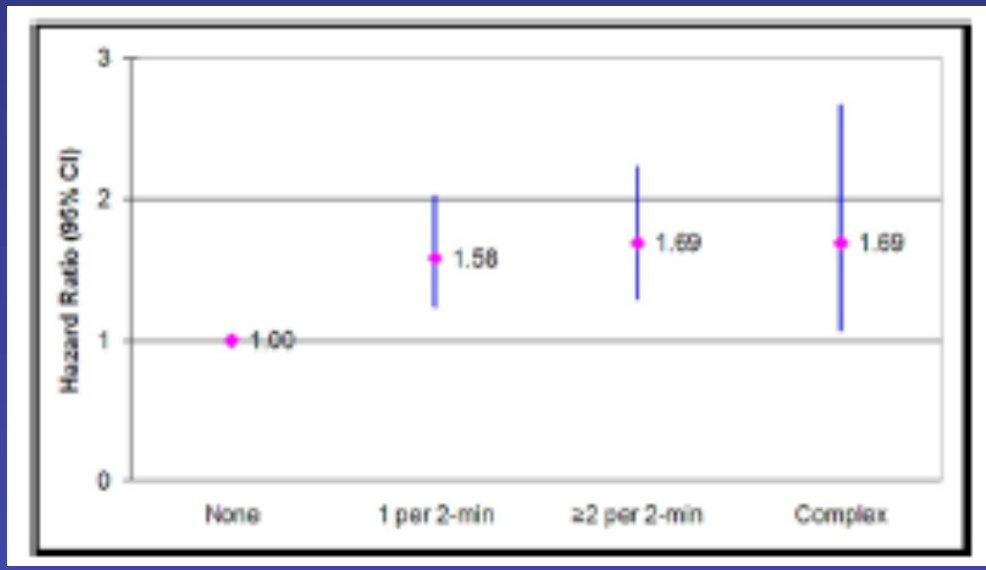
ABLATION OF PVCs IN ADULTS

Relation of Ventricular Premature Complexes to Heart Failure (from the Atherosclerosis Risk In Communities [ARIC] Study)

Sunil K. Agarwal, MD, PhD[a,b,*], Ross J. Simpson, Jr., MD, PhD[a], Pentti Rautaharju, MD, PhD[c], Alvaro Alonso, MD, PhD[d], Eyal Shahar, MD, MPH[c], Mark Massing, MD, PhD[a], Samir Saba, MD[b], and Gerardo Heiss, MD, PhD[a]

(Am J Cardiol 2012;109:105–109)





PVCs AND LVD IN ADULTS

Baman TS,. Heart Rhythm 2010
Ban JE, Europace 2013
Del Carpio MF, J Cardiovasc Electrophysiol 2011
Hasdemir C, J Cardiovasc Electrophysiol 2011

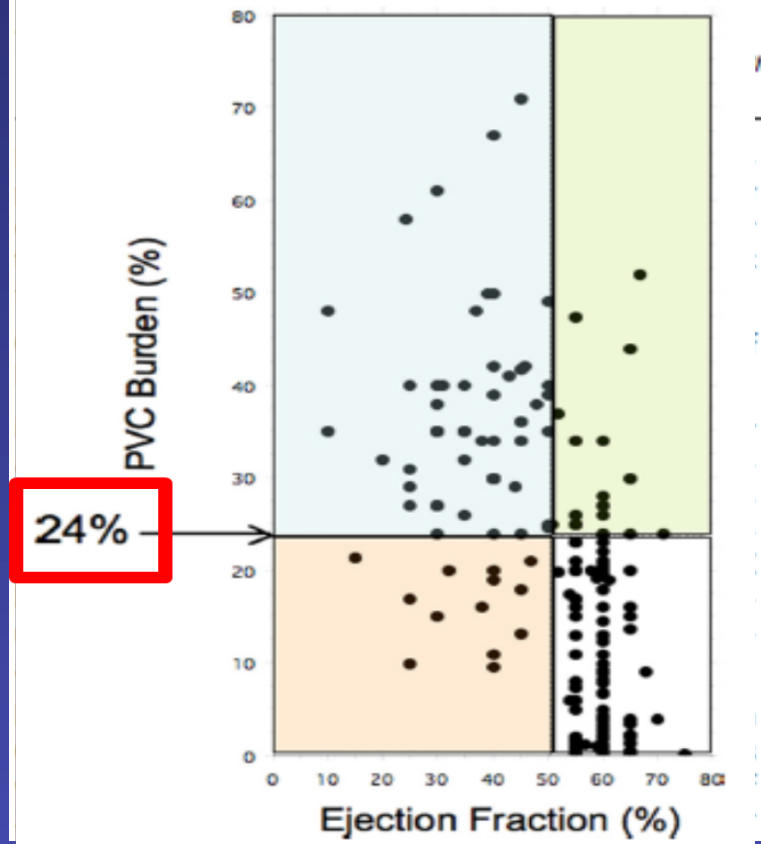
Significant risk factors for the development of LVD are:

1. A burden of PVCs of at least 24 %

PVCs AND HF IN ADULTS

Relationship between burden of premature ventricular complexes and left ventricular function

Timir S. Baman, MD,* Dave C. Lange, MD,* Karl J. Ilg, MD,* Sanjaya K. Gupta, MD,* Tzu-Yu Liu, MS,† Craig Alguire, MD,* William Armstrong, MD, FACC,* Eric Good, DO, FACC,* Aman Chugh, MD, FACC,* Krit Jongnarangsin, MD,* Frank Pelosi, Jr., MD,* Thomas Crawford, MD,* Matthew Ebinger, MD, DO,* Hakan Oral, MD, FACC,* Fred Morady, MD, FACC,* Frank Bogun, MD, FACC*



nce, University of Michigan, Ann Arbor, Michigan.

function 13% ± 12% (P <.0001). A PVC burden of >24% best separated the patient population with impaired as compared with preserved left ventricular function (sensitivity 79%, specificity 78%, area under curve 0.89) The lowest PVC burden resulting in a reversible cardiomyopathy was 10%. In multivariate analysis, PVC burden (hazard ratio 1.12, 95% confidence interval 1.08 to 1.16; P <.01) was independently associated with PVC-induced cardiomyopathy.

CONCLUSION A PVC burden of >24% was independently associated with PVC-induced cardiomyopathy.

KEYWORDS Premature ventricular complexes, Ablation, Cardiomyopathy

ABBREVIATIONS **CI** = confidence interval; **EF** = ejection fraction; **HR** = hazard ratio; **LV** = left ventricular; **PVC** = premature ventricular complexes; **ROC** = receiver operator characteristic; **RVOT** = right ventricular outflow tract

(Heart Rhythm 2010;7:865–869)

PVCs AND LVD IN ADULTS

Baman TS,. Heart Rhythm 2010
Ban JE, Europace 2013
Del Carpio MF, J Cardiovasc Electrophysiol 2011
Hasdemir C, J Cardiovasc Electrophysiol 2011

Significant risk factors for the development of LVD are:

1. A burden of PVCs of at least 24 %

2. A greater QRS duration of PVCs

Impact of QRS duration of frequent premature ventricular complexes on the development of cardiomyopathy

Miki Yokokawa, MD, Hyungjin Myra Kim, ScD, Eric Good, DO, Thomas Crawford, MD, Aman Chugh, MD, Frank Pelosi Jr, MD, Krit Jongnarangsin, MD, Rakesh Latchamsetty, MD, William Armstrong, MD, Craig Alguire, MD, Hakan Oral, MD, Fred Morady, MD, Frank Bogun, MD

From the Division of Cardiovascular Medicine, University of Michigan, Ann Arbor, Michigan.

BACKGROUND Patients with frequent premature ventricular complexes (PVCs) are at risk of developing reversible PVC-induced cardiomyopathy (rPVC-CMP). Not all determinants of rPVC-CMP are known.

OBJECTIVE To assess the impact of the QRS duration of PVCs on the development of rPVC-CMP.

RESULTS The PVC-QRS width was significantly greater in patients with rPVC-CMP than in patients without rPVC-CMP (164 ± 20 ms vs 149 ± 17 ms; $P < .0001$). The site of origin of the PVC had an impact on the PVC-QRS width, with epicardial PVCs having the broadest QRS complexes. Patients with PVCs originating from the

and PVC site of origin, PVC-QRS width and an epicardial PVC origin were independently associated with rPVC-CMP. Based on receiver operator characteristics analysis, a QRS duration of >150 ms best differentiated patients with and without rPVC-CMP (area under the curve 0.66; sensitivity 80%; specificity 52%). The PVC burden for developing rPVC-CMP is significantly lower in patients with a

QRS complexes. After adjusting for PVC burden, symptom duration,

PVCs AND LVD IN ADULTS

Baman TS,. Heart Rhythm 2010
Ban JE, Europace 2013
Del Carpio MF, J Cardiovasc Electrophysiol 2011
Hasdemir C, J Cardiovasc Electrophysiol 2011

Significant risk factors for the development of LVD are:

1. A burden of PVCs of at least 24 %

2. A greater QRS duration of PVCs

3. A rather short coupling interval of the PVCs (<300 ms)

4. Presence of ns VTs

BENEFICIAL EFFECTS OF RFTA IN ADULTS WITH PVCs AND LVD

- Bogun F, Crawford T, Reich S, Koelling TM, Armstrong W, Good E et al. ***Radiofrequency ablation of frequent idiopathic premature ventricular complexes: comparison with a control group without intervention.*** Heart Rhythm 2007;4:863–7.

- Wijnmaalen AP, Delgado V, Schalij MJ, van Huls van Taxis CF, Holman ER, Bax JJ et al. ***Beneficial effects of catheter ablation on left ventricular and right ventricular function in patients with frequent premature ventricular contractions and preserved ejection fraction.*** Heart 2010;96:1275–80.

- Yokokawa M, Good E, Crawford T, Chugh A, Pelosi F Jr, Latchamsetty R et al. ***Recovery from left ventricular dysfunction after ablation of frequent premature ventricular complexes.*** Heart Rhythm 2013;10:172–5.

- Zang M, Zhang T, Mao J, Zhou S, He B. ***Beneficial effects of catheter ablation of frequent premature ventricular complexes on left ventricular function.*** Heart 2014;100:787–93.

BENEFICIAL EFFECTS OF RFTA IN ADULTS WITH PVCs AND HF

Time Course of Recovery of Left Ventricular Systolic Dysfunction in Patients with Premature Ventricular Contraction-Induced Cardiomyopathy

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OGUZ YAVUZGİL, M.D.,* MEHMET AYDİN, M.D.,† and LEVENT H. CAN, M.D.*
From the *Department of Cardiology, Ege University School of Medicine, Izmir, Turkey; and †Tepecik Teaching and Research Hospital, Izmir, Turkey

Background: *Idiopathic ventricular arrhythmias in the form of frequent, monomorphic premature ventricular contractions (PVC) can cause PVC-induced cardiomyopathy (PICMP). The aim of this study was to determine the baseline echocardiographic characteristics and the time course and degree of recovery of left ventricular (LV) systolic dysfunction in patients with PICMP.*

Methods: *Study population consisted of 348 consecutive patients (205F/143M, 44 ± 19 y/o) with frequent PVCs and/or ventricular tachycardia. PICMP was defined as LV ejection fraction (LVEF) of <55% in the absence of any detectable underlying heart disease and improvement of LVEF ≥ 15% following treatment of ventricular arrhythmia. Patients with PCIMP underwent transthoracic echocardiography for LV size and function at 1 week and at 1–3 to 6–12 months of follow-up.*

Results: *Twenty-four patients (8F/16M, 47 ± 18 y/o) with PICMP with complete echocardiographic data were included in the study. Average baseline LV end-diastolic diameter, LV end-systolic volume, LV mass index, and LVEF were 55.4 ± 6.8 mm, 69.6 ± 23.3 mL, 110.2 ± 28.3 g/m2, and 41 ± 8.4%, respectively. Mild-to-moderate mitral regurgitation (MR) was present in 13 (54%) patients. Early improvement (≥25% increase in LVEF at 1-week follow-up compared to baseline) was observed in 13 (54%) patients. Patients with early improvement had higher LVEF at 12 months of follow-up compared to patients without early improvement (58.8 ± 5.0% vs 52.5 ± 6.7%, P = 0.019).*

Conclusions: *PCIMP is characterized by mild-to-moderate global LV systolic dysfunction with slightly increased LV mass and mild-to-moderate MR. Greatest improvement in LV systolic dysfunction was observed at 1-week follow-up in our study population. Early improvement in LVEF may potentially predict the complete reversibility of LV systolic dysfunction. (PACE 2013; 36:612–617)*

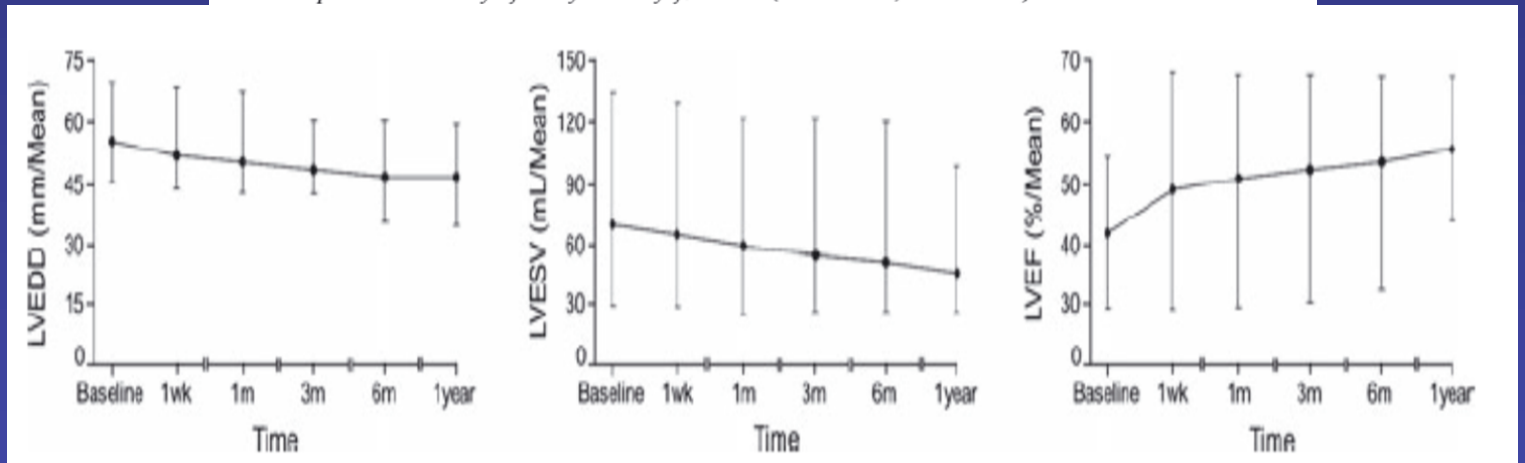

Figure 2. *The time course of recovery in left ventricular end-diastolic diameter (LVEDD), left ventricular end-systolic volume (LVESV), and left ventricular ejection fraction (LVEF) after treatment of index ventricular arrhythmia.*

BENEFICIAL EFFECTS OF RFTA IN ADULTS WITH PVCs AND HF

Effect of ablation of frequent premature ventricular complexes on left ventricular function in patients with nonischemic cardiomyopathy

Moutaz El Kadri, MD,[†] Miki Yokokawa, MD,[†] Troy Labounty, MD,[†] Gisela Mueller, MD,[*] Thomas Crawford, MD,[†] Eric Good, DO, FACC,[†] Krit Jongnarangsin, MD,[†] Aman Chugh, MD,[†] Hamid Ghanbari, MD,[†] Rakesh Latchamsetty, MD,[†] Hakan Oral, MD, FACC,[†] Frank Pelosi, MD, FACC,[†] Fred Morady, MD, FACC,[†] Frank Bogun, MD, FACC[†]

From the [†]Department of Cardiology, University of Michigan Health System, Ann Arbor, Michigan, and [*]Department of Radiology, University of Michigan Health System, Ann Arbor, Michigan.

BACKGROUND Frequent idiopathic premature ventricular complexes (PVCs) can result in PVC-induced cardiomyopathy. Frequent PVCs can also aggravate ischemic cardiomyopathy.

OBJECTIVE The purpose of this study was to investigate the impact of frequent PVCs on nonischemic cardiomyopathy.

cardiac magnetic resonance imaging and/or a history of cardiomyopathy before the presence of frequent PVCs who were referred for ablation of frequent PVCs.

RESULTS Ablation was successful in 18 of 30 patients (60%), resulting in an increase of mean EF from 33.9% ± 14.5% to 45.7% ± 17% ($P < .0001$) during mean follow-up of 30 ± 28 months. The PVC burden in these patients was reduced from 23.1% ± 8.8% to 1.0% ± 0.9% ($P < .0001$). Mean EF did not change in patients with a failed ablation procedure (44.4 ± 16 vs 43.5 ± 21, $P = .85$). The PVC site of origin was in scar tissue in 14 of 18 patients with a successful ablation procedure. Mean New York Heart Association functional class improved from 2.3 ± 0.6 to 1.1 ± 0.2 ($P < .0001$) in patients with a successful outcome and remained unchanged in patients with an unsuccessful outcome (1.9 ± 0.9 vs 1.9 ± 0.7, $P = 1$).

CONCLUSION In patients with frequent PVCs and nonischemic

RESULTS Ablation was successful in 18 of 30 patients (60%),

scar tissue.

KEYWORDS Premature ventricular complex; Nonischemic cardiomyopathy; Ablation

ABBREVIATIONS **DE-MRI** = delayed enhanced magnetic resonance imaging; **EF** = ejection fraction; **ICD** = implantable cardioverter-defibrillator; **MRI** = magnetic resonance imaging; **PVC** = premature ventricular complex; **VT** = ventricular tachycardia

(Heart Rhythm 2015;12:706–713)

PVCs IN CHILDREN

Natural History

Ventricular couplets in the young: prognosis related to underlying substrate. Paul T, Am Heart J. 1990

- 104 patients

22 NORMAL HEART

- Number of ventricular couplets was higher
- None had inducible VT

82 ABNORMAL HEART

- 32 had an EPS: nine (28%) had s VT, 16 (50%) had ns VT, and seven (22%) had no inducible VT.

AFTER MEAN FOLLOW-UP OF 29.7 MONTHS

- all 22 patients were alive without VT
- 6 were treated for palpitations, with complete suppression of couplets in two
- In 70% of the pts, ventricular couplets disappeared spontaneously

- 2 had sudden death with documented VT/VF
- In only 12% of pts ventricular couplets disappeared spontaneously

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Europace (2008) 10, 998–1003
doi:10.1093/europace/eun121

Natural history of ventricular premature contractions in children with a structurally normal heart: does origin matter?

Gertie C.M. Beaufort-Krol, Sebastiaan S.P. Dijkstra, and Margreet Th.E. Bink-Boelkens*

Beatrix Children's Hospital, Division of Pediatric Cardiology, University Medical Center Groningen, University of Groningen, Hanzeplein 1, PO Box 30.001, 9700 RB Groningen, The Netherlands

Received 10 November 2007; accepted after revision 15 April 2008; online publish-ahead-of-print 6 May 2008

PVCs WITH RBBB

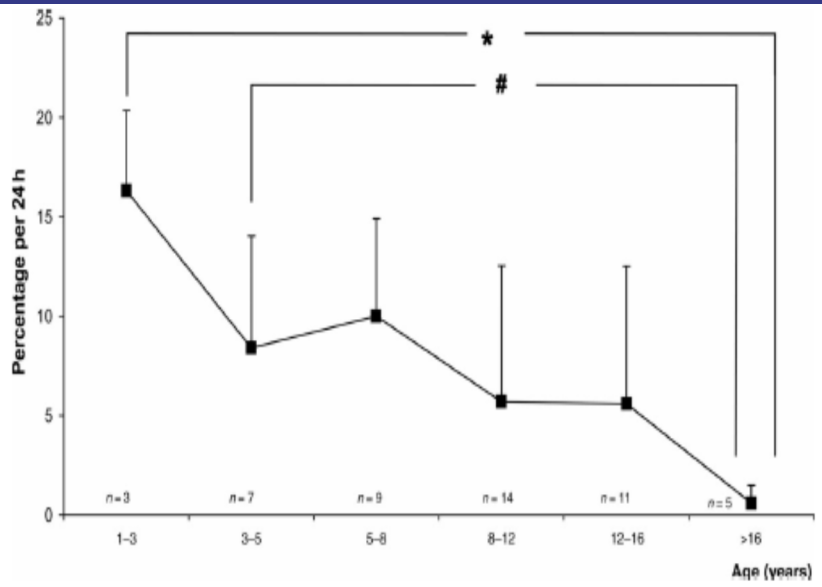

Figure 3 Percentage (mean ± SD) premature ventricular contraction with right bundle branch block of total number of QRS complexes per 24 h in the Holter recording per age group. *$P < 0.02$; #$P < 0.01$.

PVCs WITH LBBB

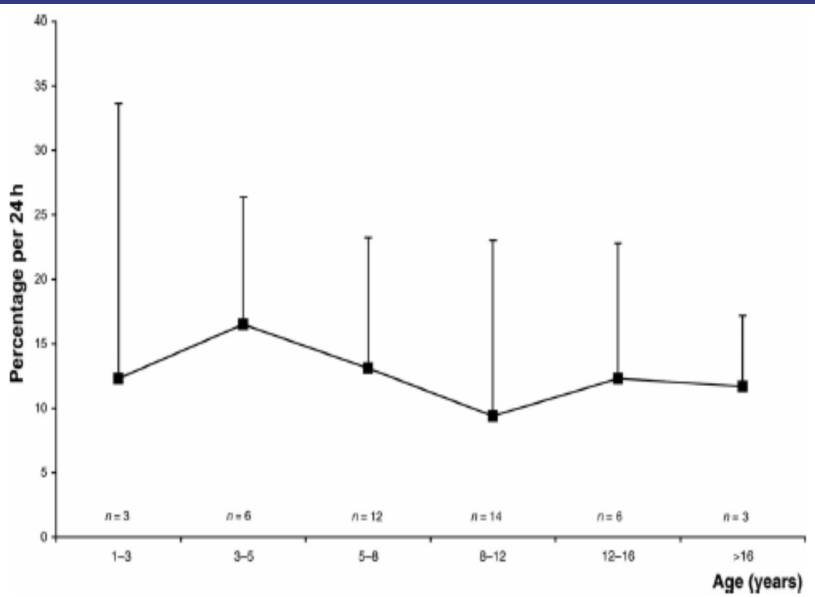

Figure 2 Percentage (mean ± SD) premature ventricular contraction with left bundle branch block of total number of QRS complexes per 24 h in the Holter recording per age group.

PVCs IN CHILDREN

LVD

Usefulness of Ventricular Premature Complexes in Asymptomatic Patients ≤21 Years as Predictors of Poor Left Ventricular Function

Karine Guerrier, DO, MPH*, Jeffrey B. Anderson, MD, MPH, Richard J. Czosek, MD, Wayne A. Mays, MS, Christopher Statile, MD, Timothy K. Knilans, MD, and David S. Spar, MD

Variable	n=123
Age (years)	12 (6 – 14)
Male	77 (63%)
Height (cm)	152 (122 – 167)
Weight (kg)	41 (21 – 62)

AM J CARDIOL
2015

Cincinnati Children's Hospital Medical Center,

Lack of correlation between VPC burden and LV systolic function

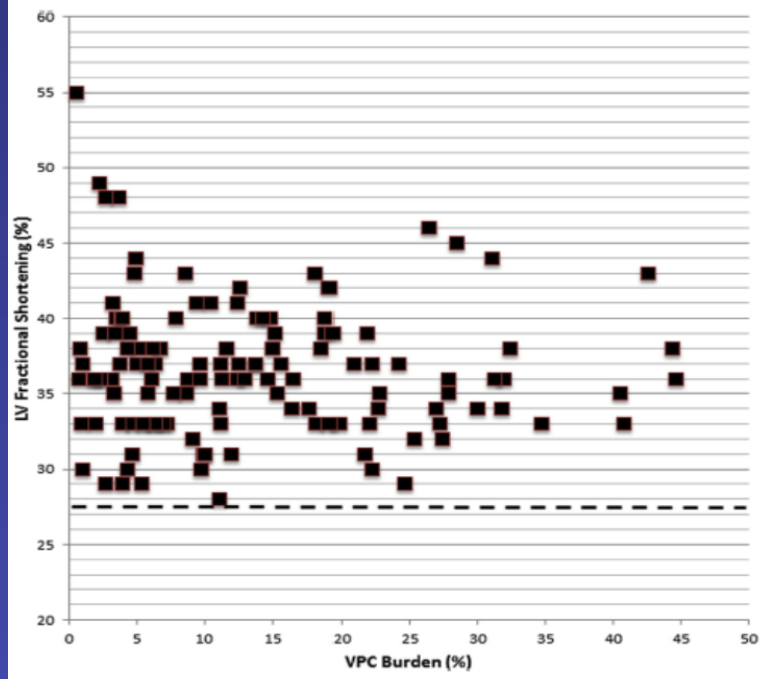

Figure 1. Scatterplot of LV FS in relation to VPC burden percentage.

Usefulness of Ventricular Premature Complexes in Asymptomatic Patients ≤21 Years as Predictors of Poor Left Ventricular Function

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AM J CARDIOL
2015

Cincinnati Children's Hospital Medical Center,

No correlation between VPC characteristics (the presence of uniform vs. multiform VPCs, fixed vs. variable coupling intervals, VPC morphology, couplets, or runs) and LV systolic function.

Relationship between ventricular premature complex characteristics and left ventricular shortening fraction

Ventricular Premature Complex Characteristics	p value
Uniform vs. multiform	0.29
Left bundle branch vs. right bundle branch morphology	0.73
Fixed vs. variable coupling interval	0.74
Couplets	0.37
Runs	0.19

P value $\leq$ 0.05 considered significant.

PVCs AND LVD IN CHILDREN WITH NORMAL HEART

Pediatr Cardiol (2010) 31:986–990
DOI 10.1007/s00246-010-9740-7

ORIGINAL ARTICLE

Frequent Ventricular Premature Beats in Children With a Structurally Normal Heart: A Cause for Reversible Left Ventricular Dysfunction?

Bahram Kakavand · Hubert V. Pallard · Thomas G. Disessa

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First report in children

The review identified:

- **28 patients (age 13 ± 5.2 years) with frequent PVCs**
- **The echocardiograms of 4 patients (2 boys, 14%) showed LVD**
- **The patients with LVD had a significantly higher PVCs burden: 36.3 ± 17.9 vs. 15.4 ± 9.9% (p = 0.0016).**

- **Cardiac function normalized in all four patients:**

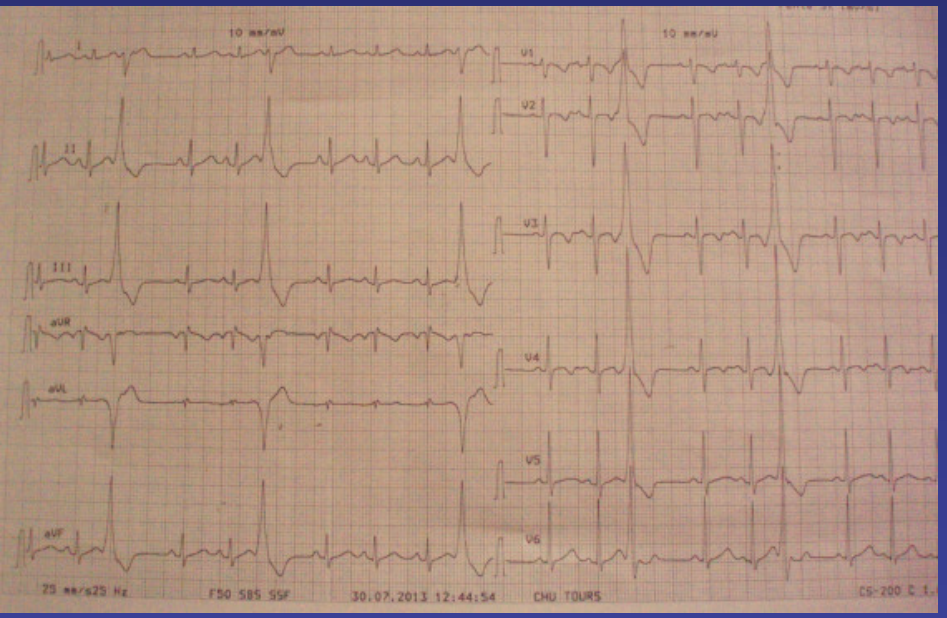
- **WITH SPONTANEOUS RESOLUTION OF THE PVCs (2 PATIENTS)**
- **WITH ANTIARRHYTHMIC THERAPY (2 PATIENTS)**

Cardiomyopathy induced by frequent premature ventricular contractions

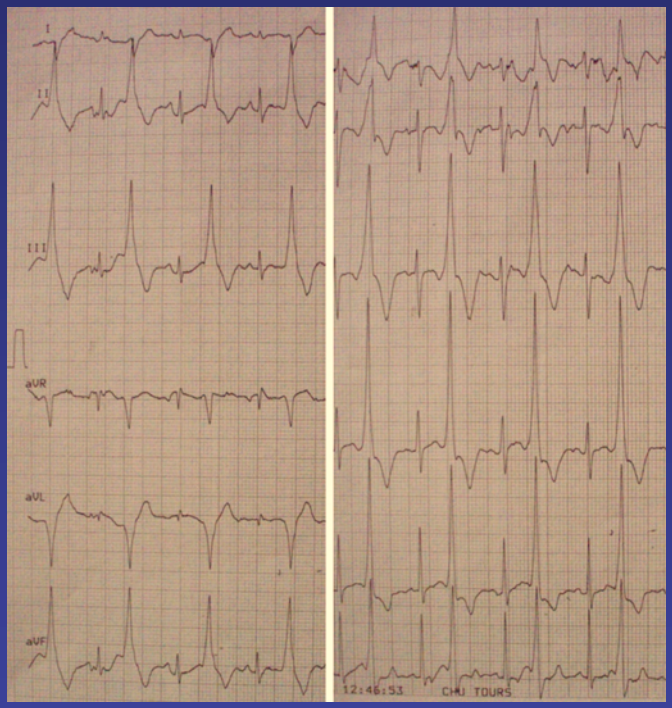
Chantepie A , Archives de Pédiatrie, 2016,

7-YEAR-OLD CHILD

presenting with frequent and apparently benign
premature ventricular complexes (burden 45%) and left ventricular dysfunction.



LBBB
Inferior Axis



Six months after increasing dose of bisoprolol,
the VPCs were less frequent (burden 20%)
and left ventricular function was completely normalized.

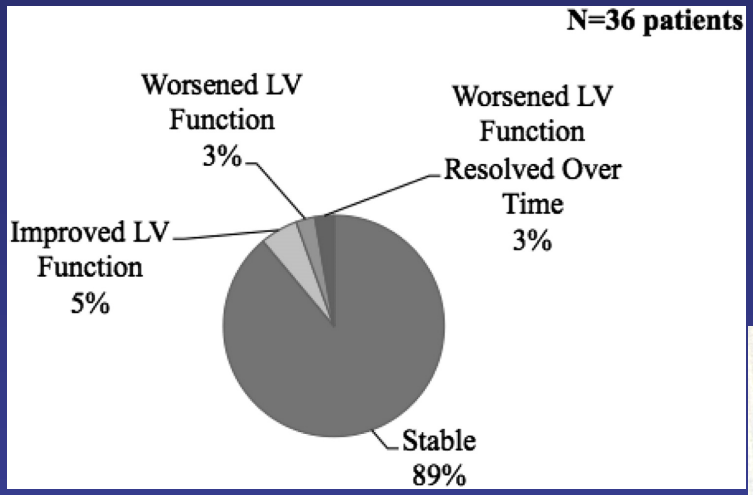
PVCs IN CHILDREN

Ablation results

Ventricular ectopy in children without known heart disease

West L,The Journal of Pediatrics 2015

- 219 patients (median age of diagnosis 11.3 years).



only 36 with echo FU data

Sequential echocardiogram data for patients with changing cardiac function over time

Patient	Sex	Age at diagnosis	Origin of VE by ECG	Echo 1 (age at time of study)	Echo 1 % VE (by Holter)	Echo 2 (age at time of study)	Echo 2 % VE (by Holter)	VE Category
1	F	16	RVOT	Decreased (16)	17	Normal (20)	0	PVC
2	M	16	RVOT	Decreased (16)	72	Normal (17)	0	VT
3	M	14	LVPF	Decreased (14)	45	Normal (35)	<1%	VT
4	M	5	RVOT	Normal (8)	30	Decreased (14)	97	PVC → Incessant VT

No case of SCD!

Children's Hospital of Pittsburgh of University of Pittsburgh Medical Center, Pittsburgh, PA

Ventricular ectopy (VE) in children without known heart disease

West L,The Journal of Pediatrics 2015

- Ablation was attempted in 11 patients
- 4 (36%) were successful at eliminating the focus of VE
- 6 (55%) were unsuccessful at eliminating the VE focus
- In 1 (9%, but with VT) VE was eliminated successfully but PVCs persisted during follow-up.

So ..the ablation success rate was only 40%!

Children's Hospital of Pittsburgh of University of Pittsburgh Medical Center, Pittsburgh, PA

PVCs AND LVD IN CHILDREN WITH NORMAL HEART

Europace Advance Access published May 31, 2016

Europace
doi:10.1093/europace/euw075

CLINICAL RESEARCH

Left ventricular dysfunction is associated with

Aims To assess the risk factors for left ventricular (LV) dysfunction in a paediatric population with idiopathic frequent premature ventricular contractions (PVCs) and asymptomatic ventricular tachycardias (VTs).

Methods and results Paediatric patients with the diagnosis of idiopathic frequent PVCs and asymptomatic VTs were retrospectively evaluated. Frequent PVCs were defined as >5% on 24 h Holter recording. Left ventricular dysfunction was defined as a shortening fraction of ≤28%. Seventy-two children were identified. Six patients showed LV dysfunction at diagnosis [age 10 ± 7 years, 2 (33%) had symptoms such as syncope, palpitations, fatigue, and dizziness], and 66 showed normal LV function [age 8 ± 6 years, 22 (33%) with symptoms]. Patients with LV dysfunction had a higher percentage of PVCs on Holter recordings (47 ± 16 vs. 16 ± 11%, $P = 0.006$), higher prevalence of VT [5 (83%) vs. 27 (41%), $P = 0.045$] and sustained ventricular tachycardia (sVT) [3 (50%) vs. 4 (6%), $P = 0.001$], and a higher number of couplets [6 (100%) vs. 34 (52%), $P = 0.030$]. In patients with LV dysfunction, two responded to medication (Classes Ic and II) and five underwent ablation, of which one was unsuccessful. During follow-up, LV function normalized in five of six patients. In patients with a normal function, none developed LV dysfunction during the follow-up.

Conclusion In children with idiopathic PVCs and asymptomatic VTs, development of LV dysfunction is associated with a higher burden of PVCs, the presence of sVTs, and couplets. Left ventricular dysfunction appears to be reversible if the burden of PVCs is decreased by medication or ablation.

burden of PVCs, the presence of sVTs, and couplets. Left ventricular dysfunction appears to be reversible if the burden of PVCs is decreased by medication or ablation.

PVCs AND LVD IN CHILDREN WITH NORMAL HEART

Table 2 Comparison of determinants of PVCs in patients with different LV function

	SF <28% (n = 6)	SF ≥28% (n = 66)	P-value
QRS axis			0.939
Inferior	5 (83)	53 (80)	
Superior	1 (17)	13 (20)	
Block pattern			0.611
LBBB	3 (50)	43 (65)	
RBBB	3 (50)	23 (35)	
QRS duration	173 (±22)	162 (±28)	0.356
QTc	493 (±23)	486 (±65)	0.811
Coupl/R–R ratio	0.63 (±0.14)	0.65 (±0.13)	0.760
Couplets	6 (100)	34 (52)	**0.030**
Bigeminy	6 (100)	50 (76)	0.327
Trigeminy	4 (67)	45 (68)	0.939
Quadrigeminy	2 (33)	9 (14)	0.219
VT	5 (83)	27 (41)	0.045
nsVT	2 (33)	23 (35)	0.941
sVT	3 (50)	4 (6)	0.001
PVC burden	47 (±16)	16 (±11)	0.006
LV z-score	2.2 (±1.8)	1.3 (±1.0)	0.112

All children with LV dysfunction had a PVC burden of 30% or more!

PVCs AND LVD IN CHILDREN WITH NORMAL HEART

Table 3 Characteristics of patients with LV dysfunction

	1	2	3	4	5	6
Sex	M	M	F	M	F	F
Age at diagnosis	1 month	15 years	15 years	16 years	11 years	3 years
QRS axis	Inferior	Inferior	Inferior	Inferior	Inferior	Superior
Block pattern	RBBB	RBBB	LBBB	LBBB	LBBB	RBBB
PVC burden (%)	40	47	74	30	34	57
VT	Yes	Yes	Yes	No	Yes	Yes
SF (%)	25	26	25	23	<18	26
LVED z-score	3.7	4.5	0.5	3.0	0.8	1.3
Medication	2	1C	NR	NR	NR	NR
Ablation	No	US	Yes	Yes	Yes	Yes
Focus PVC during EP study and ablation	N/A	Antero lateral PM	Antero septal RVOT	Anterior RVOT	Left coronary cusp	Postero medial PM
PVC burden at FU	26	7	1	1	0	14
SF at FU (%)	43	31	29	32	40	12

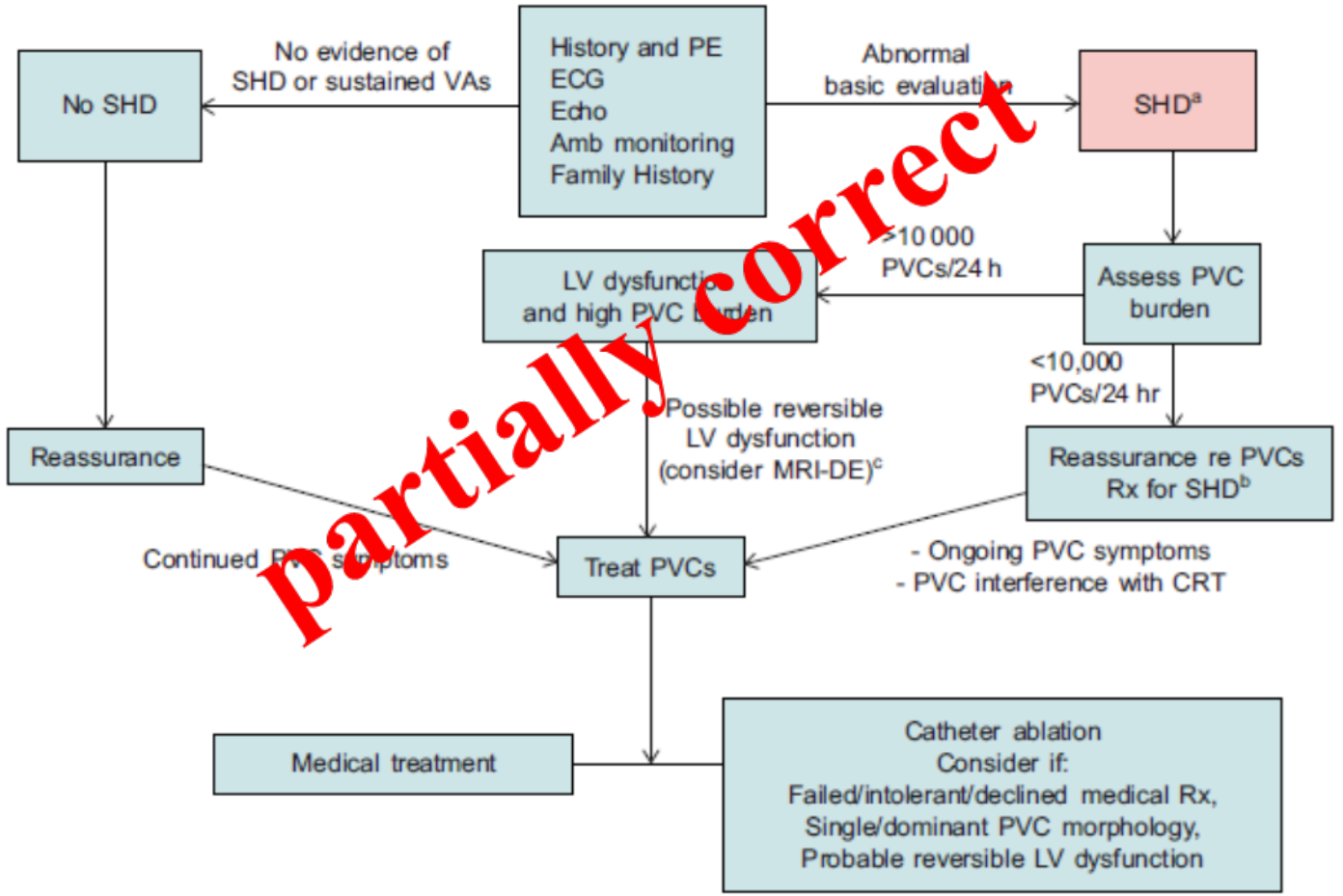
QRS axis, QRS axis of PVC or VT on frontal plane; block pattern, block pattern of PVC; LBBB, left bundle branch block; RBBB, right bundle branch block; PVC burden (%), total percentage PVCs on Holter; VT, ventricular tachycardia; SF, shortening fraction; FU, follow-up; M, male; F, female; NR, not responding on medication; US, unsuccessful ablation; PM, papillary muscle; RVOT, right ventricular outflow tract.
Numbers at medication correspond with anti-arrhythmic drugs according to the Singh Vaughan Williams classification.

CURRENT GUIDELINES OF PVCs ABLATION IN ADULTS

EHRA/HRS/APHRS Expert Consensus on Ventricular Arrhythmias

Heart Rhythm. 2014

Pedersen et al EHRA/HRS/APHRS Expert Consensus on Ventricular Arrhythmias



partially correct

2015 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death

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Eur Heart J. 2015

Recommendations	Class[a]	Level[b]
In patients with frequent symptomatic PVC or NSVT:		
– Amiodarone should be considered.	IIa	B
– Catheter ablation should be considered.	IIa	B
Catheter ablation should be considered in patients with LV dysfunction associated with PVCs.	IIa	B

partially correct

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VT/PVCs

Recommendations	Class[a]	Level[b]
Catheter ablation of RVOT VT/PVC is recommended in symptomatic patients and/or in patients with a failure of anti-arrhythmic drug therapy (e.g. beta-blocker) or in patients with a decline in LV function due to RVOT-PVC burden.	I	B
Catheter ablation of RVOT/aortic cusp/ epicardial VT/PVC by experienced operators after failure of one or more sodium channel blockers (class IC agents) or in patients not wanting long-term anti-arrhythmic drug therapy should be considered in symptomatic patients.	IIa	B

correct

CURRENT GUIDELINES OF PVCs ABLATION IN CHILDREN

2015 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death

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MANAGEMENT OF VENTRICULAR ARRHYTHMIAS IN **CHILDREN** WITH A STRUCTURALLY NORMAL HEART

Recommendations	Class[a]	Level[b]
It is recommended that asymptomatic children with frequent isolated PVCs or an accelerated ventricular rhythm and normal ventricular function be followed-up without treatment.	I	B
Medical therapy or catheter ablation is recommended in children with frequent PVCs or VT thought to be causative of ventricular dysfunction.	I	C

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MANAGEMENT OF VENTRICULAR ARRHYTHMIAS IN **CHILDREN** WITH A STRUCTURALLY NORMAL HEART

Catheter ablation should be considered when medical therapy is either not effective or undesired in symptomatic children with idiopathic RVOT VT/ PVCs or verapamil-sensitive left fascicular VT.	**IIa**	**B**
Catheter ablation by experienced operators should be considered after failure of medical therapy or as an alternative to chronic medical therapy in symptomatic children with idiopathic LVOT, aortic cusps or epicardial VT/ PVCs.	**IIa**	**B**
Catheter ablation is not recommended in children <5 years of age except when previous medical therapy fails or when VT is not haemodynamically tolerated.	**III**	**B**

PACES/HRS Expert Consensus Statement on the Evaluation and Management of Ventricular Arrhythmias in the Child With a Structurally Normal Heart

Heart Rhythm 2014;11:e55–e78

C. Indications for catheter ablation in children with idiopathic ventricular arrhythmias*

Class 1 — Catheter ablation is recommended in children with:

1. Ventricular dysfunction or hemodynamic compromise presumed to be due to ventricular ectopy or tachycardia, either as primary therapy or in patients not controlled medically (Level of evidence: C).
2. Intrafascicular verapamil-sensitive reentrant tachycardia, either as primary therapy or if not controlled by calcium-channel blockers (Level of evidence: C).

Class 2a — Catheter ablation can be useful in:

1. Symptomatic children with presumed idiopathic outflow tract tachycardia (Level of evidence: C).
2. Symptomatic children with rhythm-correlated symptoms due to frequent ventricular ectopy or accelerated idioventricular rhythm (Level of evidence: C).

Class 2b — Catheter ablation may be reasonable to consider in children with polymorphic ventricular arrhythmia where one morphology dominates or when there is a suspected trigger that can be targeted (Level of evidence: C).

Class 3 — Catheter ablation is not recommended in:

1. Infants and toddlers, except in the case of VT that cannot be adequately controlled medically and is not tolerated hemodynamically (Level of evidence: C).
2. Asymptomatic ventricular ectopy or tachycardia that is not suspected of causing ventricular dysfunction (Level of evidence: C).
3. Ventricular arrhythmias due to transient reversible causes, such as acute myocarditis or drug toxicity (Level of evidence: C).

CONCLUSIONS

- Ablation in children with PVCs is rarely indicated
- We should always keep in mind that PVCs disappear in the majority of children especially those with RBBB morphology
- Not rarely the site of origin is epicardial reducing the success rate of a safer (?) endocardial approach

CONCLUSIONS

- In case of any doubts, it's better to consult Pediatric Guidelines than current guidelines of ablation in adults
- because…

first ….

not to harm!

Rome, September 2017

First Announcement

6th TEACHING COURSE OF THE ASSOCIATION FOR EUROPEAN PAEDIATRIC AND CONGENITAL CARDIOLOGY PEDIATRIC ARRHYTHMIAS

September 22/23, 2017

Organized by the AEPC working Group of Pediatric Dyshrhythmias and Electrophysiology

Auditorium San Paolo – Ospedale Pediatrico Bambino Gesù
Viale Ferdinando Baldelli, 38 – 001146 Roma

Bambino Gesù
OSPEDALE PEDIATRICO