Com prevenir i tractar la disfunció ventricular esquerra en pacients amb estimulació cardíaca permanent

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1. Estimulació Ventricular: evidència dels seus efectes deleteris
2. Estratègies per reduir efectes adversos de l'estimulació ventricular dreta
3. Algoritmes d'actuació
4. Guies de Pràctica Clínica
5. Conclusions

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Survival in 1,431 Pacemaker Patients: Prognostic Factors and Comparison With the General Population

VERA JELIĆ, KAREN BELKIĆ, MILAN DJORDJEVIĆ, and DUSAN KOCOVIĆ

From the Pacemaker Center, University Clinical Center, Belgrade, Yugoslavia

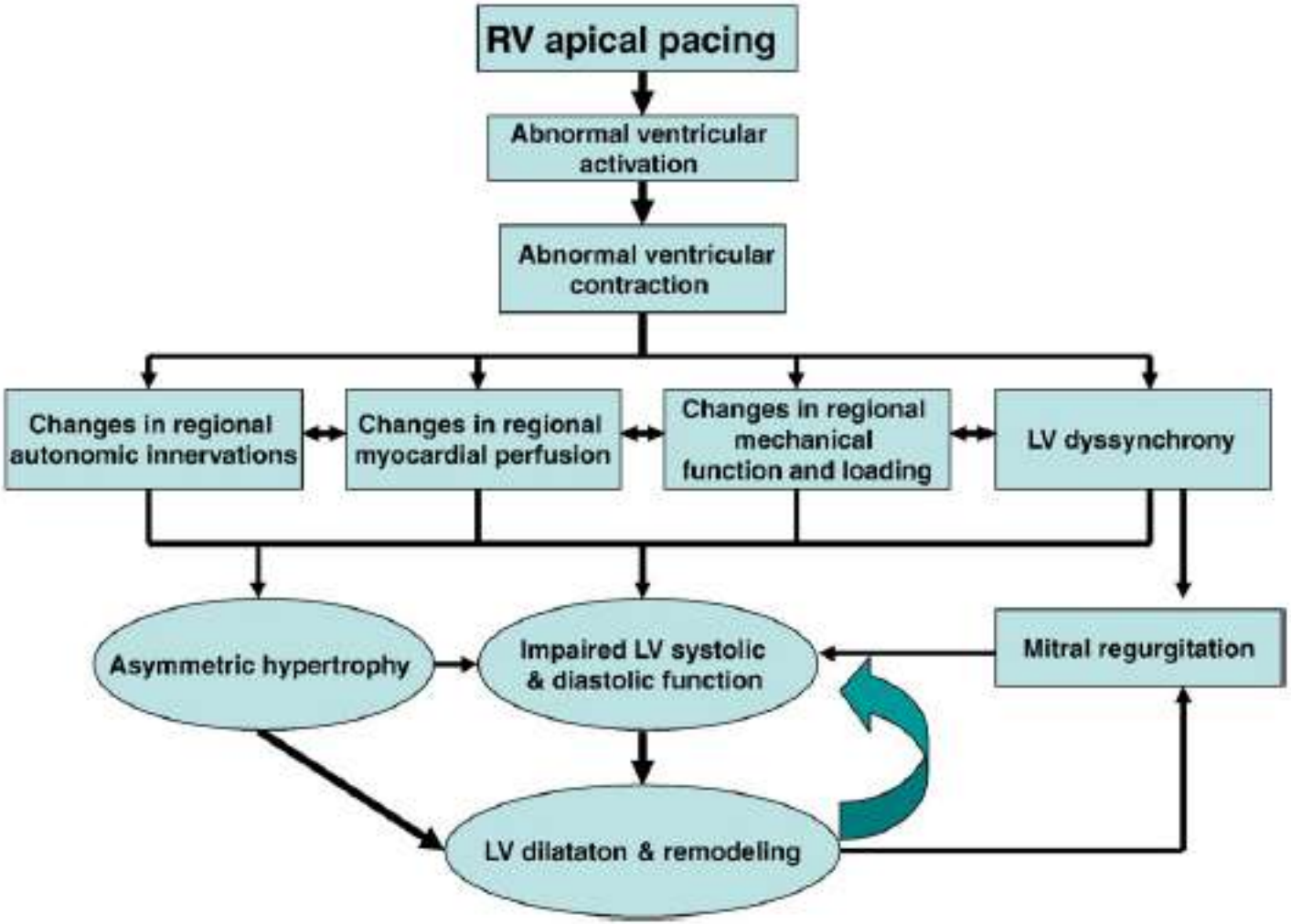
JELIĆ, V., ET AL.: Survival in 1,431 Pacemaker Patients: Prognostic Factors and Comparison With the General Population. *A total of 1,431 patients (mean age 63.4 ± 14.1) with pacemakers (96.2% VVI) primoimplanted between 1967 and 1985 were followed for a mean duration of 78.2 ± 40 pacing months, with 0.6% loss to follow-up. Cumulative survival for 1, 3, and 10 years was 0.9427, 0.9136, and 0.7536, respectively. There was no significant difference in survival between atrioventricular block (AVB) and sick sinus syndrome (SSS) patients. In addition to age and gender, factors existent prior to implantation that independently affected prognosis included manifest coronary heart disease (CHD), congenital/acquired heart lesions, heart failure, noncardiac internal disease, syncope, and generalized fatigue. After implantation, the most important factor was generalized fatigue, then age, stroke, myocardial infarct (MI), gender (male), heart failure, and syncope. Patients with no underlying disease showed an extremely high cumulative survival (0.9173 at 10 years). Compared to the general population of Yugoslavia, the pacemaker patients showed a similar yearly mortality rate until 1981. After that, elderly males (70+) had a significantly lower yearly mortality than the matched population. Thus, in this large series of pacemaker patients followed into the most recent period with an extremely low loss to follow-up, short- and long-term survival was very high. Pacemaker patients of any age who are otherwise in good health have an excellent prognosis. (PACE, Vol. 15, February 1992)*

Estimulació Ventricular (Est Ventr) Dreta Apical

- Deteriorament funció ventricular
- Fibril.lació auricular
- Insuficiència Cardíaca
- Increment mortalitat
- Pitjor en pacients amb disfunció ventricular

Delgado V et al. Circ Arrhythm Electrophysiol 2009;2: 135–45.
Sweeney MO et al. Circulation 2003;107:2932–7.
Wilkoff BL et al. JAMA 2002;288:3115–23.

Efectes Adversos Est Ventr Dreta Apical : Fisiopatologia



Prog Cardiovasc Dis. 2008 ;51:171-82

Efectes Adversos Est Ventr Dreta Apical: Evidència Clínica

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"FEVE N"

FEVE ↓

Table 1 Summary of the major pacing and implantable cardioverter-defibrillator randomized trials that compared atrial (AAI or DDD) *vs* ventricular based pacing strategies

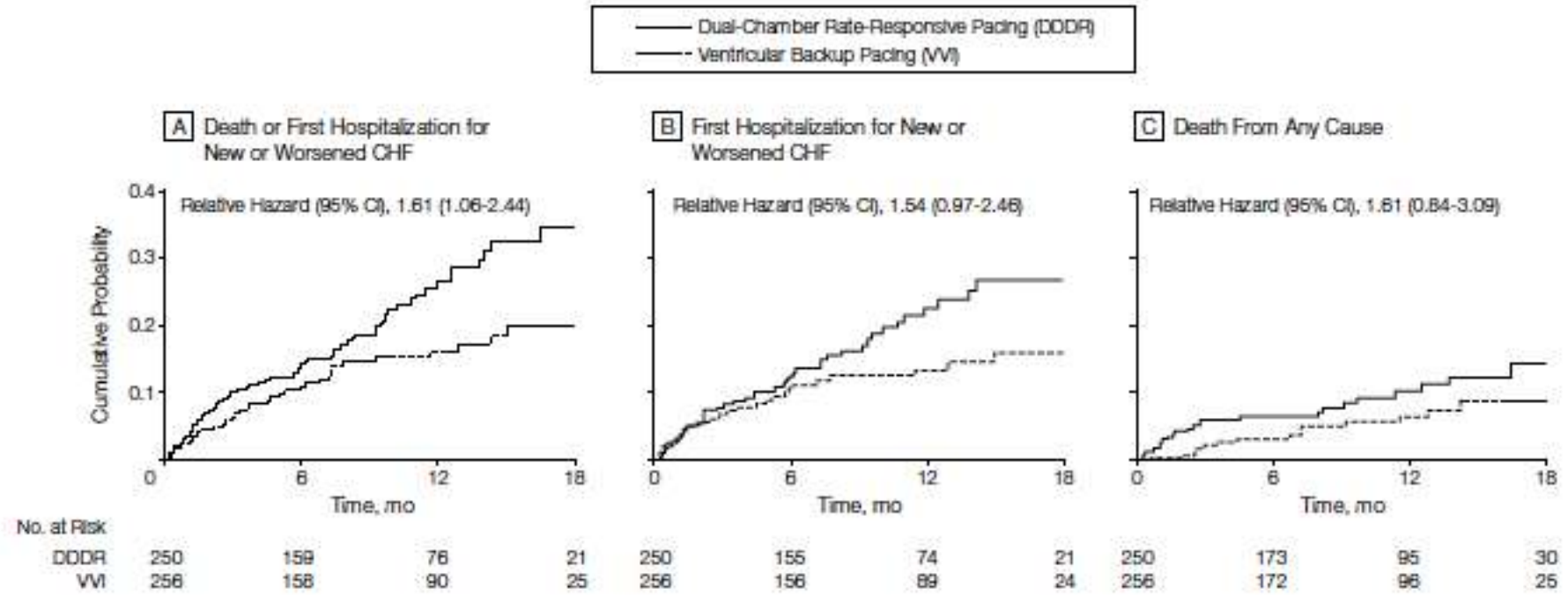
Ref.	Patients (*n*)	Follow-up (yr)	Pacing/ICD indication	Study groups	Endpoints	Results
Danish study[8] (1997)	225	5.5	SSS	AAI *vs* VVI	All-cause mortality, CV mortality, AF, stroke, HF, and AV block	Significant reduction in CV mortality, AF, stroke and HF in the AAI group
PASE[11] (1998)	407	1.5	SSS and AVB	DDDR *vs* VVIR	Quality of life, all-cause mortality[1], HF[1], and AF[1]	No overall difference in quality of life albeit moderate improvement in patients with SSS but not AVB in the DDDR group No difference in mortality, HF or AF
CTOPP[9] (2000)	2568	6.4	SSS and AVB	DDD/AAI *vs* VVI(R)	Stroke, CV mortality, all-cause mortality[1], AF[1], and HF[1]	No difference in stroke, CV mortality, all-cause mortality or HF Significant reduction in AF in the DDD/AAI group.
MOST[10] (2002)	2010	2.8	SSS	DDDR *vs* VVIR	All-cause mortality, stroke, AF[1], HF[1], QoL[1], pacemaker syndrome[1]	No difference in all-cause mortality, stroke Significant reduction in AF, HF, and QoL in the DDDR group 18.3% cross-over due to pacemaker syndrome in the VVIR group
UK-PACE[14] (2005)	2021	3	AVB	DDD(R) *vs* VVI(R)	All-cause mortality, AF[1], HF[1], stroke[1]	No difference in any of the endpoints
DANPACE[13] (2011)	1415	5.4	SSS	AAIR *vs* DDDR	All-cause mortality, AF[1], HF[1], stroke[1], need for pacemaker reoperation[1]	No difference in all-cause mortality, chronic AF, HF or stroke Increased risk of paroxysmal AF and need for pacemaker reoperation (development of AVB) in the AAIR group
DAVID[7] (2002)	506	0.8	Primary and secondary prevention ICD	VVI 40 *vs* DDDR 70 ICD	Composite of hospitalization for HF and mortality	Prematurely interrupted due to increased occurrences of the composite endpoint in the DDDR 70 group
MADIT II substudy[17] (2005)	1232	1.7	Primary prevention ICD	0%-50% *vs* 51%-100% VP	Composite of HF and mortality	Nearly two-fold increase in hospitalization for HF in the 51%-100% VP group

Akerström F et al. World J Cardiol. 2013;5:410-9

Dual-Chamber Pacing or Ventricular Backup Pacing in Patients With an Implantable Defibrillator

The Dual Chamber and VVI Implantable Defibrillator (DAVID) Trial

FEVE ≤ 40 %, DAI bicameral. Randomització a VVI-40 bpm vs. DDDR-70



Wilkoff BL et al. JAMA 2002;288:3115–23.

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Right Ventricular Pacing Can Induce Ventricular Dyssynchrony in Patients With Atrial Fibrillation After Atrioventricular Node Ablation

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Leiden, the Netherlands

OBJECTIVES This study was designed to assess the effects of long-term right ventricular (RV) pacing on left ventricular (LV) dyssynchrony, LV function, and heart failure symptoms.

BACKGROUND Atrioventricular (AV) node ablation and subsequent long-term RV pacing is a well-established treatment option in patients with atrial fibrillation (AF).

METHODS In 55 patients with drug-refractory AF, AV node ablation and implantation of a pacemaker was performed. At baseline and after a mean of 3.8 ± 1.7 years, LV dyssynchrony (by M-mode echocardiography and tissue Doppler imaging), LV function, and volumes and functional status were assessed.

RESULTS After long-term RV pacing, 27 patients (49%) had developed LV dyssynchrony. Concomitantly, these patients worsened in heart failure symptoms (New York Heart Association functional class increased from 1.8 ± 0.6 to 2.2 ± 0.7, $p < 0.05$), with a decrease in LV ejection fraction (from 48 ± 7% to 43 ± 7%, $p < 0.05$) and an increase in LV end-diastolic volume (from 116 ± 39 ml to 130 ± 52 ml, $p < 0.05$). Conversely, patients without LV dyssynchrony did not deteriorate in heart failure symptoms, LV function, or LV volumes.

CONCLUSIONS Long-term RV pacing can induce LV dyssynchrony in almost 50% of patients treated with AV node ablation for chronic AF. The development of LV dyssynchrony was associated with deterioration in heart failure symptoms, systolic LV function, and LV dilatation. (J Am Coll Cardiol 2006;48:1642–8)

Vall d'Hebron Hospital

Prognostic value of the electrocardiogram in patients with syncope: Data from the Group for Syncope Study in the Emergency Room (GESINUR)

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BACKGROUND The Group for Syncope Study in the Emergency Room (GESINUR) was a Spanish multicenter, prospective, observational study that evaluated the clinical presentation and acute management of loss of consciousness in Spain. Several studies have shown that an abnormal ECG is a poor prognostic factor in patients with syncope. However, the prognostic significance of each ECG abnormality is not well known.

OBJECTIVE The purpose of this study was to study the association between specific ECG abnormalities and mortality in patients with syncope from the GESINUR study.

METHODS All patients in the GESINUR study who had syncope and had available, readable ECG and 12-month follow-up data were included in this retrospective observational study (n = 524, age 57 ± 22 years, 50.6% male). ECG abnormalities were analyzed and assessed to evaluate whether an association with all-cause mortality existed at 12 months.

RESULTS ECGs were classified as abnormal in 344 patients (65.6%). Thirty-three patients died during follow-up (6.3%), but only 1 due to sudden cardiovascular death. Atrial fibrillation (odds ratio [OR] 6.8, 95% confidence interval [CI] 2.8–16.3, $P < .001$), intraventricular conduction disturbances (OR 3.8, 95% CI 1.7–8.3, $P = .001$), left ventricular hypertrophy ECG criteria (OR 6.3, 95% CI 1.5–26.3, $P = .011$), and ventricular pacing (OR 21.8, 95% CI 4.1–115.3, $P < .001$) were the only independent ECG predictors of all-cause mortality.

CONCLUSION Although an abnormal ECG in patients with syncope is a common finding, only the presence of atrial fibrillation, intraventricular conduction disturbances, left ventricular hypertrophy ECG criteria, and ventricular pacing is associated with 1-year all-cause mortality.

KEYWORDS Abnormality; Atrial fibrillation; Electrocardiogram; Intraventricular conduction disturbances; Left ventricular hypertrophic criteria; Mortality; Prognosis; Syncope; Ventricular pacing

ABBREVIATIONS **AF** = atrial fibrillation; **CI** = confidence interval; **ECG** = electrocardiogram; **ED** = emergency department; **ER** = early repolarization; **GESINUR** = Group for Syncope Study in the Emergency Room; **HF** = heart failure; **ICD** = implantable cardioverter-defibrillator; **IVCD** = intraventricular conduction disturbance; **LVH** = left ventricular hypertrophy; **OR** = odds ratio; **SCD** = sudden cardiovascular death

(Heart Rhythm 2014;11:2035–2044)

Pérez-Rodon J et al. Heart Rhythm 2014; 11: 2035-44

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Table 4 ECG predictors of all-cause mortality at 1-year follow-up in multivariable analysis

Variable	Regression coefficient	Odds ratio (95% confidence interval)	*P* value
Ventricular pacing	3.0	21.8 (4.1–115.3)	<.001
Atrial fibrillation	1.9	6.8 (2.8–16.3)	<.001
Left ventricular hypertrophy criteria	1.8	6.3 (1.5–26.3)	.011
Intraventricular conduction disturbances	1.3	3.8 (1.7–8.3)	.001

Hosmer–Lemeshow test ($P = .795$).

Pérez-Rodon J et al. Heart Rhythm 2014; 11: 2035-44

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Estratègies per Reduir Efectes Adversos Est Ventr Dreta

- Tractament mèdic de la IC
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Renin–angiotensin system blockers are associated with reduced mortality and heart failure hospitalization in patients paced for complete atrioventricular block

Douglas H.J. Elder, MRCP, CCDS,* Chim C. Lang, MD, FACC,* Sushma Rekhraj, MRCP,* Benjamin Szwejkowski, MRCP,* Jacob George, MD, MRCP,* Stuart D. Pringle, MD, FRCP,† Allan D. Struthers, MD, FESC,* Anna Maria Choy, FACC, FRCP*

Table 2 Proportional hazards model for the death risk

Variable	HR (95% CI)	P
ACE use (Y/N)	0.67 (0.47–0.94)	.017
Age paced (per year)	1.06 (1.04–1.07)	<.001
Male sex	1.37 (1.08–1.74)	.09
Diabetes (Y/N)	1.19 (0.87–1.65)	.270
Aspirin use (Y/N)	1.01 (0.75–1.33)	.968
Beta-blocker use (Y/N)	0.83 (0.61–1.14)	.27
Loop diuretic use (Y/N)	1.60 (1.2–2.1)	.01
Statin use (Y/N)	1.56 (1.1–2.10)	.01
Calcium antagonist use (Y/N)	1.11 (0.82–1.51)	.49
Heart failure (Y/N)	1.42 (0.84–2.37)	.19
Myocardial infarction (Y/N)	1.36 (0.92–1.99)	.11
Atrial fibrillation	1.10 (0.79–1.51)	.57
Hemoglobin (per 1 g/dL)	0.89 (0.82–0.96)	.04
Creatinine (per mg/dL)	1.01 (1.00–1.01)	.03
Deprivation score (quintile)		
1 (lowest)	Reference	
2	0.94 (0.65–1.36)	.74
3	0.83 (0.57–1.22)	.35
4	0.71 (0.50–0.99)	.04
5 (highest)	0.76 (0.54–1.09)	.15
DDD vs VVI pacing	0.75 (0.58–0.96)	<.001

ACE = angiotensin-converting enzyme; CI = confidence interval; DDD = dual-chamber pacemaker; HR = hazard ratio; VVI = ventricular demand pacemaker.

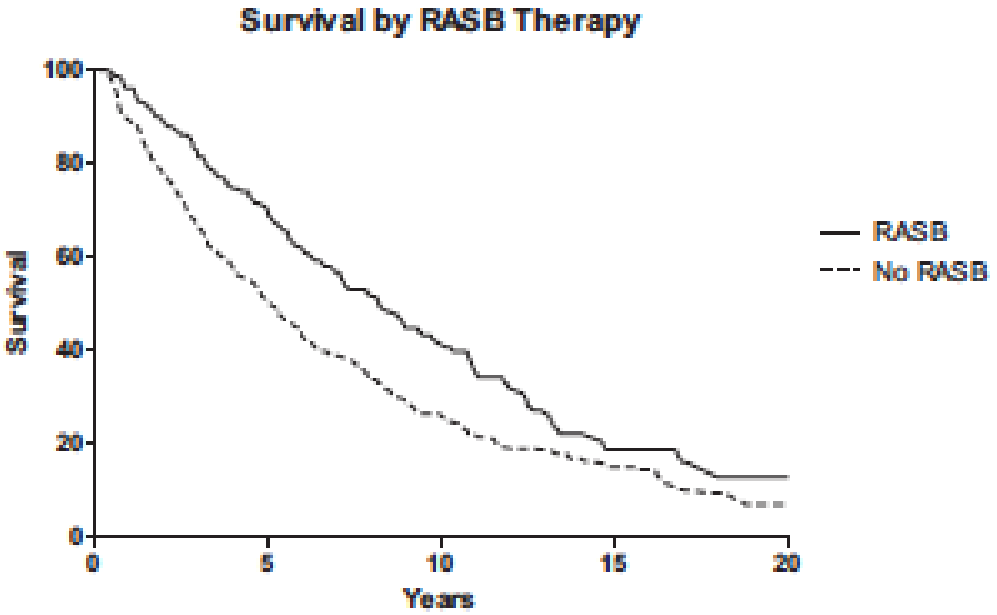

Figure 1 Survival by renin–angiotensin system blocker therapy.

Elder DH et al. Heart Rhythm 2012; 9: 505 -510

Tractament mèdic per la IC

- Betablocants
- IECA / ARA II
- Espironolactona /eplerenona
- Ivabradina

ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012. Eur Heart J 2012; 33: 1787-847

Predictors Clínics d'Absència de Remodelat Invers (FEVE ≤ 35% 6 mesos)

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Variable n=97	Remodelat invers (n=52)	Absència remodelat invers (n=45)	Valor de P
Edat, anys	63 ± 14	67 ± 12	0,117
Dones, n (%)	16 (30,8)	9 (20)	0,227
Temps IC (mesos)	15 ± 27	24 ± 31	0,119
Temps cardiopatia (mesos)	48 ± 77	92 ± 149	0,067
Etiologia isquèmica, n (%)	12 (23,1)	27 (60,0)	<0,001
HTA, n (%)	25 (48,1)	34 (75,6)	0,006
Vas. perifèrica, n (%)	3 (5,8)	9 (20)	0,060
QRS ≥ 120ms, n (%)	23 (45,1)	26 (63,4)	0,080
QRS (ms)	121 ± 31	134 ± 33	0,068
BBEFH, n (%)	17 (33)	22 (53,7)	0,050
Estim. Ventr., n (%)	2 (3,8)	5 (11,1)	0,168
Insuficiència renal, n (%)	18 (34,6)	(44,4)	0,323
Fibrilació auricular, n (%)	12 (23,1)	12 (26,7)	0,683
Classe NYHA inicial	2,1 ± 0,6	2,2 ± 0,5	0,276
Qualitat Vida (Minnesota)	33,0 ± 22,7	33,2 ± 19,8	0,962

Pérez-Rodon et al. ESC 2013. http://dx.doi.org/10.1093/eurheartj/eht309.P3325

Estratègies per Reduir Efectes Adversos Est Ventr Dreta

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Estratègies per Reduir Est Ventr

- Interval AV llarg
- Algoritmes
  - “Histeresis AV” : prolongació periòdica AV per buscar conducció AV intrínseca i permetre-la
  - AAI per defecte amb canvi a DDD en cas de detecció de BAV “AAI <-> DDD”

Algoritmes per Reduir Est Ventr
Descripció

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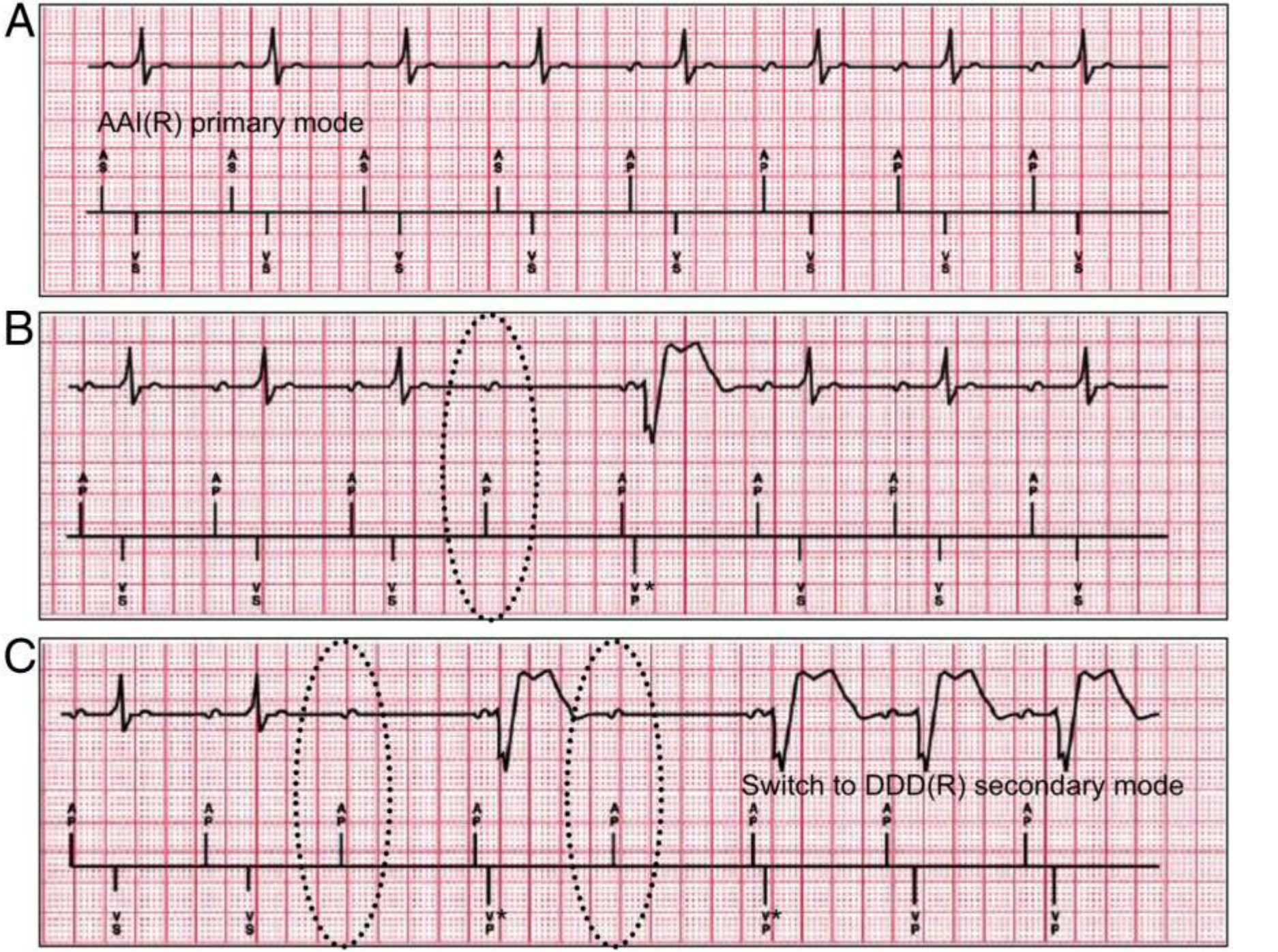
Description of specific pacemaker algorithms that reduce RVA pacing.

Name (Manufacture)	Baseline pacing mode	Criteria for loss of AV conduction that triggers switch to DDD(R) mode	Criteria for AV conduction recovery that triggers switch back to baseline pacing mode
MVP™ (Medtronic)	AAIR(R) Backup VP is delivered at 80 ms following AV block	AV block in 2 of 4 consecutive A–A intervals (AV block is defined as the absence of a VS event between 2 atrial events)	Following 1 VS event occurring between 2 atrial events (The device periodically checks for AV conduction recovery at 1, 2, 4, 8 min … 16 h)
RMS™ RYTHMIQ™ (Boston Scientific)	AAI(R) mode with VVI backup at the programmed LRL minus 15/min (the two modes operate independently from one another and may cause asynchronous VP).	3 "slow ventricular beats" detected in a window of 11 beats defined as any of the following: (1) VP (by VVI backup) (2) VS–VS interval > AAI LRL + 150 ms (3) VS–VS interval > AAIR sensor indicated rate + 150 ms	Following ≥ 25 VS events detected by the AV Search Plus™ algorithm
AAISafeR™ AAISafeR2™ Safe R™ (Sorin Group)	AAI(R)	Any of the following: (1) "third degree AVB": 2 consecutive blocked A–A intervals (defined as no VS detection between the 2 atrial events) (2) "second degree AVB": 3 blocked A–A intervals in a window of 12 beats (3) "first degree AVB": 6 consecutive abnormally prolonged AV intervals (>350/450 ms; sensed/paced) (4) "Pause": VS–VS interval > programmed value between 2 and 4 s (default: 3 s)	Following 12 consecutive VS events or automatically every 100 VP cycles (The device remains in DDD(R) mode when a large amount of mode switches from AAI(R) to DDD(R) have occurred)

AV = atrioventricular; AVB = atrioventricular block; LRL = lower rate limit; RVA = right ventricular apex; VP = ventricular paced event; VS = ventricular sensed event.

Akerström F et al. Int J Cardiol 2014; 173: 351-360


A
AAI(R) primary mode
B
C
Switch to DDD(R) secondary mode

Algoritmes per Reduir Est Ventr Estudis Clínics

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Clinical studies of pacemaker algorithms that minimize RVA pacing.

Study (year)	Patients (n)	Pacing indication	Design	Follow-up (months)	Results
Sweeny [49] (2004)	30	SSS & AVB	Randomized, crossover MVP vs. DDD(R)	7–10 days	Amount of pacing: MVP: 3.8%; DDD(R): 80.6%
Sweeney [47] (2005)	181	ICD	Randomized, crossover MVP vs. DDD(R)	1	Amount of pacing: MVP: 4.1%; DDD(R): 73.8%
Murakami [45] (2010)	127	SSS & AVB	Randomized, crossover MVP vs. Search AV+	1	Amount of pacing: MVP: 66.1%; Search AV+: 54.3% (patients with %RVP < 40) MVP: 57.5%; Search AV+: 38.6% (patients with %RVP < 10)
INTRINSIC RV [52] (2007)	1530	ICD*	RCT DDD(R) AVSH 60/min vs. VVI 40/min (noninferiority)	10	Trend towards a lower rate of death and hospitalization for HF in the DDD(R) AVSH group Amount of pacing: DDD(R) AVSH 10%; VVI 3%
SAVE PACE [50] (2007)	1065	SSS	RCT Search AV+/MVP vs. DDD(R)	12	Reduction in time to development of AF (primary endpoint) in the Search AV+/MVP group No difference in hospitalization for HF or death (secondary endpoints) Amount of pacing: DDD(R): 99%; Search AV+/MVP: 9.1%
MVP [56] (2010)	1030	ICD	RCT MVP 60/min vs. VVI 40/min (noninferiority)	29	Prematurely interrupted due slightly more deaths and hospitalization for HF in MVP group

Akerström F et al. Int J Cardiol 2014; 173: 351-360

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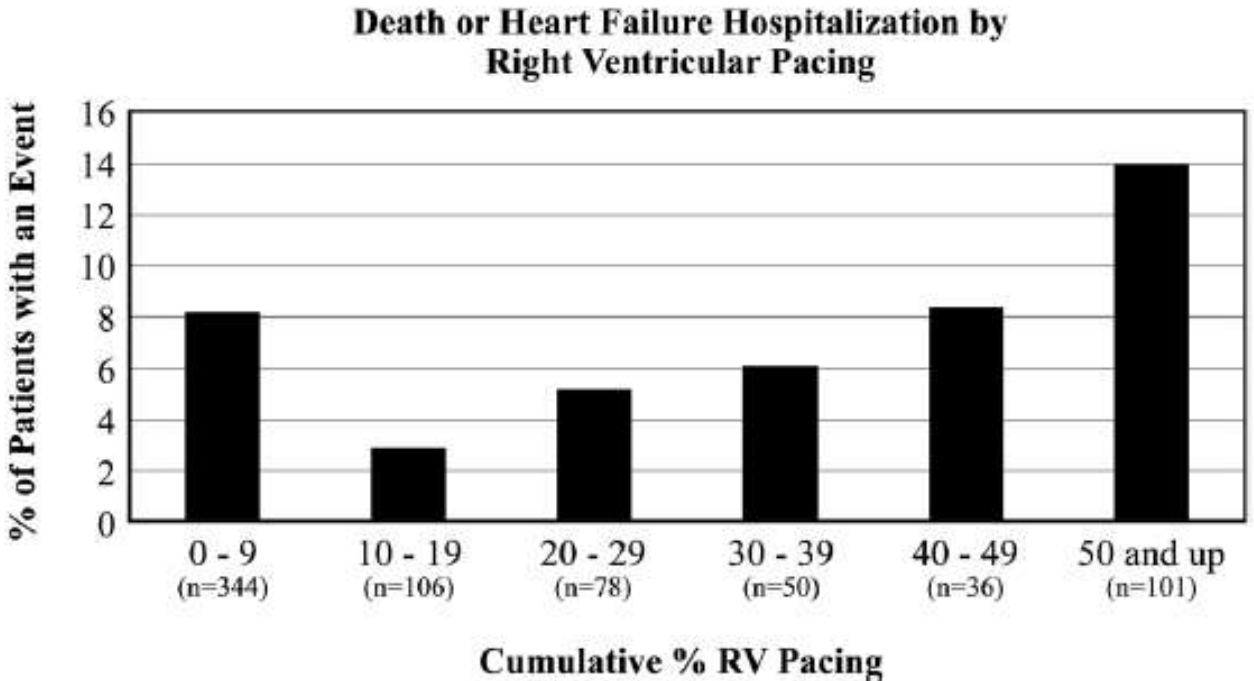
Eliminating right ventricular pacing may not be best for patients requiring implantable cardioverter-defibrillators

Brian Olshansky, MD,* John D. Day, MD,† Darin R. Lerew, PhD,‡ Scott Brown, PhD,§
Kira Q. Stolen, PhD,‡ for the INTRINSIC RV Study Investigators

715 patients amb DAI bicameral programats en DDDR amb el mode Search AV



Olshansky B et al. Heart Rhythm; 4: 886-891

Inconvenients Algoritmes

- Canvi a DDD (R) inapropiat (EEVV)[1]
- Permeten PR molt llargs
  - Contracció auricular ineficient
  - Insuficiència mitral [2]

1. Akerström F et al. Heart Rhythm. 2013;10:1146-52
2. Ishikawa et al. Pacing Clin Electrophysiol 1992;15:1927–31

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Terapia de Resincronització Cardíaca

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- En pacients amb FEVI <35%, QRS ample, CF NYHA II-IV la TRC:
  - Millora la FEVE i la CF NYHA
  - Disminueix la mortalitat i els ingressos per IC
- Excepte RAFT (135 pacients), els grans estudis han exclòs pacients que precisen est ventr

Biventricular Pacing for Atrioventricular Block and Systolic Dysfunction

Anne B. Curtis, M.D., Seth J. Worley, M.D., Philip B. Adamson, M.D., Eugene S. Chung, M.D., Imran Niazi, M.D., Lou Sherfesee, Ph.D., Timothy Shinn, M.D., and Martin St. John Sutton, M.D., for the Biventricular versus Right Ventricular Pacing in Heart Failure Patients with Atrioventricular Block (BLOCK HF) Trial Investigators

Vall d'Hebron Hospital

918 pacients, BAV amb indicació d'estimulació, NYHA I-III, FEVE ≤ 50%. TRC +/- DAI. Randomitzats a estimulació VD o Biventricular. Seguiment a 37 mesos

Table 2. Primary and Secondary Outcomes.

Outcome	Pacemaker (N=484)		ICD (N=207)		Hazard Ratio (95% CI)*			Posterior Probability of Hazard Ratio <1†
	Biventricular Pacing (N=243)	Right Ventricular Pacing (N=241)	Biventricular Pacing (N=106)	Right Ventricular Pacing (N=101)	Pacemaker (N=484)	ICD (N=207)	All Patients (N=691)	
	number of patients							
Primary outcome	108	127	52	63	0.73 (0.58–0.91)	0.75 (0.57–1.02)	0.74 (0.60–0.90)	0.9978
Event related to left ventricular end-systolic volume index	56	79	31	36				
Urgent care visit for heart failure	40	38	16	23				
Death	12	10	5	4				
Secondary outcomes‡								
Death or urgent care visit for heart failure	78	95	39	44	0.73 (0.56–0.94)	0.73 (0.53–1.02)	0.73 (0.57–0.92)	0.9970
Death or hospitalization for heart failure	76	89	39	40	0.77 (0.58–1.00)	0.80 (0.58–1.13)	0.78 (0.61–0.99)	0.9802
Death	52	64	23	26	0.83 (0.59–1.17)	0.84 (0.55–1.28)	0.83 (0.61–1.14)	0.8588
Hospitalization for heart failure	49	63	27	27	0.68 (0.49–0.94)	0.73 (0.50–1.11)	0.70 (0.52–0.93)	0.9922

Curtis AB et al. N Engl J Med 2013; 368:1585-93

Terapia de Resincronització Cardíaca

Vall d'Hebron Hospital

RCTs comparing RVA pacing versus CRT in patients with sinus rhythm.

Study (year)	Patients (n)	Follow-up (months)	Pacing indication	Baseline LVEF (%)	Study endpoints	CRT benefits
PACE [64] (2009)	177	12	AVB & SSS	62 ± 7	LVEF* and LVESV* 6 min walk distance, QoL, and hospitalization for HF	Improved LVEF and LVESV No difference in 6 min walk distance, QoL, or hospitalization for HF
PREVENT-HF [67] (2011)	108	12	AVB	55 ± 13 (RVA pacing) 58 ± 12 (CRT)	LVEDV* LVESV, LVEF, MR Composite of cardiac mortality, hospitalization for HF or worsening of HF	No difference in any of the study endpoints
Albertsen [66] (2011)	50	36	AVB	59 ± 5 (RVA pacing) 57 ± 7 (CRT)	LVEF* 6 min walk distance, NYHA, LV dyssynchrony, LVESV, and NT-proBNP	Improved LVEF, LV dyssynchrony, and LVESV No differences in NT-proBNP or clinical endpoints
COMBAT [63] (2010)	60	3 (cross-over)	AVB	30 ± 9	QoL* and NYHA class* 6 min walk distance, peak oxygen uptake, LVEF, LVEDV, LVESV and MR	Improved NYHA class, QoL, LVEF and LVESV No difference in 6 min walk distance, peak oxygen uptake, LVEDV, or MR
BLOCK-HF [62] (2013)	691	37	AVB	40 ± 8	Composite of all-cause mortality, HF-related urgent care and LVESV* Composite of all-cause mortality and HF-related urgent care All-cause mortality and hospitalization for HF (as separate outcomes)	Reduction in primary composite endpoints Reduction in hospitalization for HF No difference in all-cause mortality (as separate outcome)

Akerström F et al. Int J Cardiol 2014; 173: 351-360

Biventricular pacing disappoints in BIOPACE trial

Vall d'Hebron Hospital

Topics: Heart Failure (HF)
Date: 01 Sep 2014

Biventricular (BiV) pacing failed to significantly improve outcome compared to right ventricular (RV) pacing in patients with atrio-ventricular block (AVB) according to preliminary results presented at ESC Congress 2014 today.

BARCELONA, Spain – Monday 1 September: Biventricular (BiV) pacing failed to significantly improve outcome compared to right ventricular (RV) pacing in patients with atrio-ventricular block (AVB) according to preliminary results presented as a Hot Line at ESC Congress 2014.

But findings of the BIOPACE (Biventricular pacing for atrIo-ventricular BlOck to Prevent cArdiaC dEsynchronization) trial suggest a non-significant trend in favour of BiV over RV pacing – the latter being the current standard of care.

> "Additional analyses will perhaps identify sub-groups for which BiV confers a clear benefit," suggested principal investigator Jean-Jacques Blanc, MD, from Brest University in Brest, France.

Patients with AVB, a common disease also known as "heart block", require permanent ventricular pacing because their heart beats too slowly.

RV pacing has been the accepted treatment for AVB, but recent evidence has suggested this approach may have deleterious long-term effects on cardiac structure and function, said Professor Blanc.

The BIOPACE trial, randomised 1810 patients with AVB (mean age 73.5 years) to either RV pacing (n=908) or BiV pacing (n=902) to determine if the latter approach could prevent some of these deleterious effects.

FEVI 55%

After a mean follow-up of 5.6 years, the groups had a similar rate of the composite endpoint that included time-to-death or first hospitalisation due to heart failure, with a non-significant trend in favour of BiV (hazard ratio [HR] 0.87; p=0.08).

This trend persisted, still without reaching statistical significance, when patients were stratified according to their left ventricular ejection fraction (LVEF). For patients with an LVEF of 50% or less, the HR was 0.92 (p=0.47) and for patients with an LVEF of more than 50% it was 0.88 (p=0.21).

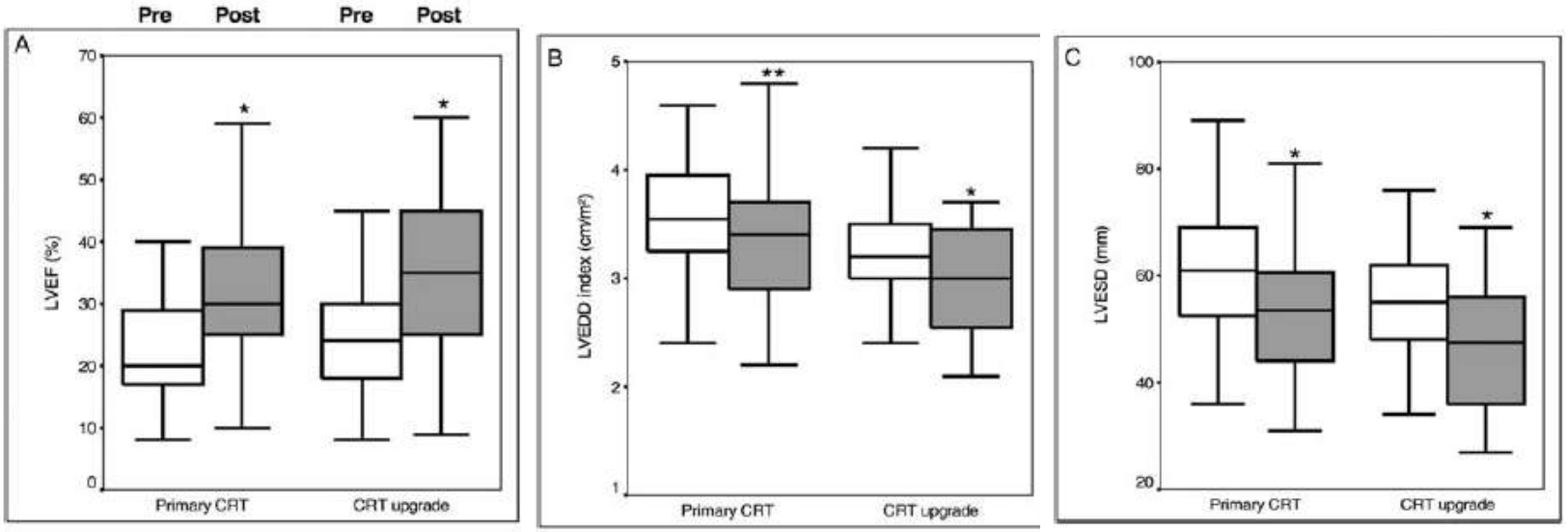
ENDS

http://www.escardio.org/about/press/press-releases/esc14-barcelona/Pages/hotline-three-biopace.aspx

Upgrading to resynchronization therapy after chronic right ventricular pacing improves left ventricular remodelling

Vall d'Hebron Hospital

172 pacients: CRT de novo (102 p) o upgrade (70). Temps mig estimulació ventricular = 80,3 mesos, estimulació ventricular > 95%.

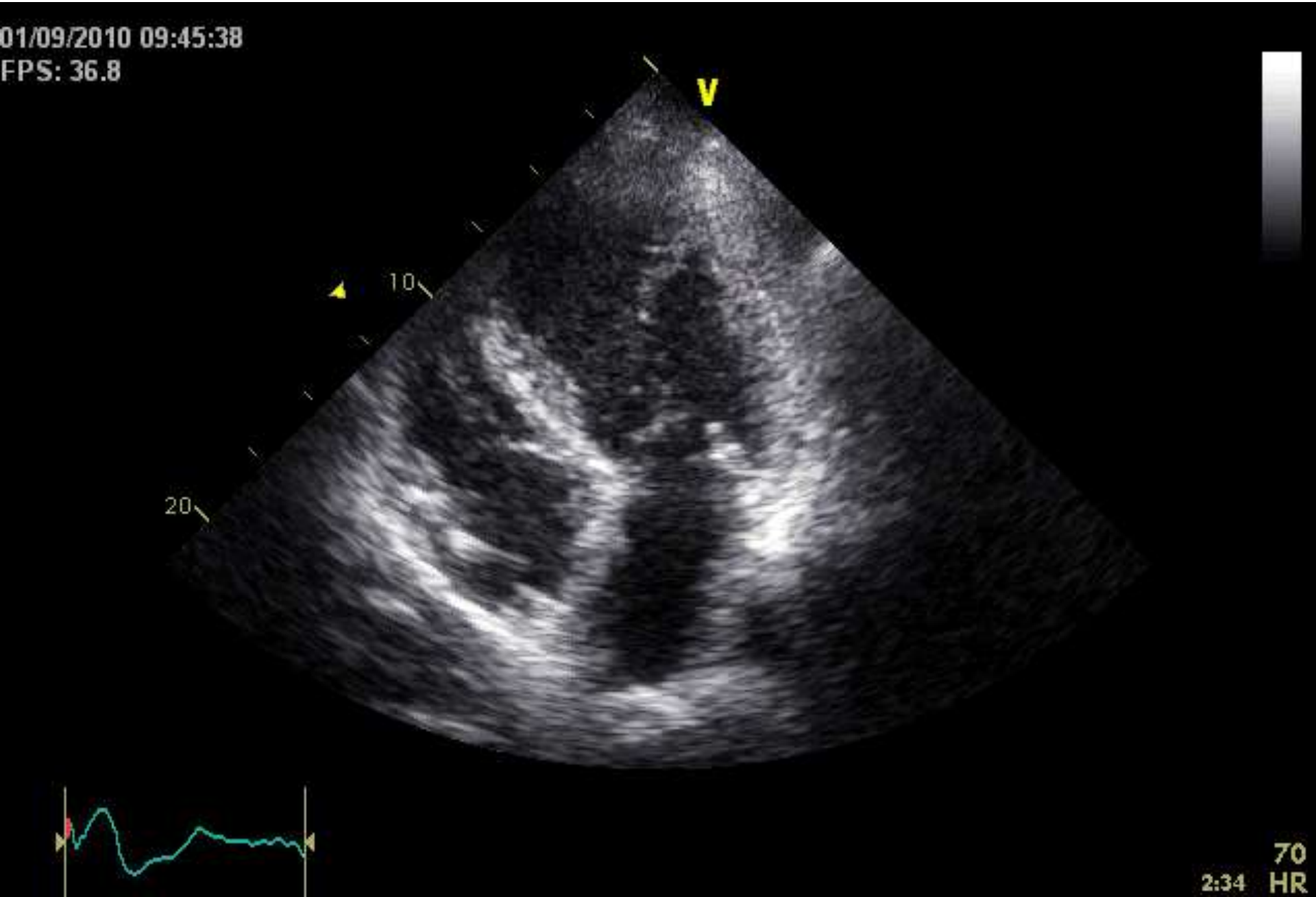


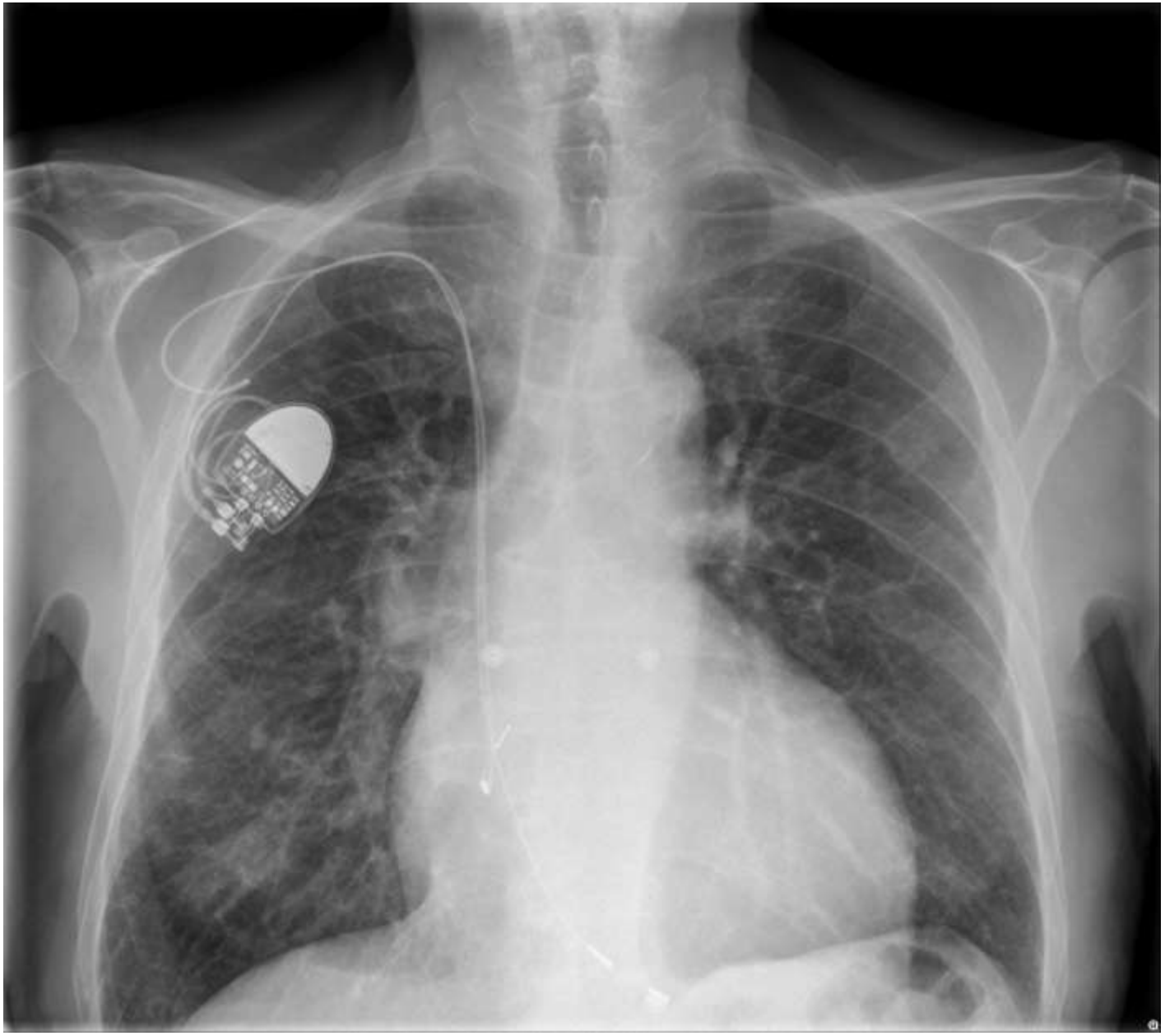
Benefici independent del ritme de base, duració QRS, duració del temps estimulació ventricular prèvia o tamany VE o FEVE

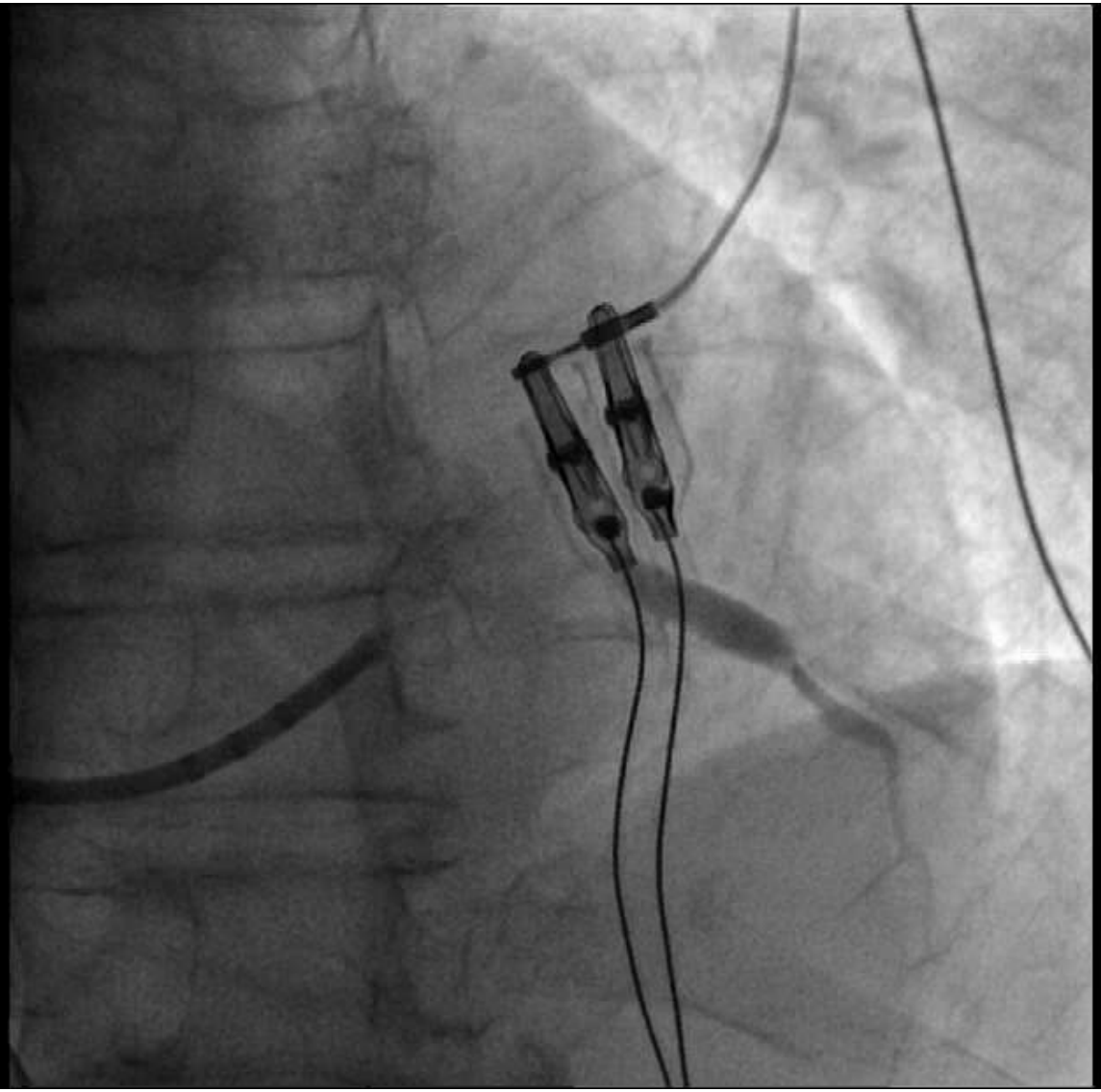
Frohlich G et al. Eur Heart J 2010; 31:1477 – 85

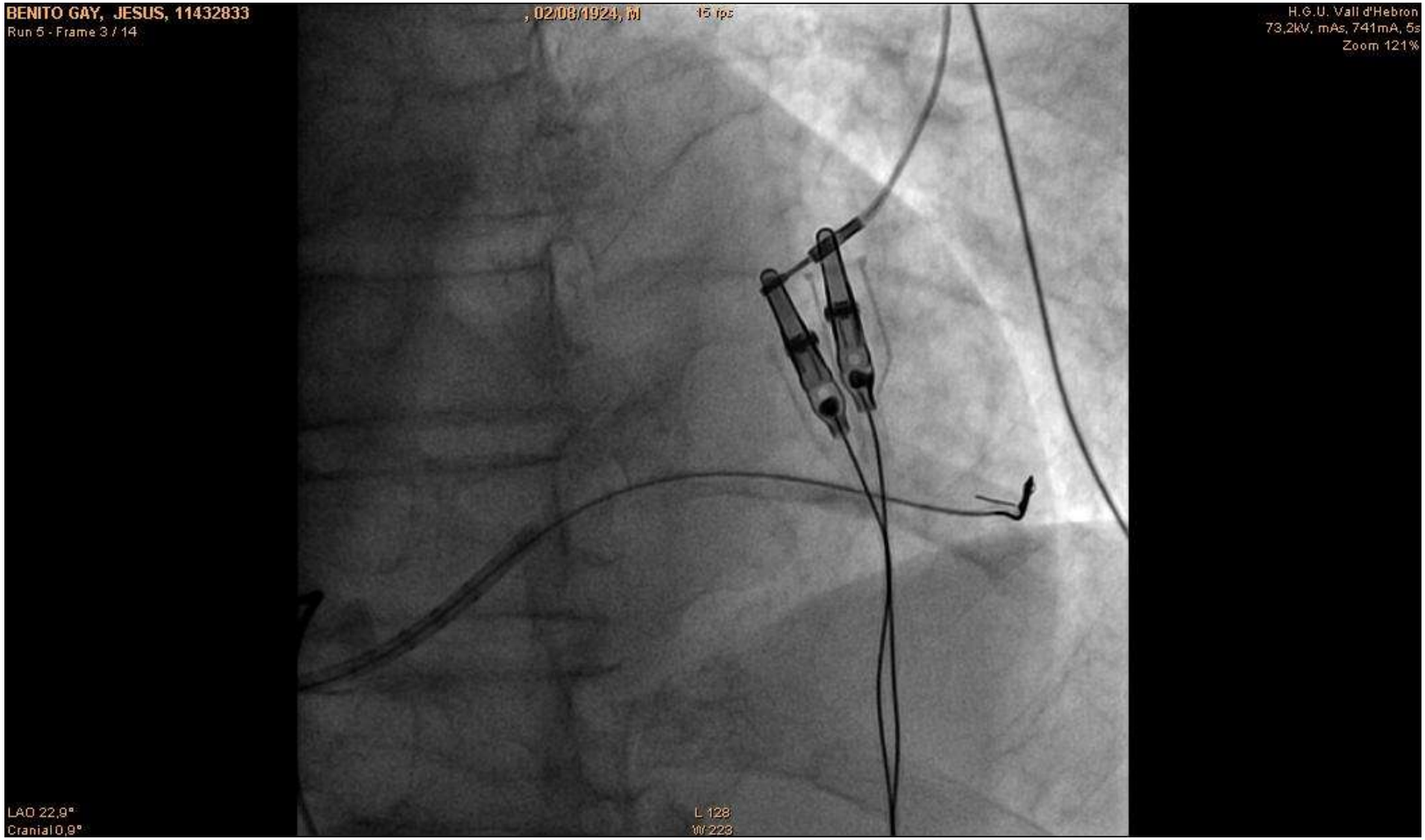
“UPGRADE” VALL D’HEBRON

- 85 anys
- Portador de Marcapassos DDDR desde 1998 per síncopes , BBDFH + HSA i HV = 80ms.
- 2008 Dispnea. Diagnòstic de Miocardiopatia dilatada. FEVE 30%. DTDVE 79mm. Ingrés per IC
- 2010 Optimització tractament mèdic a la UIC. Coronariografia normal. Hipotensió a la titulació. FA. Ingrés per IC. FEVE 27% . Indicació upgrade a TRC-P


01/09/2010 09:45:38
FPS: 36.8
V
10
20
70
2:34 HR



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Run 5 - Frame 3 / 14
, 02/08/1924, M
15 fps
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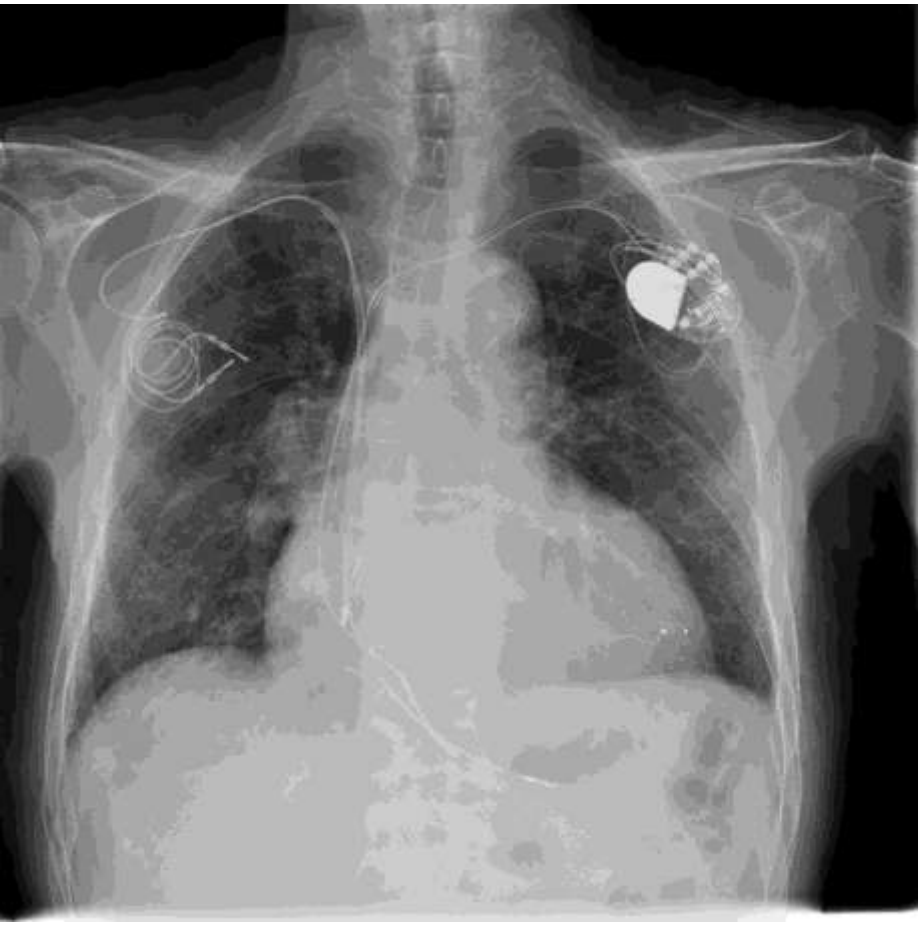
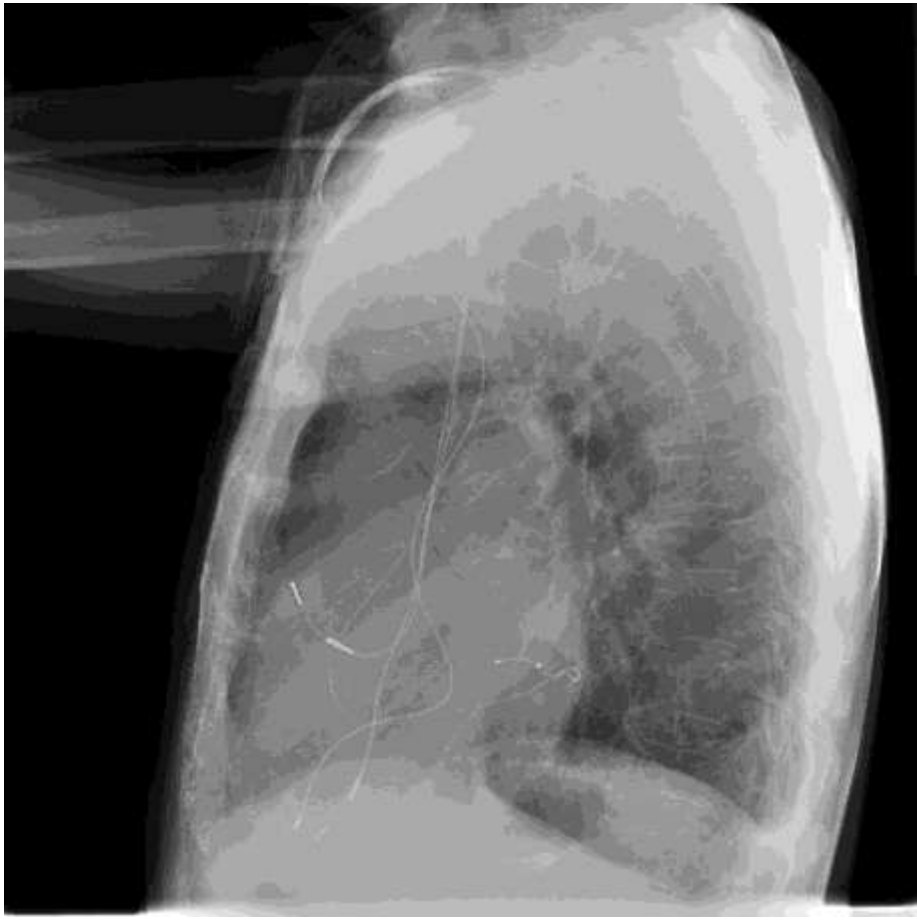
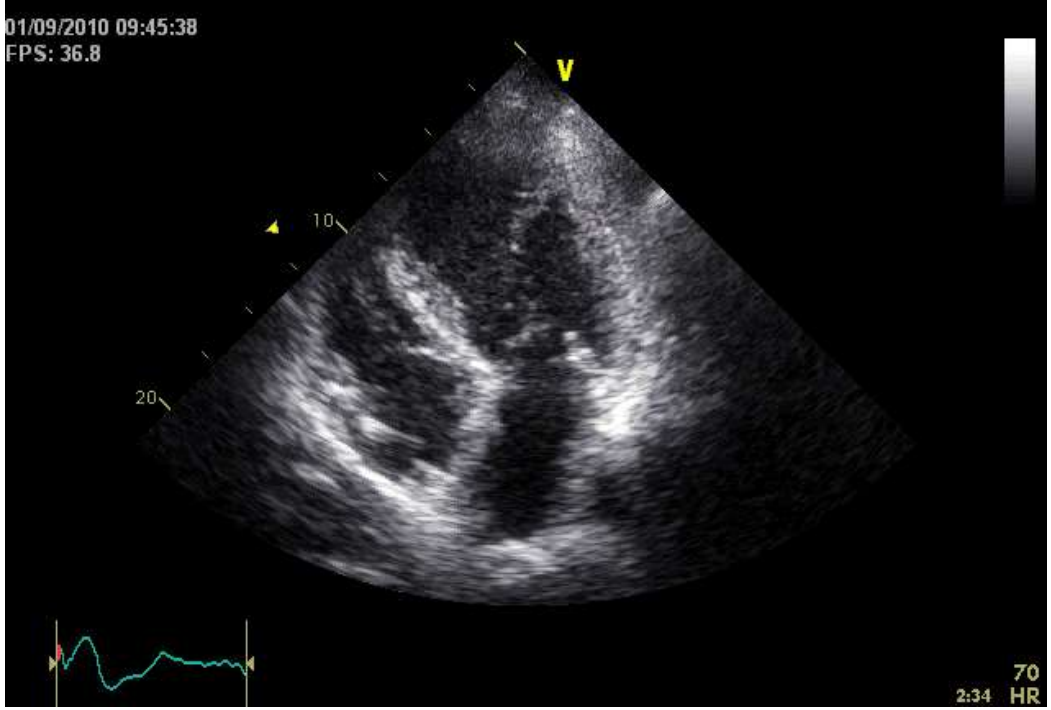
73,2kV, mAs, 741mA, 5s
Zoom 121%
LAO 22,9°
Cranial 0,9°
L 128
W 223

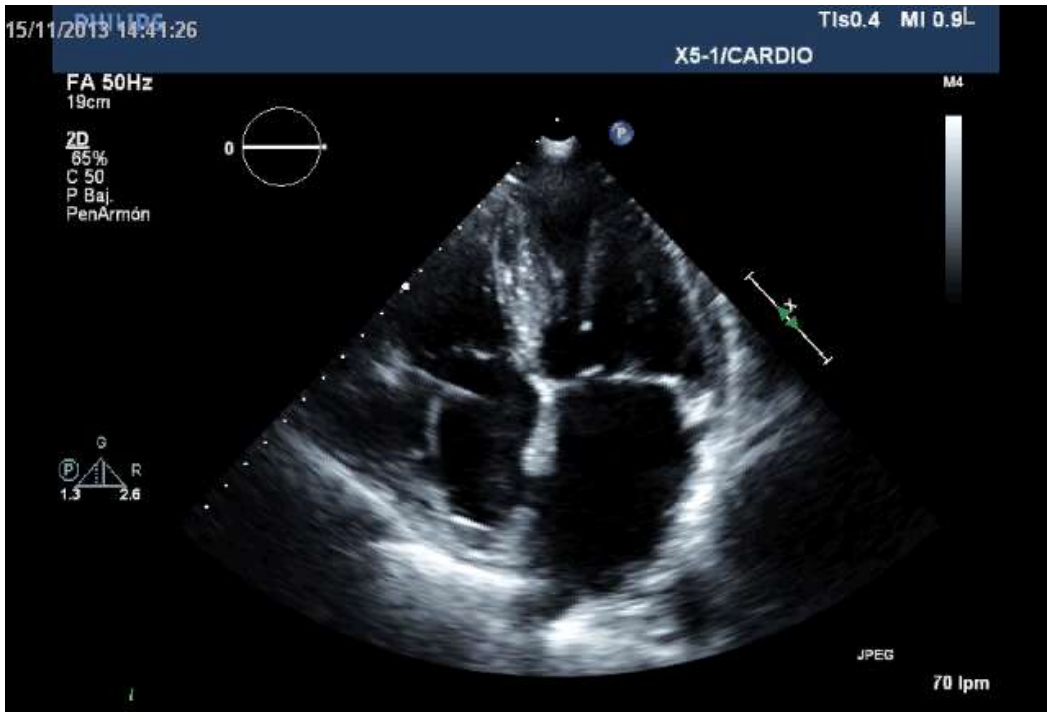




PRE-TRC



POST-TRC



Major incidència complicacions amb TRC

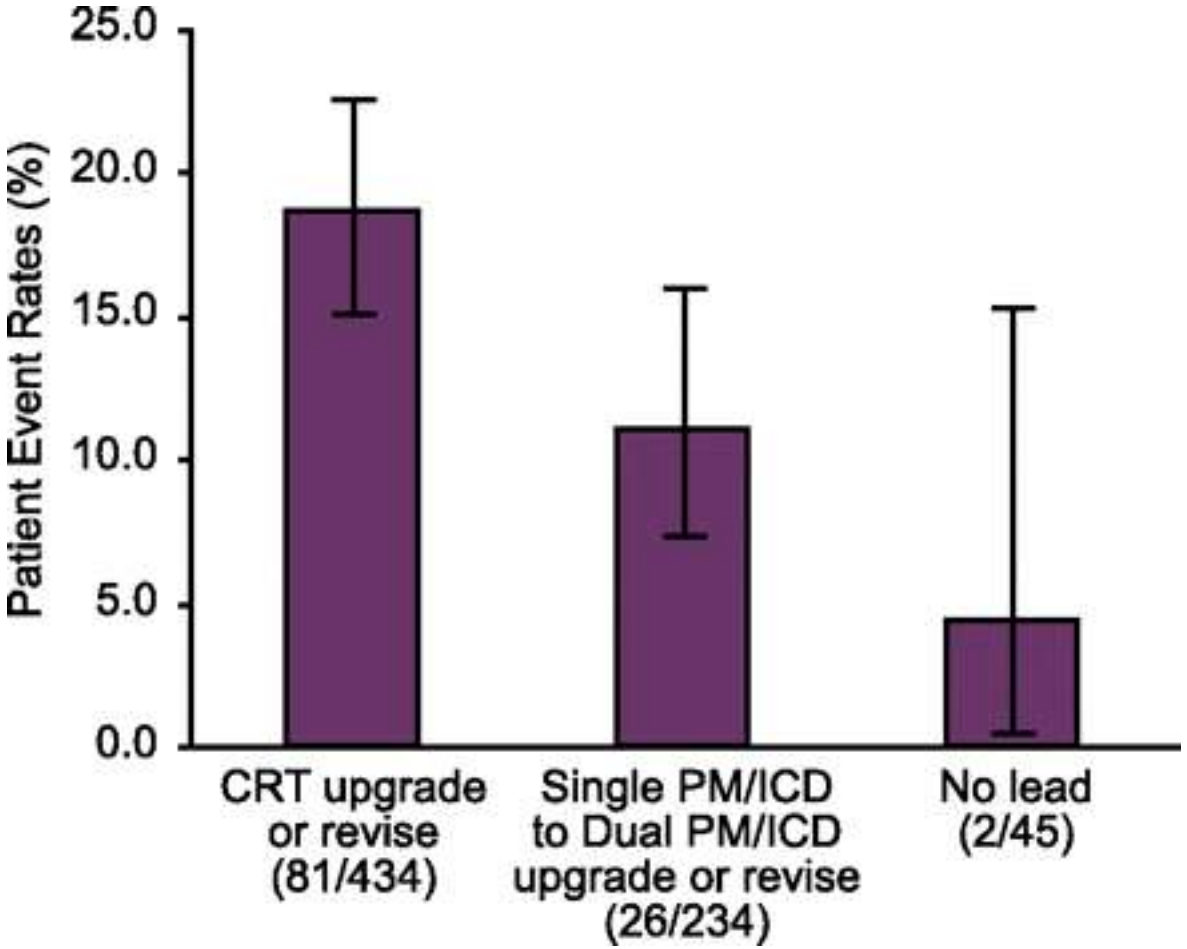
- BLOCK –HF
  - 10,3% complicacions relacionades amb l'implant del TRC (6, 4% relacionades amb electrode VE)
    - Desplaçament electrode
    - Fractura electrode
    - Falta de captura
    - Estimulació frènica
    - Infecció

Curtis AB et al. N Engl J Med 2013; 368:1585-93

Complication Rates Associated With Pacemaker or Implantable Cardioverter-Defibrillator Generator Replacements and Upgrade Procedures

Results From the REPLACE Registry

Vall d'Hebron Hospital



Poole Je et al. Circulation 2010; 122:1553-61

Estratègies per Reduir Efectes Adversos Est Ventr Dreta

- Tractament mèdic de la IC
- Programació dispositiu: estratègies per reduir estimulacio ventricular
- Teràpia de Resincronització cardíaca (TRC)
- Estimulació alternativa de ventricle dret

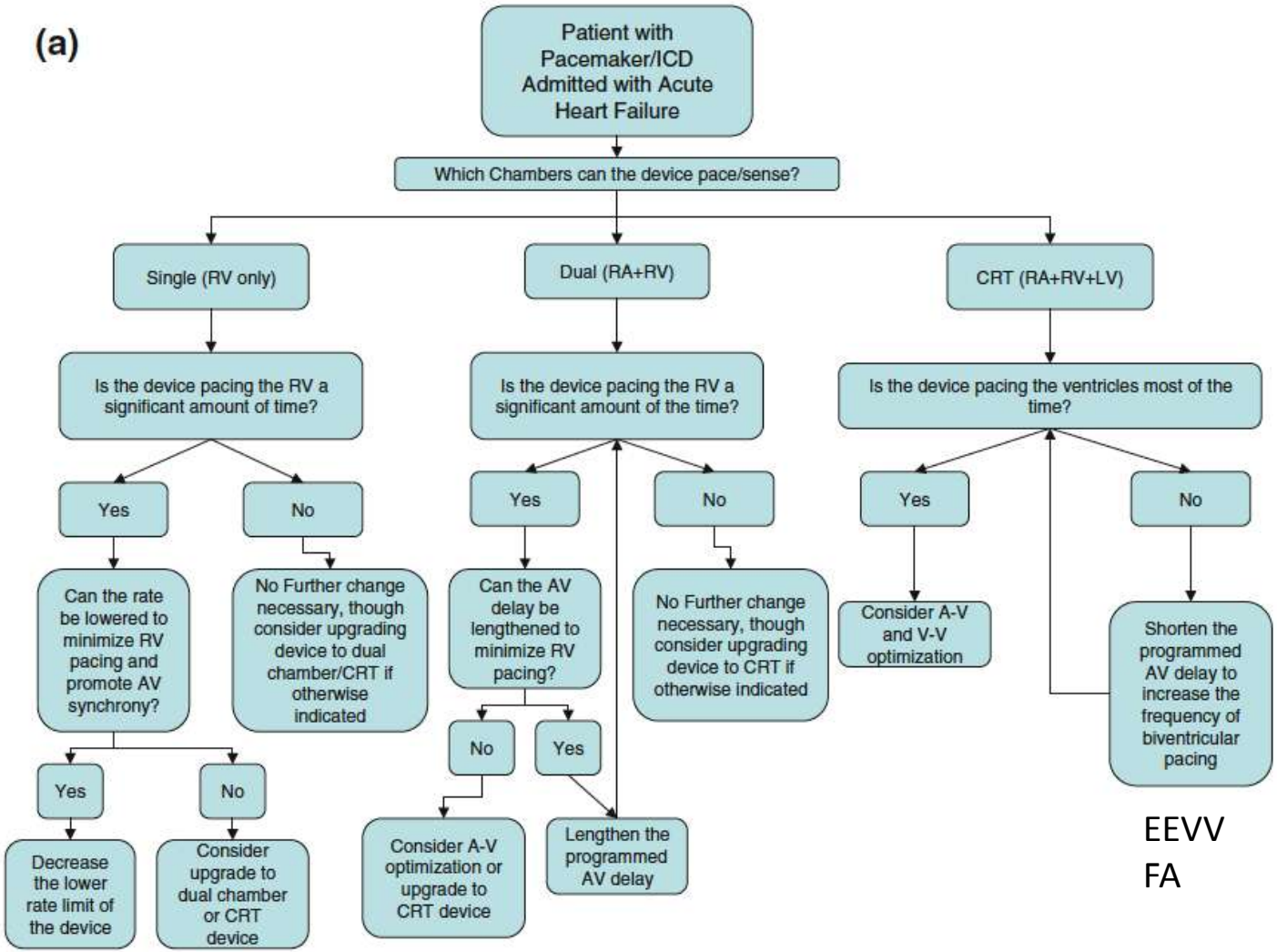
Estimulació Alternativa de Ventricle Dret

- TSVD, septum, z. parahisiana
- Estudis petits, seguiment curt
- Milloria FEVE, paràmetres asincronia i remodelat VE
- Sense un clar benefici en: capacitat d'exercici, classe funcional, qualitat de vida, mortalitat
- Millor FEVE >12 mesos (+4.27%) quan FEVE basal disminuida
- Complicacions similars a àpex VD

Shimony A et al. Europace. 2012 ;14:81-91

1. Estimulació Ventricular: evidència dels seus efectes deleteris
2. Estratègies per reduir efectes adversos de l'estimulació ventricular dreta
3. Algoritmes d'actuació
4. Guies de Pràctica Clínica
5. Conclusions

Algoritme en Pacient amb IC, Est Ventr i i Ritme Sinusal



EEVV

FA

Lahiri MK et al. Heart Fail Rev. 2011;16:441-8

1. Estimulació Ventricular: evidència dels seus efectes deleteris
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Guies

Indication for upgraded or *de novo* cardiac resynchronization therapy in patients with conventional pacemaker indications and heart failure

Recommendations	Class [a]	Level [b]	Ref. [c]
1) **Upgrade from conventional PM or ICD.** CRT is indicated in HF patients with LVEF <35% and high percentage of ventricular pacing who remain in NYHA class III and ambulatory IV despite adequate medical treatment. [d]	I	B	47, 108–122
2) ***De novo*** **cardiac resynchronization therapy.** CRT should be considered in HF patients, reduced EF and expected high percentage of ventricular pacing in order to decrease the risk of worsening HF.	IIa	B	123–130

Brignole M et al. Eur Heart J 2013; 34: 2281-2329

1. Estimulació Ventricular: evidència dels seus efectes deleteris
2. Estratègies per reduir efectes adversos de l'estimulació ventricular dreta
3. Algoritmes d'actuació
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5. Conclusions

Conclusions (1)

- L'estimulació ventricular pot causar remodelat ventricular esquerre advers i disfunció ventricular, especialment en aquells pacients que rebin un % important d'est. ventr. durant força temps i /o amb disfunció ventricular prèvia
- Utilització dels algoritmes per evitar estimulació ventricular quan sigui possible
- En pacients amb necessitat est. ventr i disfunció ventricular està indicat la TRC (ecocardio preimplant)
- En aquells pacients portadors de marcapassos que desenvolupin disfunció ventricular està indicat l"upgrade" a TRC

Conclusions (2)

- Importància de la optimització del tractament mèdic
- No existeix evidència suficient en aquests moments per recomanar est. ventr. en lloc alternatius al ventricle dret
- Falten estudis per definir aquells pacients de major risc per desenvolupar efectes adversos de l'est. ventr. dreta apical de cara a poder optimitzar les estratègies terapèutiques per minimitzar-la