

# Lo mas relevante del congreso ESC 2013 Amsterdam en arritmias y estimulación

Dr. Angel Moya

- Nuevas guías de estimulación cardiaca
- Hotline sessions en arritmias
  - ECHO – CRT
  - MADIT – CRT LIFR
  - DECAAF
- Fibrilación ventricular idiopática: aproximación diagnóstica

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# 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).**

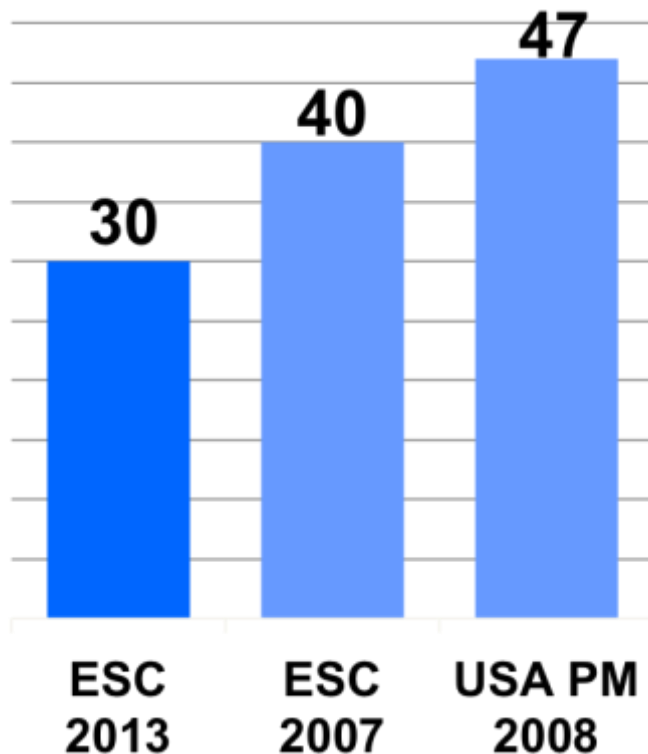
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# Style innovation

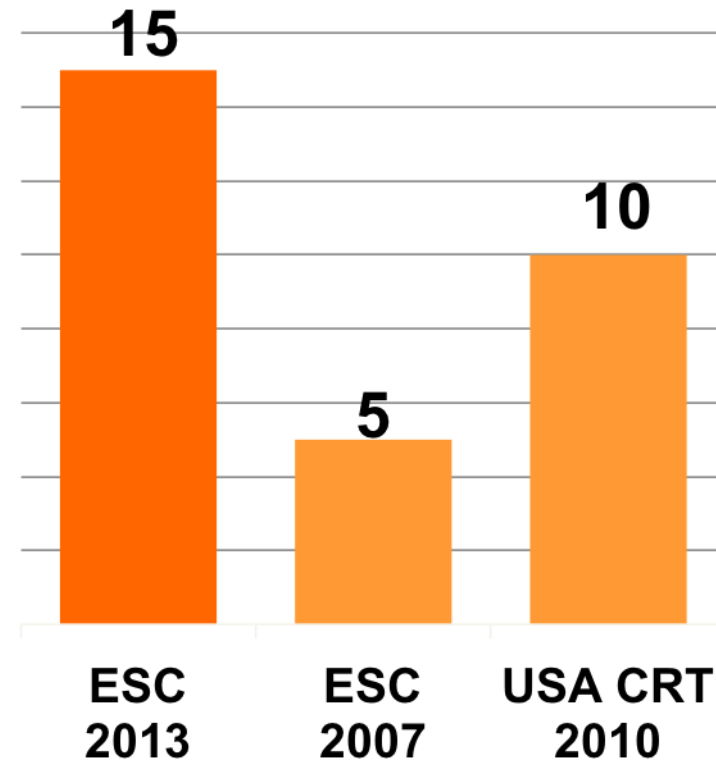
- Clinically oriented, simple, ready for use
- Short and simple articulation of recommendations
- Description of benefit and harm
- Rating of quality of evidence
- Acknowledgment of differences of opinion

# Historical comparison

Pacing indications



CRT indications



# Recommendations

**Total 65**

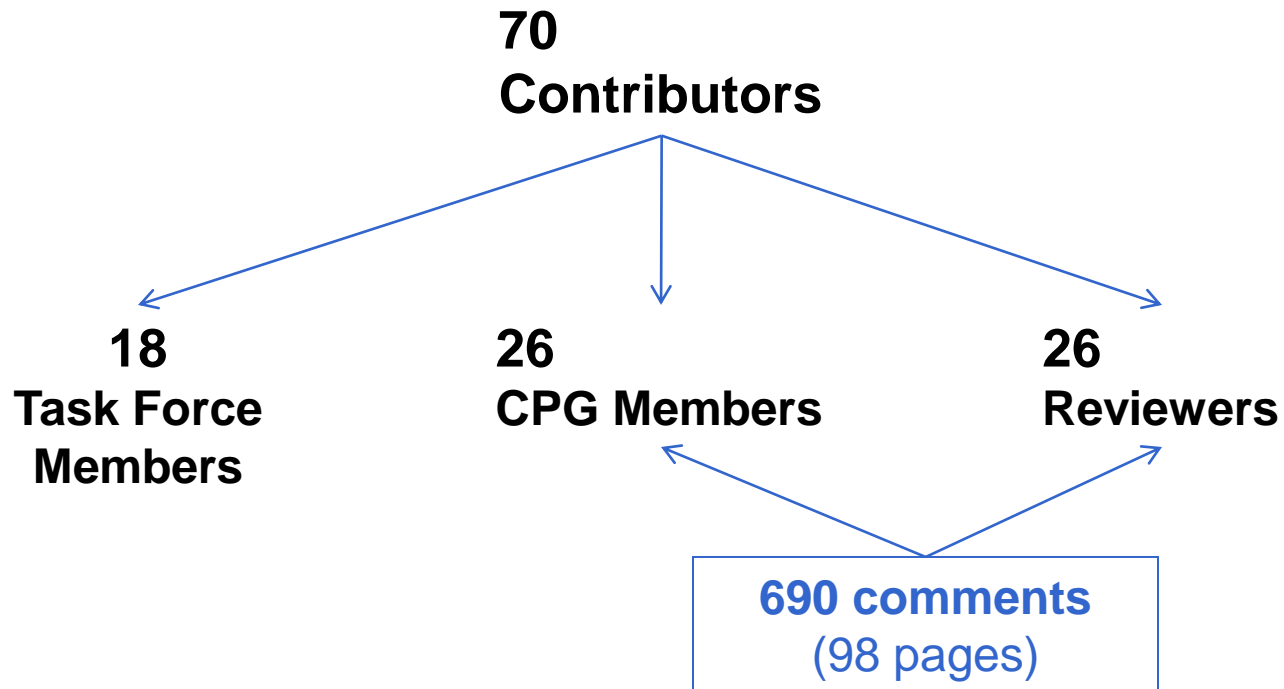
## Classes of recommendations

Class I	<b>23 (35%)</b>
Class IIa	<b>21 (32%)</b>
Class IIb	<b>11 (17%)</b>
Class III	<b>10 (15%)</b>

## Levels of evidence

Evidence A	<b>6 (9%)</b>
Evidence B	<b>32 (48%)</b>
Evidence C	<b>28 (42%)</b>

# Contributors

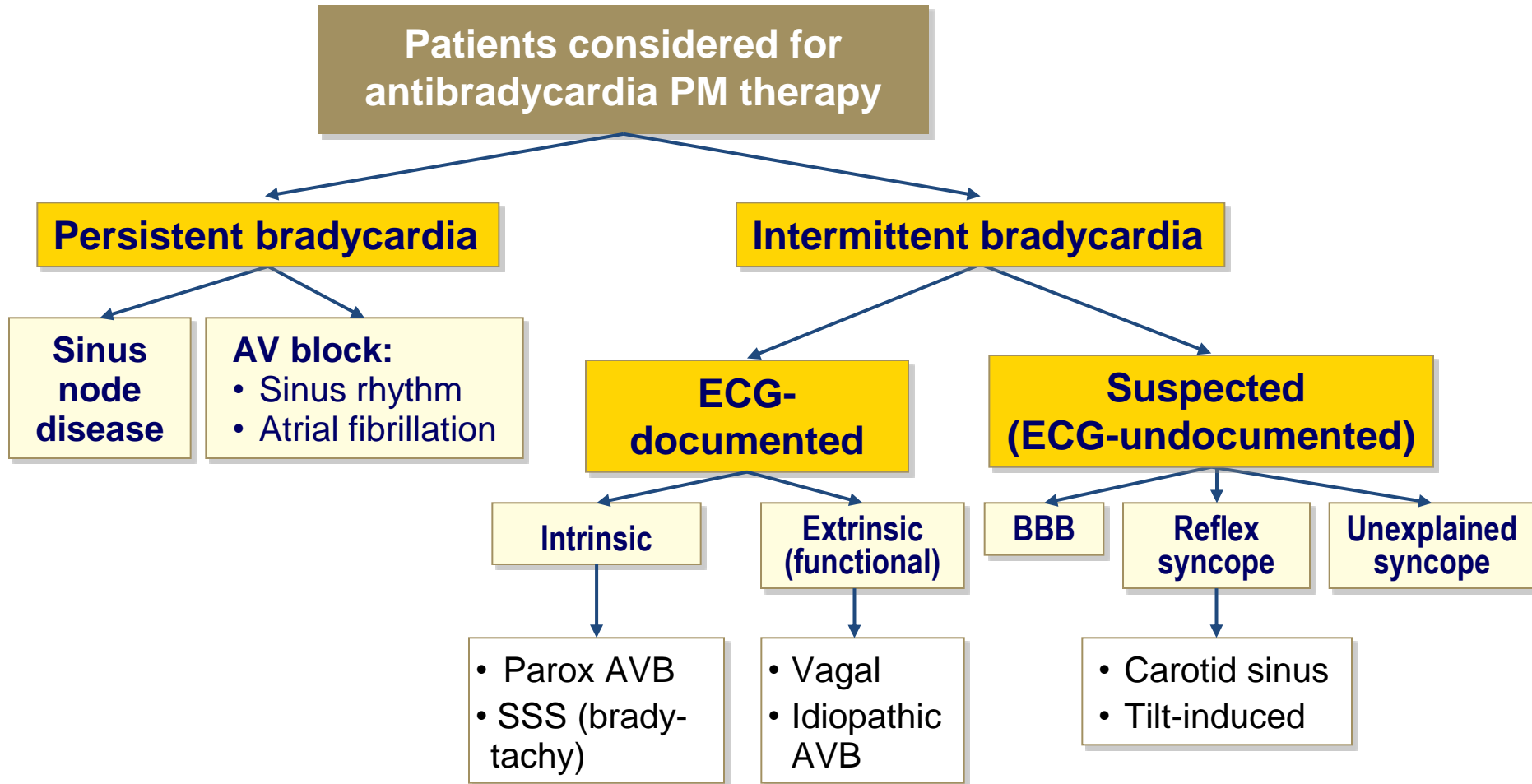




# General structure of the document

1. Pacing for bradycardia
  - Indications
  - mode of pacing
2. Cardiac resynchronization therapy
  - Indications
  - mode of pacing
3. Complication of pacing and CRT
4. Management considerations

# Classification of bradyarrhythmias based on the patient's clinical presentation



# Clinical perspectives

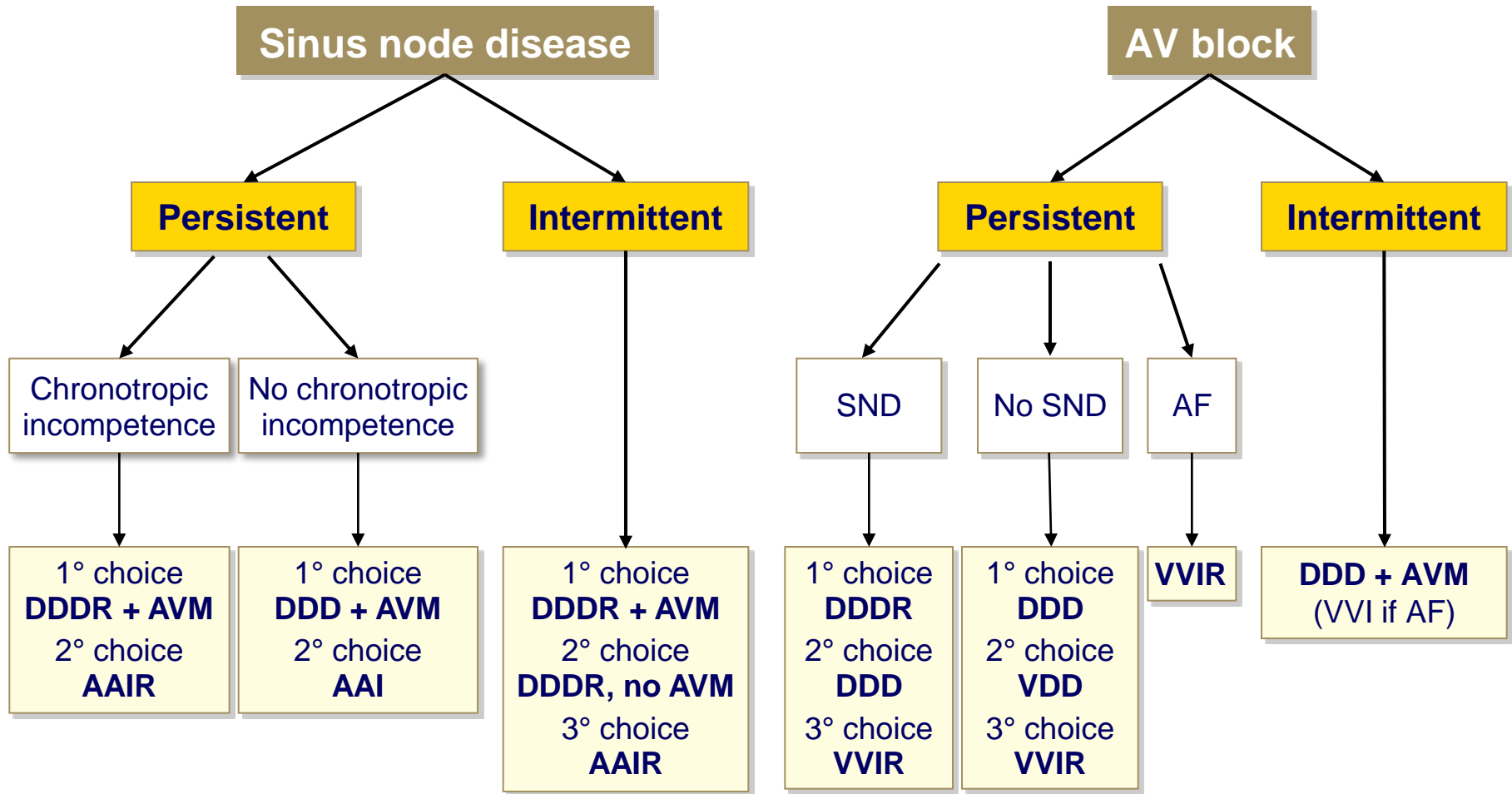
New

Recommendations	Class	Level
<b>1) Carotid sinus syncope.</b> Pacing is indicated in patients with dominant cardioinhibitory carotid sinus syndrome and recurrent unpredictable syncope.	I	B

## Clinical perspectives

- The decision to implant a pacemaker should be made in the context of a relatively benign condition .....
- ..... carotid sinus syndrome does not affect survival,.....
- ..... syncopal recurrences are still expected to occur in up to 20% of paced patients within 5 years.....

# Choice of pacing mode



*Consider CRT if low EF/HF*

# Dual-chamber versus ventricular pacing

Outcome	Dual-chamber benefit over ventricular pacing
All-cause deaths	No benefit
Stroke, embolism	Benefit (in meta-analysis only, not in single trial)
Atrial fibrillation	Benefit
HF, hospitalization for HF	No benefit
Exercise capacity	Benefit
Pacemaker syndrome	Benefit
Functional status	No benefit
Quality of life	Variable
Complications	More complications with dual-chamber

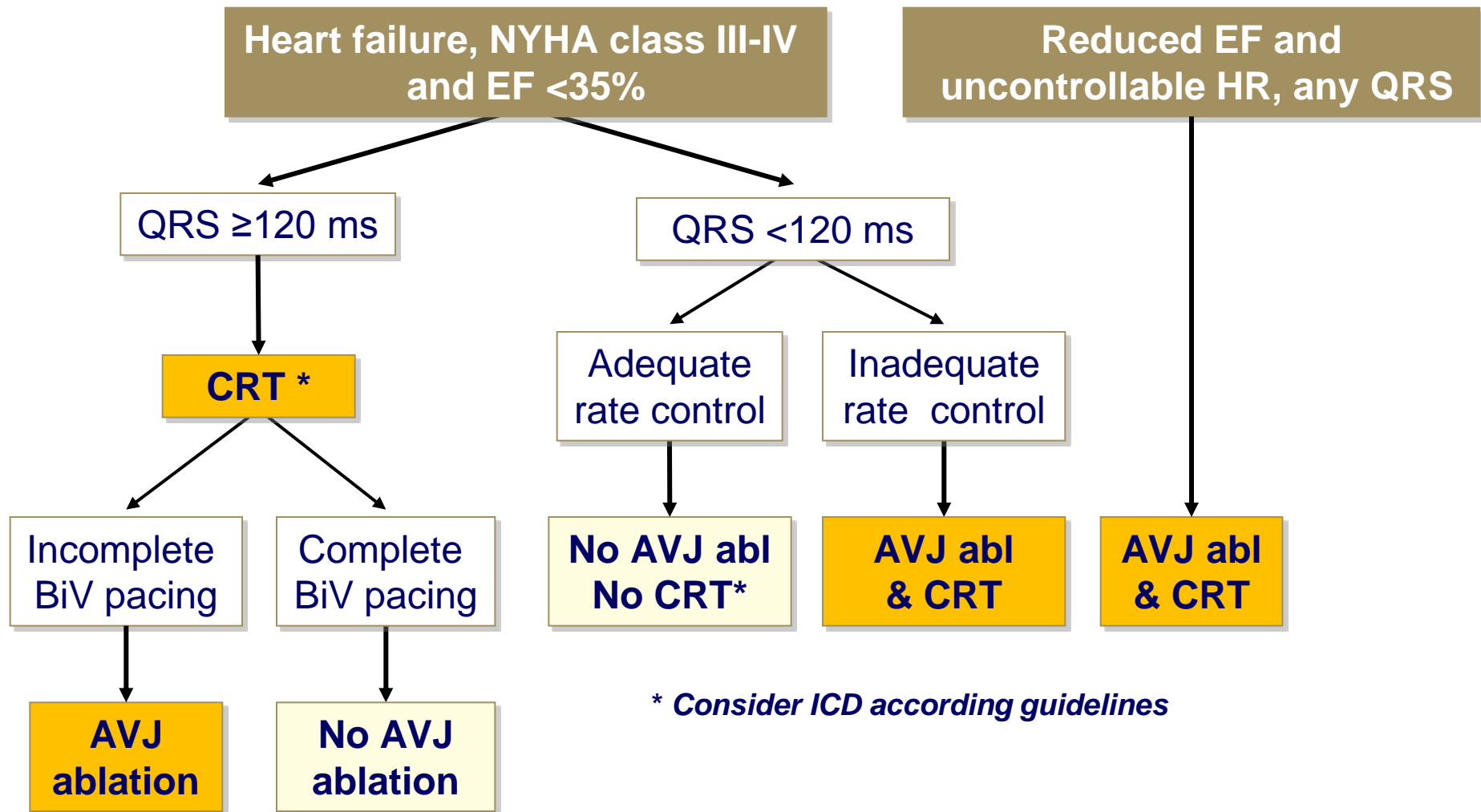
# Indications for CRT in patients in sinus rhythm

Recommendations	Class	Level
<b>1) LBBB with QRS duration &gt;150 ms</b> is recommended in chronic HF patients and LVEF $\leq 35\%$ who remain in NYHA functional class II, and ambulatory IV despite adequate medical treatment. (*)	I	A
<b>2) LBBB with QRS duration 120-150 ms</b> should be considered in chronic HF patients and LVEF $\leq 35\%$ who remain in NYHA functional class II, and ambulatory IV despite adequate medical treatment. (*)	I	B
<b>3) Non-LBBB with QRS duration &gt;150 ms</b> should be considered in chronic HF patients and LVEF $\leq 35\%$ who remain in NYHA functional class II, and ambulatory IV despite adequate medical treatment. (*)	IIa	B
<b>4) Non-LBBB with QRS duration 120-150 ms</b> may be considered in chronic HF patients and LVEF $\leq 35\%$ who remain in NYHA functional class II, and ambulatory IV despite adequate medical treatment. (*)	IIb	B
<b>5) QRS duration &lt;120 ms</b> CRT in patients with chronic HF with QRS duration <120 ms is not recommended.	III	B

# Indication for CRT in patients with permanent AF

Recommendations	Class	Level
<b>1) Patients with HF, wide QRS and reduced LVEF:</b> <b>1a)</b> should be considered in chronic HF patients, intrinsic QRS $\geq 120$ ms and LVEF $\leq 35\%$ who remain in NYHA functional class III and ambulatory IV despite adequate medical treatment (*), provided that a biventricular pacing as close to 100% as possible can be achieved.	<b>IIa</b>	<b>B</b>
<b>1b)</b> AV junction ablation should be added in case of incomplete biventricular pacing.	<b>IIa</b>	<b>B</b>
<b>2) Patients with uncontrolled heart rate who are candidates for AV junction ablation.</b> CRT should be considered in patients with reduced LVEF who are candidates for AV junction ablation for rate control.	<b>IIa</b>	<b>B</b>

# Indications for AVJ ablation ( $\pm$ CRT) in permanent AF



*\* Consider ICD according guidelines*



# Upgraded or *de novo* CRT in patients with conventional pacemaker indications and HF

Recommendations	Class	Level
1) <b>Upgrade from conventional PM or ICD</b> 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.	I	B
2) <b>“De novo” implantation</b> 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

## Clinical perspectives

- A strategy of initially conventional antibrady pacing with late upgrade in case of worsening symptoms seems reasonable
- In the decision process physicians should take into account the excess complication rate related to the more complex biventricular system, the shorter longevity of CRT devices and the excess of costs.

**New**

# Backup ICD in patients indicated for CRT

## Comparative results of CRT-D versus CRT-P in primary prevention

	CRT-D	CRT-P
Mortality reduction	Similar level of evidence but CRT-D slightly better	Similar level of evidence but CRT-P slightly worse
Complications	Higher	Lower
Costs	Higher	Lower

## Clinical guidance to the choice of CRT-P or CRT-D in primary prevention

Factors favouring CRT-D	Factors favouring CRT-P
Life expectancy >1 year	Advanced heart failure
Stable heart failure, NYHA II	Severe renal insufficiency or dialysis
Ischemic heart disease (low and intermediate MADIT risk score)	Other major co-morbidities
Lack of comorbidities	Frailty
	Cachexia

**New**

# Choice of pacing mode (and CRT optimization)

Recommendations	Class	Level
1) The goal of should be to achieve biventricular pacing as close to 100% as possible since the survival benefit and reduction in hospitalization are strongly associated with an increasing percentage of biventricular pacing.	<b>IIa</b>	<b>B</b>
2) Apical position of the LV lead should be avoided when possible.	<b>IIa</b>	<b>B</b>
3) LV lead placement may be targeted at the latest activated LV segment.	<b>IIb</b>	<b>B</b>

## Clinical perspectives

- The usual (standard) modality of CRT pacing consists of simultaneous biventricular pacing (RV and LV) with a fixed 100-120 ms AV delay with LV lead located in a posterolateral vein, if possible.

**New**

# MRI in patients with implanted cardiac devices

Recommendations	Class	Level
<p><b>1) Conventional cardiac devices.</b> In patients with conventional cardiac devices, MRI at 1.5 T can be performed with a low risk of complications if appropriate precautions are taken (see additional advice).</p>	<b>IIb</b>	<b>B</b>
<p><b>2) MRI-conditional PM systems.</b> In patients with MR-conditional PM systems, MRI at 1.5 T can be done safely following manufacturer instructions.</p>	<b>IIa</b>	<b>B</b>

## Conventional devices

- Monitoring by qualified personnel during MRI is essential.
- Exclude patients with leads <6 weeks and those with epicardial and abandoned leads.
- Program an asynchronous mode in PM-dependent and an inhibited mode in non PM-dependent patients.
- In contrast, use an inhibited pacing mode for patients without PM dependence, to avoid inappropriate pacing due to tracking of electromagnetic interference.
- Deactivate other pacing functions.
- Deactivate tachyarrhythmia monitoring and therapies (ATP/shock).
- Reprogram device immediately after the MRI examination.

## MRI-conditional devices

According to manufacturer conditions:

- Monitoring by qualified personnel during MRI is essential.
- Exclude patients with leads <6 weeks and those with epicardial and abandoned leads.
- Automatically performed by an external physician-activated device.
- Reprogram device immediately after the MRI examination

**New**

# Remote management of arrhythmias and device

Recommendations	Class	Level
Device-based remote monitoring should be considered in order to provide earlier detection of clinical problems (e.g. ventricular tachyarrhythmias, atrial fibrillation) and technical issues (e.g. lead fracture, insulation defect).	IIa	A

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# Cardiac-Resynchronization Therapy in Heart Failure with a Narrow QRS Complex

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Jeroen J. Bax, M.D., Ph.D., Jeffrey S. Borer, M.D., Josep Brugada, M.D., Ph.D.,  
Kenneth Dickstein, M.D., Ph.D., Ian Ford, M.D., Ph.D., John Gorcsan III, M.D.,  
Daniel Gras, M.D., Henry Krum, M.B., B.S., Ph.D., Peter Sogaard, M.D., D.M.Sc.,  
and Johannes Holzmeister, M.D., for the EchoCRT Study Group\*

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# Echo -CRT

- Estudio multicéntrico, prospectivo, aleatorizado que analiza el efecto de la implantación de un sistema de TRC en pacientes con:
  - > 18 AÑOS
  - Indicación establecida de DAI
  - Ritmo sinusal
  - HYHA III – IV
  - Tratamiento médico óptimo
  - FE  $\leq$  35%
  - DTDVI  $\geq$  55 mm
  - QRS < 130 ms
  - Evidencia de disincronia en eco

# Echo -CRT

- Implantación de CRT-D (Biotronik Lumax HF-T)

→ Aleatorización 1:1

→ CRT ON

→ CRT OFF

→ Todos los dispositivos con la función DAI ON

# Echo -CRT

## → End point primario:

→ De eficacia:

→ Mortalidad total + 1ª hospitalización por empeoramiento de IC

→ De seguridad:

→ Complicaciones debidas al implante de CRTD

## → End points secundarios

→ Cualquier hospitalización por empeoramiento de IC

→ Cambio clase funcional a los 6 meses

→ Calidad de vida

→ Mortalidad total

# Echo -CRT

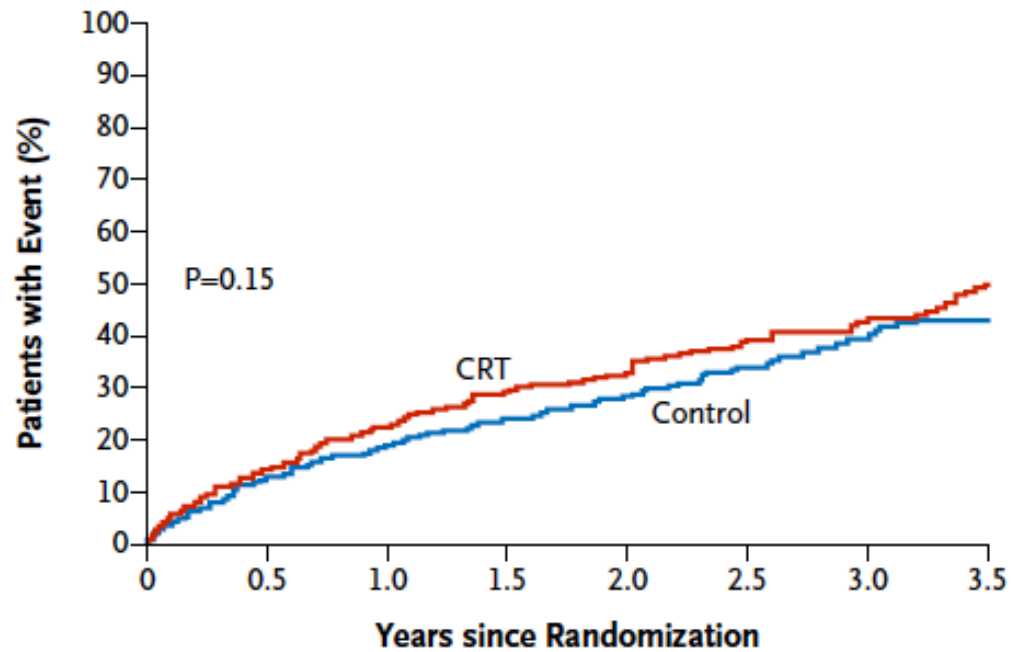
Desde Agosto 2008 hasta marzo 2013, 1680 pacientes habían sido evaluados de los que **809** fueron finalmente aleatorizados.

El estudio fue parado prematuramente en mayo 2013 por 'futility and potential harm'

	TRC (404)	Control (495)
Edad	55 $\pm$ 12	57 $\pm$ 12
HYHA III (%)	85	92
FE %	27 $\pm$ 5	25 $\pm$ 6
QRS ms	105 $\pm$ 12	106 $\pm$ 13

# Echo -CRT

## A Primary Composite Outcome

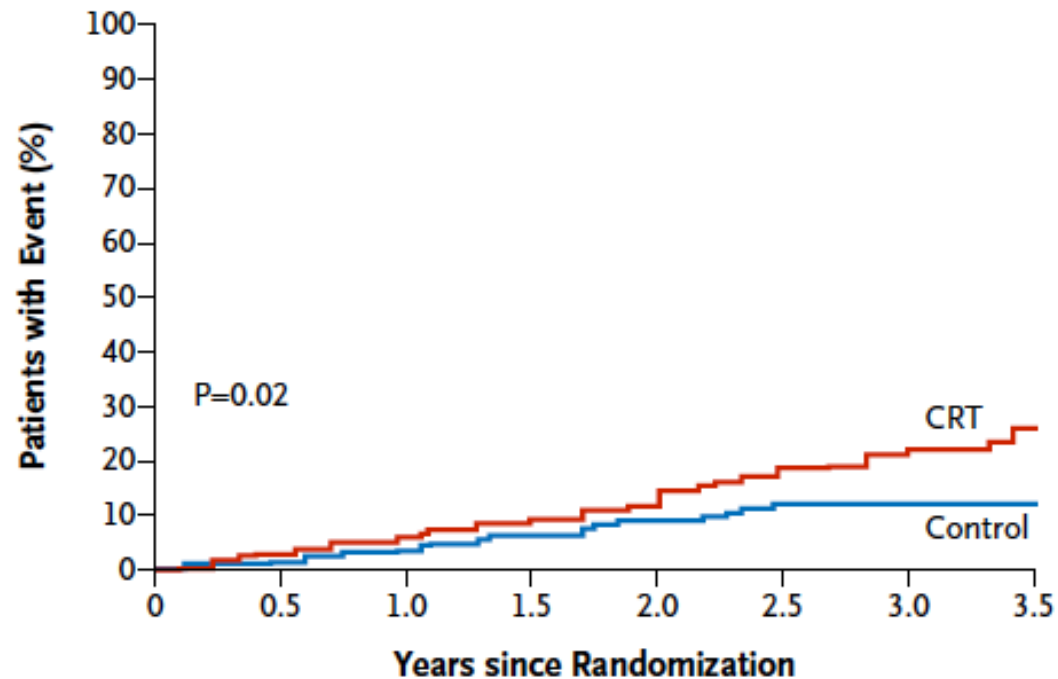


### No. at Risk

CRT	404	297	223	155	103	65	42	19
Control	405	302	236	166	119	71	44	15

# Echo -CRT

## B Death from Any Cause



### No. at Risk

CRT	404	334	267	199	132	84	56	25
Control	405	335	269	195	141	87	62	27

# Echo -CRT

- **Take home message:**
  - Los pacientes con IC avanzada, depresión de la función ventricular y signos de disincronía en el ECO, pero con QRS < 130 ms, no se benefician de terapia de resincronización

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# MADIT - CRT LIFR

## Seguimiento a 6 años en non US centers

### En el seguimiento a los 6, 3 años:

- ✓ Se mantuvo la diferencia entre los dos grupos en el endpoint principal (I. C. + mortalidad) : 46% en DAI vs. 36% en CRT-D
- ✓ Se mantuvo la diferencia en la I. C.: 38% en DAI vs. 21% en CRT-D
- ✓ Se mantuvieron las diferencias en la FE, VTDVI y VTSVI

# MADIT – LIFR

## Seguimiento a 6 años en non US centers

En el análisis por grupos, estos beneficios sólo se observaron en los pacientes con BRI mientras que los pacientes sin BRI no mostraron beneficios

# MADIT – LIFR

## Seguimiento a 6 años en non US centers

### Take home message:

La intervención precoz con terapia de resincronización cardiaca en pacientes con disfunción ventricular, FE < 30% y BRI con QRS > 130 ms, produce una disminución del 'outcome' combinado de IC y muerte, especialmente a costa de la disminución de IC, que se mantiene a lo largo de 6,3 años

# Indications for CRT in patients in sinus rhythm

## Magnitude of benefit from CRT

**Highest  
(responders)**

Wider QRS, LBBB, females,  
non-ischemic cardiomyopathy

Males, ischemic cardiomyopathy

**Lowest  
(non-responders)**

Narrower QRS, non-LBBB

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# Delayed enhancement – MRI determinant of successful Catheter ablation in AF (DECAAF)

- Estudio multicéntrico (17 centros) de seguimiento, ciego
- **Objetivo:** analizar si el grado de fibrosis de la AI detectado mediante DE-MRI predice el éxito de la ablación
- **Métodos:**
  - MRI pre y a los 3 meses de la ablación
  - 1r procedimiento de ablación
  - Protocolo del centro
  - Seguimiento con Holter a 1 año

# Delayed enhancement – MRI determinant of successful Catheter ablation in AF (DECAAF)

- La fibrosis pre RF se estratificó en 4 grupos (< 10%; 10-20%; 20-30%; >30%)
- En el análisis multivariado, la fibrosis fue el único predictor independiente de éxito de la ablación
- El análisis de la DE-MRI a los 3 meses, mostró que en sólo un 6,7% de los pacientes había lesiones de aislamiento completo en las 4 VVPP y un 39% no tenían ninguna vena aislada

- Nuevas guías de estimulación cardiaca
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  - DECAAFF
- **Fibrilación ventricular idiopática: nueva estrategia de aproximación diagnóstica**



# Systematic assesment of patients with unexplained cardiac arrest: results from the FIVI-Gen study

J. Jimenez Jaimez<sup>1</sup>, R. Peinado<sup>2</sup>, E. Zorio Grima<sup>3</sup>, J.R. Gimeno<sup>4</sup>, F. Segura<sup>5</sup>, F. Mazuelos<sup>6</sup>, P. Morinas<sup>7</sup>, M. Alvarez<sup>1</sup>, L. Montserrat<sup>8</sup>, L. Tercedor<sup>1</sup>, <sup>1</sup>University Hospital Virgen de las Nieves - Granada - Spain, <sup>2</sup>University Hospital La Paz - Madrid - Spain, <sup>3</sup>Hospital La Fe - Valencia - Spain, <sup>4</sup>University Hospital Virgen de la Arrixaca - Murcia - Spain, <sup>5</sup>Insular Hospital - Las Palmas De Gran Canaria - Spain, <sup>6</sup>University Hospital Reina Sofia - Cordoba - Spain, <sup>7</sup>Hospital Juan Ramon Jimenez - Huelva - Spain, <sup>8</sup>Health in Code SL - La Coruna - Spain,



## Systematic assesment of patients with unexplained cardiac arrest: results from the FIVI-Gen study

- **Objetivo:** Evaluar el rendimiento diagnóstico de un una nueva estrategia sistemática en pacientes con FV idiopática (FVI).
- **FVI:** FV que requirió desfibrilación externa y en la que el ECG basal, el ecocardiograma y la coronariografía fueron normales

### c) Diagnostic Protocol

IVF

- Prospective/retrospective
- Non diagnostic ECG
- Normal Echo
- Coronary angiogram with no lesions

24 Pacientes (66,7% varones)  
Edad: 40,37 ± 14,2 (15 -61)

Pharmacological tests  
adrenaline/flecainide

+ → Dx in step 1

-  
Familial study → + → Dx in step 2

-  
Next generation sequencing → + → Dx in step 3

-  
Idiopathic Case

Phenotype-directed genetic test

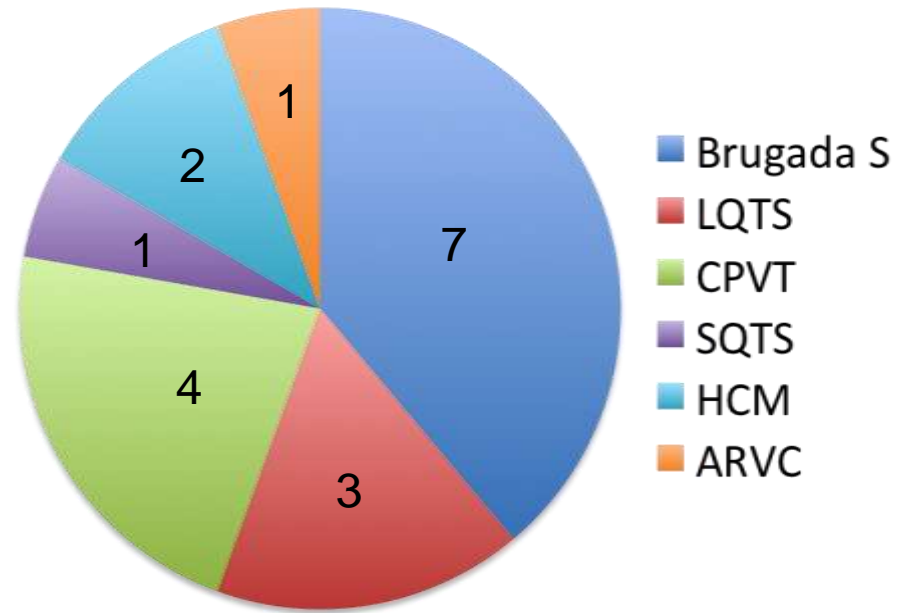
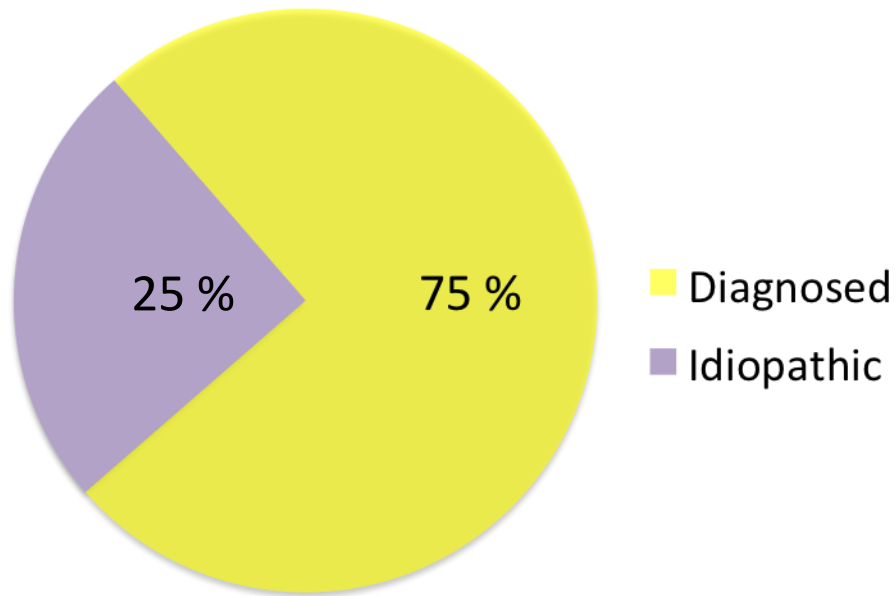
## FIVI-Gen (Results)

### Cumulative diagnosis of each diagnostic step

	Step 1 (Ph tests)	Step 2 (familial screening)	Step 3 (genetic test)	Total
Brugada Syndrome	4	2	1	7
Long QT Syndrome	1	0	2	3
CPVT	1	0	3	4
Short QT Syndrome	0	1	0	1
HCM	0	0	2	2
ARVC	0	0	1	1
<b>Diagnosis (%)</b>	<b>6/24 (25%)</b>	<b>3/18 (16,6%)</b>	<b>9/15 (60%)</b>	<b>18/24 (75%)</b>

?

# Global Results



# IV) CONCLUSIONS

- 1.- This novel systematic approach for patient with Unexplained Cardiac Arrest can lead to a definitive diagnosis in almost three fourths of the cases
- 2.- Cardiac channelopathies and, in less proportion, cardiomyopathies, may have a very low clinical penetrance, but this does not avoid malignant ventricular arrhythmias
- 3.- Familial screening is useful, not only to detect concealed cases, but also as diagnostic tool in low penetrance mutations
- 4.- Next generation sequencing testing is extremely useful to detect subclinical disease, but it must be properly interpreted and findings should be coherent and co-segregate in the family

- Las nuevas guías de estimulación suponen una aproximación clínica y actualizada sobre la estimulación cardíaca en su sentido más amplio.
- Los datos de la literatura confirma que el ECG es la herramienta de mayor utilidad en la selección de pacientes candidatos a resincronización.
- El beneficio inicial de la TRC observado en el estudio MADIT-CRT se mantiene a lo largo del tiempo

- La caracterización de la fibrosis en AI mediante RMN, puede ayudar a la selección de los mejores candidatos para la ablación de la FA
- Le aplicación de un protocolo sistemático que incluya el estudio de los familiares de primer y segundo grado y el estudio genético mediante ulraseduenciación, puede permitir establecer el diagnóstico etiológico en un elevado número de pacientes que han sufrido un episodio de MS