GAPS IN PACEMAKER GUIDELINES

Pacing for bradycardia and asymptomatic pauses: who and why

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Indication for pacing in patients with persistent bradycardia

Recommendations	Class	Level
1) Sinus node disease. Pacing is indicated when symptoms can clearly be attributed to bradycardia.	I	B
2) Sinus node disease. Pacing may be indicated when symptoms are likely to be due to bradycardia, even if the evidence is not conclusive.	IIb	C
3) Sinus node disease. Pacing is not indicated in patients with SB which is asymptomatic or due to reversible causes.	III	C
4) Acquired AV block. Pacing is indicated in patients with third- or second-degree type 2 AV block irrespective of symptoms.	I	C
5) Acquired AV block. Pacing should be considered in [illegible] gree type 1 AV block which causes symptoms or is found to be located at intra- or infra-His levels at EPS.	IIa	C
6) Acquired AV block. Pacing is not indicated in patients with AV block which is due to reversible causes.	III	C

No gap

www.escardio.org/guidelines

European Heart Journal 2013; 34: 2281–2329

Europace 2013; 15: 1070-1118

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Indication for pacing in intermittent documented bradycardia

Recommendations	Class	Level
1) Sinus node disease (including brady-tachy form). Pacing is indicated in patients affected by sinus node disease who have the documentation of symptomatic bradycardia due to sinus arrest or sinus-atrial block.	I	B
2) Intermittent/paroxysmal AV block (including AF with slow ventricular conduction). Pacing is indicated in patients with intermittent/paroxysmal intrinsic third- or second-degree AV block.	I	C
3) Reflex asystolic syncope. Pacing should be considered in patients ≥40 years with recurrent, unpredictable reflex syncopes and documented symptomatic pause/s due to sinus arrest or AV block or the combination of the two.	IIa	B
4) Asymptomatic pauses (sinus arrest or AV block). Pacing should be considered in patients with history of syncope and documentation of asymptomatic pauses >6 s due to sinus arrest, sinus-atrial block or AV block.	IIa	C
5) Pacing is not indicated in reversible causes of bradycardia.	III	C

No gap

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Indication for pacing in intermittent documented bradycardia

Pacemaker is not indicated in patients:

- with asymptomatic bradycardia, or

- asymptomatic pauses and no history of syncope

European Heart Journal
2013; 34: 2281–2329

Europace
2013; 15: 1070-1118

2015 Heart Rhythm Society Expert Consensus Statement on the Diagnosis and Treatment of Postural Tachycardia Syndrome, Inappropriate Sinus Tachycardia, and Vasovagal Syncope

Robert S. Sheldon, MD, PhD, FRCPC, FHRS (Chair),[1] Blair P. Grubb II, MD, FACC (Chair),[2]

Recommendations - Pacemaker for VVS	Class	LoE
Dual-chamber pacing can be effective for patients 40 years of age or older with recurrent and unpredictable syncope who have a documented pause ≥3 seconds during clinical syncope or an asymptomatic pause ≥6 seconds.	**IIa**	**B-R**
Tilt-table testing may be considered to identify patients with a hypotensive response who would be less likely to respond to permanent cardiac pacing.	**IIb**	**B-NR**

Why 6 sec pause?

Arguments for adapting cut-off value of asystolic pause ≥ 6 sec

- Pathophysiological reasoning: no loss of consciousness before 6 s asystole

Wieling et al. Brain 2009;132: 2630

- In clinical follow-up of syncope, only 0.7% of asystolic episodes of 3–6 s but 43% of episodes of >6 s resulted in pre-syncopal or syncopal symptoms

Menozzi et al. Am J Cardiol 1993; 72: 1152

- In ISSUE-2, the average pause at time of syncope recurrence was of 9 s (range 8–18)

Brignole et al. Europace 2007; 9: 305

Reproducibility of Electrocardiographic Findings in Patients with Reflex Neurally-Mediated Syncope

Moya et al. Am J Cardiol 2008; 102:1518 –1523

Correlation between documented non-syncopal episodes and index syncope.

		Non-syncopal episodes		
		Asystole **6 pts**	Tachycardia **3 pts**	Not significant arrhythmias **23 pts**
Index syncope	Asystole	**6 (100%)**	**0**	**6 (26%)**
	Tachycardia	**0**	**3 (100%)**	**1 (4%)**
	Not significant arrhythmias	**0**	**0**	**16 (70%)**

Non-syncopal episodes documented 137 (1-436) days before syncope

Moya et al. Am J Cardiol 2008; 102:1518 –1523

Indication for pacing in intermittent documented bradycardia

Inference

In a patient with reflex syncope the diagnostic value of an asymptomatic pauses >6 sec is not different from that of a symptomatic pause

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2013; 34: 2281–2329

Europace
2013; 15: 1070-1118

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ISSUE 3

International Study on Syncope of Uncertain Etiology 3

Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association®

Pacemaker Therapy in Patients With Neurally Mediated Syncope and Documented Asystole : Third International Study on Syncope of Uncertain Etiology (ISSUE-3): A Randomized Trial

Michele Brignole, Carlo Menozzi, Angel Moya, Dietrich Andresen, Jean Jacques Blanc, Andrew D. Krahn, Wouter Wieling, Xulio Beiras, Jean Claude Deharo, Vitantonio Russo, Marco Tomaino and Richard Sutton

Circulation. 2012;125:2566-2571; originally published online May 7, 2012;

ISSUE 3

SYNCOPE

Study design

ILR screening phase

Pts affected by **severe, recurrent** reflex syncopes, **aged >40 yrs**

↓

ILR implantation (Reveal DX/XT)

↓

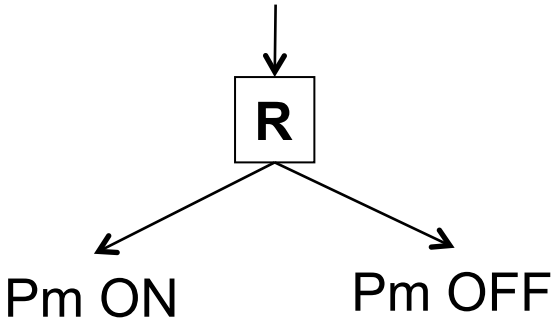
ILR follow-up (max 2 yrs)

↓

ISSUE 3 study phase

ILR eligibility criteria:

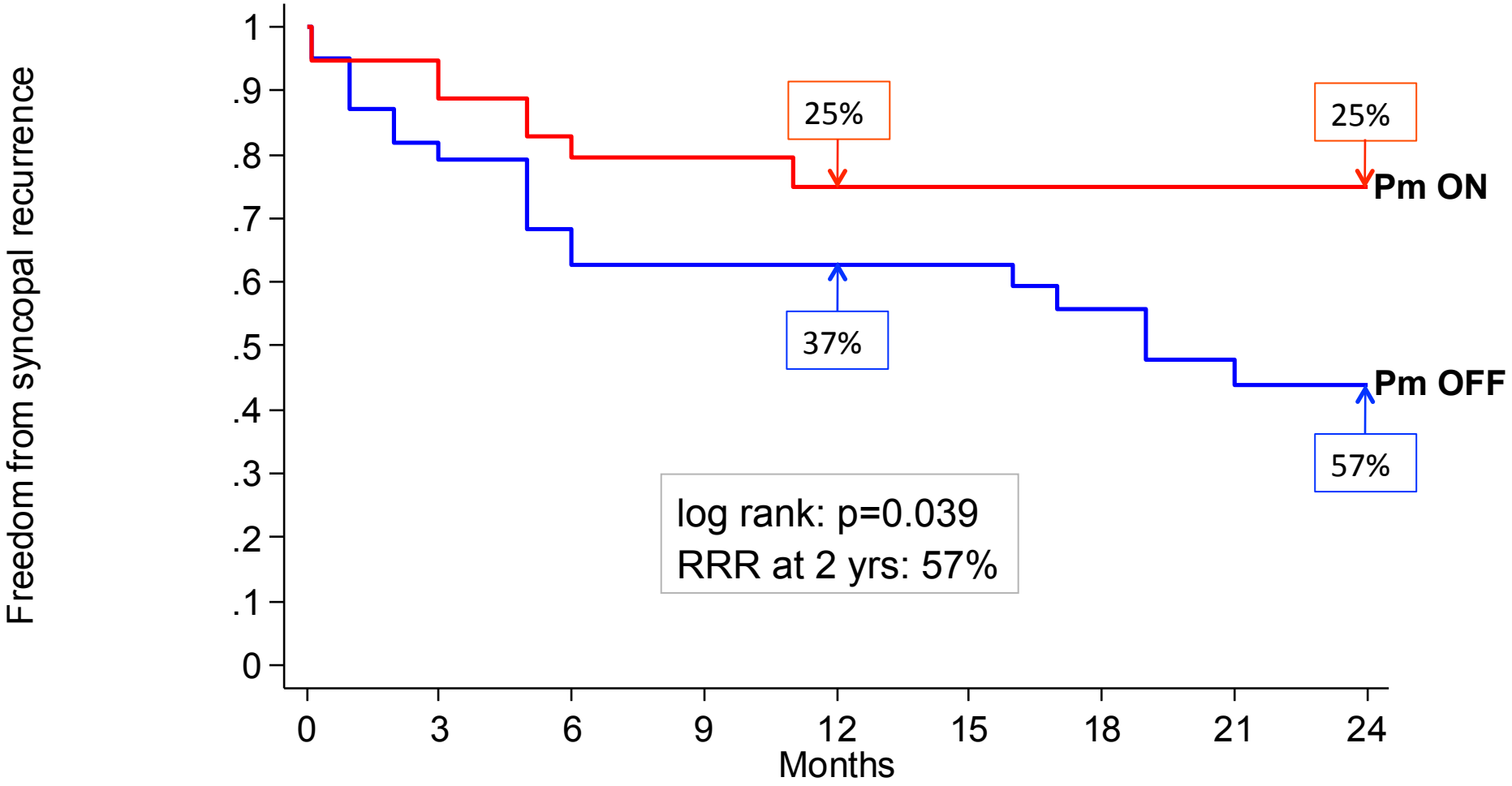
- ***Asystolic syncope ≥3 s**, or*
- ***Non-syncopal asystole ≥6 s***



Patient characteristics (II)

Characteristics	**Pm ON** n=38	**Pm OFF** n=39	**Registry** n=12.
ILR documentation (eligibility criteria):			
- Syncope and asystole ≥3 s	79%	82%	77%
- Non-syncopal pause ≥6 s	21%	18%	17%
- Mean length of asystole, s	10	12	12
Tilt testing: performed	87%	82%	83%
- Positive of those performed	42%	72%	50%
Medical history			
- Structural heart disease	13%	10%	0%
- Hypertension	50%	49%	33%
- Diabetes	11%	10%	8%
Concomitant medications			
- Anti-hypertensive	47%	31%	25%
- Psychiatric	11%	5%	0%
- Any other drugs	26%	25%	25%

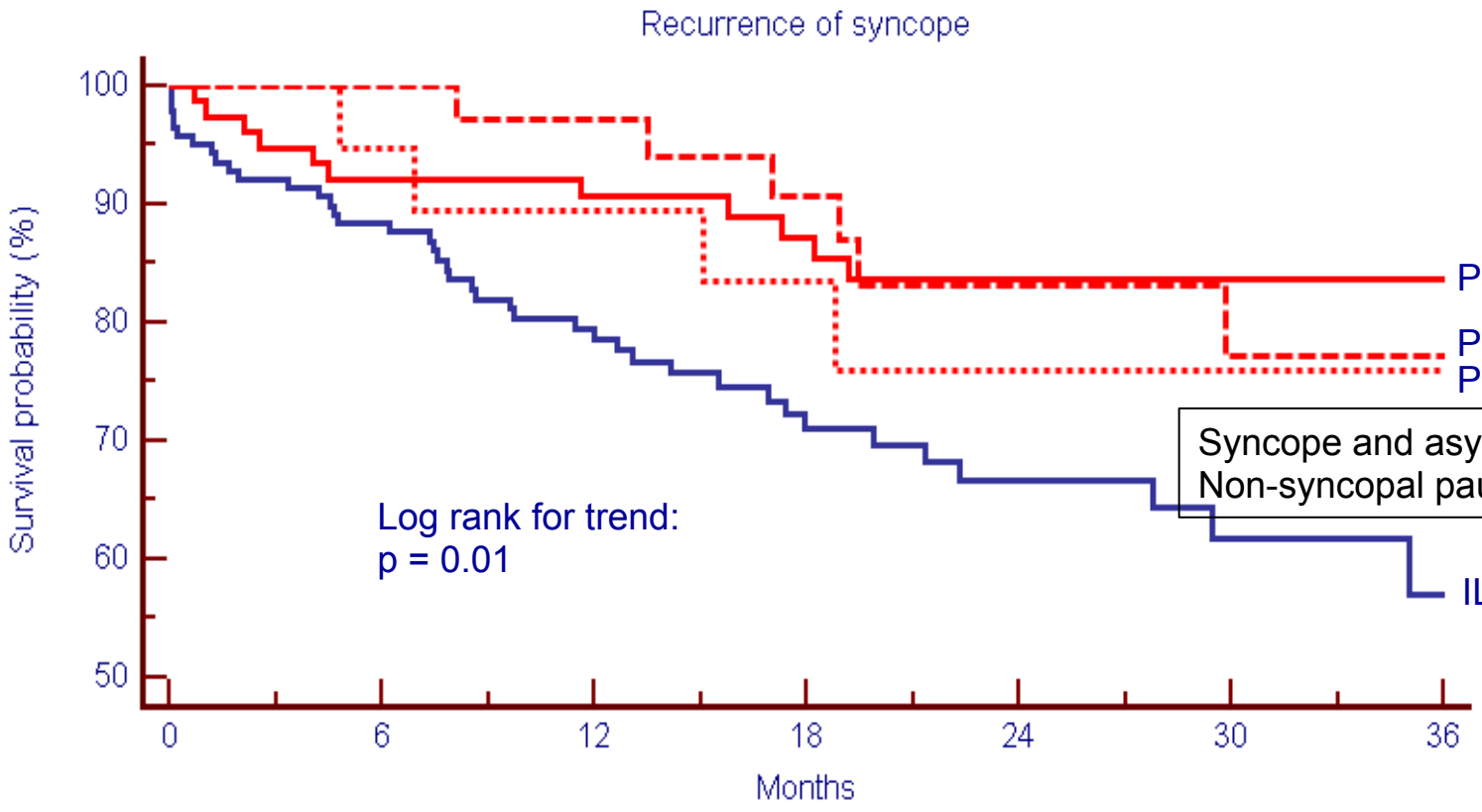
First syncope recurrence
(intention-to-treat)



Number at risk

Pm OFF	39	31	25	21	21	18	15	12	8
Pm ON	38	32	27	22	16	14	13	13	11

SUP 2 study: 3-years extended follow-up

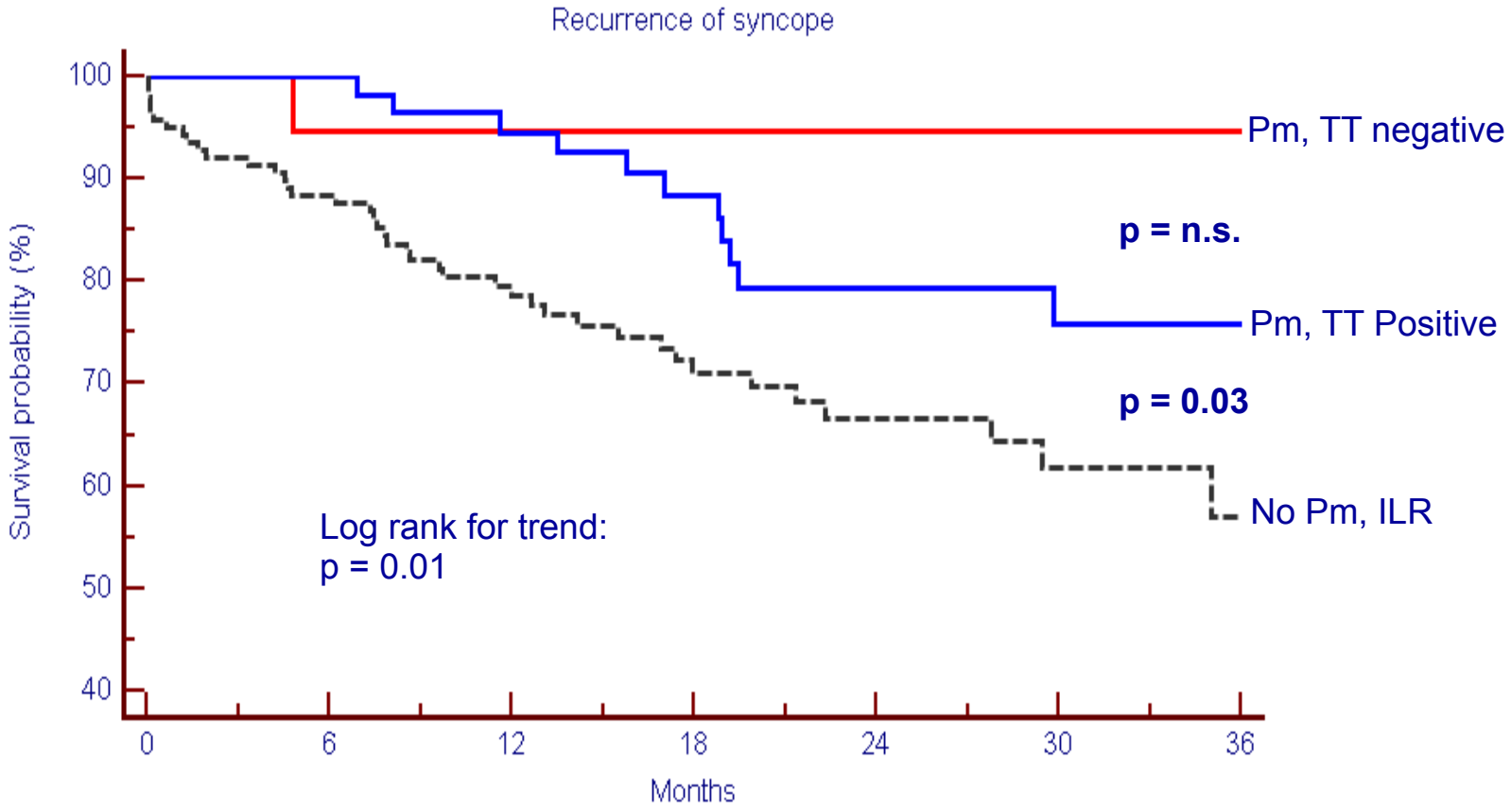


Syncope and asystole >3 “: 17 pts
Non-syncopal pause >6 “: 4 pts

Number at risk						
Group: ILR						
142	115	90	58	37	22	10
Group: PM-CSS						
78	69	61	51	40	26	17
Group: PM-ILR						
21	18	17	11	8	6	1
Group: PM-VASIS 2B						
38	37	32	26	21	13	6

(EP in press)

SUP 2 study: 3-years extended follow-up



Number at risk							
Group: 1							
	20	18	17	12	11	6	4
Group: 2							
	61	57	50	41	30	21	8
Group: ILR							
	142	115	90	58	37	22	10

(EP in press)

European Heart Journal (2014) **35**, 2211–2212
doi:10.1093/eurheartj/ehu255

CURRENT OPINION

Twenty-eight years of research permit reinterpretation of tilt-testing: hypotensive susceptibility rather than diagnosis

Richard Sutton[1]* and Michele Brignole[2]

A positive tilt test suggests the presence of a **hypotensive susceptibility**, which plays a role in causing syncope irrespective of the etiology and mechanism of syncope.

Changed indications for Tilt Table Testing

Old (initial) indications	New indications
Diagnosis of VVS	Susceptibility to orthostatic stress, irrespective of the etiology of syncope
Identification of candidates for permanent pacing (CI form)	Identification of non-responder to cardiac pacing (any positive response)

Sutton & Brignole. Eur Heart J 2014

GAPS IN PACEMAKER GUIDELINES

Pacing for bradycardia and asymptomatic pauses: who and why

Who ?

ISSUE 3 population

Features:

- Mean age at presentation: >60 years
- History of recurrent syncopes beginning in middle or older age
- Severe clinical presentation requiring treatment (high risk and/or high frequency)
- Atypical presentation without warning
- Frequent injuries related to presentation without warning
- ILR documentation of long pauses (mean 11 seconds)

Estimated prevalence:

9% of patients affected by NMS referred to Syncope Clinic

Perspectives

Candidates for pacing

The typical patient who is expected to benefit from cardiac pacing:

- is around the age of 70 years,
- has a history of unpredictable syncopes (i.e., without or with very short prodromes)…
- … which start in advanced age (mostly after the age of 40).

European Heart Journal *2015;* 36: 1529–35