Ασυμπτωματικός ασθενής με διαταραχές αγωγής. Πρόγνωση θεραπεία

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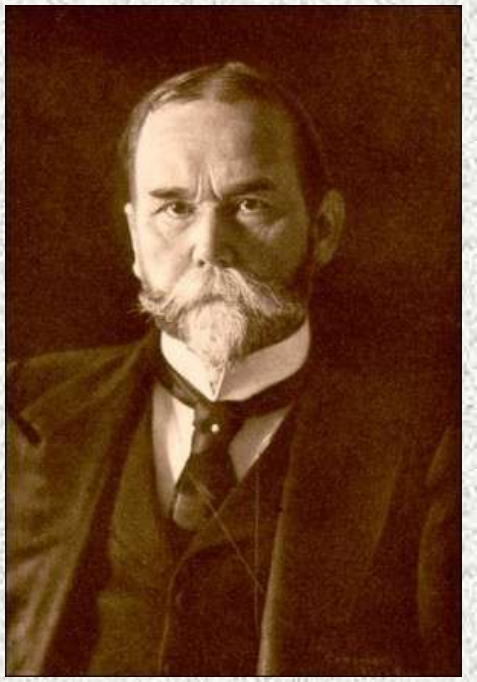
Θεσσαλονίκη

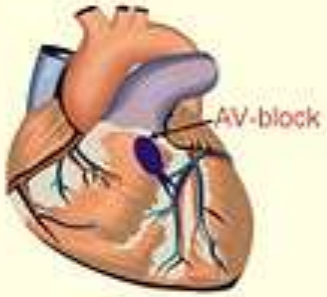
1899 he provided a description of irregular pulses due to partial blockage of AV conduction which created a progressive lengthening of conduction time



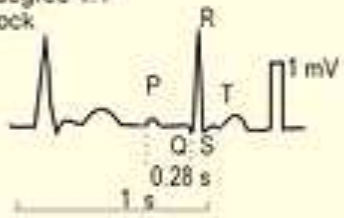
1924 Mobitz classified second-degree AV block into type I and type II using the electrocardio-gram

Four Types of AV-block

(PQ interval > 0.2 s)

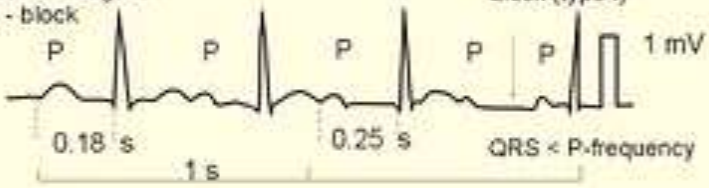


First - degree 1:1
AV - block



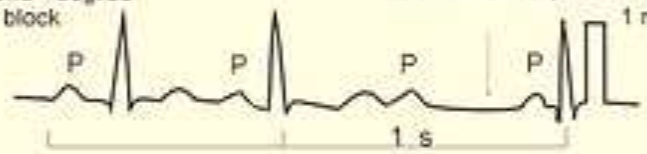
Second - degree
AV - block

Wenchebach
block (type I)



Second - degree
AV - block

Mobitz II block (no warning)



Third - degree
AV - block

Complete AV - block (Adam Stokes disease
in AV or His-bundle

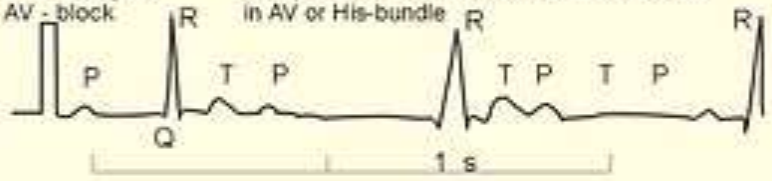
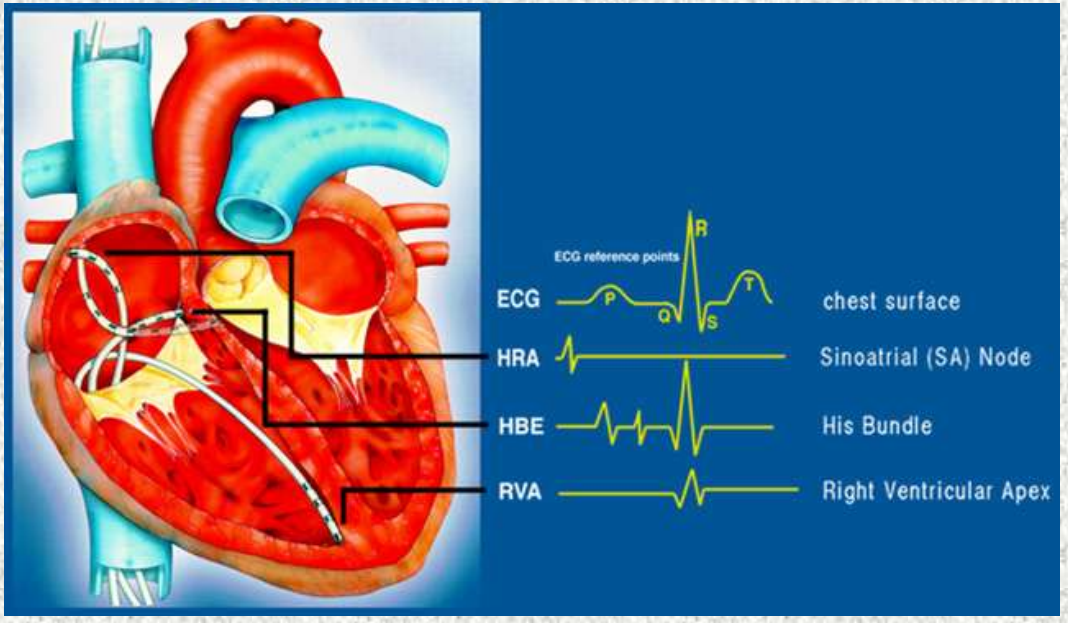
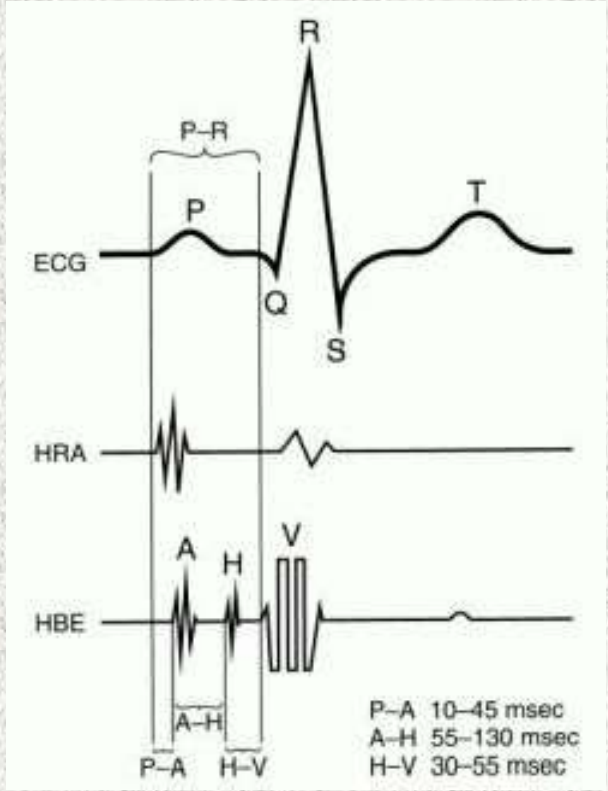


Fig. 11-12

KMc



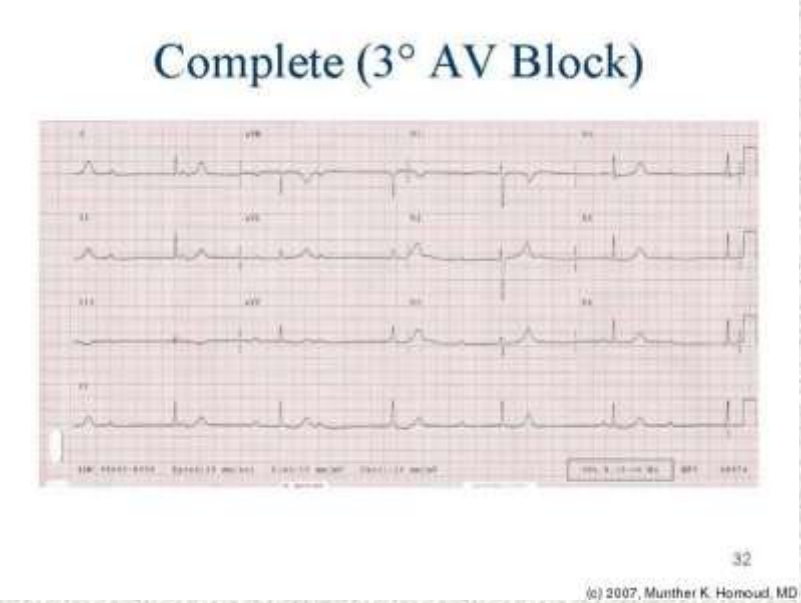


HV challenge:

- atrial pacing
- procainamide

- **AV block** remains one of the most common reasons for pacemaker implantation
- there are still **open questions** about the indications for pacing
- lack of large, comparative, randomized **studies**,
- The situation may become even more complex when the conduction disturbance is **intermittent**
- The decision to implant a pacemaker is based, to a large extent, on the presence **of symptoms** that are directly related to the bradycardia caused by the AV block

complete AV block



- a number of nonrandomized studies showing that permanent cardiac pacing improves survival
- especially in patients who experience episodes of syncope

Permanent pacemaker implantation is indicated for third-degree and advanced second-degree AV block

Class I indication

- at any anatomic level in awake, symptom-free patients in sinus rhythm, with documented periods of asystole greater than or equal to 3.0 seconds or any escape rate less than 40 bpm, or with an escape rhythm that is below the AV node. **(Level of Evidence: C)**
- asymptomatic persistent third-degree AV block at any anatomic site with average awake ventricular rates of 40 bpm or faster if cardiomegaly or LV dysfunction is present or if the site of block is below the AV node. **(Level of Evidence: B)**
- at any anatomic level in awake, symptom-free patients with AF and bradycardia with 1 or more pauses of at least 5 seconds or longer. **(Level of Evidence: C)**

ACC/AHA/HRS 2008 Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities. Circ 2008

Permanent pacemaker implantation is indicated for

Class I indication

- Permanent pacemaker implantation is indicated for second- or third-degree AV block during exercise in the absence of myocardial ischemia. (Level of Evidence: C)
- at any anatomic level after catheter ablation of the AV junction. **(Level of Evidence: C)**
- at any anatomic level associated with postoperative AV block that is not expected to resolve after cardiac surgery. (Level of Evidence: C)
- at any anatomic level associated with neuromuscular diseases with AV block (Level of Evidence: B)

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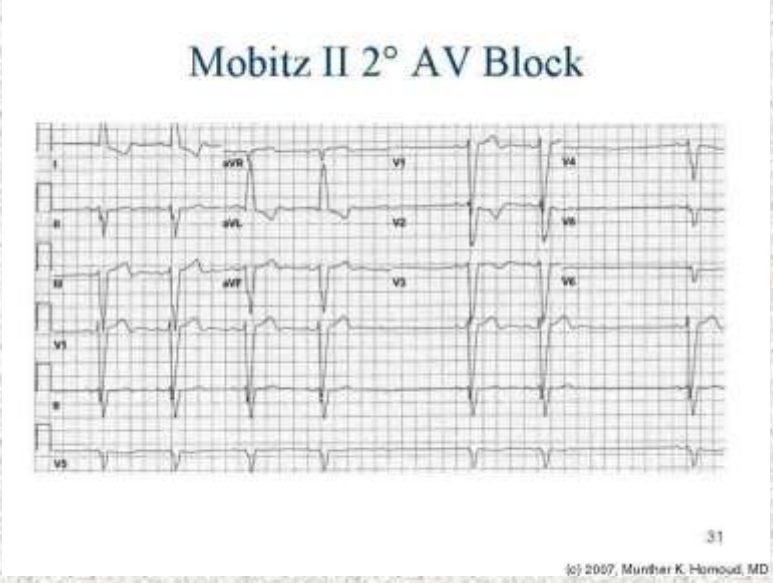
Permanent pacemaker implantation is indicated for Class IIa indication

- Permanent pacemaker implantation is reasonable for persistent third-degree AV block with an escape rate greater than 40 bpm in asymptomatic adult patients without cardiomegaly. (Level of Evidence: C)

ACC/AHA/HRS 2008 Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities. Circ 2008

Second-degree block type II
Mobitz II

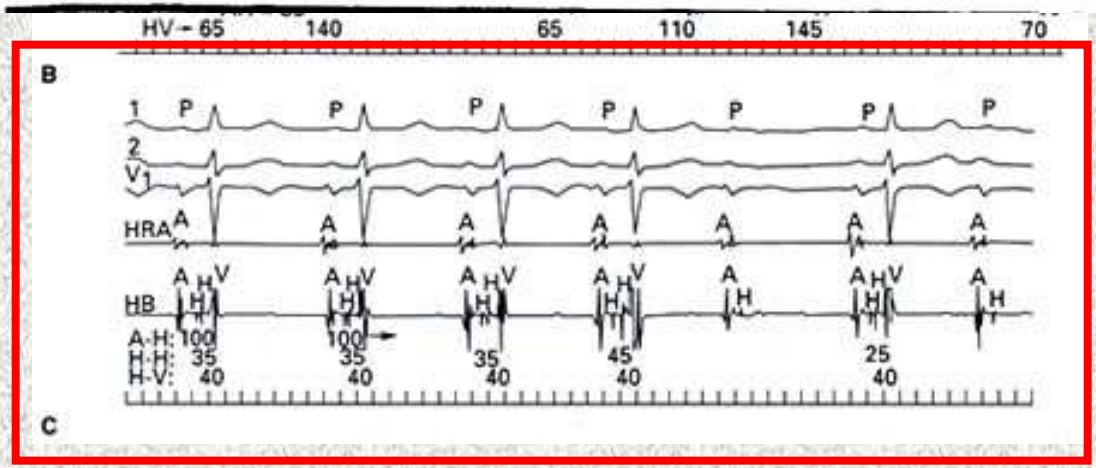


Second-degree block type II
Mobitz II

D. Zipes. Circ 1979

TABLE 1. *Site of Second-degree Atrioventricular Block*

Type of block	Normal QRS	BBB
Type I	AVN>>>>HPS	AVN>HPS
Type II	HPS>AVN	HPS>>>>AVN
1:1→2:1; fixed 2:1 or greater	HPS=AVN	HPS>>AVN



is usually infranodal (either intra- or infra-His) especially when the QRS is wide

Type II second-degree AV block

- symptoms are frequent
- prognosis is compromised and
- progression to third-degree AV block is common and sudden.

✓ Thus, type II second-degree AV block with a wide QRS typically indicates diffuse conduction system disease and constitutes an **indication for pacing even in the absence of symptoms**

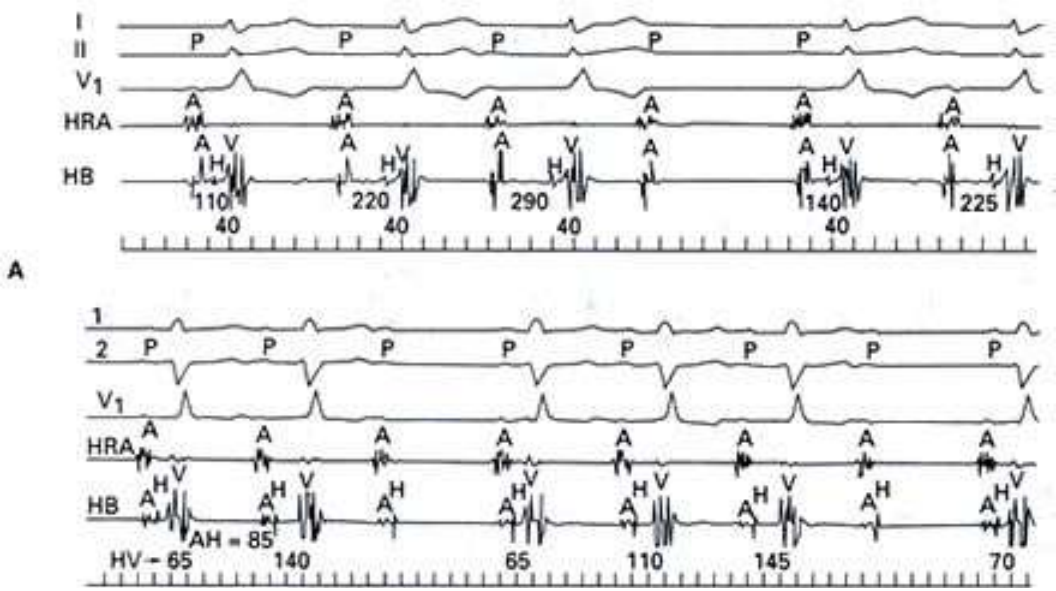
second-degree AV block

Class IIa indication for P/M

- Permanent pacemaker implantation is reasonable for **asymptomatic**
  - second-degree AV block at intra- or infra-His levels found at electrophysiological study. (Level of Evidence: B)
  - asymptomatic type II second-degree AV block with a narrow QRS. (Level of Evidence: B)
  - When type II second-degree AV block occurs with a wide QRS, including isolated right bundle-branch block, pacing becomes a **Class I** recommendation.

ACC/AHA/HRS 2008 Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities. Circ 2008

second-degree AV block type I
Mobitz I or Wenckenbach



usually due to delay in the AV node irrespective of QRS width

TABLE 1. *Site of Second-degree Atrioventricular Block*

Type of block	Normal QRS	BBB
Type I	AVN>>>>HPS	AVN>HPS
Type II	HPS>AVN	HPS>>>>AVN
1:1→2:1; fixed 2:1 or greater	HPS=AVN	HPS>>AVN

Natural History of Chronic Second-degree Atrioventricular Nodal Block

- ECGs in all patients demonstrated episodes of type I second degree block
- electrophysiologic diagnosis of second-degree AV nodal block.
- 34% had no evidence of organic heart disease, and second-degree AV nodal block was considered to be idiopathic
  - None of the patients (with or without syncope) were treated with pacemakers
  - FU:1395 ± 636 days, 1/19 P/M
- 66% had clinically diagnosable organic heart disease
  - FU:1347 ± 825 days, P/M:10/15

- Among our 56 patients with chronic AV nodal block, 18 had an associated intraventricular conduction defect.
  - All these patients had organic heart disease and
  - most presented with either congestive heart failure or syncope

.

BORIS STRASBERG et al

Circ 1981

second-degree AV block type I
Mobitz I or Wenckenbach

- The natural history is related to the presence or absence of organic disease
- it is usually benign in the former and more malignant in the latter
- progression to advanced AV block in this situation is uncommon
- pacing is usually not indicated
- unless the patient is symptomatic.

asymptomatic type I second-degree AV block

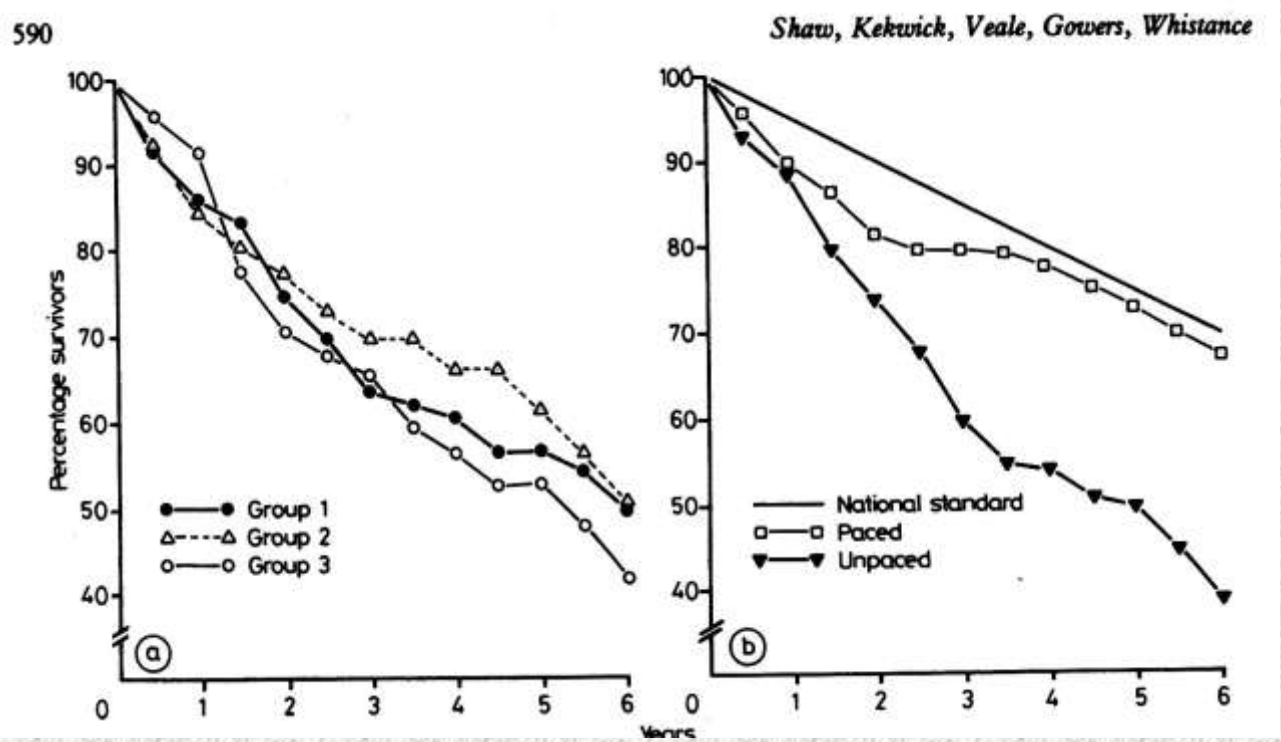
Class III indication for P/M

Permanent pacemaker implantation is not indicated for

- asymptomatic type I second-degree AV block at the supra-His (AV node) level or that
- which is not known to be intra- or infra-Hisian. (Level of Evidence: C)

ACC/AHA/HRS 2008 Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities. Circ 2008

Survival in second degree atrioventricular block



group 1: Mobitz type I block

group 2: Mobitz type II block

group 3: 2:1 or 3:1 block

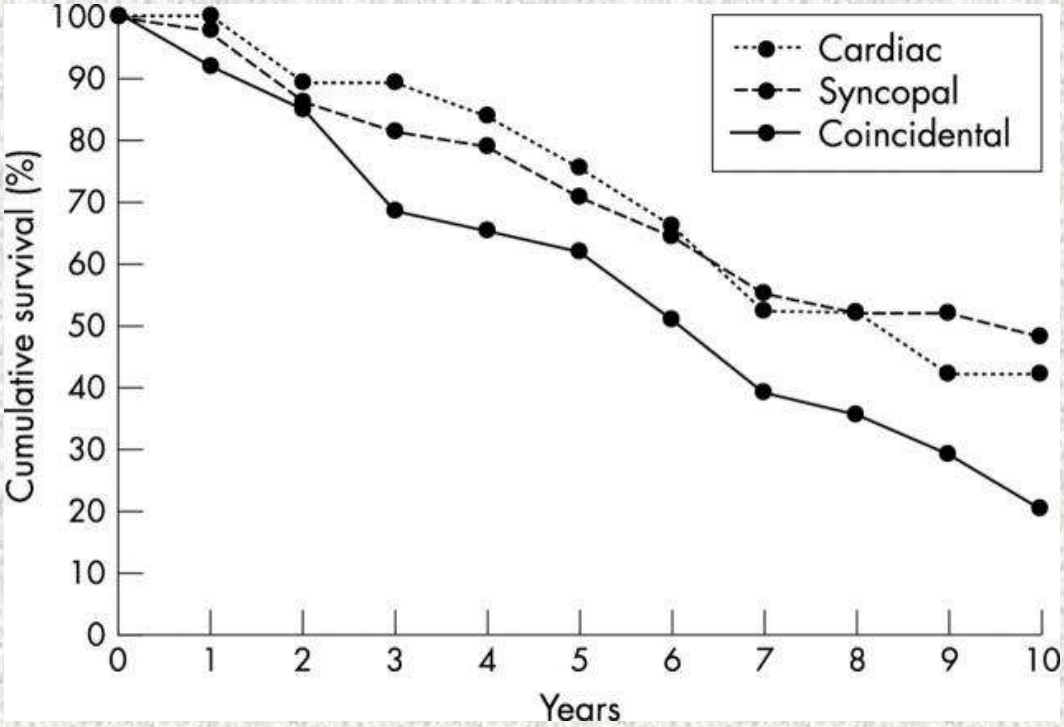
- The presence or absence of bundle branch block did not appear to influence prognosis
- Even patients without major symptoms fared badly if left unpaced.

DAVID B SHAW et al.

Br Heart J 1985

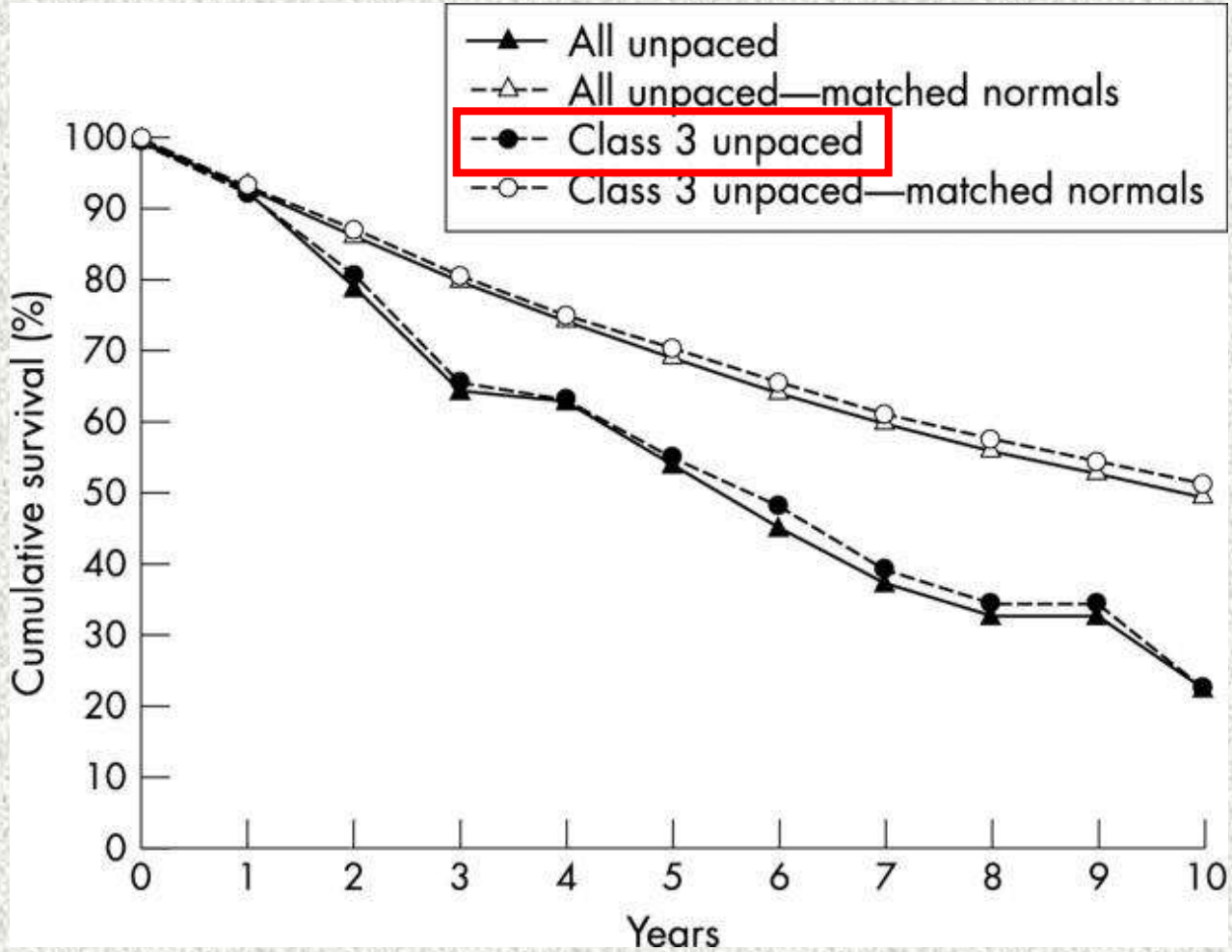
Is Mobitz type I atrioventricular block benign in adults?

- **Syncopal reason** for referral was defined as a disturbance of consciousness (syncope or presyncope)
- **Cardiac reason** was palpitation, breathlessness, chest pain, or suspected cardiac failure
- **Coincidental reason** was discovery of Mobitz I on the preoperative ECG, during the health check, or during an intercurrent infection or other disease



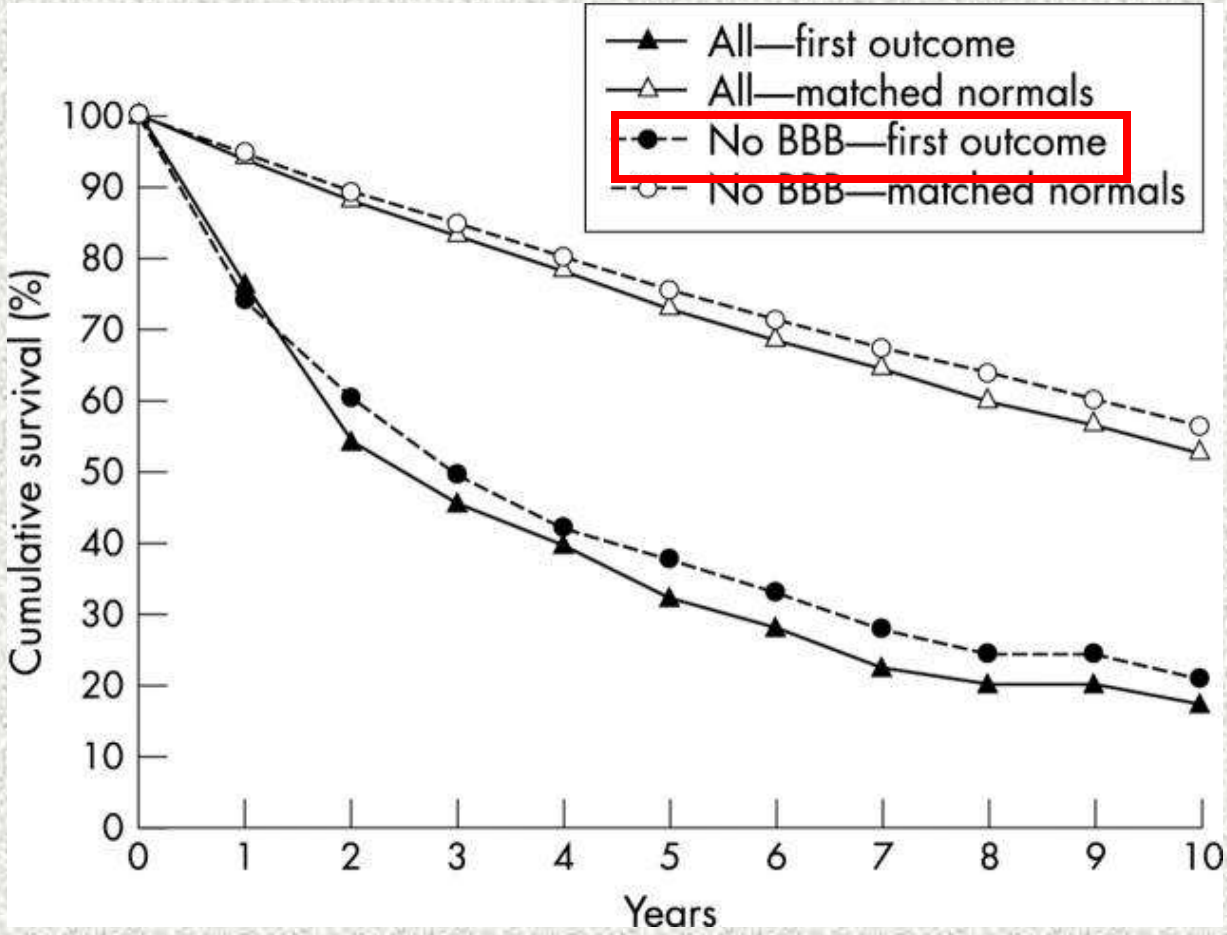
D B Shaw et al. Heart. 2004

Life table survival curves for patients with Mobitz I atrioventricular block who did not receive a pacemaker and for matched normal populations

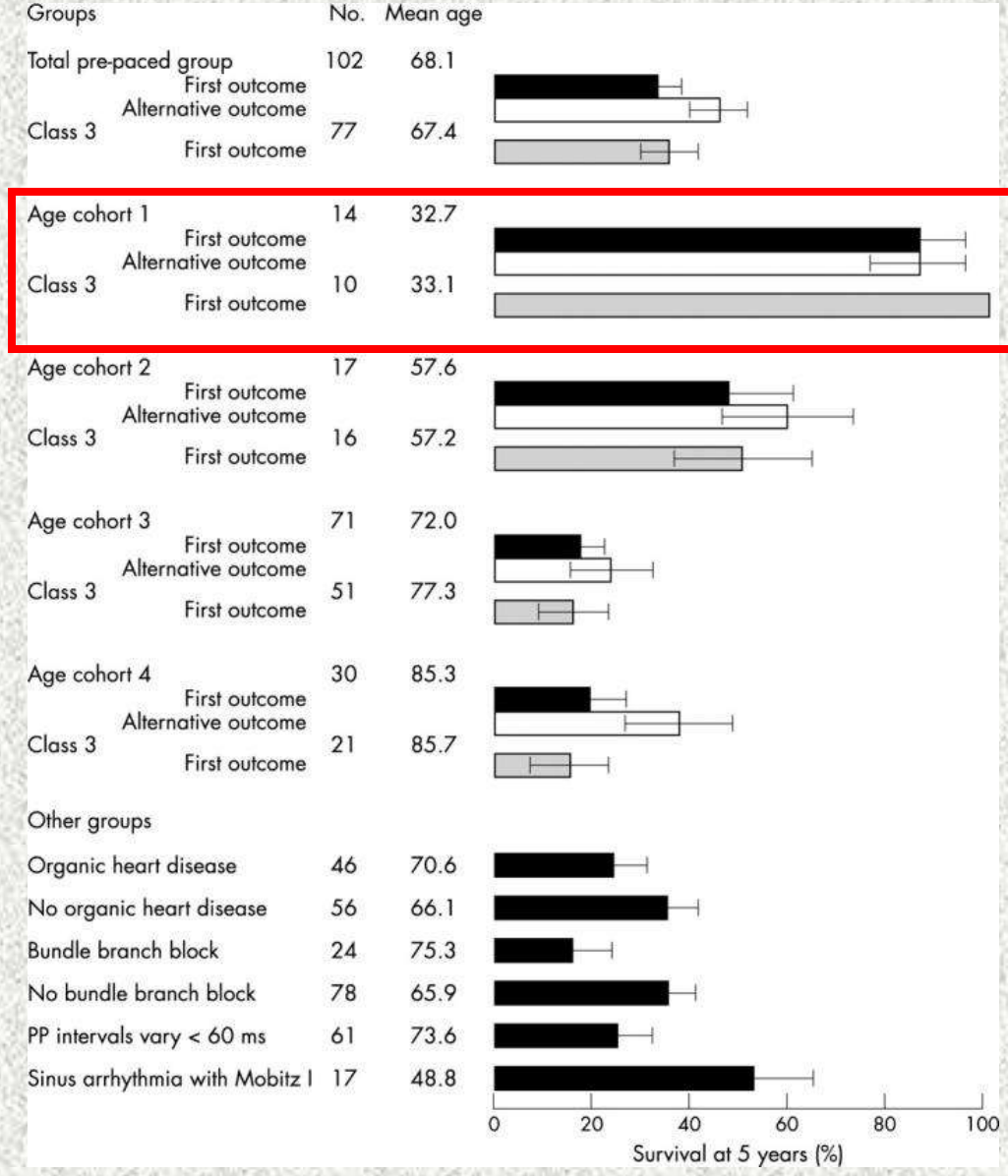


D B Shaw et al. Heart. 2004

Survival to the first outcome (death, deterioration in conduction, or symptomatic bradycardia) in patients with Mobitz I and to death in a matched normal population



D B Shaw et al. Heart. 2004



- Mobitz I was **not benign** in most of those studied who were aged > 45 years

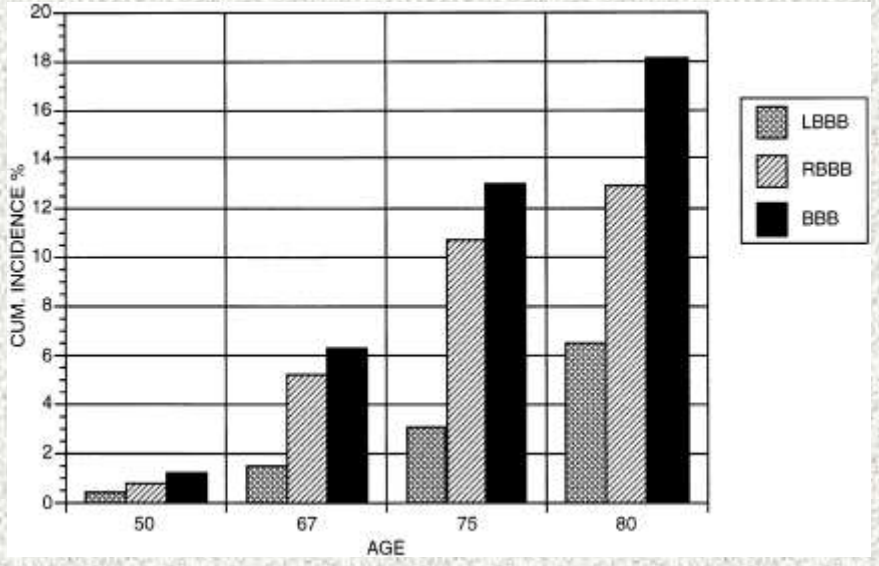
- **In class 3**

  47% of pts with **organic heart disease**

D B Shaw et al. Heart. 2004

Bifascicular blocks
LBBB, RBBB+LAH, RBBB+LPH

- ✓ Prevalence: 1% to 1.5% in the adult population
- ✓ often a manifestation of serious underlying heart disease
- ✓ higher probability of progression to advanced atrioventricular block (AVB) and
- ✓ increased risk of ventricular arrhythmias, which results in an
- ✓ increase in mortality when compared to the general population.



- ❖**bundle-branch block is highly age-dependent,**
- ❖**uncommon (1.2%) at age 50**
- ❖**to becoming common (17%) at age 80 in the same population.**

Eriksson P et al. Circulation 1998;98:2494-2500

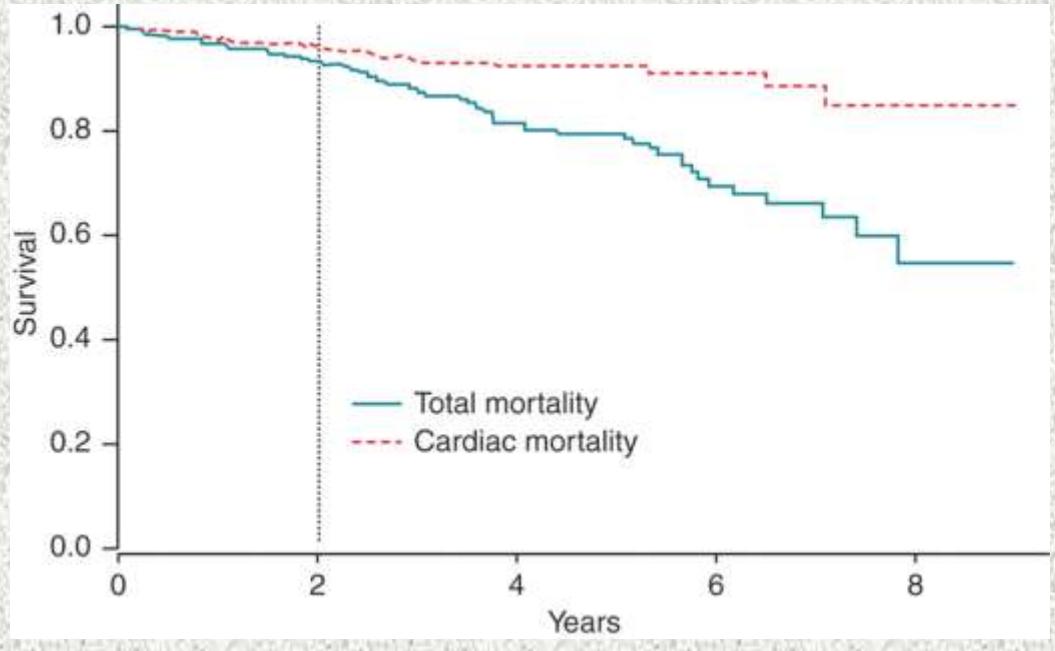
Long-term mortality predictors in patients with chronic bifascicular block.

- Between 1998 and 2006,
- 259 consecutive patients with chronic bifascicular block
- FU: 4.5 years.
- mean age: 73 years,
- 47% structural heart disease,
- LVEF ≤ 35% in 12% of patients,
- 42% impaired renal function.
- prior syncope/pre-syncope (82% of the whole population).

Marti-Almor J et al. Europace 2009;11:1201-1207

Europace

Long-term mortality predictors in patients with chronic bifascicular block.



- death occurred in 20% of patients,
- cardiac death accounting for only about one-third (7%) of all deaths.

Marti-Almor J et al. Europace 2009;11:1201-1207

Europace

Hazard ratio for total and cardiac mortality during the follow-up using bivariate Cox models

Variables	Total mortality (n = 53)	Cardiac mortality (n = 19)
Male	1.03 (0.58–1.84)	1.04 (0.39–2.74)
Age	1.04 (1.01–1.08)	1.0 (0.95–1.05)
Syncope/pre-syncope	1.08 (0.52–2.21)	1.86 (0.43–8.05)
NYHA >II	3.13 (1.79–5.51)	6.93 (2.69–17.87)
Structural heart disease	2.3 (1.31–4.04)	4.45 (1.47–13.42)
Hypertension	1.33 (0.74–2.39)	2.94 (0.85–10.13)
Diabetes	1.16 (0.64–2.08)	1.49 (0.58–3.81)
Dyslipaemia	0.77 (0.41–1.47)	0.66 (0.22–2.01)
Active smoker	1.09 (0.64–1.87)	1.06 (0.43–2.62)
LVEF <35%	2.95 (1.5–5.78)	4.75 (1.77–12.74)
Renal function		
eGFR ≥60 mL/min/1.73 m^2	Reference	
eGFR 40–59 mL/min/1.73 m^2	1.46 (0.78–2.75)	1.46 (0.49–4.35)
eGFR <40 mL/min/1.73 m^2	5.06 (2.54–10.1)	5.82(1.93–17.52)
ECG		
Atrial fibrillation	2.77 (1.18–6.51)	0.05 (indeterminate)
PR interval >200 ms	1.35 (0.75–2.42)	1.48 (0.59–3.72)
Kind of BFB		
LAFB+RBBB	Reference	
LPFB+RBBB	0.46 (0.14–1.53)	0.46 (0.06–3.6)
LBBB	0.9 (0.51–1.61)	1.08 (0.42–2.76)
EPS		
HV interval >70 ms	0.95(0.53–1.69)	1.06 (0.42–2.71)
VT inducibility	2.07 (0.50–8.54)	3.18 (0.42–24.05)

Marti-Almor J et al. Europace 2009;11:1201-1207

Europace

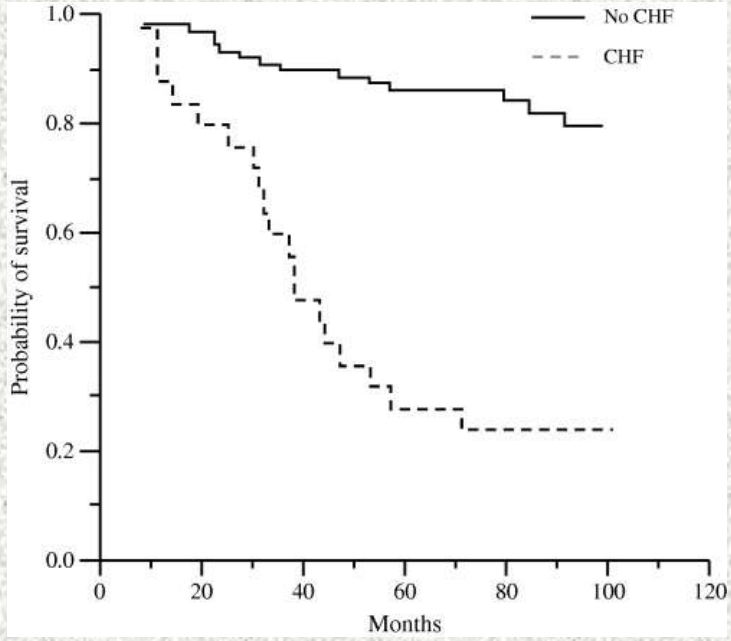
Hazard ratio for total and cardiac mortality during the follow-up using multivariate Cox models

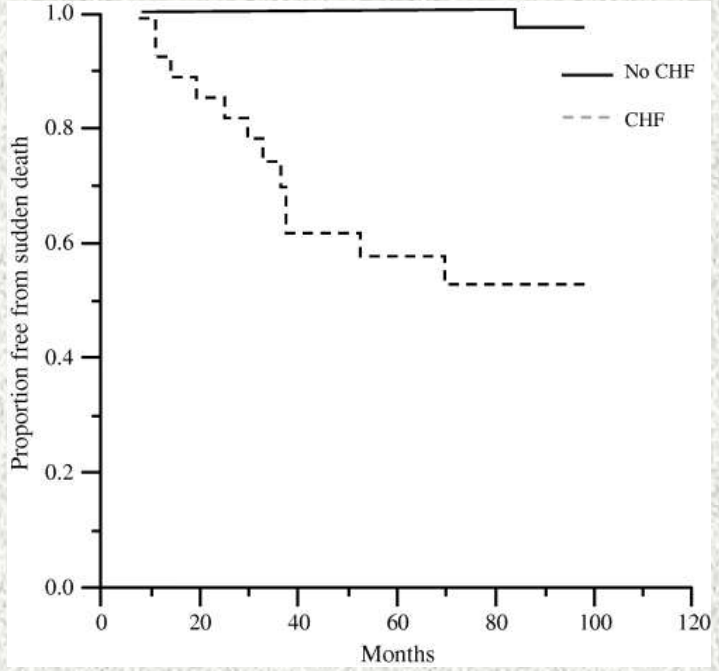
Variable	HR	95% IC	*P*-value
Total mortality			
Age	1.04	1.01–1.09	0.02
Atrial fibrillation	2.96	1.10–7.92	0.03
eGFR <40 mL/min/1.73 m^2	4.29	2.04–9.01	<0.001
NYHA ≥II	2.17	1.05–4.52	0.03
LVEF <35%	2.41	0.99–5.84	0.05
Cardiac mortality			
NYHA ≥II	5.45	2.01–14.82	0.001
eGFR <40 mL/min/1.73 m^2	3.82	1.21–12.06	0.02

Marti-Almor J et al. Europace 2009;11:1201-1207

Europace

Long-term prognosis in patients with bifascicular block – the predictive value of noninvasive and invasive assessment





An annual all-cause mortality and sudden death of 4.7% and 2%, respectively

F. TABRIZI et al. Journal of Internal Medicine July 2006

Long-term prognosis in patients with bifascicular block – the predictive value of noninvasive and invasive assessment

Table 3 Hazard ratios and 95% confidence intervals for different covariates for death from any cause in the study population

Variable	HR	95% CI	*P*-value
Age	1.03	0.97–1.09	0.3
Previous MI	1.09	0.43–2.79	0.9
CHF	4.68	2.03–10.79	<0.001
LV-EF	0.98	0.95–1.01	0.1
Monomorphic VT	0.42	0.12–1.47	0.2

F. TABRIZI et al. Journal of Internal Medicine July 2006

total mortality rate in patients with bifascicular block

- Marti-Almor J et al. Europace 2009: (20.1% in a median follow-up of 4.5 years)
- Tabrizi F et al. J Intern Med 2006: a mortality rate of 33%, half of them due to SCD
- McAnulty JH et al. N Engl J Med 1982: mortality rate among BFB patients of 29%, 42% of which due to SCD
- Dhingra RC et al. Circulation 1981:total mortality of 38% was determined after a 7 year follow-up period, with SCD being mainly responsible for this mortality rate.

total mortality rate in patients with bifascicular block

- higher percentage of patients with structural heart disease and lower LVEF in these previous studies

- Moreover, drugs such as ACE-inhibitors, angiotensin receptor blockers, beta-blockers, or statins, with proven survival benefits, were less frequently administered when these studies were published than currently

Progression of atrioventricular block

- annual incidence of AVB ranging between 5% and 11% according to different series
- In asymptomatic patients, this is lower, ranging from 0.6% to 0.8%

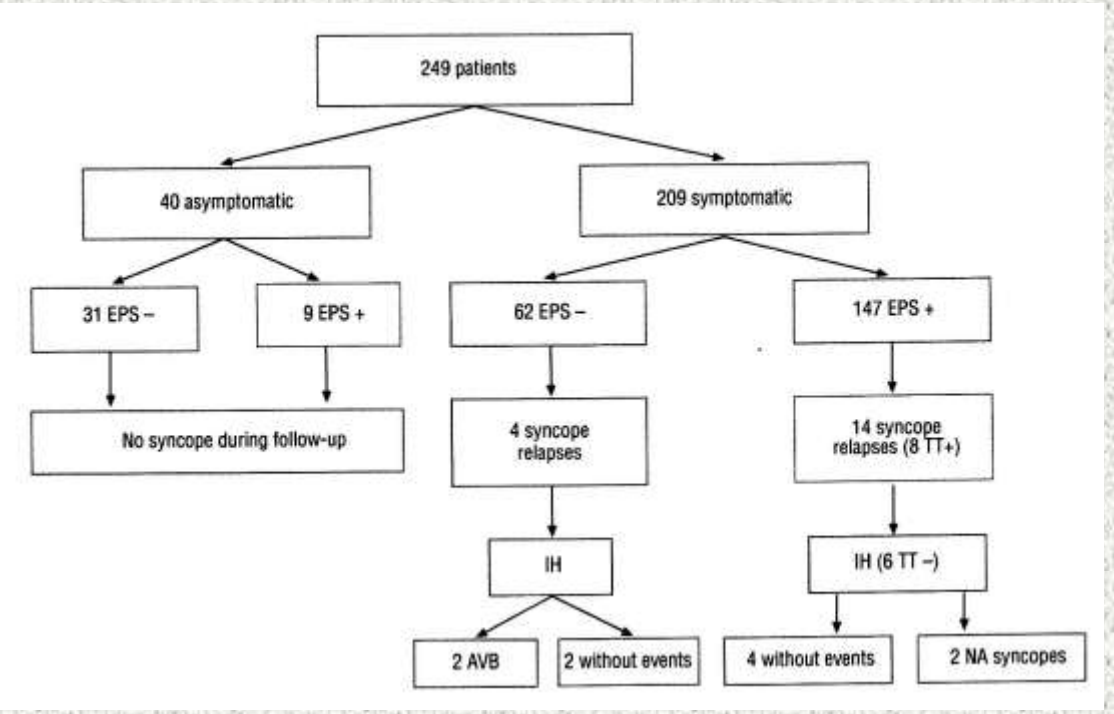
independent predictors of advanced AVB?

- the presence of syncope and documentation of prolonged HV intervals in electrophysiological studies (EPS)

- The progression rate to AV block at 4 years was 4, 12, and 24%, respectively, for patients with an HV interval ,55 ms (normal), 70 ms and 100 ms

- ✓ The sensitivity and specificity of the EPS has been questioned
  - ✓ consensus on the limit value of the HV interval necessary to indicate the implementation of a pacemaker ?
  - ✓ currently accepted value is ≥70 ms in symptomatic patients and ≥100 ms in asymptomatic patients

Novel Predictors of Progression of Atrioventricular Block in Patients With Chronic Bifascicular Block



- 249 patients with BFB
- Mean age, 73.4 years
- median FU: 4.5 years
- 47% had structural heart disease

Martí-Almor J et al. Rev Esp Cardiol. 2010

results

- no difference in the HV interval between different types of BFB

- HV interval was higher in patients with
  - structural heart disease (68), compared to patients without heart disease (64) and
  - Patients with CF ≥II had a significantly higher HV interval (71), than patients in FC I (64)

Martí-Almor J et al. Rev Esp Cardiol. 2010

TABLE 2. **Multivariate Analysis Using the Cox Regression of the Clinical Variables**

Variable	HR	95% CI	P
Prior clinic	2.88	1.44-5.78	.03
GFRe <60 ml/min/1.73m2	1.5	0.99-2.27	.054
PR>200 ms	2.52	1.62-3.91	<.001
QRS>140 ms	2.68	1.75-4.1	<.001

GFRe indicates glomerular filtration rate.

TABLE 4. **Multivariate Cox Analysis of the Clinical and Electrophysiological Variables for Need of Pacemaker**

Variable	HR	95% CI	P
QRS width >140 ms	2.44	1.59-3.76	<.001
HV>64 ms	6.6	4.04-10.80	<.001
Prior symptoms	2.06	1.03-4.12	.041
GFRe<60 mL/min/1.73m2	1.86	1.22-2.83	.004

GFRe indicates glomerular filtration rate.

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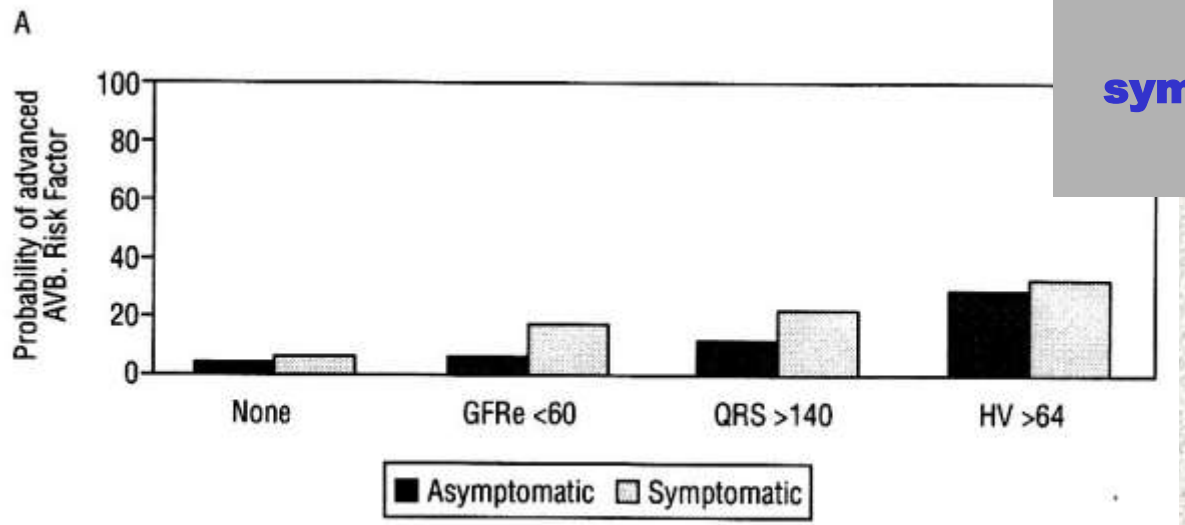
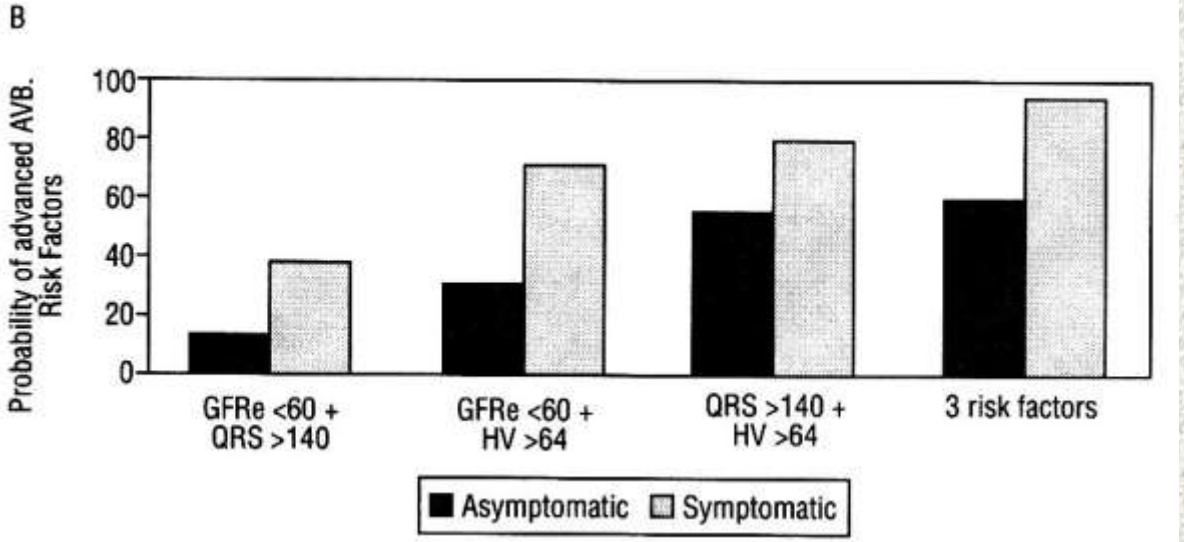
annual probability of requiring a pacemaker in symptomatic and asymptomatic patients





- the most important predictor was the HV interval, although this is only able to predict the need for PM in symptomatic patients in 33%.

- However, if you associate a QRS width > 140 ms, and renal failure, the probability increases to 95% in symptomatic patients and 59% of asymptomatic patients

Martí-Almor J et al. Rev Esp Cardiol. 2010

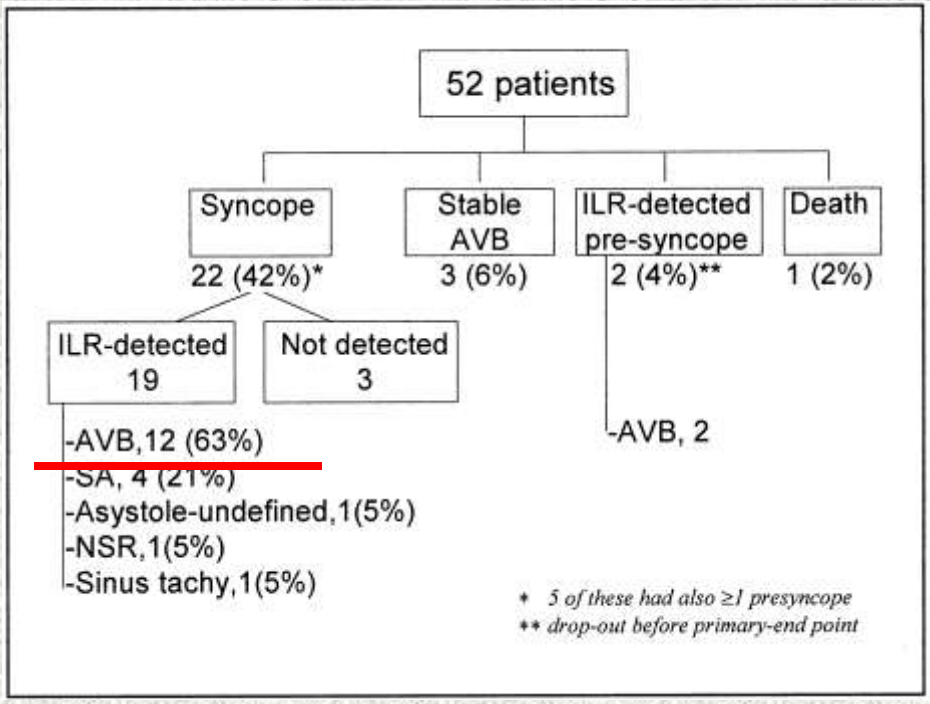
Sensitivity and Specificity of the HV Interval

- the cut-off of 70 ms (guidelines of the ESC 2009)
  - sensitivity of 74% and a specificity of 78%

- a cut-off of HV>64 ms
  - sensitivity increase to 83% and specificity decreased to 70%
  - with a positive predictive value (PPV) of 54% and negative predictive value (NPV) of 91%,
  - with an area under the ROC curve of 0.856 (95% CI, 0.81-0.91)

Martí-Almor J et al. Rev Esp Cardiol. 2010

Mechanism of Syncope in Patients With Bundle Branch Block and Negative Electrophysiological Test



- a negative EPS cannot rule out a paroxysmal AV block as the cause of syncope
- 33% of the patients with a negative study had a documented episode of AV block

Brignole M et al. Circulation 2001;104:2045-2050

Significance of chronic bifascicular block without apparent organic heart disease

TABLE 3. *Comparative Electrophysiologic Data in Primary Conduction Disease and Organic Heart Disease Patients*

	PCD (n = 86)			OHD (n = 366)			
	Range	Mean ± SEM	No. of pts.	Range	Mean ± SEM	No. of pts.	*p*
Heart rate (beats/min)	40–110	74 ± 1.4	86	19–147	77 ± 0.84	366	NS
AH interval (msec)	55–188	96 ± 2.9	82	45–402	110 ± 2.4	357	<0.01
Prolonged AH interval (> 130 msec)			6 (7%)			54 (15%)	<0.02
HV interval (msec)	24–100	50 ± 1.5	86	30–125	55 ± 0.74	366	<0.005
Prolonged HV interval (> 55 msec)			18 (21%)			150 (41%)	<0.001
Atrial ERP (msec)	140–390	254 ± 6.9	59	170–370	260 ± 3.5	227	NS
AV Nodal ERP (msec)	230–440	337 ± 9.9	33	220–420	363 ± 6.9	125	NS
VSCS ERP (msec)	350–530	490 ± 21.2	8	340–750	476 ± 31.0	14	NS
Sinus recovery time (msec)	600–1500	1016 ± 19	76	735–4500	1018 ± 19	287	NS

Abbreviations: PCD = primary conduction disease; OHD = organic heart disease; ERP = effective refractory period; VSCS = ventricular specialized conduction system; AV = atrioventricular.

RC Dhingra et al. Circ 1979

spontaneous progression of conduction disease

- strong association of prolonged HV interval and severity of organic heart disease in patients with chronic bifascicular block
- the risk of developing spontaneous AV block in patients with primary conduction disease was significantly lower than in those with organic heart disease (1% vs 5%)
- In asymptomatic subjects with chronic bifascicular block, the risk of AV block is low
- and the sensitivity and specificity of a prolonged HV interval in predicting AV block would presumably be low
- His bundle recording would not be indicated as a routine diagnostic procedure.

RC Dhingra et al. Circ 1979

Recommendations for Permanent Pacing in Chronic Bifascicular Block

- Class I:

- Permanent pacemaker implantation is indicated for advanced second-degree AV block or intermittent third-degree AV block. (**Level of Evidence: B)**

- Permanent pacemaker implantation is indicated for type II second-degree AV block. **(Level of Evidence: B)**

- Permanent pacemaker implantation is indicated for alternating bundle-branch block. **(Level of Evidence: C)**

ACC/AHA/HRS 2008 Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities. Circ 2008

Recommendations for Permanent Pacing in Chronic Bifascicular Block

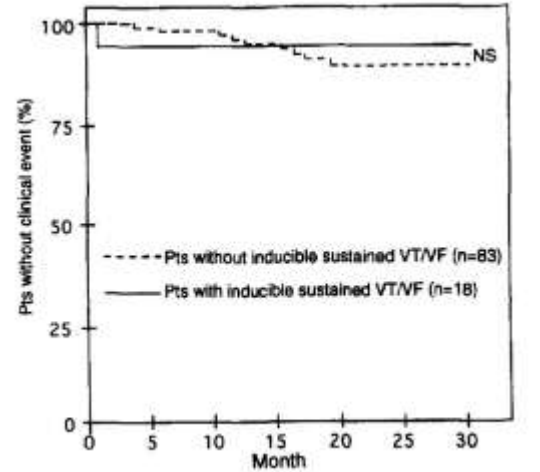
- Class IIa:

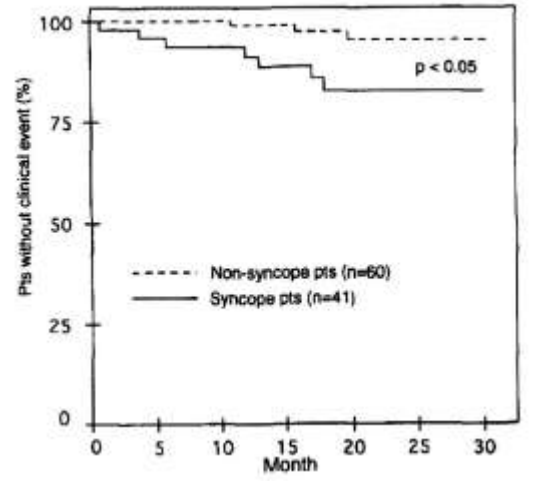
- Permanent pacemaker implantation is reasonable for an incidental finding at electrophysiological study of a markedly prolonged HV interval (greater than or equal to 100 milliseconds) in asymptomatic patients. **(Level of Evidence: B)**

- Permanent pacemaker implantation is reasonable for an incidental finding at electrophysiological study of pacing-induced infra-His block that is not physiological. **(Level of Evidence: B)**

ACC/AHA/HRS 2008 Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities. Circ 2008

Diagnostic value of programmed ventricular stimulation in patients with bifascicular block: a prospective study of patients with and without syncope





- The **inducibility** of ventricular arrhythmias is high in patients with bifascicular block
- **Clinical events** during follow-up were not predicted by programmed ventricular stimulation in either of the two groups.
- The finding of inducible ventricular arrhythmia in patients with bifascicular block should therefore be interpreted with caution.

A Englund et al.

J Am Coll Cardiol, 1995

Συμπεράσματα

- Οι ασθενείς με διαταραχές της αγωγής έχουν αυξημένο ποσοστό επίπτωσης καρδιακής νόσου
- Η πρόγνωση τους ως αναφορά την θνητότητα και την επιδείνωση σε πλήρη κκα είναι χειρότερη από τον γενικό πληθυσμό και φαίνεται ότι συσχετίζεται με την υποκείμενη καρδιοπάθεια
- Οι ασυμπτωματικοί χωρίς καρδιακή νόσο ασθενείς έχουν καλύτερη πρόγνωση
- Η ΗΦΜ, ιδιαίτερα σε ασυμπτωματικούς ασθενείς έχει χαμηλή ευαισθησία και ειδικότητα ως προγνωστικό εργαλείο επιδείνωσης της αγωγής αλλά και αιφνίδιου θανάτου από κοιλιακή ταχυκαρδία

Θεραπεύουμε τους ασθενείς και όχι ΗΚΦήματα