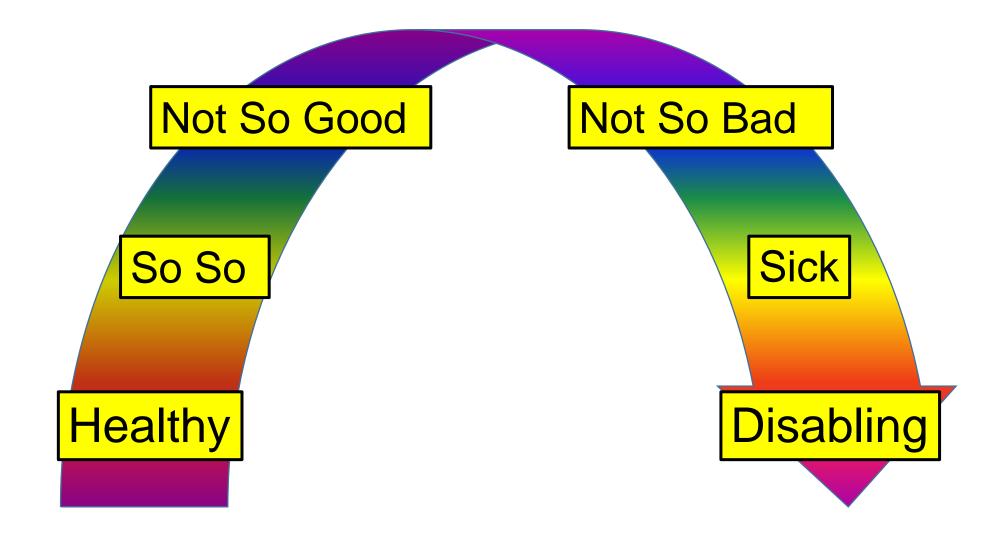
### Asymptomatic 1<sup>st</sup> degree AV block, BBB, or Fascicular block;

Which one is sick heart?

전남대학교병원 순환기내과 박형욱

#### Cardiac conduction disease continuum



#### Effects of aging on the conduction system

- Calcification of the cardiac skeleton
  - : particularly in the region including the central fibrous body and the left-sided valves (aortic and mitral valve rings).
- The AV node, AV bifurcation, as well as the proximal left and right bundle branches are located near the central fibrous body, and are thus vulnerable to slowed signal transmission with increasing age-related changes.

#### Effects of aging on the conduction system

 The PR interval undergoes a modest but significant prolongation with advancing age.

 Mean PR interval occurred between the third and ninth decades of life.

Men VS. Women
153 ms -- 182 ms 148 ms -- 166 ms

## Age-associated changes in the components of atrioventricular conduction in apparently healthy volunteers

- 185 healthy volunteers
- 20-83 years from the Baltimore Longitudinal Study of Aging
- Normal rest (PR interval < 210 ms) and exercise ECGs</li>
- P-R interval increased with age
- Due entirely to prolongation of the interval between the P wave onset and His bundle potential, i.e., the P-H interval
- No age-associated change in the H-V interval, p = NS.
- The P-H interval prolongation with age was localized to the P-R segment proximal to His bundle activation

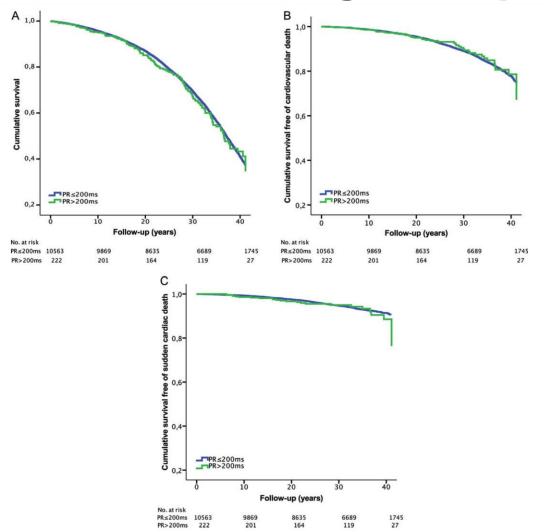
#### Effects of aging on the conduction system

- QRS duration shows no significant age relationship
- QRS axis does shift leftward with age
- Mean QRS axis shift 56 to 8 degrees between the third and ninth decades, with corresponding lower limits shifting from −3 to −60 degrees.
- Left axis deviation (defined as a QRS axis <-30 degrees) increases to 20% by the tenth decade

### The natural history of primary first-degree atrioventricular heart block

- PR interval of > 200 ms
- Usually asymptomatic and is associated with normal aging.
- First-degree AV block in healthy older men; 3-4 %
- Resting ECGs of 3983 healthy airmen
- Followed for 30 years
- By the seventh decade, 20% of study participants had a PR interval of at least 200 ms but a PR interval ≥ 220 ms was seen in only 4% of this group
- No significant differences in cardiac morbidity or mortality were observed in these latter individuals compared to age-matched controls during 30 years of follow-up

### Prognostic significance of prolonged PR interval in the general population



" In the middle-aged general population, prolonged PR interval normalizes in a substantial proportion of subjects during the time course, and it is not associated with an increased risk of allcause or cardiovascular mortality "

#### Long-term Outcomes in Individuals with a Prolonged PR Interval or First-Degree Atrioventricular Block

- 20-year follow-up data from 7,575 individuals in the Framingham study (mean age 46 ± 15 years at baseline)
- Increased risks of atrial fibrillation, pacemaker implantation, and all-cause mortality associated with PR interval prolongation, even within the normal range.

# First-degree atrioventricular block is associated with heart failure and death in persons with stable coronary artery disease: data from the Heart and Soul Study

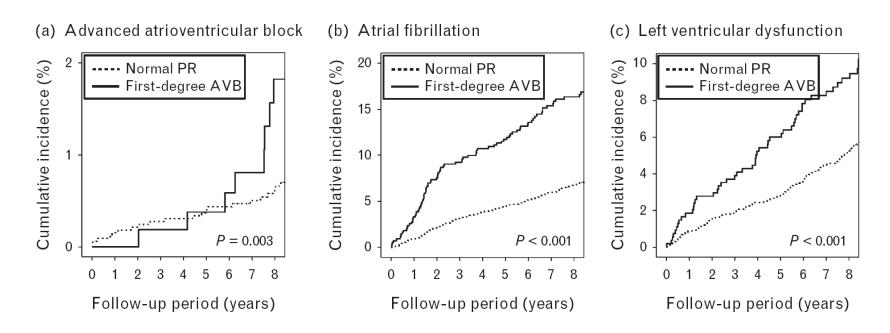
- 938 patients with known stable coronary disease and mean age 66 years
- First-degree AV block (defined as a PR interval ≥ 220 ms) and an increased risk of both heart failure hospitalization, and overall mortality over a 5-year follow-up period

# First-degree atrioventricular block is associated with advanced atrioventricular block, atrial fibrillation and left ventricular dysfunction in patients with hypertension

- 3816 (mean age, 61.0±10.6 years; men, 47.2%) with HTN
- Normal PR interval (120 ms<PR <200 ms) and first-degree AVB (PR >200 ms)
- 14.3%, 9.4 ± 2.4 years.
- Incidence and cumulative incidence of advanced AVB, atrial fibrillation and left ventricular dysfunction in patients with firstdegree AVB were significantly higher than in patients with normal PR interval.

# First-degree atrioventricular block is associated with advanced atrioventricular block, atrial fibrillation and left ventricular dysfunction in patients with hypertension

 First-degree AVB is an independent risk factor for future development of advanced AVB, atrial fibrillation and left ventricular dysfunction in patients with hypertension



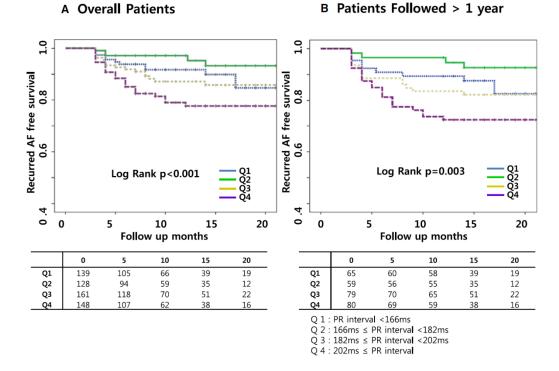
Uhm JS, et al. Journal of Hypertension 2014, 32:1115–1120

### Prolonged PR Interval Predicts Clinical Recurrence of Atrial Fibrillation After Catheter Ablation

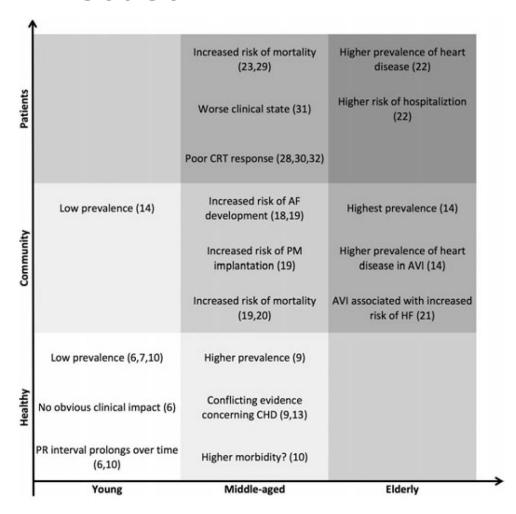
- 576 patients with AF who underwent RFCA.
- 4 groups based on the quartile values of the PR interval (166, 182, and 202 ms),
- Left atrium (LA) volume (CT; Computed tomography), LA voltage (NavX), and clinical outcome of AF ablation.
- Q4 had the greatest LA dimension and volume index and lowest LA appendage-emptying velocity and LA voltage compared with the others.

## Prolonged PR Interval Predicts Clinical Recurrence of Atrial Fibrillation After Catheter Ablation

 The PR interval was closely associated with advanced LA remodeling due to AF, and had a noninvasive significant predictive value of clinical recurrence of AF after RFCA



### First-Degree AV Block—An Entirely Benign Finding or a Potentially Curable Cause of Cardiac Disease?



"Prognostic significance of first-degree AV block may differ, depending on whether cardiac disease is present"

#### Right bundle branch block

- Framingham Heart Study
- the incidence of RBBB peaked in men in the seventh decade, while a continued rise occurred in women throughout the study period
- **1.3%**
- subsequent incidence of coronary artery disease was 2.5 times greater (P<0.001) and congestive heart failure was almost 4 times greater (P=0.02) in patients with RBBB compared to those without by the end of the study period.

### Right bundle branch block: long-term prognosis in apparently healthy men

- In the BLSA, RBBB was observed in 39 of 1142 (3.4%) men on resting ECG, of whom 24 (2.1%) had no evidence of associated cardiac disease. Mean age on presentation with, or development of, RBBB was 64 ± 13.5 years.
- In both the BLSA and Framingham cohorts, the diagnosis of RBBB in persons without concurrent clinical heart disease was not associated with major adverse cardiac events

## The epidemiology of right bundle branch block and its association with cardiovascular morbidity-The Reykjavik Study

- In the Reykjavik Study, RBBB increased in prevalence from 0% in persons 30–39 years to 4.1% of men and 1.6% of women 75–79 years old.
- In men but not women, RBBB was associated with cardiomegaly, ischemic heart disease, and arrhythmias on resting ECG.

## The Prognostic Significance of Right Bundle Branch Block: A Meta-analysis of Prospective Cohort Studies; Nineteen cohort studies

General population with RBBB:

Pooled adjusted HR for all-cause mortality was 1.17 Risk of cardiac death (HR: 1.43)

Patients with RBBB and acute MI:

Pooled risk ratio was 2.31 for in-hospital mortality

2.85 for 30-day mortality

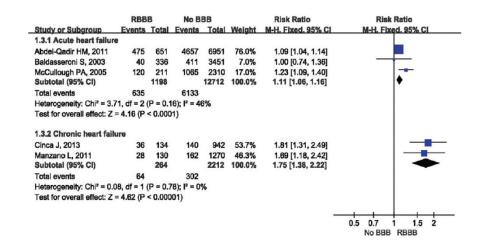
1.96 for longer-term mortality.

- Patients with RBBB and Acute HF
   Pooled risk ratio of all-cause mortality was 1.11
- Chronic HF patients; 1.75

#### The Prognostic Significance of Right Bundle **Branch Block: A Meta-analysis of Prospective Cohort Studies; Nineteen cohort studies**

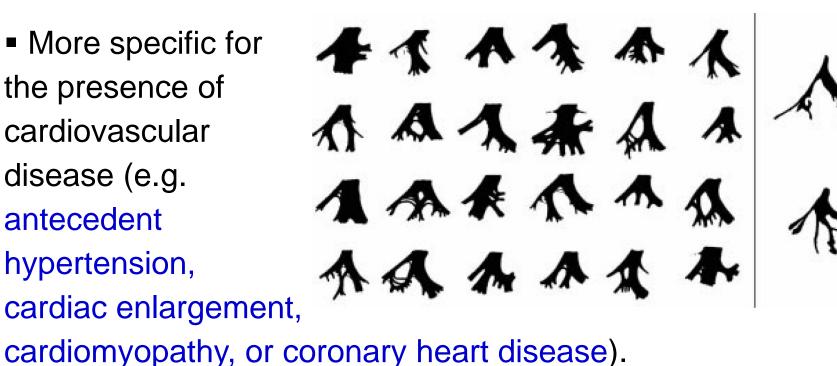
			RBBB	No BBB		Hazard Ratio	Hazard Ratio
Study or Subgroup	log[Hazard Ratio]	SE	Total	Total	Weight	IV. Fixed, 95% C	IV, Flxed, 95% Cl
Bussink BE, 2013	0.217	0.0858	166	17651	56.2%	1.24 [1.05, 1.47]	<b>=</b>
Eriksson P, 2005	-0.1328	0.2466	70	7322	6.8%	0.88 [0.54, 1.42]	<del></del>
Hesse B, 2001	0.4186	0.165	190	6733	15.2%	1.52 [1.10, 2.10]	
Stein R, 2010	0.1215	0.4055	23	8024	2.5%	1.13 [0.51, 2.50]	<del></del>
Taniguchi M, 2003	0	0	36	2686		Not estimable	
Zhang ZM, 2012	-0.1133	0.1465	534	52663	19.3%	0.89 [0.67, 1.19]	
Total (95% CI)			1019	95079	100.0%	1.17 [1.03, 1.33]	<b>♦</b>
Heterogeneity: Chi <sup>2</sup> = 7	'.80, df = 4 (P = 0.10)	); I <sup>2</sup> = 49	%				0.1 0.2 0.5 1 2 5 10
Test for overall effect: 2	Z = 2.45 (P = 0.01)						0.1 0.2 0.5 1 2 5 10 No BBB RBBB

Study or Substrous   Events   Total Private   Total Weight   MeH. Fixed   95% CI   Meh		RBB		No E			Risk Ratio	Risk Ratio
Ahmada A, 2014  Inexaski J, 2009  3 145 8 2062 4.3% 2.35 [2.32,2.86]  Robermann T, 2000  3 145 8 2062 4.3% 2.2% 2.06 [1.66,2.34]  Robermann T, 2001  All 197 247 243 243 243 2.06 [1.66,2.34]  Workmaky P, 2016  Interface and effect 2 = 1.35 (P < 0.00001)  1.2.3 3 0.45 9 0.0% 2.31 [2.13, 2.49]  Interface and effect 2 = 1.35 (P < 0.00001)  1.2.3 0.45 9 0.0% 2.31 [2.13, 2.49]  Interface and effect 2 = 1.35 (P < 0.00001)  1.2.3 0.45 y mortality  Interface and effect 2 = 1.35 (P < 0.00001)  1.2.3 0.45 y mortality  Interface and effect 2 = 1.35 (P < 0.00001)  1.2.3 1.3 Longer-femm mortality  Archbold RA. 1969  8 44 194 1220 0.0% 1.34 [1.60, 2.17]  Robermann T, 2009  Malgarej-Norwon A, 1967 5 135 136 194 1103 0.0% 2.32 [1.2.2, 2.69]  Malgarej-Norwon A, 1967 5 135 194 1103 0.0% 2.32 [1.2.2, 2.69]  Malgarej-Norwon A, 1967 5 135 194 1103 0.0% 2.32 [1.2.2, 2.69]  Malgarej-Norwon A, 1967 5 135 194 1103 0.0% 2.32 [1.2.2, 2.69]  Malgarej-Norwon A, 1967 5 136 194 1103 0.0% 2.32 [1.2.2, 2.69]  Malgarej-Norwon A, 1967 5 136 194 1103 0.0% 2.32 [1.2.2, 2.69]  Malgarej-Norwon A, 1967 5 136 194 1103 0.0% 2.32 [1.2.2, 2.69]  Malgarej-Norwon A, 1967 5 136 194 1103 0.0% 2.32 [1.2.2, 2.69]  Malgarej-Norwon A, 1967 5 136 150 100 100 0.0% 2.25 [1.2.7, 3.59]  No BBB  Sibilative G Subgrous Events Total Femins Total Weight W-H, Random, 95% CI  1.2.1 in hospital mortality  1.2.1 in hospital mortality  1.2.1 in hospital mortality  1.2.2 1.5 4 0.00 0.00 2.00 1.00 2.00 1.00 2.00 1.00 0.00 2.00 1.00 2.00 1.00 0.00 0	Study or Subgroup	Events	Total	Events	Total	Weight	M-H. Fixed, 95% CI	M-H. Fixed, 95% CI
Neessabl J. 2009   30   146   82   1002   3.3%   2.73   187, 3.99								100
Widemark 17, 2006   2418   25207   54.2%   2.2%   2.0%   1.0%   2.3%   2.0%   1.0%   2.0%								
Subtotal (89% CI) 2439 44476 100.0% 2.31 [2.13, 2.49]  **Helerogramity: Chir = 7.08, cf = 4 (P = 0.13), F = 44%  **Total events affect: Z = 21.07 (P < 0.00001)  **L2.23 0.49 mortality  **Helerogramity: Chir = 7.08, cf = 4 (P = 0.13), F = 44%  **Total events affect: Z = 1.08 (P < 0.00001)  **L2.23 0.49 mortality  **Helerogramity: Not applicable  **Total events mortality  **Helerogramity: Not applicable  **Total events mortality  **Helerogramity: Not applicable  **Total events mortality  **Helerogramity: Chir = 4.88, cf = 2 (P = 0.10), P = 57%  **Helerogramity: Chir = 4.88, cf = 2 (P = 0.10), P = 57%  **Helerogramity: Chir = 4.88, cf = 2 (P = 0.10), P = 57%  **Helerogramity: Chir = 4.88, cf = 2 (P = 0.10), P = 57%  **Test for overall effect: Z = 18.60 (P < 0.00001)  **RBBB  **Biblity: or Subgramia: Subgramia: Chir = 1.88, cf = 2 (P = 0.10), P = 57%  **Test for overall effect: Z = 18.60 (P < 0.00001)  **RBBB  **Biblity: or Subgramia: Subgramia: Chir = 1.88, cf = 2 (P = 0.10), P = 57%  **Test for overall effect: Z = 18.60 (P < 0.00001)  **Total events affect: Z = 19.60 (P < 0.00001)  **Total events affect: Z = 1.08, cf = 2 (P = 0.10), P = 57%  **Test for overall effect: Z = 1.80, cf = 2 (P = 0.10), P = 57%  **Test for overall effect: Z = 1.00, cf = 1.00, cf = 1.00, cf = 2.00, cf =								
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Subhotai (8% C) 2439 4476 100.0% 2.31 [2.13, 2.49]  1051 of Subgroup (10% C) 2439 4476 100.0% 2.31 [2.13, 2.49]  11.2 30-40y mortality (10% C) 21.00 (10% 10% 10% 10% 10% 10% 10% 10% 10% 10%								
Total events		61		243				1 7
Helerography: Chi = 7.08, of = 2 (P = 0.13); P = 44% Test for versal effect: Z = 21.07 (P < 0.00001) 1.3.2 30-day montality Waveq CK 2000 1.49 573 1402 15340 100.0% 2.85 [2.46, 3.30] Subtrotal (19% Cl) 149 573 1402 15340 100.0% 2.85 [2.46, 3.30] Subtrotal (19% Cl) 149 1402 Total events 1.2.1 Longer-term montality Archboid RA, 1896 Risemann T, 2008 Risemann R,			2439		46476	100.0%	2.31 [2.13, 2.49]	•
Test for oversial effect: Z = 21.07 (P < 0.00001) 1.2.3 0.day provided (PA = 1.00001) Wang CK 2006 Stricted (19% CD) 149 573 1402 15340 190.0% 2.85 [2.46, 3.30] Wang CK 2006 Stricted (19% CD) 149 573 15340 190.0% 2.85 [2.46, 3.30] Stricted (19% CD) 149 573 15340 190.0% 2.85 [2.46, 3.30] Total events 140 1220 0.0% 1.14 [0.80, 2.17] Norman 7.200 Malagaraph Annual A, 1907 50 132 140 140 1220 0.0% 1.14 [0.80, 2.17] Norman 7.200 No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Stricted (19% CD) No BBB Study of Study of Stricted (19% CD) No BBB Study of Str								
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Total ervenis  Final Property (Chief and Part State Control of the	Wong CK, 2006	149	573	1402	15340	100.0%	2.85 [2.46, 3.30]	
Helerogeneity-Not applicable Test for overall effect: Z = 13.96 (P < 0.00001)  1.3.3 Longer-term mortality 1.3.3 Longer-term mortality 1.3.3 Longer-term mortality 1.3.4 Longer-term mortality 1.3.4 Longer-term mortality 1.3.5 Longer-term mortality 1.3.5 Longer-term mortality 1.3.6 Longer-term mortality 1.3.6 Longer-term mortality 1.3.7 Longer-term mortality 1.3.8 Longer-term mortality 1.3.8 Longer-term mortality 1.3.1 Longer-term mortality 1.3.2 Longer-term mortality 1.3.4 Longer-term mortality 1.3.5 L	Subtotal (95% CI)					100.0%	2.85 [2.46, 3.30]	•
Treat for overall effect: Z = 13.96 (P < 0.0001)  1.31 Longer-ferm mortality Archbold RA, 1989  8	Total events	149		1402				
1.2.3 Longer-term mortality Archbold RA, 1866  4	Heterogeneity: Not applicable							
Archbold RA, 1989 8 44 194 1220 0.0% 1.14 p.80, 2.17]  Melgangin-Moreno A, 1997 55 135 194 9455 2237 0.0% 1.14 p.80, 2.17]  Melgangin-Moreno A, 1997 55 135 194 9410 0.0% 2.32 p.82, 2.96]  Heterogeneity: Chi = 4,85, 61 = 2 (P = 0.10); P = 57%.  Test for overall effect: Z = 18,80 (P < 0.0001)  RBBB No BBB  RBudr or Buberous Frenta Total Frenta Total Weight H. Random 95% CI  12.1 to heapflat moretality  Neesabl J, 2009 30 145 82 1082 0.0% 2.73 p.73, 3.99  Neesabl J, 2009 30 145 82 1082 0.0% 2.73 p.73, 3.99  Neesabl J, 2009 30 145 82 1082 0.0% 2.73 p.73, 3.99  Neesabl J, 2009 30 145 82 1082 0.0% 2.73 p.73, 3.99  Neesabl J, 2009 30 145 82 1082 0.0% 2.73 p.73, 3.99  Neesabl J, 2009 30 145 82 1082 0.0% 2.73 p.73, 3.99  Neesabl J, 2009 30 145 82 1082 0.0% 2.73 p.73, 3.99  Neesabl J, 2009 30 145 82 1082 0.0% 2.73 p.73, 3.99  Neesabl J, 2009 30 149 2418 2.287 0.0% 2.25 p.73, 3.97  Neesabl J, 2009 30 149 2.418 2.247 0.0% 2.25 p.73, 3.97  Neesabl J, 2009 30 149 2.418 2.447 0.9% 2.25 p.73, 3.97  Neesabl J, 2009 30 149 2.73 p.73, 3.99  Neesabl J, 2009 30 1.00 0.00 p.75  Neesabl J, 200 0.00 p.75  Neesabl J, 2009 30 1.00 0.00 p.75  Neesabl J, 2009 3	Test for overall effect: Z = 13	.95 (P < 0	0.00001	)				
No.	1.2.3 Longer-term mortality	,						
No.	Archbold RA, 1998	8	44	194	1220	0.0%	1.14 [0.60, 2.17]	
Meligranip-Moreno A, 1997 55 135 194 1103 0.0% 2.32 [1.62, 2.95]  Stubbota (19% C) 1228 2323  Stellar C, 10 1228 2328 2328  Stellar C, 10 1228 232	Kleemann T, 2008	501	1349	4845	25287			
Total events  504  5033  Test for overall effect: Z = 18.60 (P < 0.0001) P = 57%  Test for overall effect: Z = 18.60 (P < 0.00001)  0.1 0.2 0.5 1 2 5  No BBB  Blady or Bubarosup  Franta Total  Fran	Melgarejo-Moreno A, 1997	55	135	194	1103		2.32 [1.82, 2.95]	
Heterogeneity: Chi* = 4.86, 6f = 2 (P = 0.10); P = 57% Test for overall effect: Z = 18.60 (P < 0.00001)  RBBB No BBB RBB No BBB RBB RBB RBB RBB RBB RBB RBB RBB RB	Subtotal (95% CI)		1528		27610	0.0%	1.95 [1.82, 2.09]	
Test for overall effect: Z = 18.60 (P < 0.00001)  RBBB No BBB  Black or Subarcous French Total French Total Weighb H-H. Randoms 95% CI 1.2.1 in hospital mortality 1.2.1 in hospital mortality 1.2.2 in hospital mortality 1.2.3 in hospital mortality 1.2.4 in hospital mortality 1.2.4 in hospital mortality 1.2.5 in hospital mortality 1.2.6 in hospital mortality 1.2.7 in hospital mortality 1.2.8 in hospital mortality 1.2.8 in hospital mortality 1.2.8 in hospital mortality 1.2.8 in hospital mortality 1.2.9 in hospital mortality 1.2.9 in hospital mortality 1.2.1 in hospital mortality 1.2.2 in hospital mortality 1.2.2 in hospital mortality 1.2.2 in hospital mortality 1.2.2 in hospital mortality 1.2.3 in hospital mortality 1.2.4 in hospital mortality 1.2.5 in hospital mortality 1.2.6 in hospital mortality 1.2.7 in hospital mortality 1.2.8 in hospital mortality 1.2.9 in hospital mortality 1.2.1 in hospital mortality 1.2.2 in hospital mortality 1.2.3 in hospital mortality 1.2.4 in hospital mortality 1.2.3 in hospital mortality 1.2.3 i	Total events	564		5233				
Test for overall effect: Z = 18.60 (P < 0.00001)  RBBB No BBB  Black or Subarcous French Total French Total Weighb H-H. Randoms 95% CI 1.2.1 in hospital mortality 1.2.1 in hospital mortality 1.2.2 in hospital mortality 1.2.3 in hospital mortality 1.2.4 in hospital mortality 1.2.4 in hospital mortality 1.2.5 in hospital mortality 1.2.6 in hospital mortality 1.2.7 in hospital mortality 1.2.8 in hospital mortality 1.2.8 in hospital mortality 1.2.8 in hospital mortality 1.2.8 in hospital mortality 1.2.9 in hospital mortality 1.2.9 in hospital mortality 1.2.1 in hospital mortality 1.2.2 in hospital mortality 1.2.2 in hospital mortality 1.2.2 in hospital mortality 1.2.2 in hospital mortality 1.2.3 in hospital mortality 1.2.4 in hospital mortality 1.2.5 in hospital mortality 1.2.6 in hospital mortality 1.2.7 in hospital mortality 1.2.8 in hospital mortality 1.2.9 in hospital mortality 1.2.1 in hospital mortality 1.2.2 in hospital mortality 1.2.3 in hospital mortality 1.2.4 in hospital mortality 1.2.3 in hospital mortality 1.2.3 i	Heterogeneity: Chil = 4.68. d	# = 2 (P =	0.10):	P = 57%				
RBBB   No BBB   No BBB   Risk Ratio   Risk								
Study or Studenous							OL 1 D. H.	
1.2.1 in hospital mortality Whereack J. 2014								
Ahmed A, 2014   158   383   2285   14850   0.0%   2.53   2.32   2.88		Lyeins	100	Lyenia	1004	Hengin	mirth, Ramadan, 2023 C	m-ti. Namouni. 22 A Ci
Nemana   1,200			202	****	****	0.00	2 62 12 22 2 661	
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Medigraphy-Noreno A, 1997 35 135 109 1103 0.0% 2.02 [1.87, 3.67] Wolfmarky P, 2012 61 427 243 345 0.0% 2.56 [1.87, 3.57] Wolfmarky P, 2012 61 427 243 345 0.0% 2.31 [2.13, 2.49] Wolfmarky P, 2012 61 427 243 46476 0.0% 2.31 [2.13, 2.49] Wolfmarky P, 2013 (2.14 2.10) Wolfmarky P, 2014 (2.14 2.10) Wolfmarky P								
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Networpowinty Tau" = 0.01; CPI" = 7.06, df = 4 (P = 0.13); P = 44%   Test for covarial direct 2 = 21.07 (P < 0.00001)     1.2.3 2.0 day mortality   Novg CK, 2000   149 573 1402 15340 0.0% 2.85 (2.46, 3.30)     Studeotal (9% C)	Subtotal (95% CI)		2439		46476	0.0%	2.31 [2.13, 2.49]	
Test for ownsid effect: Z = 21.07 (P = 0.00001)  1.22 36-day mortality Wong CX, 2006  149 573 1402 15340 0.0% 2.85 (2.46, 3.30)  149 1402  1402  1403  1404  1405  1407	Total events	551		5207				
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Substolat (9% C) 573  15340 0.0% 2.85 [2.46, 3.30]  Total events 149 1402  **Heterogeneity: Not applicable Test for oversite effect 2 = 13.85 (P < 0.00001)  1.2.3 Longer-term mortality 7.2.3 Longer-term mortality 7.2.4 Longer-term mortality 7.2.5 Longer-term mortality 7.2.6 Longer-term mortality 7.2.7 Longer-term mortality 7.2.7 Longer-term mortality 7.2.8 Longer-term mortality 7.2.9 Longer-								
Total severis  149  1402  Heterogeneity Not applicable Test for oversit effect: 2 = 13.95 (P < 0.0001)  Archoold RA. 1995  194  194  195  190  190  190  190  190  190  190		149		1402				
Networpensity Not applicable   12.3 Longer-term mortality     13.3 Longer-term mortality     13.4 Longer-term mortality			573		15340	0.0%	2.85 [2.46, 3.30]	
Total for owned affect: Z = 1.36 (P = 0.00001)  1.2.3 Longer-term mortality Archboold RA, 1986 8 44 194 1220 8.3% 1.14 [0.80, 2.17] Archboold RA, 1986 8 44 194 1220 8.3% 1.14 [1.80, 2.07] Resember 1, 2006 8 194 194 194 194 194 194 194 194 194 194				1402				
Archbold RA, 1989 8 44 194 1220 9.3% 1.14 [0.0, 2.17] Weemann T, 2008 501 1349 4845 2287 58.6% 1.94 [1.0, 2.09] Melgamyo-Moreno A, 1997 55 135 194 1103 34.1% 2.32 [1.82, 2.95] Welgamyo-Moreno A, 1997 55 135 194 1103 34.1% 2.32 [1.82, 2.95] Total envels 1528 27819 190.0% 1.38 [1.59, 2.42]  Total envels 48.0 (# 2 - 48.0 (# 2 - 2 (P = 0.10); F = 57%			.00001)					
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Kleemann 7, 2006   501 1349   4845 25287 565%   1.94 [1.00, 2.09]	Test for overall effect: Z = 13.							
Melgamp-Moreno A, 1997 55 135 194 1103 34.1% 2.32 [18.2, 2.95]  ##- Subtotal (19% C) 1528 27919 190.0% 1.96 [1.59, 2.42]  Total events 554 5233  Heterogeneity: "Fut" = 0.02; Chi" = 4.68, df = 2 (P = 0.10; F = 57%	Tost for overall effect: Z = 13. 1.2.3 Longer-term mortality		44	194	1220	9.3%	1.14 (0.60, 2.17)	
Subtotal (95% CI) 1528 27610 100.0% 1.96 [1.59, 2.42]   Total events 564 5233 5233 5234 5256 5256 5256 5256 5256 5256 5256 525	Test for overall effect: Z = 13. 1.2.3 Longer-term mortality Archbold RA, 1998							
Heterogeneity: Tau* = 0.02; Chi* = 4.68, df = 2 (P = 0.10); i* = 57%	Test for overall effect: Z = 13. 1.2.3 Longer-term mortality Archbold RA, 1998 Kleemann T, 2008	8 501	1349	4845	25287	56.6%	1.94 [1.80, 2.09]	
	Tost for overall effect: Z = 13. 1.2.3 Longer-term mortality Archbold RA, 1998 Kleemann T, 2008 Melgarejo-Moreno A, 1997	8 501 55	1349 135	4845 194	25287 1103	56.6% 34.1%	1.94 [1.80, 2.09] 2.32 [1.82, 2.95]	
Test for overall effect: Z = 6.22 (P < 0.00001)	Test for overall effect: Z = 13. 1.2.3 Longer-term mortality Archbold RA, 1998 Kleemann T, 2008 Melgarejo-Moreno A, 1997 Subtotal (95% CI) Total events	8 501 55	1349 135 1528	4845 194 5233	25287 1103 27610	56.6% 34.1% 100.0%	1.94 [1.80, 2.09] 2.32 [1.82, 2.95]	
	Test for overall effect: Z = 13. 1.2.3 Longer-term mortality Archbold RA, 1998 Kongarejo-Moreno A, 1997 Subtotal (95% CI) Total events Heterogenelty: Tau* = 0.02; C	8 501 56 564 ChP = 4.68	1349 135 1528 1, df = 2	4845 194 5233	25287 1103 27610	56.6% 34.1% 100.0%	1.94 [1.80, 2.09] 2.32 [1.82, 2.95]	
01 02 05 1 2 5	Test for overall effect: Z = 13. 1.2.3 Longer-term mortality Archbold RA, 1998 Kongarejo-Moreno A, 1997 Subtotal (95% CI) Total events Heterogenelty: Tau* = 0.02; C	8 501 56 564 ChP = 4.68	1349 135 1528 1, df = 2	4845 194 5233	25287 1103 27610	56.6% 34.1% 100.0%	1.94 [1.80, 2.09] 2.32 [1.82, 2.95]	



#### Left bundle branch block

More specific for the presence of cardiovascular disease (e.g. antecedent hypertension, cardiac enlargement,

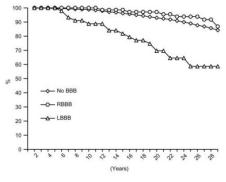


The prognosis is closely tied to that of the underlying heart disease.

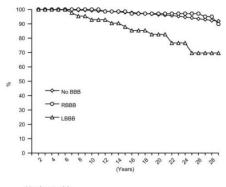
#### Left bundle branch block

- The Irish Heart Foundation (n=110,000)
- Revealing 112 subjects (0.1%) with LBBB and no prior history of hypertension or heart disease.
- Cardiovascular disease developed in more patients with LBBB than in controls (21% vs 11%; P=0.04)

Fahy GJ, et al. Am J Cardiol. 1996; 77(14):1185-90



Year	0	5	10	15	20	25
No BBB	7276	7118	6804	6281	5588	4406
RBBB	70	70	69	64	58	46
LBBB	46	44	38	34	28	19



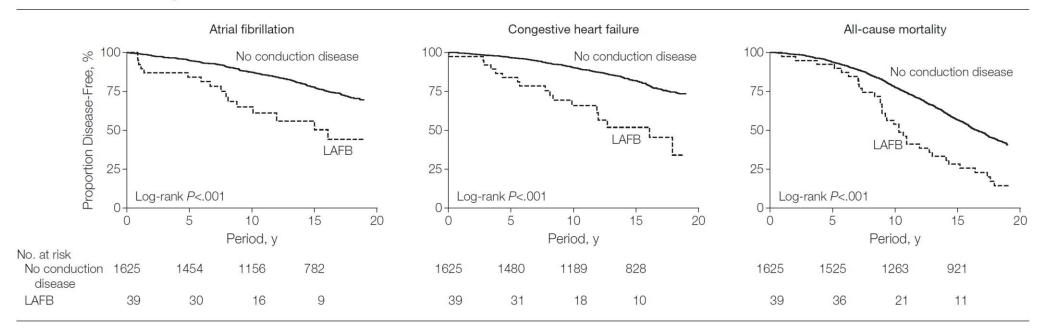
Year	0	5	10	15	20	25
No BBB	7276	7118	6804	6281	5588	4406
RBBB	70	70	69	64	58	46
LBBB	46	44	38	34	28	19

Bundle-branch block in middle-aged men: risk of complications and death over 28 years: The Primary Prevention Study in Go"teborg, Sweden

Eriksson P, et al. EurHeart J 2005; 26: 2300–2306

## Long-term Outcomes of Left Anterior Fascicular Block in the Absence of Overt Cardiovascular Disease

**Figure.** Unadjusted Kaplan-Meier Estimates of Proportions of Individuals With and Without Left Anterior Fascicular Block (LAFB) Developing Atrial Fibrillation, Congestive Heart Failure, or Death



### The resting electrocardiogram as a screening test. A clinical analysis

- Resting ECG predicts cardiac disease?
- Screening ECG is to detect disease whose effects can be prevented by early treatment
- A screening ECG can also serve as a "baseline" tracing. Two studies have shown that the baseline tracing has little effect on decision making in the emergency room.
- The evidence does not support doing a screening ECG in men without evidence of cardiac disease or cardiovascular risk factors.

#### Which one is sick heart?

LBBB; Most sick

#### Which one is sick heart?

- LBBB; Most sick
- RBBB ≈ LAHB;
   cause or effect, modest

#### Which one is sick heart?

- LBBB; Most sick
- RBBB ≈ LAHB;
   Cause or effect, modest
- First degree AV block;
   Possible
   Needs more results

# Thank you for attention