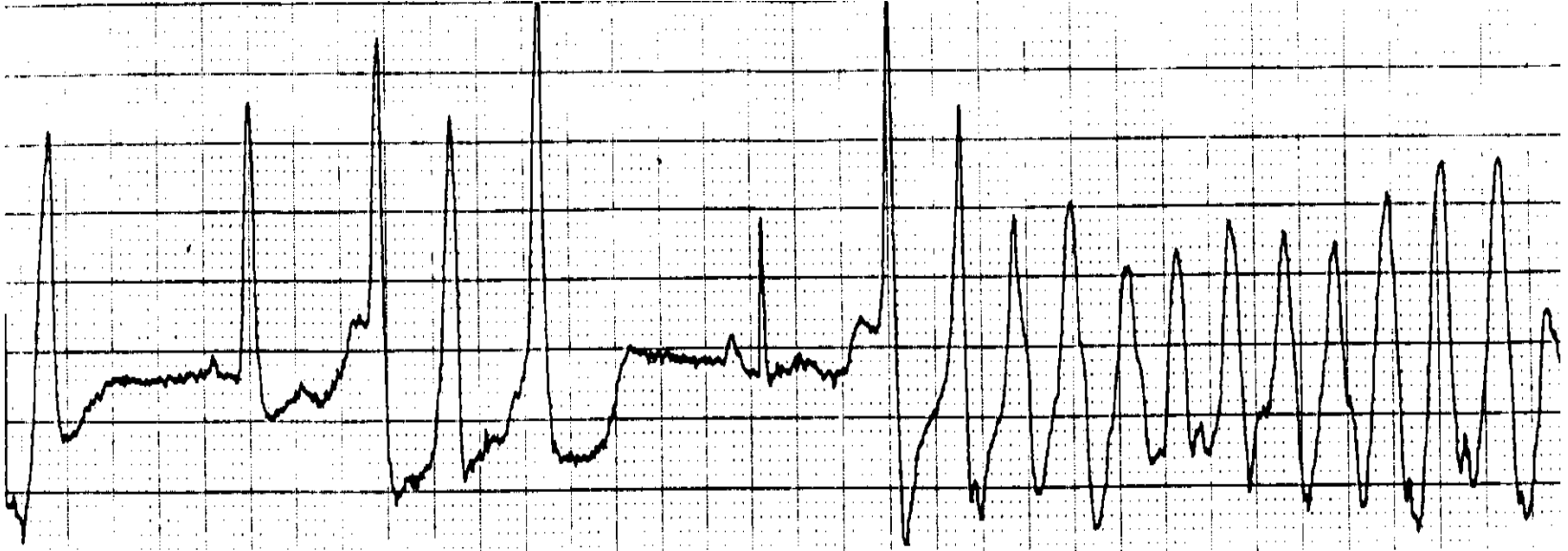


# Therapy In Long QT Syndrome

Spencer Z. Rosero, M.D.



# Torsades De Pointes



# Goals of Therapy

- Reduce risk of arrhythmic events
- Minimize abrupt sympathetic-adrenergic response
- Shorten QT interval
- Improve function of ion channels at the cellular level

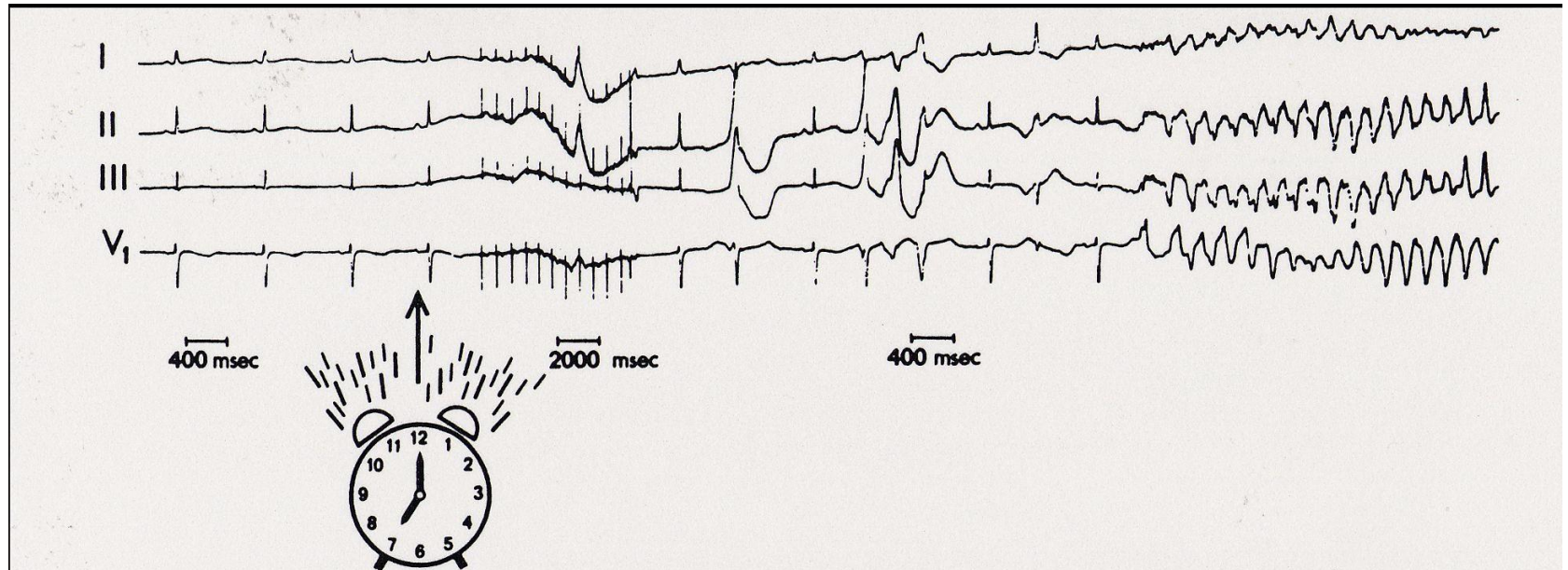


# Approaches to Treatment

- Preventive measures: lifestyle modifications, minimize triggers, avoiding drug interactions
- Anti-adrenergic Therapy
  - 1) Beta-blockers
  - 2) Left cardiac ganglion sympathectomy
- Pacemakers
- Implantable Cardioverter Defibrillators (ICD)
- Gene-specific Therapy
- Gene Therapy



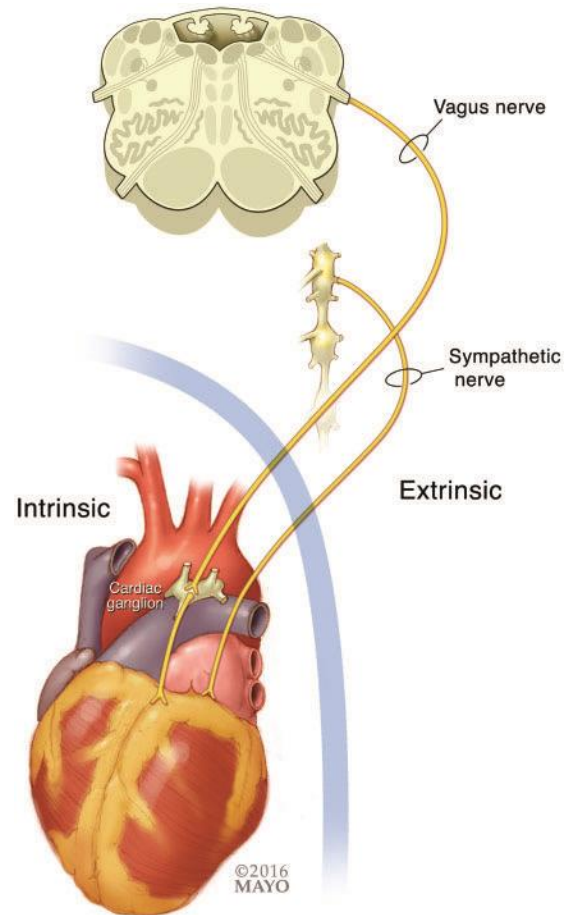
# Triggers: Auditory



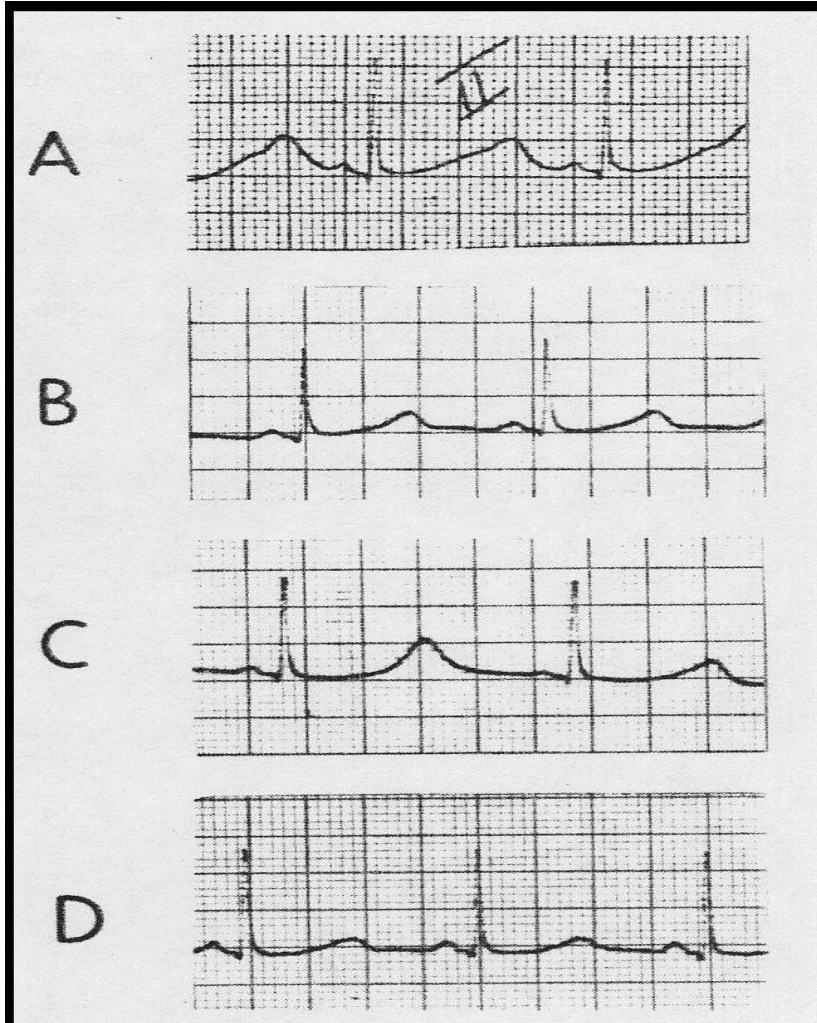
Wellens HJ, Vermeulen D, Durrer D. Circulation 1972;46:661



# Sympathetic Denervation



# Sympathetic Denervation



**Before**

QTc = 0.64

**Left stellate ganglion block**

QTc = 0.46

**Right stellate ganglion block**

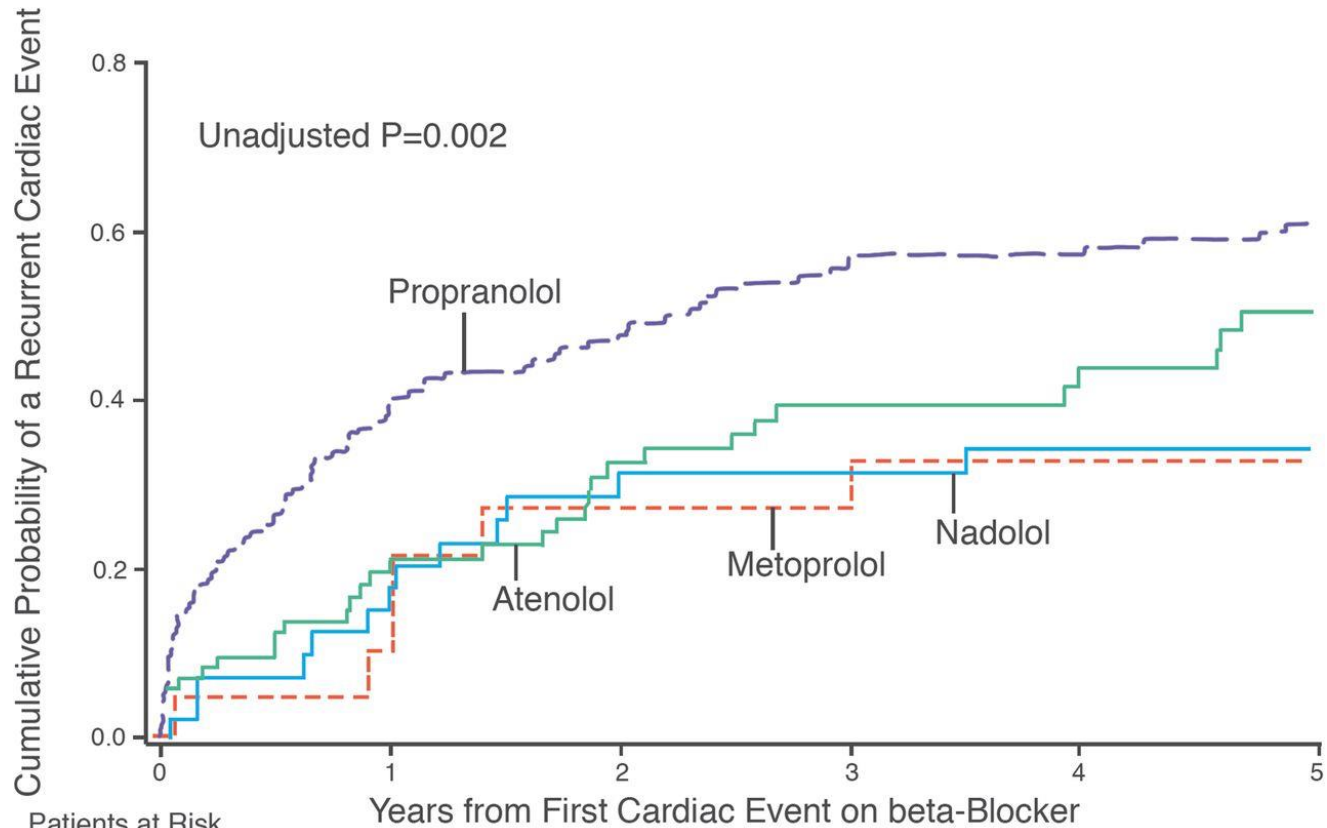
QTc = 0.72

**6 months: left cervicothoracic  
sympathetic ganglionectomy QTc =  
0.44**

Moss AJ, McDonald J. NEJM 1971;285:903-904



# Beta Blockers in LQTS



Patients at Risk	0	1	2	3	4	5
Atenolol	88	53 (0.21)	41 (0.33)	33 (0.39)	26 (0.44)	21 (0.50)
Metoprolol	26	14 (0.22)	13 (0.27)	12 (0.33)	11 (0.33)	9 (0.33)
Propranolol	147	83 (0.40)	69 (0.48)	52 (0.58)	50 (0.58)	45 (0.61)
Nadolol	54	31 (0.18)	25 (0.31)	25 (0.31)	24 (0.34)	21 (0.34)





# Beta Blockers in LQTS

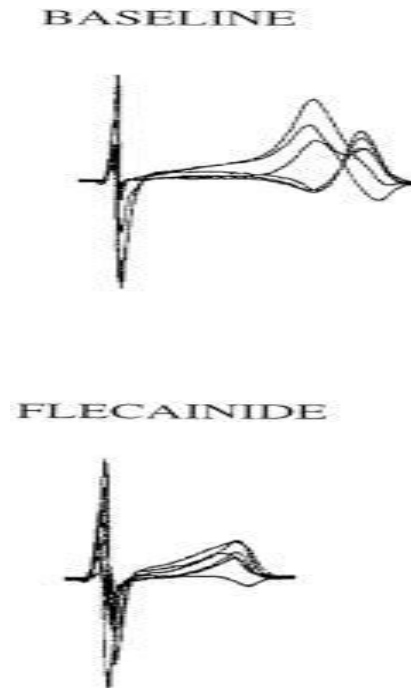
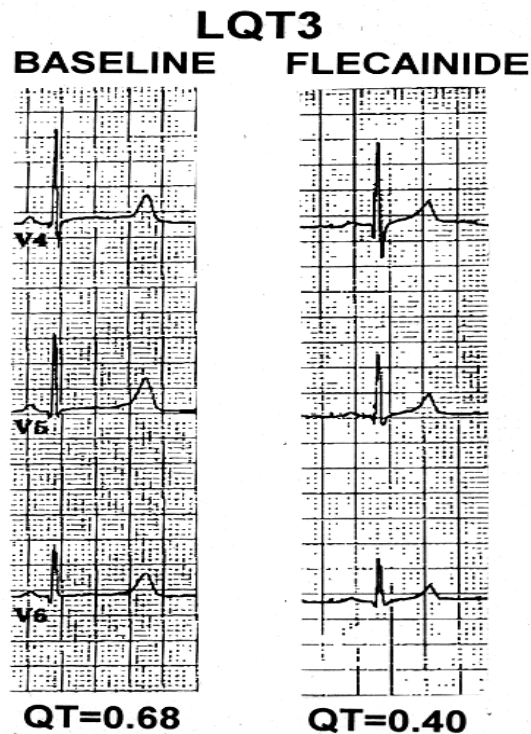
- **LQT1:** the risk reduction for first cardiac events was similar among the four beta-blockers.
- **LQT2:** nadolol provided the only significant risk reduction (hazard ratio: 0.40 [0.16 to 0.98]).
- If prior cardiac event while taking b-blockers, efficacy for recurrent events differed by drug ( $p = 0.004$ ):  
propranolol was the least effective compared with the other b-blockers.

Long QT Syndrome (LQTS)	Class	Level of evidence <sup>*</sup>
Beta-blockers are recommended in patients with a clinical diagnosis of LQTS.	I	Not available
Beta-blockers <i>are recommended</i> in patients with a diagnosis of LQTS who are:	IIa	Not available
a. Asymptomatic with $QTc \geq 470$ ms <i>and/or</i>		
b. Symptomatic for syncope or documented ventricular tachycardia/ventricular fibrillation (VT/VF).		

2013 HRS/EHRA/APHRs Expert Consensus Statement



# Gene-Specific Therapy Flecainide

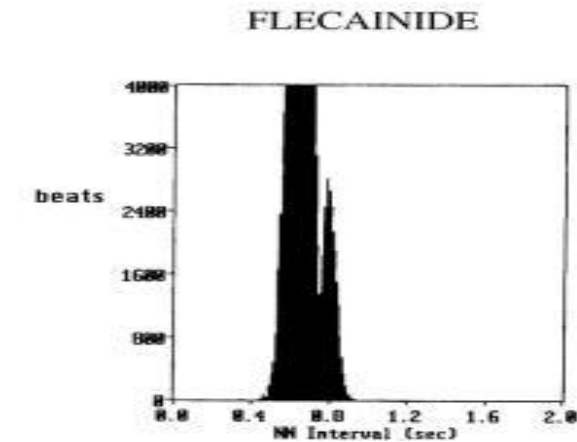
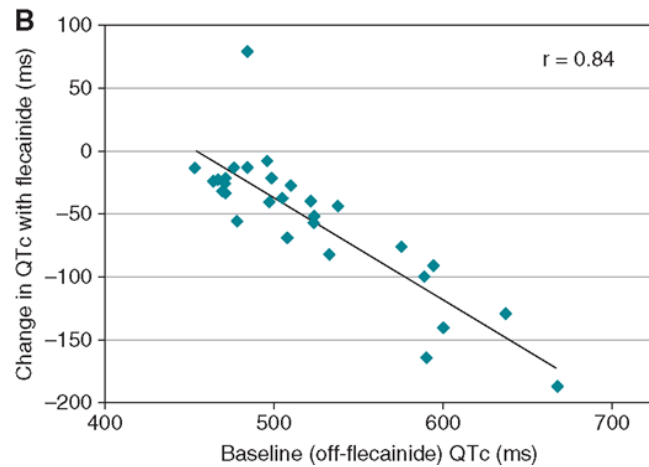
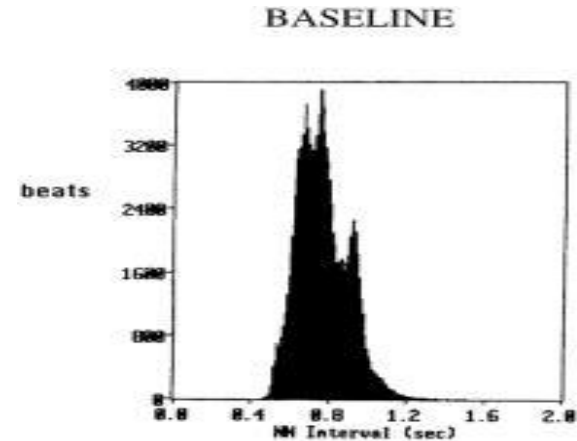
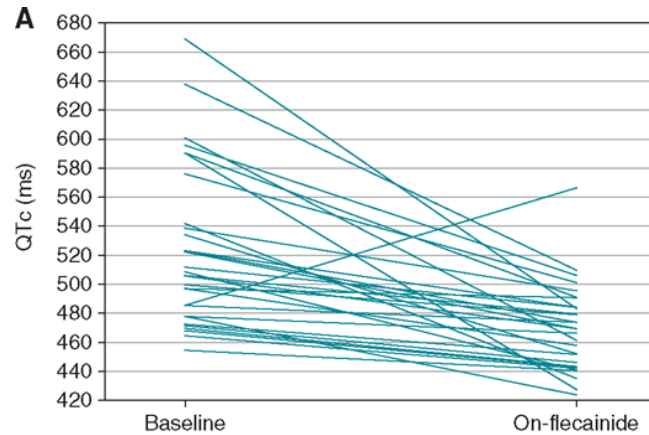


Moss and Zareba 2004

Benhorin J et al. Circulation 2000;101:1698-1706



# Flecainide in LQTS

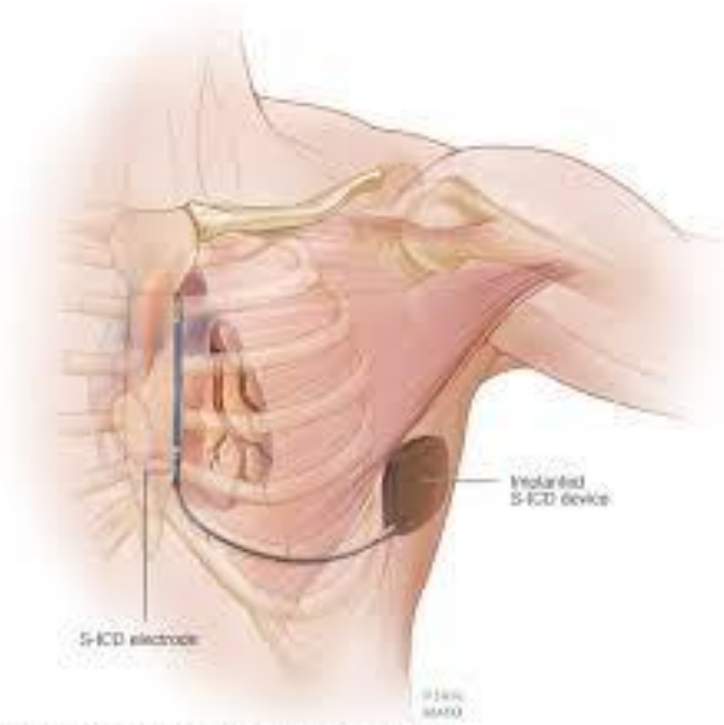
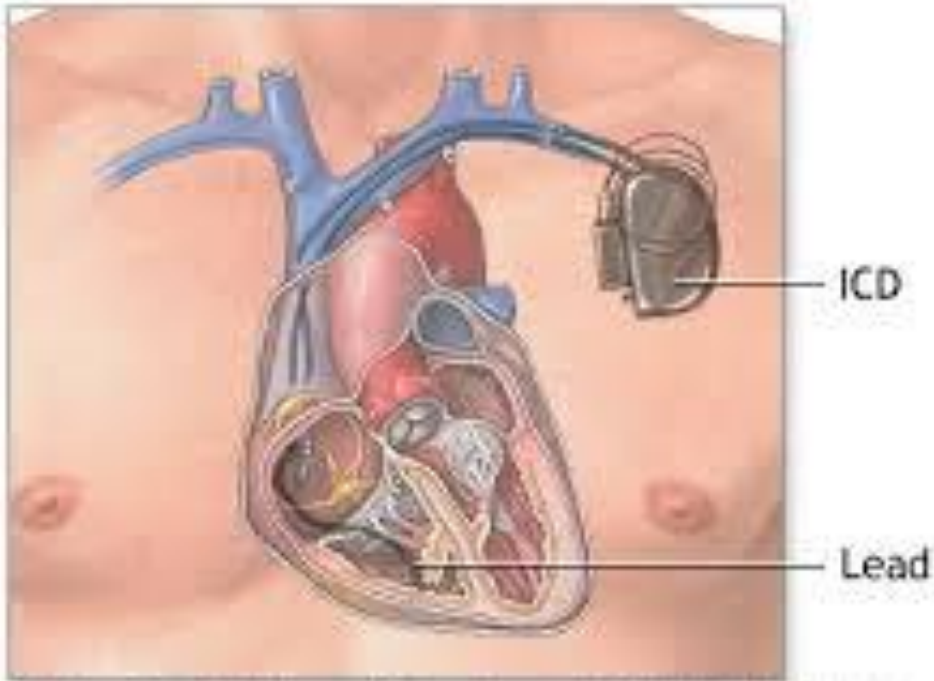


Chorin, e. etal. *Europace* (2018) 20, 370–376

Benhorin J et al. *Circulation* 2000;101:1698-1706

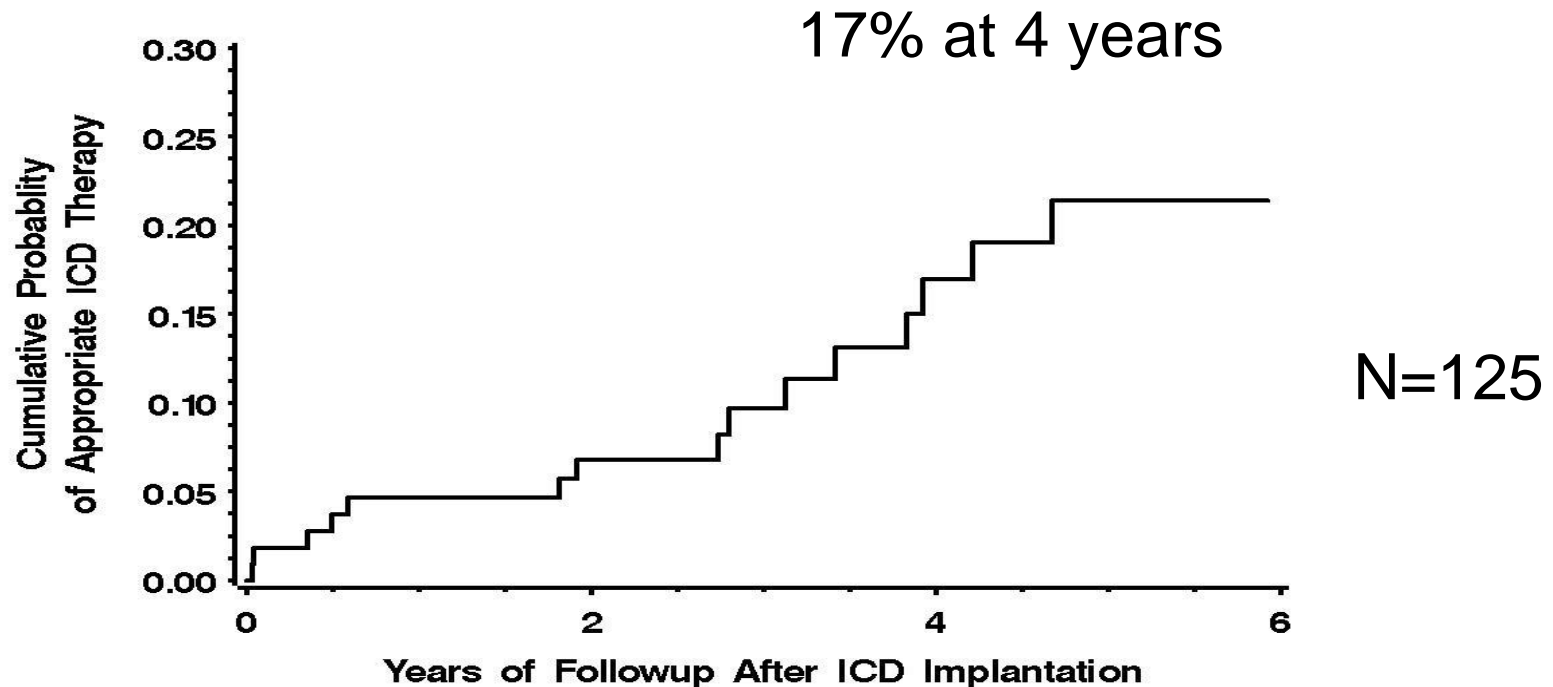


# ICD



# Probability of ICD Therapy

## Prospective LQTS ICD Registry



Zareba et al. J Cardiovasc Electrophysiol 2003;14:337-341



Risk of mortality, mortality at the age of 50 years, and SCD associated with time-varying ICD status in LQTS patients

	No. of deaths/ Total N	HR (95%CI)	P value
Mortality*	389/3035	0.54 (0.34 - 0.86)	0.010
Mortality censored at the age of 50 years	137/3035	0.29 (0.14 - 0.61)	0.001
Sudden cardiac death	116/3035	0.22 (0.09 - 0.55)	0.001

Models were stratified by sex, decade of birth (results of threshold selection and genotype, and adjusted for QTc and time dependent variables including beta blocker use, cardiac events (ACA, syncope, or appropriate ICD shock) that occurred while on BB and off BB, and family history of SCD/ACA.

\*For overall mortality, time-dependent comorbidities including coronary heart disease, heart failure, cancer, diabetes, hypertension, and stroke were additionally adjusted.



# Approaches to Treatment

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