

# Sports and Long QT Syndrome

Spencer Z. Rosero, M.D.



# In LQTS, can Sports.....

-

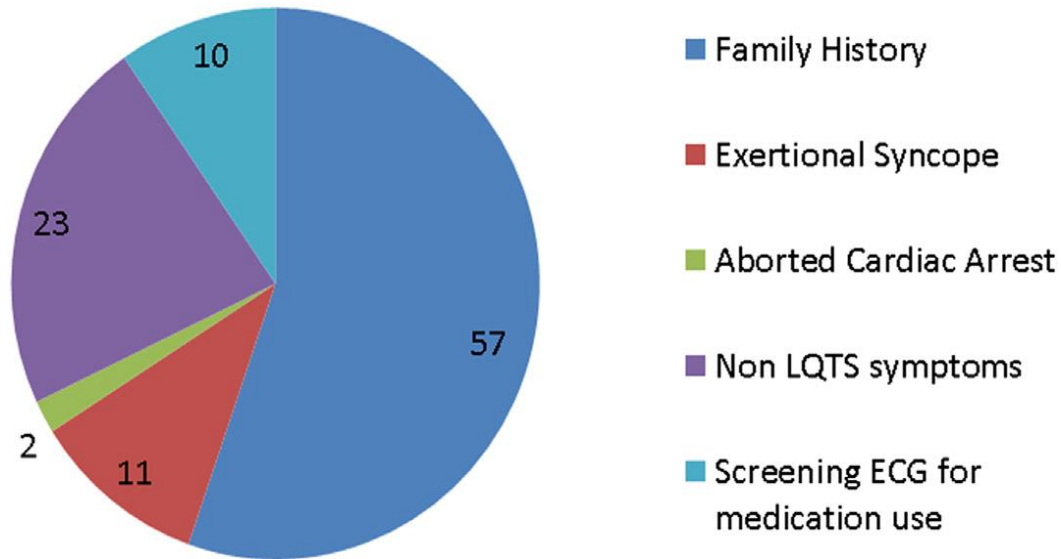
- Increase risk of arrhythmias
- Increase adrenergic state that reduced ICD efficacy
- Cause Inappropriate shocks
- Cause secondary damage to system

+

- Improve quality of life
- Reduce comorbidities: obesity, diabetes, Type II, Sleep apnea, stroke, HTN long term
- Improve Social environment

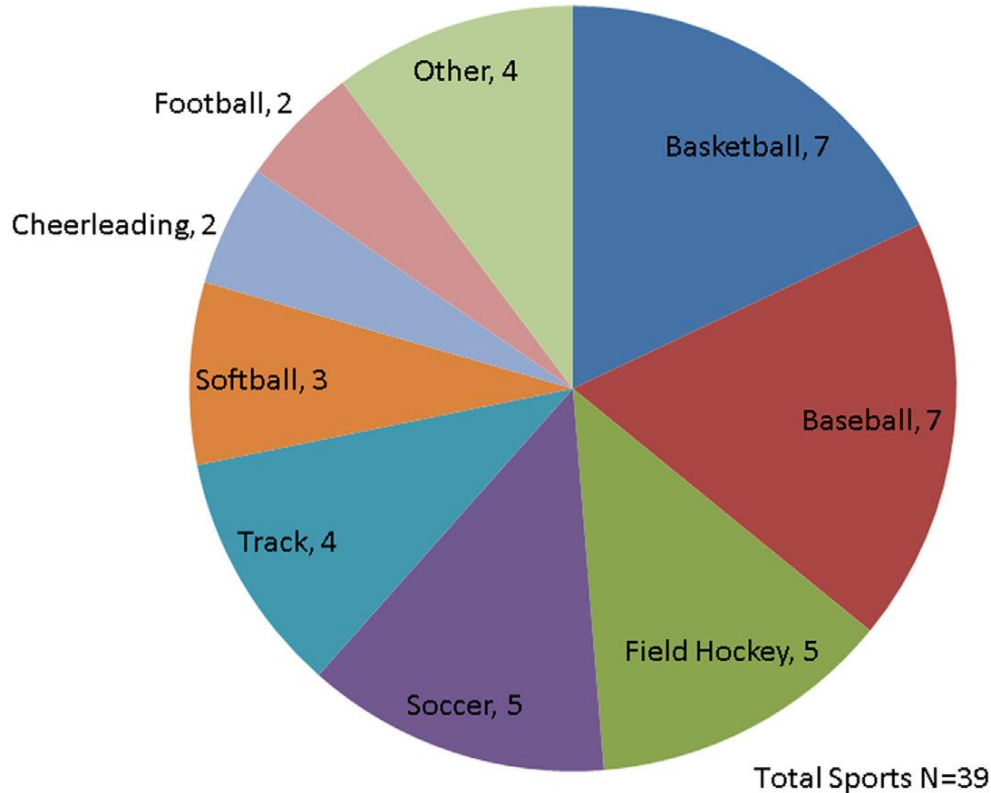


# Genotype Positive-Sports participation



- 1998-2013: Childrens Hospital of Philadelphia
- Most diagnosed between age 7-9 years
- N=212 Genotype +
- N=103 Competitive (26) or recreational sports(77)
- 49% female
- Average QTc (All)=468 msec
- Average QTc (Competitive)=426msec





- Sport type diversified
- No LQTS symptoms during sports in treatment compliant patients
- 755 patient years of follow up
- Average follow up 6.6-7.3 years



# Safety in Sports in Patients with ICD

## Multinational ICD Sports Registry

- Registry: 441 patients age between 2006-2014
- Subgroup 129 athletes: 396 person yrs
- Organized sports/regular competition
- Age 10-21 yrs (median 17 yrs)  
Greater than class 1A

Cardiac diagnosis, n (%)	
Long QT syndrome	49 (38)
Hypertrophic cardiomyopathy	30 (23)
Congenital heart disease	15 (12)
Idiopathic VT/VF (normal heart)	10 (7.8)
Catecholaminergic polymorphic VT	7 (5)
Arrhythmogenic right ventricular cardiomyopathy	6 (5)
Dilated cardiomyopathy	3 (2)
Brugada syndrome	1 (1)
Left ventricular noncompaction	2 (1)
Coronary artery disease	0
Other	6 (4.7)

Saarel et al; Young ICD Patients and Sports: Long-Term Results. *Circ Arrhythm Electrophysiol.* 2018;11:e006305.



# Results

## Out of 129 athletes

- No tachyarrhythmic deaths
- No external resuscitations during or after sports
- No severe injuries resulting from arrhythmia induced syncope/shock
- 29 appropriate shocks in 18 athletes
- 4 individuals received appropriate shock during competition



# Appropriate Shocks during Competition

4 of 129 athletes received appropriate shocks during/after competition

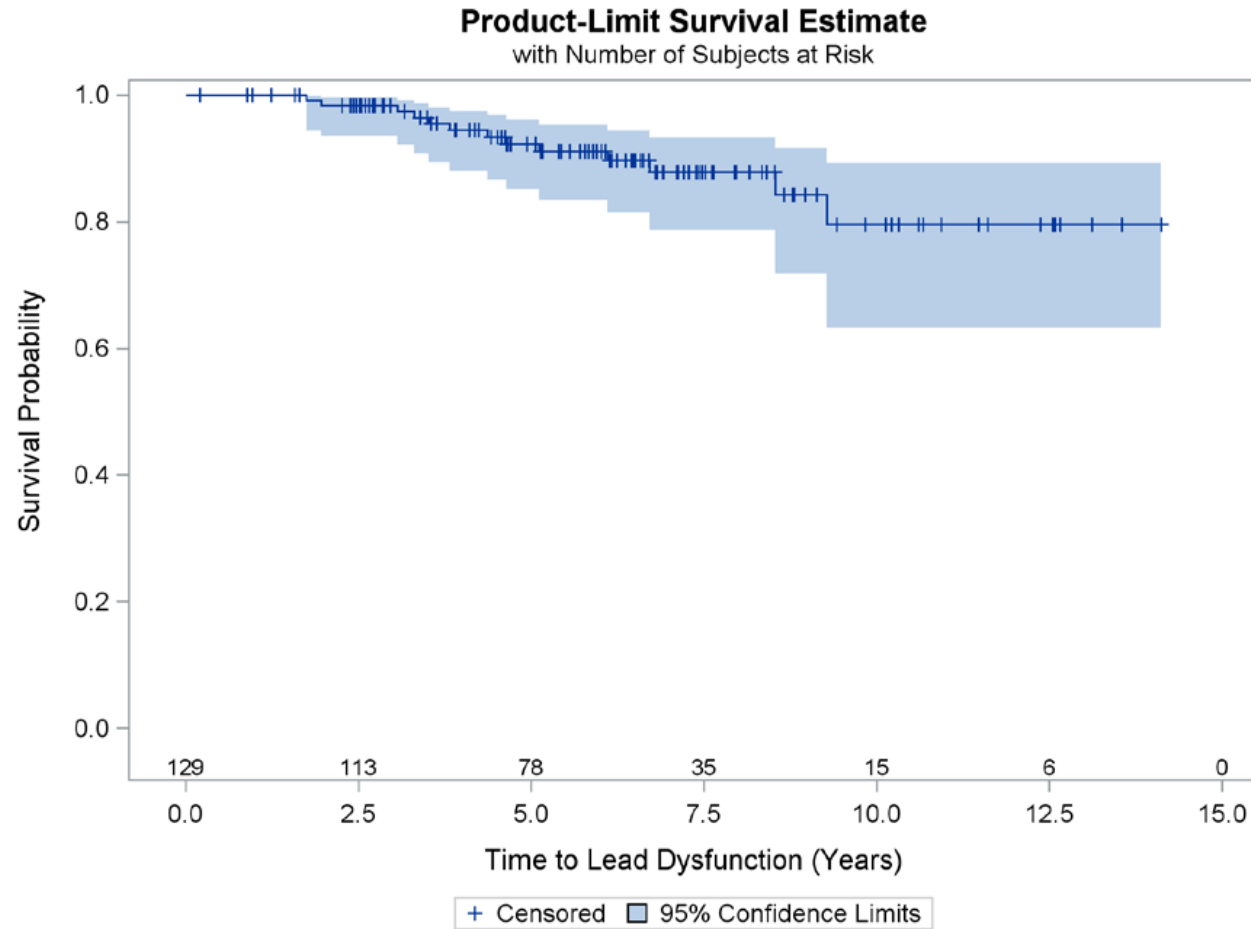
Subject	Age	Sex	Primary Cardiac Diagnosis	ICD Indication	Activity at Time of Shock	Sports Level	Rhythm
1	14	M	Congenital	VF/arrest	Basketball game	High school JV	VF
2	16	F	LQTS	Syncope	Soccer practice	High school varsity	VF
					Soccer game	High school varsity	VF
3	18	M	Idiopathic VT/VF	VF/arrest	Baseball game	College division 3	Storm
					Basketball game		VF
4	15	F	HCM	Prophylactic	Volleyball practice	High school varsity	VT

All arrhythmias were terminated with the first high-energy shock. F indicates female; HCM, hypertrophic cardiomyopathy; ICD, implantable cardioverter-defibrillator; JV, junior varsity; LQTS, long QT syndrome; M, male; VF, ventricular fibrillation; and VT, ventricular tachycardia.

**35% of all athletes received an inappropriate shock at some point**



# ICD-Lead System Longevity





# Shared Decision Making

- It is reasonable for an asymptomatic athlete with genotype-positive/phenotype-negative LQTS, to participate in all competitive sports with **appropriate precautionary** measures
- In symptomatic LQTS or ECG manifest LQTS (i.e., corrected QT interval >470 ms in males or >480 ms in females), competitive sports participation may be considered after institution of treatment and **appropriate precautionary measures** assuming the athlete has been asymptomatic on treatment for at least 3 months
- Except competitive swimming in a previously symptomatic LQT1 host)

AHA/ACC Eligibility and Disqualification Recommendations for Competitive Athletes With Cardiovascular Abnormalities-Cardiac Channelopathies  
Ackerman et al. JACC [Volume 66, Issue 21](#), 1 December 2015, Pages 2424-2428



# Appropriate Precautions

**CredibleMeds Mobile Apps Available Now!**

Available for Apple iOS, Android and Windows Mobile devices

- Convenient mobile access to the QTdrugs database for healthcare providers and patients
- Instant access to latest revisions to the QTdrugs lists



		Temperature (°F)															
		80	82	84	86	88	90	92	94	96	98	100	102	104	106	118	110
Relative Humidity (%)	40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	135
	45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
	50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
	55	81	84	86	89	93	97	101	106	112	117	124	130	137			
	60	82	84	88	91	95	100	105	110	116	123	129	137				
	65	82	85	89	93	98	103	108	114	121	128	136					
	70	83	86	90	95	100	105	112	119	126	134						
	75	84	88	92	97	103	109	116	124	132							
	80	84	89	94	100	106	113	121	129								
	85	85	90	96	102	110	117	126	135								
	90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127											
100	87	95	103	112	121	132											

