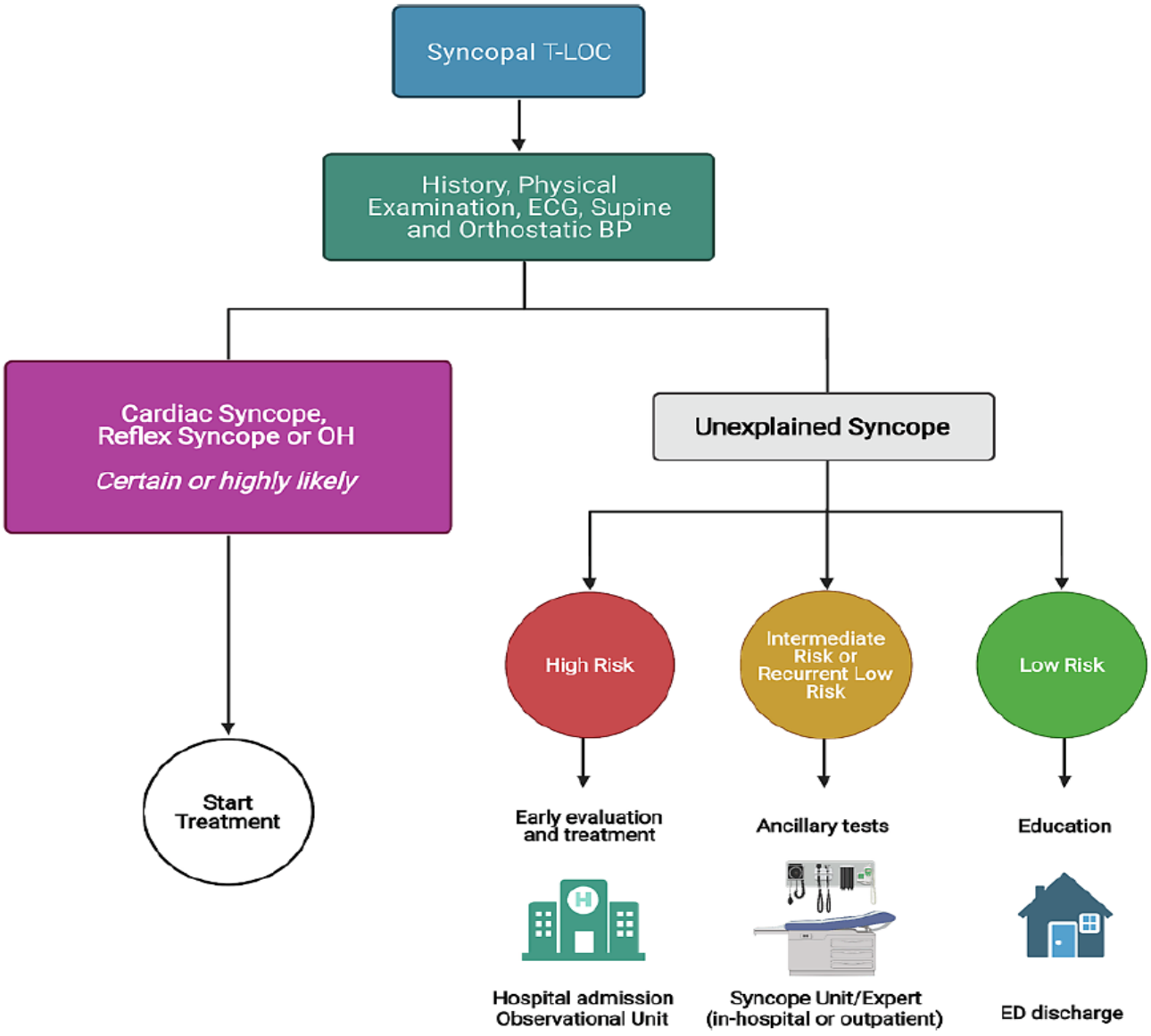
LA SINCOPE NEL GIOVANE

La stratificazione del rischio nelle sincopi inspiegate

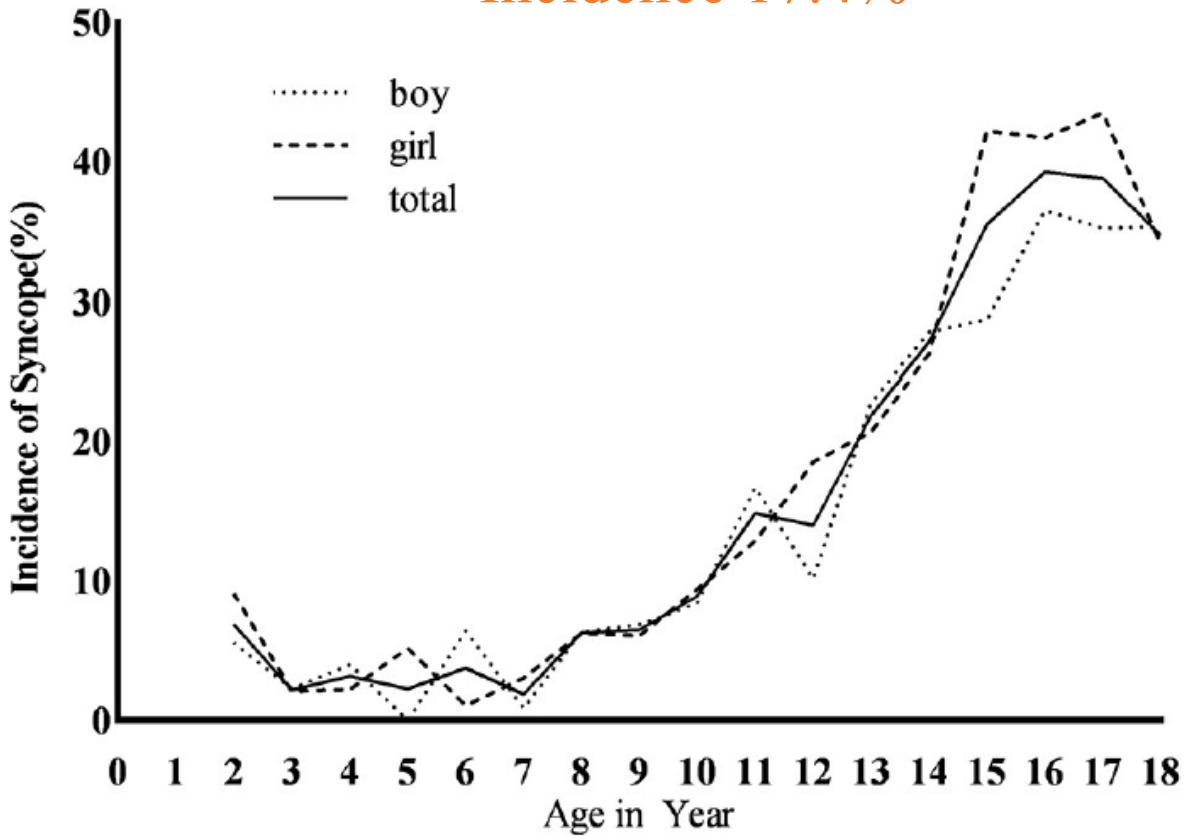
Attilio Del Rosso

nessun conflitto di interesse


Syncopal T-LOC
History, Physical Examination, ECG, Supine and Orthostatic BP
Cardiac Syncope, Reflex Syncope or OH
Certain or highly likely
Unexplained Syncope
Start Treatment
High Risk
Intermediate Risk or Recurrent Low Risk
Low Risk
Early evaluation and treatment
Ancillary tests
Education
Hospital admission Observational Unit
Syncope Unit/Expert (in-hospital or outpatient)
ED discharge

Incidence of sincope in children and adolescents

Incidence 17.4%



Front. Pediatr.9:638394.doi:10.3389/fped.2021.638394

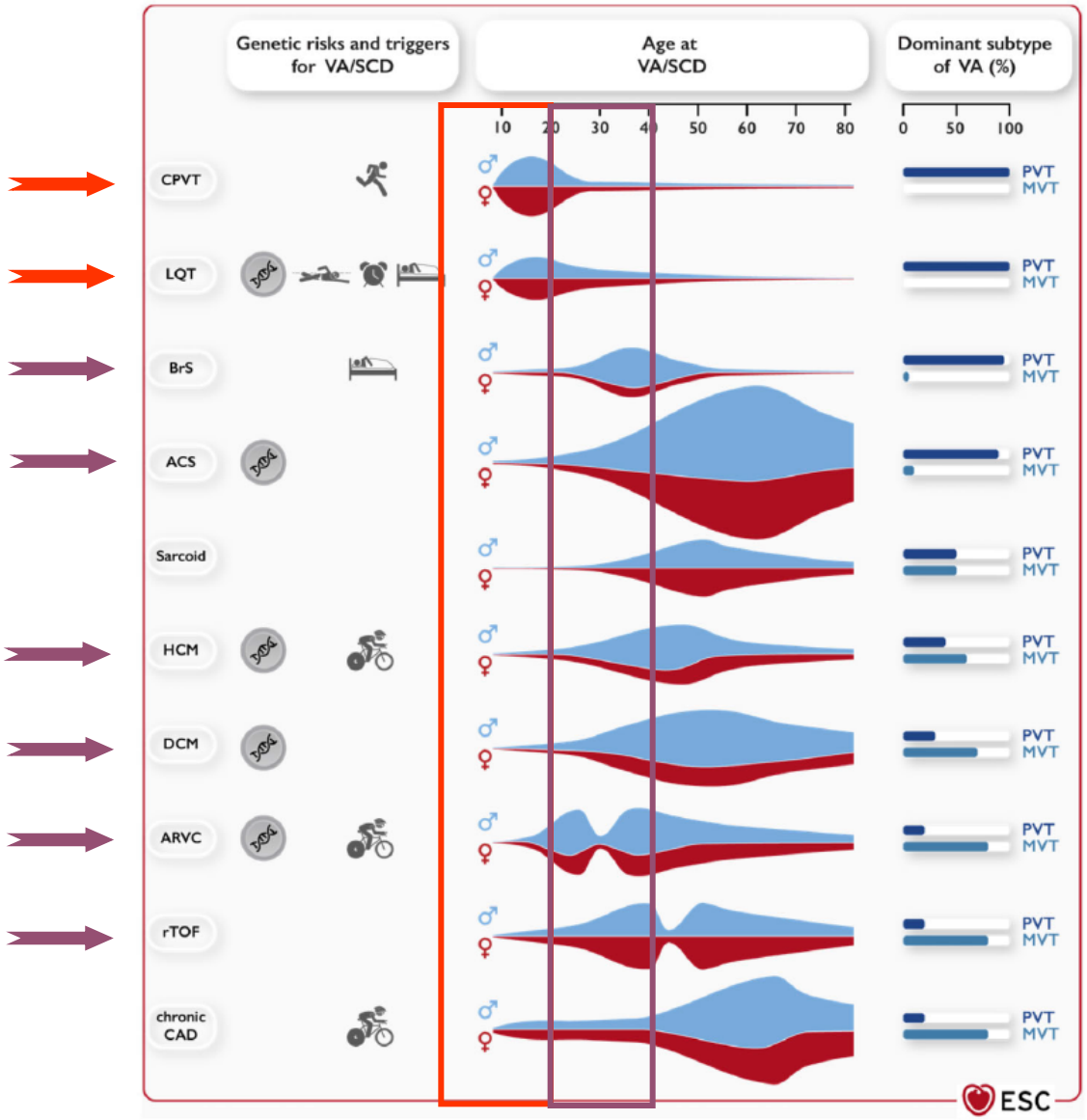
Causes of TLOC and predictors of unexplained syncope in individuals below 40 years old (n=3153)

Causes of TLOC	**%**
Reflex syncope	66
Unexplained syncope	15
Orthostatic hypotension	8
Other disease	4
Drugs/alcohol	4
Head trauma	2
Epileptic seizure	1

J Cardiovasc Electrophysiol. 2021;1–9.

Due differenti scenari

Giovane	Anziano
Prevalenza sincopi cardiache:1-4%	Prevalenza sincopi cardiache:16-34%


Genetic risks and triggers for VA/SCD
Age at VA/SCD
Dominant subtype of VA (%)
10
20
30
40
50
60
70
80
0
50
100
CPVT
LQT
BrS
ACS
Sarcoid
HCM
DCM
ARVC
rTOF
chronic CAD
PVT
MVT
ESC

Anamnesi familiare

- Familiarità per morte improvvisa < 50 anni
- Familiarità per cardiopatie aritmogene
- Cardiomiopatie familiari
- Morti improvvise inclusi incidenti inspiegabili che coinvolgono un solo veicolo a motore o annegamento

Anamnesi patologica

- Sordità sensoriale congenita (QT lungo)
- Malattia di Kawasaki
- Pregressa chirurgia cardiaca

Circostanze della sincope

- **Sincope durante sforzo**

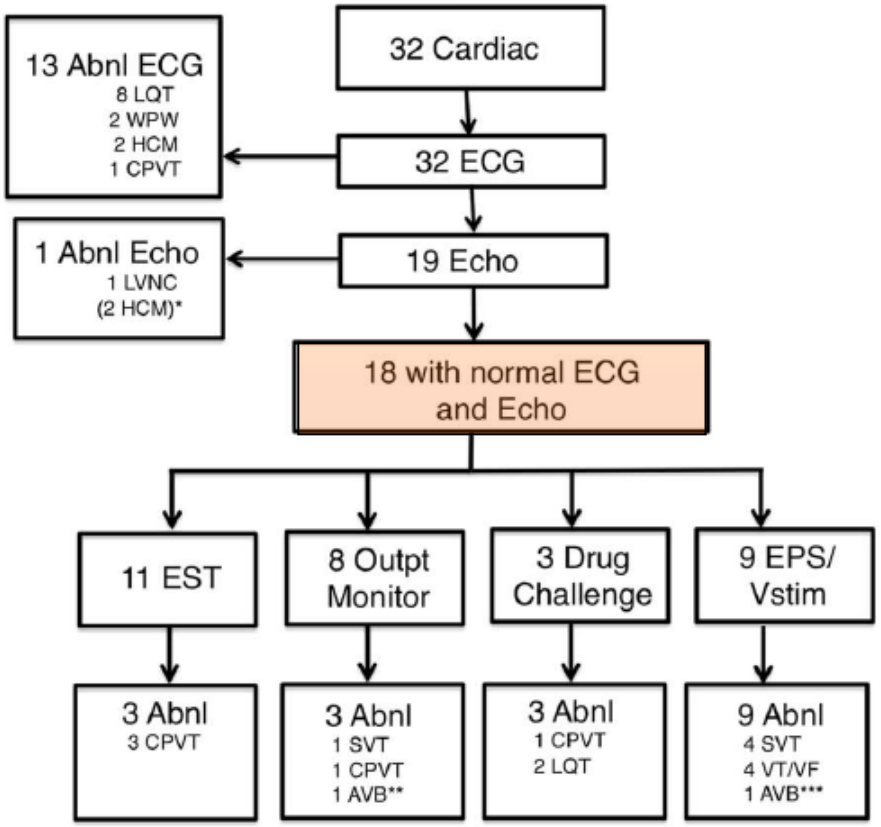
Risk of cardiac disease and observations on lack of potential predictors by clinical history among children presenting for cardiac evaluation of mid-exertional syncope

60 Exertional syncope

- 32 Cardiac
  - 10 long QT
  - 6 CPVT
  - 5 SVT
  - 2 VT
  - 2 Idiopatic FV
  - 2 AV block
  - 2 HCM
  - LVNC
- 28 Non cardiac
  - 16 Unexplained
  - 11 Vasovagal
  - 1 Psycogenic

Cardiology in the Young (2016), **26**, 894–900
doi:10.1017/S1047951115001481

Risk of cardiac disease and observations on lack of potential predictors by clinical history among children presenting for cardiac evaluation of mid-exertional syncope



Cardiology in the Young (2016), **26**, 894–900
doi:10.1017/S1047951115001481

Catecholaminergic Polymorphic Ventricular Tachycardia

CPVTshould be suspected in individuals who have one or more of the following:

- **Syncope occurring during physical activity or acute emotion**
- History of exercise- or emotion-related palpitations and dizziness in some individuals
- Sudden unexpected cardiac death triggered by acute emotional stress or exercise
- Family history of juvenile sudden cardiac death triggered by exercise or acute emotion
- Exercise-induced bidirectional or polymorphic ventricular arrhythmias
- mean onset is age seven to 12 years. Less frequently, first manifestations may occur later in life; individuals with a first event up to age 40 years have been reported
- *** Note: The resting EKG of individuals with CPVT is usually normal**

Circumstances of cardiac arrest during sports activity recorded on video

Alessandro Zorzi, Alberto Cipriani and Domenico Corrado

European Journal of Preventive Cardiology
0(00) 1–3

DOI: 10.1177/2047487318791289
journals.sagepub.com/home/ejpc
SAGE

- In one case (4%), the athlete suffered CA during high-intensity exercise
- Twenty-one athletes (92%) were participating in the game but performing low-intensity physical activities such as walking , standing , slow running, down-hill cycling or kneeling after a tackle
- One athlete (4%) was sitting in the bench.

Circostanze della sincope

- Sincope durante sforzo
- **Sincope in posizione supina**

Value of history-taking in syncope patients: in whom to suspect long QT syndrome?

Table 4 Frequency of triggers/circumstances in LQTS patients and in vasovagal patients

	LQTS patients ($n = 32$)[a]	Vasovagal patients ($n = 69$)[b]	*P*-value	LR (95% CI)
Supine	24 (80%)	18 (27%)	**<0.001**	**2.8 (1.5–5.1)**
Standing	10 (33%)	58 (87%)	**<0.001**	**0.20 (0.10–0.39)**
Sitting	13 (43%)	41 (61%)	0.10	0.69 (0.44–1.06)
Emotion/pain/loud noise/startle	21 (70%)	17 (25%)	**<0.001**	**2.3 (1.36–3.93)**
Associated with exercise	10 (33%)	22 (32%)	0.92	1.02 (0.75–1.37)
Venipuncture	1 (3.3%)	12 (17.6%)	**0.04**	**0.85 (0.75–0.97)**
Bad night rest	4 (13%)	11 (16,4%)	0.48	0.96 (0.81–1.15)
Situational (micturition, defaecation, coughing)	4 (13%)	12 (17%)	0.40	0.95 (0.80–1.13)
Turning of the head	2 (3%)	4 (13%)	0.07	1.12 (0.97–1.13)
After eating	1 (3.3%)	5 (7.5%)	0.39	0.96 (0.87–1.05)

Europace (2009) **11**, 937–943
doi:10.1093/europace/eup101

Circostanze della sincope

- Sincope durante sforzo
- Sincope in posizione supina
- **Sincope innescata da forte rumore o sussulto**

Value of history-taking in syncope patients: in whom to suspect long QT syndrome?

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Europace (2009) **11**, 937–943
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Sintomi prodromici

- **Assenza di prodromi**

Aetiologic and clinical characteristics of syncope in Chinese children

Li Chen[1], Qingyou Zhang[1], Sumou Ingrid[1], Jianjun Chen[1], Jiong Qin[1], Junbao Du (junbaodu@ht.rol.cn.net)[1,2]

154 children with syncope

- VVS
  - 85% had prodrome
- Cardiac syncope
  - 40% had prodrome

Acta Pædiatrica/*Acta Pædiatrica* 2007 **96**, pp. 1505–1510

Sintomi prodromici

- Assenza di prodromi
- **Palpitazioni precedenti la perdita di coscienza**

Value of history-taking in syncope patients: in whom to suspect long QT syndrome?

	LQTS ($n = 32$)[a]	ED ($n = 113$)[b]	Vasovagal ($n = 69$)[c]	*P*-value, ED vs. LQTS	*P*-value, VVS vs. LQTS
Nausea	8 (29%)	50 (46%)	41 (60%)	0.10	**0.005**
Sweating	18 (67%)	65 (60%)	18 (71%)	0.50	0.71
Paleness	18 (67%)	53 (63%)	54 (83%)	0.74	0.08
Light-headedness	23 (82%)	79 (73%)	55 (80%)	0.33	0.78
Blurring of vision	14 (54%)	46 (44%)	37 (55%)	0.36	0.91
Wanting to lie down	14 (50%)	52 (48%)	45 (66%)	0.83	0.14
Palpitations	12 (44%)	22 (21%)	29 (43%)	**0.01**	0.92
Chest pain	4 (15%)	14 (13%)	13 (19%)	0.79	0.43
Shoulder pain	0	10 (9.3%)	4 (6%)	0.11	0.26
Funny smell/taste	2 (7.7%)	5 (4.7%)	5 (7.5%)	0.54	0.63
Abdominal discomfort	4 (16%)	10 (9.5%)	12 (18.0%)	0.35	0.54

Europace (2009) **11**, 937–943
doi:10.1093/europace/eup101

Sintomi prodromici

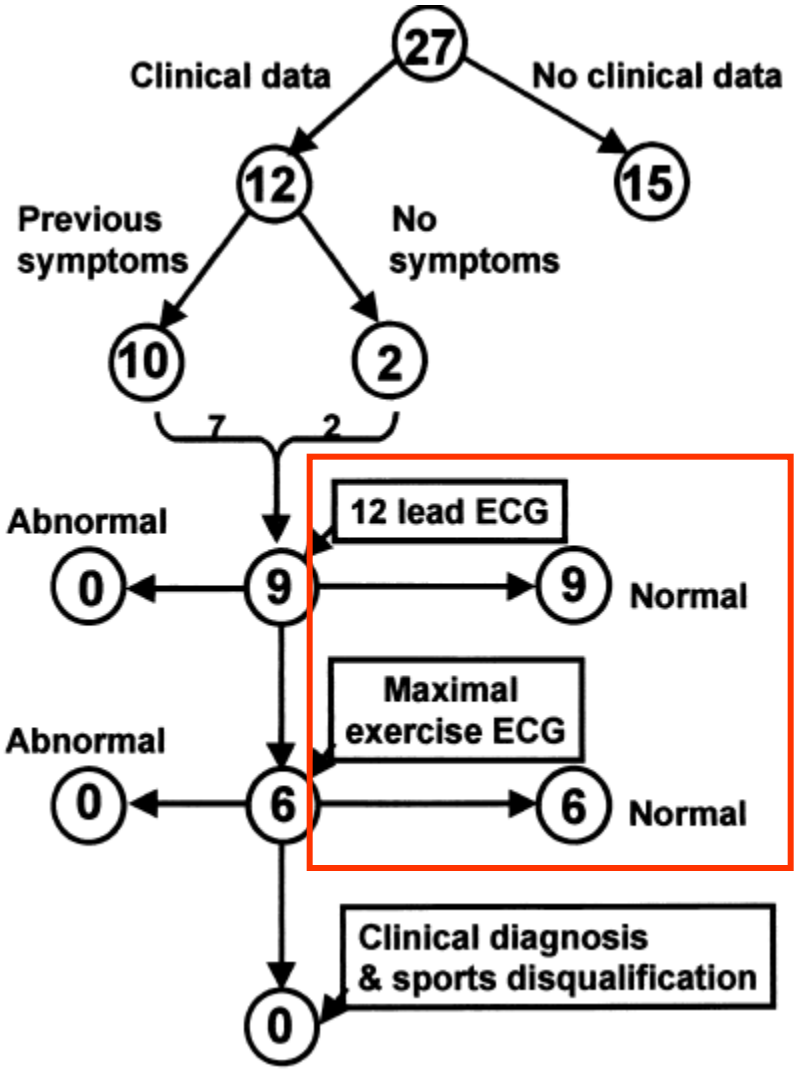
- Assenza di prodromi
- Palpitazioni precedenti la perdita di coscienza
- **Dolore toracico**

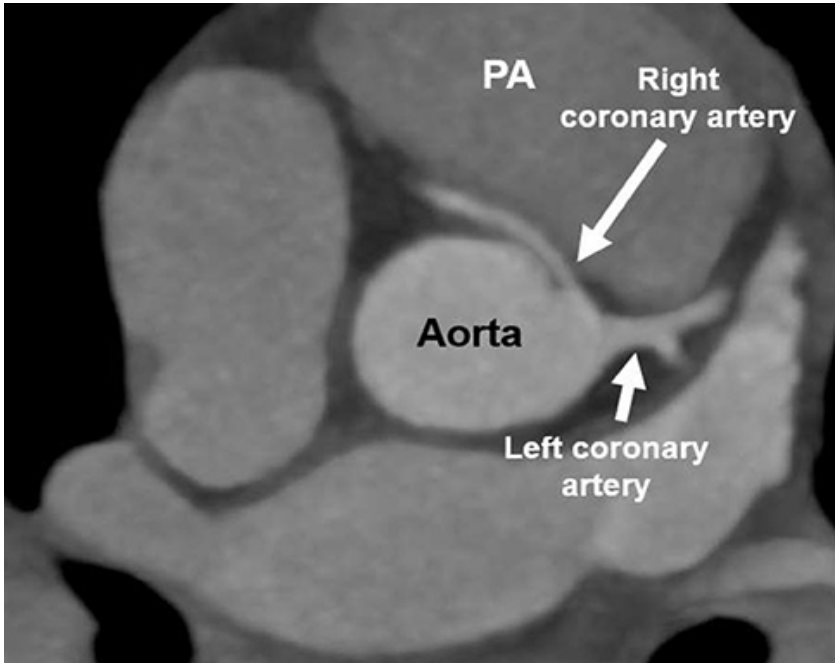
Clinical Profile of Congenital Coronary Artery Anomalies With Origin From the Wrong Aortic Sinus Leading to Sudden Death in Young Competitive Athletes

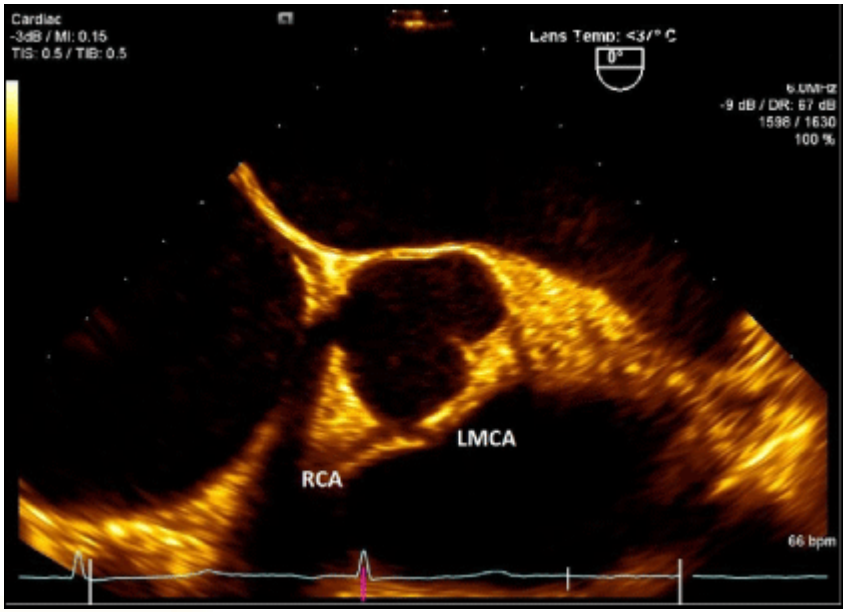
Cristina Basso, MD, PHD,* Barry J. Maron, MD, FACC,† Domenico Corrado, MD,‡ Gaetano Thiene, MD*

Age at Death	Gender	Nation	Race	Sport	Level	Site	Activity	Circumstances of Death	Prior Symptoms	Time From Symptoms to Sudden Death
11	M	Italy	W	Soccer	JHS	Field	Game	During effort	No	—
12	M	U.S.	B	Basketball	JHS	Field	Practice	During effort	Chest pain	7 days
12	M	U.S.	W	Hockey	JHS	Hotel	Sedentary	After effort	Syncope*, chest pain*	15 mo
12	M	U.S.	B	Basketball	JHS	Field	Practice	During effort	Syncope*†	14 mo
14	M	Italy	W	Soccer	JHS	Field	Game	During effort	No	—
15	M	Italy	W	Soccer	JHS	Field	Game	During effort	Syncope*	11 mo
15	F	U.S.	W	Tracksprint	HS	Field	Practice	During effort	Dizziness, palpitations*	15 mo
15	M	U.S.	B	Basketball	JHS	Field	Practice	During effort	Syncope†, chest pain	24 mo
16	M	U.S.	B	Basketball	HS	Field	Game	During effort	Chest pain*	8 mo
22	M	Italy	W	Soccer	Pro	Field	Game	During effort	Palpitations	12 mo
29	M	Italy	W	Rugby	Pro	Field	Practice	During effort	Palpitations	13 mo
32	F	Italy	W	Running	Pro	Field	Game	During effort	Chest pain*	9 mo

JACC Vol. 35, No. 6, 2000
May 2000:1493–501


27
Clinical data
No clinical data
12
15
Previous symptoms
No symptoms
10
2
7
2
Abnormal
12 lead ECG
0
9
9
Normal
Abnormal
Maximal exercise ECG
0
6
6
Normal
0
Clinical diagnosis & sports disqualification


PA
Right coronary artery
Aorta
Left coronary artery


Cardiac
LMCA
RCA

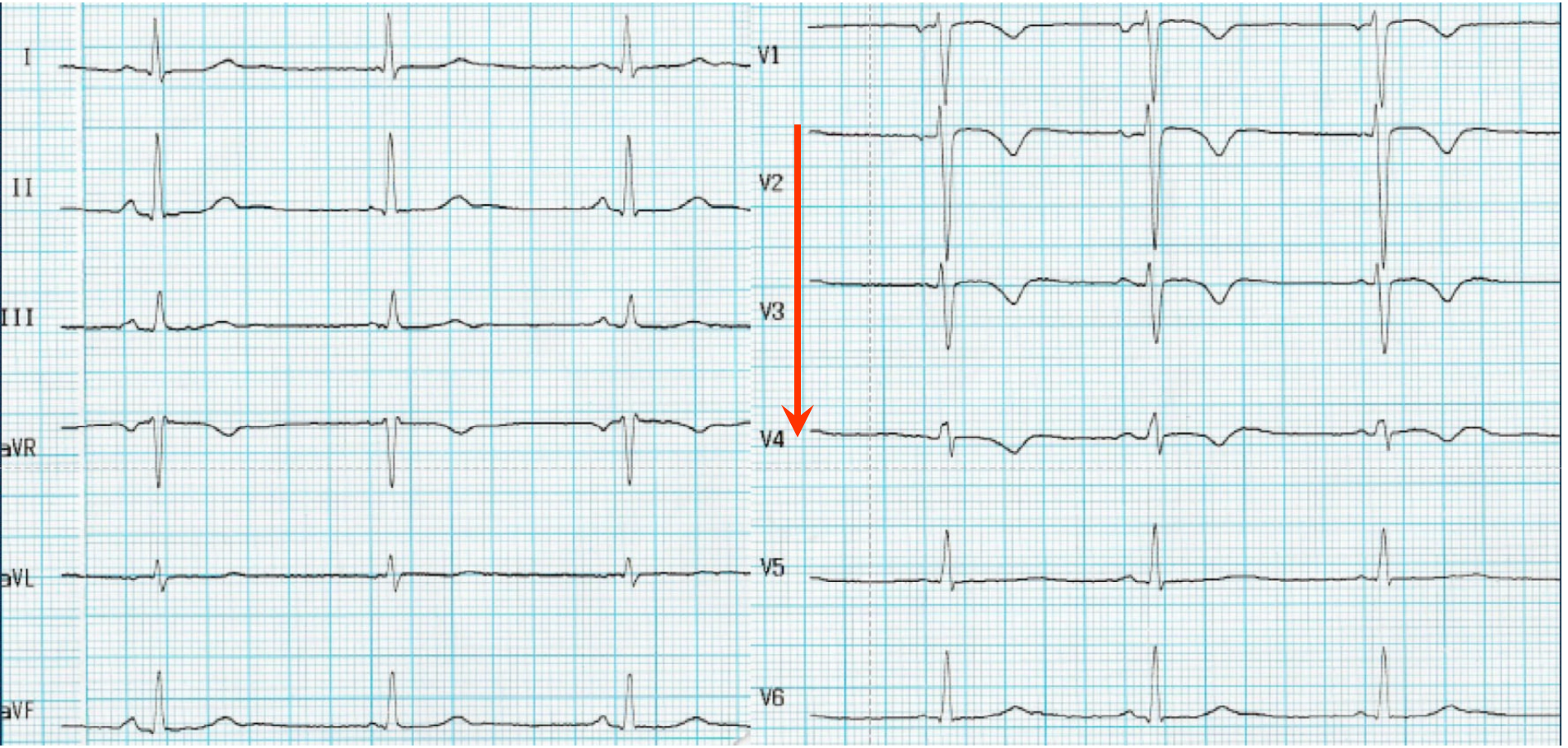
Canadian Journal of Cardiology 33 (2017) 189–198
Society Position Statement

Canadian Cardiovascular Society and Canadian Pediatric Cardiology Association Position Statement on the Approach to Syncope in the Pediatric Patient

	ECG Findings

RED LIGHT	• Abnormal QT interval*
	  ○ Long QT interval (QTc > 470 ms)
	  ○ Short QT interval (QTc ≤ 330 ms)
	• Type 1 Brugada pattern
	• Delta wave (ventricular pre-excitation or Wolff-Parkinson-White syndrome)
	• Signs of myocardial ischemia (ST-T wave changes, Q waves > 1 mm wide)
	• PVCs, polymorphic
	• Third-degree AV block

YELLOW LIGHT	• Left ventricular hypertrophy (including left axis deviation, tall R wave in V_6, tall S wave in V_1, deep Q waves in II, III, and aVF and ST-T wave changes) • PVCs, monomorphic • Second-degree AV block • Heart rate < 40 bpm in normally nourished, nonathletic individual
GREEN LIGHT	• Sinus arrhythmia • Wandering atrial pacemaker; atrial or junctional rhythm • First-degree AV block • Negative T waves in right precordial leads • Early repolarization • Incomplete right bundle branch block



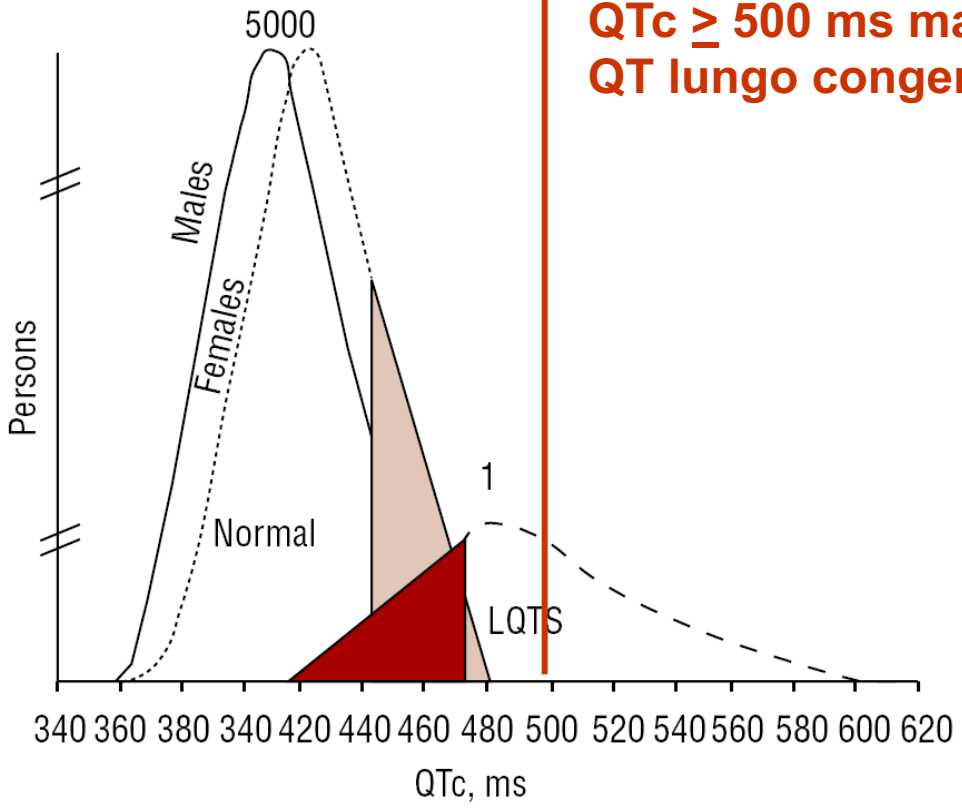
Inverted T waves in right precordial leads (V1, V2, and V3) or beyond, in individuals >14 years of age constitute a major diagnostic criterion for AC

QTc Values Among Children and Adolescents Presenting to the Emergency Department

- Many patients are incorrectly diagnosed as having LQTS after presenting to an emergency department (ED) with presyncope/syncope and demonstrating “borderline” QT prolongation (QTc 440 ms) in sentinel electrocardiograms (ECGs).

- Approximately one-third of pediatric patients have QTc values of 440 milliseconds after presenting to the ED with syncope/presyncope; normalization had occurred for most patients in follow-up evaluations. ECGs obtained in the ED after a syncopal episode must be interpreted with caution.

www.pediatrics.org/cgi/doi/10.1542/peds.2010-1513

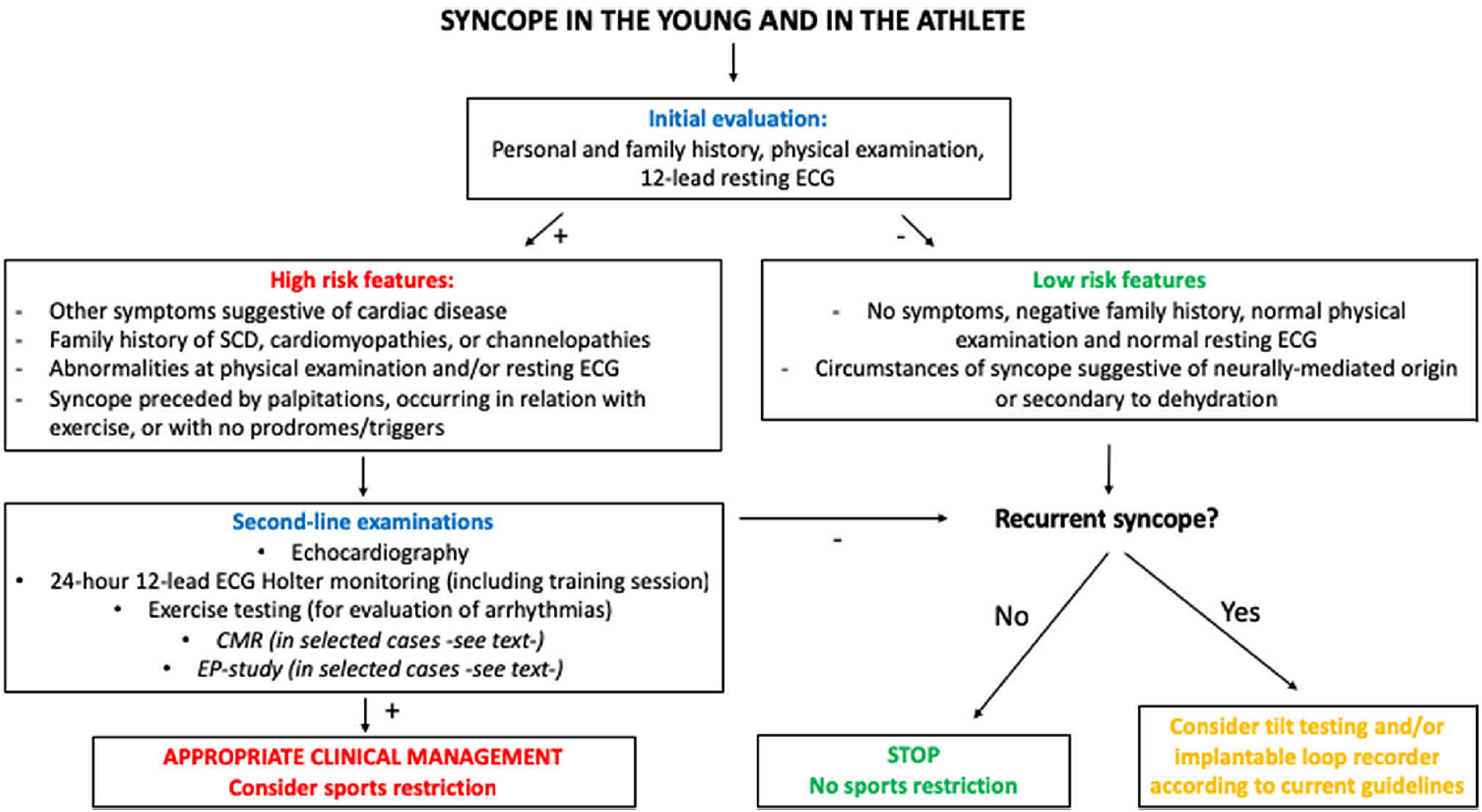


QTc ≥ 500 ms marker di proaritmia sia per il QT lungo congenito che per quello iatrogeno

Syncope prediction tools

Risk score	Sample size	Mean age
OESIL 2003	270	59±24
S.Francisco Sync. Rule 2006	684	61±22
Boston Syncope Rule 2007	293	58±24
EGSYS Score 2008	260	63±21
STePS 2008	670	59±22
Syncope Risk score 2009	2584	75 (60-102)
ROSE 2010	550	64±21
Canadian Risk Score 2016	4030	54±23
FAINT score 2020	3177	73 ± 9
ALERT-CS 2020	2269	71 (58-80)

Age: ≥ 13; ≥ 16; ≥18; ≥ 40; ≥ 60


SYNCOPE IN THE YOUNG AND IN THE ATHLETE
Initial evaluation:
Personal and family history, physical examination, 12-lead resting ECG
+
-
High risk features:
- Other symptoms suggestive of cardiac disease
- Family history of SCD, cardiomyopathies, or channelopathies
- Abnormalities at physical examination and/or resting ECG
- Syncope preceded by palpitations, occurring in relation with exercise, or with no prodromes/triggers
Low risk features
- No symptoms, negative family history, normal physical examination and normal resting ECG
- Circumstances of syncope suggestive of neurally-mediated origin or secondary to dehydration
Second-line examinations
• Echocardiography
• 24-hour 12-lead ECG Holter monitoring (including training session)
• Exercise testing (for evaluation of arrhythmias)
• CMR (in selected cases -see text-)
• EP-study (in selected cases -see text-)
-
Recurrent syncope?
No
Yes
+
APPROPRIATE CLINICAL MANAGEMENT
Consider sports restriction
STOP
No sports restriction
Consider tilt testing and/or implantable loop recorder according to current guidelines