



Heart Rhythm Congress
October 2016



GUCH Arrhythmias

why, what and which drugs are best...

Dr Graham Stuart
Bristol Congenital Heart Unit

GUCH Arrhythmias

why, what ,which drugs are best



Digitalis 1785

Darwin at the lady's house. I found her nearly in a state of suffocation; her pulse extremely weak and irregular, her breath very short and laborious, her countenance sunk, her arms of a leaden colour, clammy and cold. She could not lye down in bed, and had neither strength nor appetite, but was extremely thirsty. Her stomach, legs, and thighs were greatly fwollen; her urine very small in quantity, not more than a spoonful at a time, and that very feldom. It had been proposed to scarify her legs, but the proposition was not acceded to.

Withering W An account of the Foxglove and its medical uses.
Birmingham England 1785

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why, what ,which drugs are best



Digitalis 1785

Withering W An account of the Foxglove and its medical uses

It is now almost nine years since the Digitalis was first prescribed for this lady, and notwithstanding I have tried every preventive method I could devise, the dropfy still continues to recur at times ; but is never allowed to increase so as to cause much distress, for she occasionally takes the infusion and relieves herself whenever she chooses. Since the first exhibition of that medicine, very small doses have been always found sufficient to promote the flow of urine.

Withering W An account of the Foxglove and its medical uses.
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why, what ,which drugs are best



Digitalis 1785

Wiithering W An account of the Foxglove and its medical uses

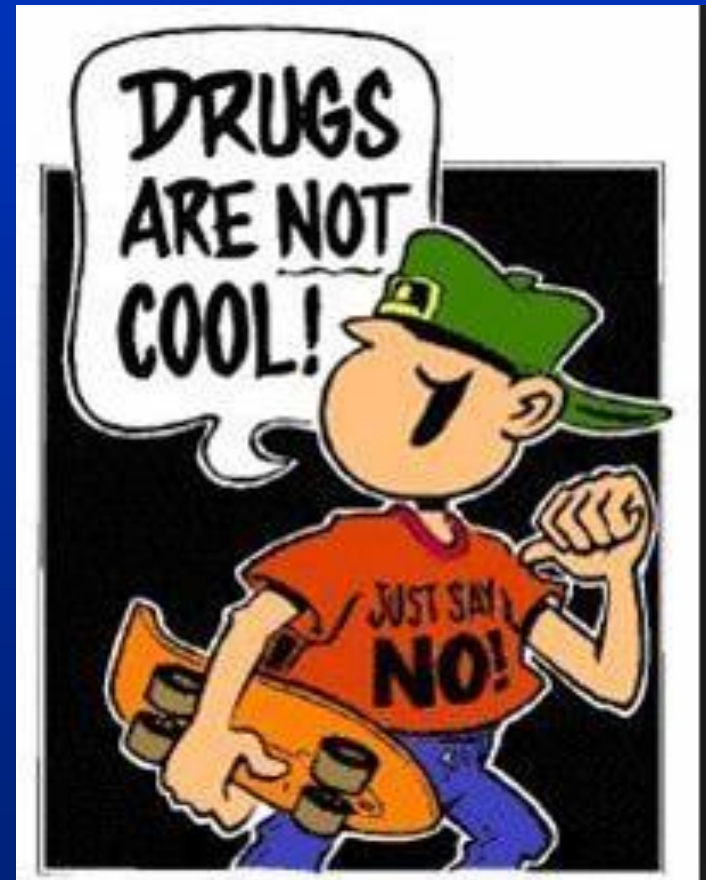
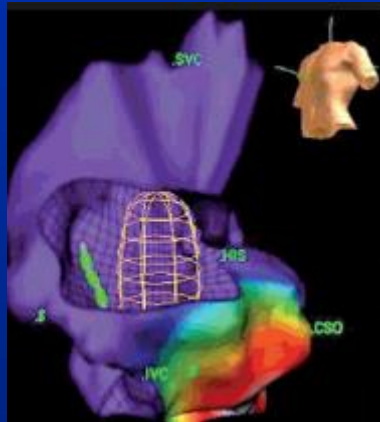
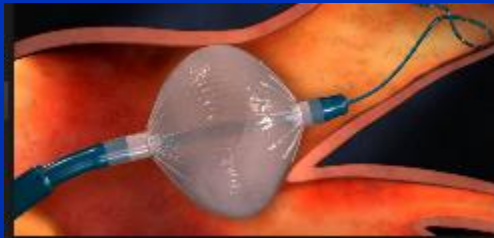
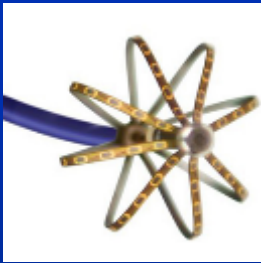


DC Ablation 1982

Gallagher et al Catheter technique for closed chest ablation NEJM

GUCH Arrhythmias

why, what, which drugs are best



GUCH Arrhythmias

why, what, which drugs are best

GUCH Arrhythmias

why, what, which drugs are best

- When / what drugs should we not use
- Drugs for Supraventricular arrhythmias
- Drugs for Ventricular arrhythmias
- Do patients take the drugs we prescribe

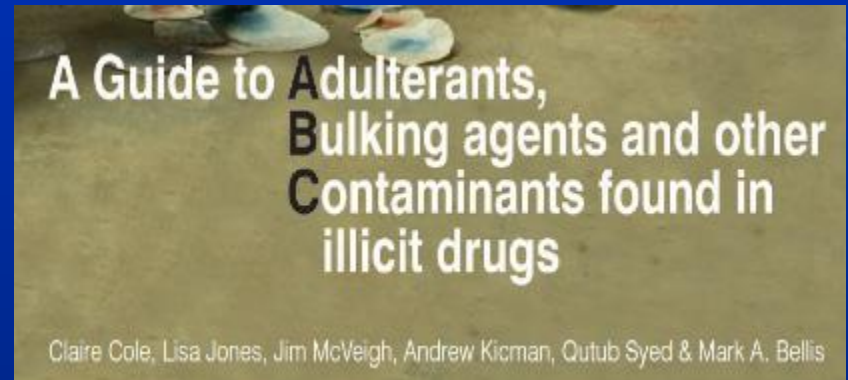
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GUCH Arrhythmias

drugs we should not use...



John Moore's University 2015

Street drugs

contaminants, adulterants, bulking agents

- Clenbuterol
- Dextromorphine
- Dexamphetamine
- Lidocaine/prilocaine
- Strychnine
- Diltiazem
- Ketamine
- Ephedrine
- scopolamine



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S

acis

“Energy Drinks”



- 30% of 12-19yr olds regularly consume energy drinks
- > 5000 overdoses per annum in USA
- Similar caffeine content to percolated coffee (90mg)

Caffeine = guaranine=theine=maurine

“Energy Drinks”



Am J Cardiol 2014;114:1124-5

Energy Drink—Induced Near-Fatal Ventricular Arrhythmia Prevented by an Intracardiac Defibrillator Decades After Operative “Repair” of Tetralogy of Fallot

Alexandra E. Ward, MD^a, Steven E. Lipshultz, MD^{b,*}, and Stacy D. Fisher, MD^c

45 yr old Man

3 energy drinks after waking “tired” for morning shift

250mg caffeine

Energy Drink Overconsumption in Adolescents: Implications for Arrhythmias and Other Cardiovascular Events

Fabian Sanchis-Gomar, PhD, MD,^a Helios Pareja-Galeano, PhD,^{a,b} Gianfranco Cervellin, MD,^c

Table 1. Possible manifestations of energy drink abuse in adolescents

Tachycardia	✱
Atrial fibrillation or flutter	✱
Ventricular arrhythmias	✱
QT prolongation	✱
ST-segment elevation	✱
Increased anxiety and depression	
Dizziness	
Sleeplessness	
Shortness of breath	* CVS effects
Loss of control and a feeling of imminent death	
Development of uncontrollable phobias and fears	
Increased platelet aggregation	
Decreased endothelial function	✱
Myocardial infarction	✱
Hemodynamic failure	
Syncope	✱
Sudden cardiac death	✱
Cumulative cardiovascular load	✱
Cerebral blood flow reduction	

“Normal heart” : restrict to one drink per day Sanchis-Gomar

“ACHD heart”: ? No safe level. Rx as per coffee



½ can Red Bull
½ ounce jagermeister



HURRICANE MATTHEW
Latest as killer storm
blasts America >

Mirror



Got a story, picture or
video to share? >

'Jagerbombs left me for dead': Teenager suffered three heart attacks before being saved by defibrillator

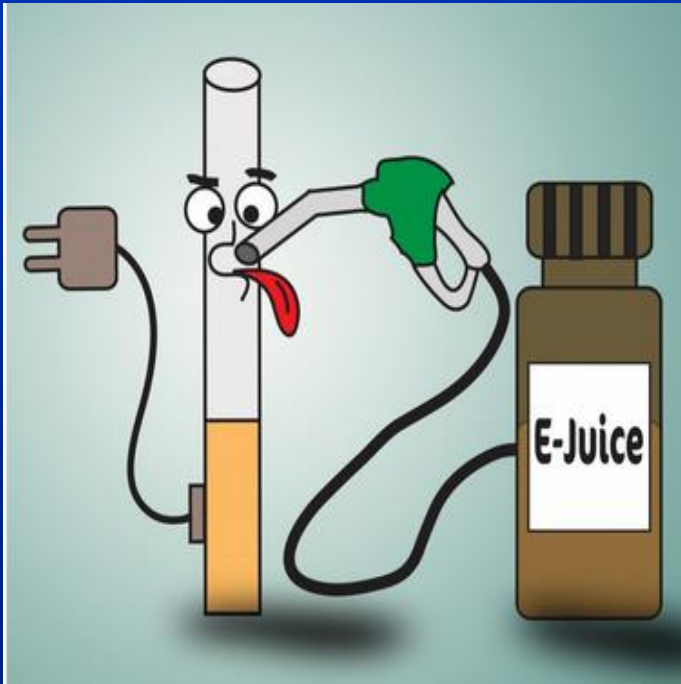
4th March 2015



A **teenager** was left "dead on the bathroom floor" by an energy drink after downing Jagerbombs on a night out with friends and had to be resuscitated with a defibrillator.

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drugs we should not use...



The Health Effects of Electronic Cigarettes

Chitra Dinakar, M.D., and George T. O'Connor, M.D.

N Engl J Med 2016;375:1372-81

Cause endothelial cell death

Increase oxidative stress

Toxic to cardiomyoblasts

depending on flavour

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drugs we should not use...

Flecainide

Negatively inotropic

Alters pacing thresholds

proarrhythmic ?

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flecainide and proarrhythmia

- CAST study
 - Ischaemic heart disease study (50% EF <40%)
 - (arrhythmia event rate = placebo if EF >40%)
- Conversion of afib to conducted atrial tachycardia *use with av node blocker*
- Interactions

Drug Metab Pharmacokinet. 2015 Aug;30(4):257-62. doi: 10.1016/j.cmpk.2015.04.001. Epub 2015 Apr 11.

Serum flecainide S/R ratio reflects the CYP2D6 genotype and changes in CYP2D6 activity.

Doki K¹, Sekiguchi Y², Kuga K³, Aonuma K⁴, Homma M⁵.

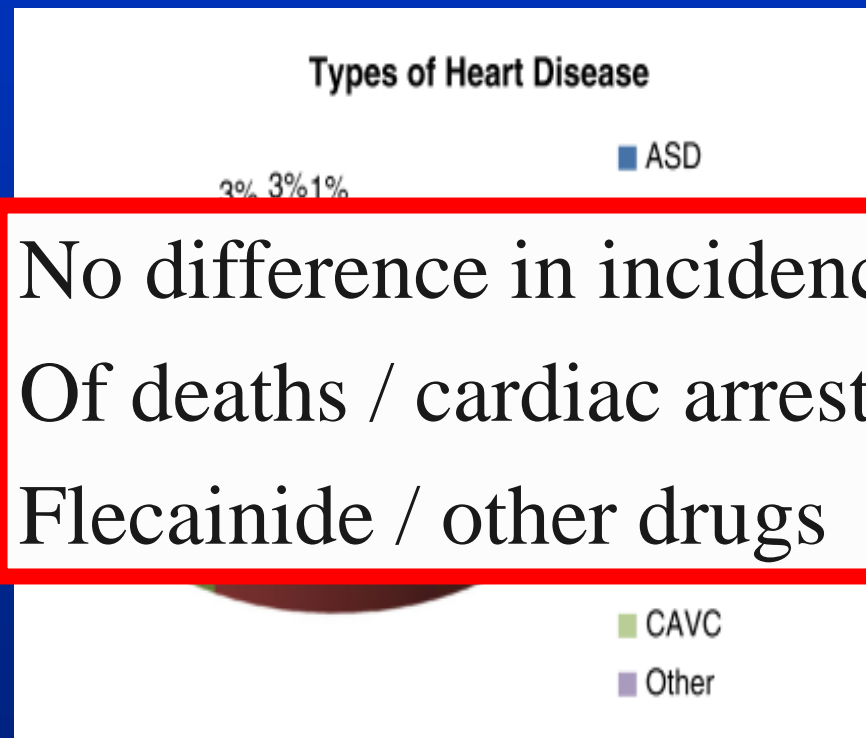
- Cytochrome P450 eg statins, prozac, citalopram

Flecainide Use in Children with Cardiomyopathy or Structural Heart Disease

Brady S. Moffett • Santiago O. Valdes •
Philip J. Lupo • Caridad delaUz • Christina Miyake •
Michele Krennek • Jeffrey J. Kim

Ped Cardiol 2015;36:146-150

- 2004-2011
- 43 hospitals PHID
Pediatric health Information database
- 3,144 children 0-18yrs
- 229 on flecainide
- 126 deaths!
- 60 Cardiac arrests



Flecainide Use in Children with Cardiomyopathy or Structural Heart Disease

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Ped Cardiol 2015;36:146-150

Flecainide **may be reasonable** option in some
ACHD patients *if ventricular function good*

GUCH Arrhythmias

why, what, which drugs are best

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Efficacy of Antiarrhythmic Drugs in Adults With Congenital Heart Disease and Supraventricular Tachycardias

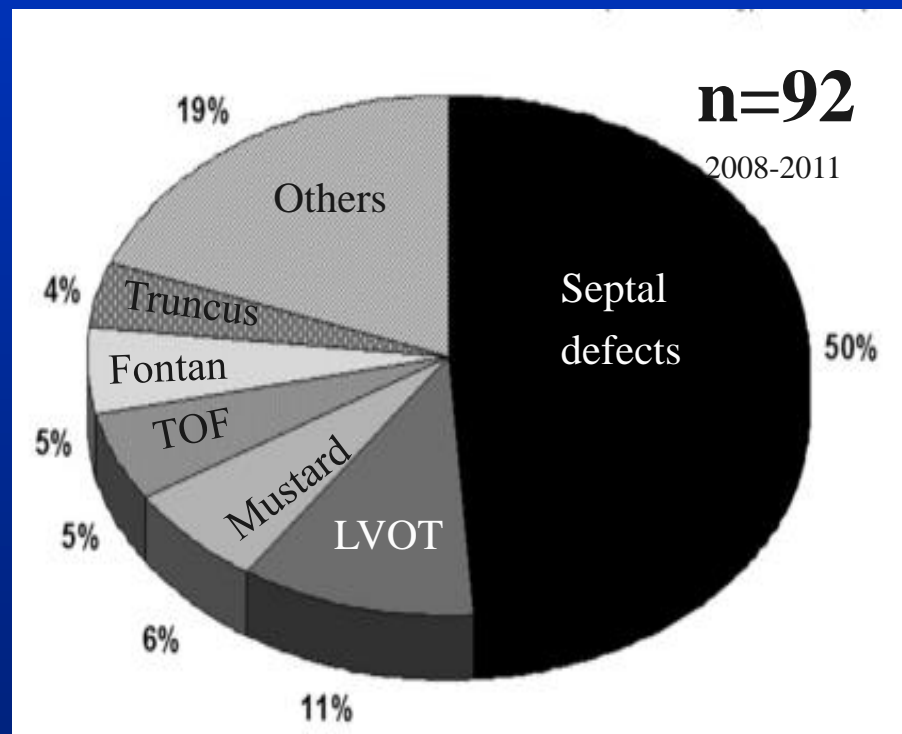
Koyak Z et al Am J Cardiol 2013;112:1461-1467

- Multicentre study/ retrospective
- Efficacy of AAD in SVT
- 2008-2011 CONCOR Database
- All new onset SVT in ACHD
 - excluded non cardiac causes of arrhythmia eg hypoT4

Efficacy of Antiarrhythmic Drugs in Adults With Congenital Heart Disease and Supraventricular Tachycardias

Koyak Z et al Am J Cardiol 2013;112:1461-1467

Mean age at first-onset SVT in yrs (SD)	51 ± 16
Men	48 (52)
Surgical repair of CHD	67 (73)
Concomitant conditions	57 (62)
HF	26 (28)
Systemic hypertension	25 (27)
Smoking	13 (14)
Obesity (body mass index ≥ 30 kg/m ²)	9 (10)
Diabetes mellitus	8 (9)
CVA	6 (7)
Myocardial infarction	2 (2)
Medication at baseline	58 (63)
Antiarrhythmics	—
β Blocker	6 (7)
Diuretics	17 (19)
ACE inhibitors	15 (16)
Warfarin	10 (11)
Aspirin	10 (11)
Echocardiogram available	58 (63)
At least moderately impaired SVF	6 (10)
At least moderately impaired PVF	9 (16)
At least moderate SAVR	14 (24)
At least moderate PAVR	19 (33)
Dilated left or right atrium	32 (55)



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At least moderate SAVR	14 (24)
At least moderate PAVR	19 (33)
Dilated left or right atrium	32 (55)

Mean age 51 yrs

73% post-op.

Sick patients
62% comorbidity

Poor ventricles 5-10%
Big atria >50%

Efficacy of Antiarrhythmic Drugs in Adults With Congenital Heart Disease and Supraventricular Tachycardias

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Acute treatment of first-onset supraventricular tachycardias (n = 92)

Treatment Method	Patients (%)	Success Rate (%)
Electrical cardioversion	35 (38)	31 (89)
Vagal maneuvers*	2 (2)	0 (0)
Intravenous drug therapy	14 (15)	14 (100)
Adenosine	3 (21)	3
Amiodarone	3 (21)	3
Sotalol	2 (14)	2
Flecainide	2 (14)	2
Verapamil	2 (14)	2
Metoprolol	1 (7)	1
Procainamide	1 (7)	1
Oral drug therapy	34 (37)	30 (88)
Sotalol	14 (41)	14
Amiodarone	2 (6)	2
Metoprolol	10 (29)	6
Verapamil	4 (12)	4
Procainamide	4 (12)	4
Spontaneous conversion	9 (10)	9 (100)

Efficacy of Antiarrhythmic Drugs in Adults With Congenital Heart Disease and Supraventricular Tachycardias

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Long-term management of first-onset supraventricular tachycardias in 83 patients to maintain sinus rhythm; drugs and dosages used in patients

Drug	No. of Patients (%)	Mean Dosage (mg/day)
No antiarrhythmic drugs	13 (16)	—
Class I		
Propafenone	4 (5)	563 ± 309
Flecainide	5 (6)	120 ± 45
Class II		
Metoprolol	22 (27)	69 ± 44
Class III		
Sotalol	28 (34)	156 ± 51
Amiodarone	4 (5)	350 ± 191
Class IV		
Verapamil	7 (8)	166 ± 75

Efficacy of Antiarrhythmic Drugs in Adults With Congenital Heart Disease and Supraventricular Tachycardias

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Side effects / recurrence

22% had side effects

75% on class III drugs

85% changed AAD

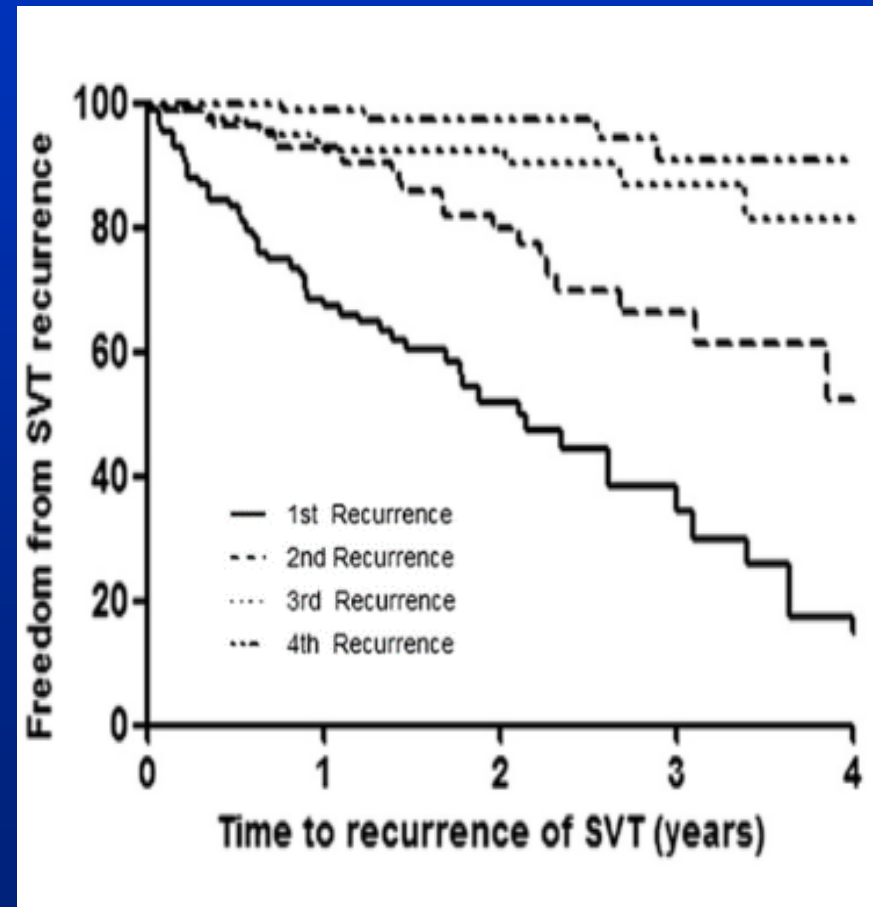
22% adverse events

Pacemaker 9, admission 8

Death 2, CVA 1

50% recurred by 2yrs

80% recurred by 4 years



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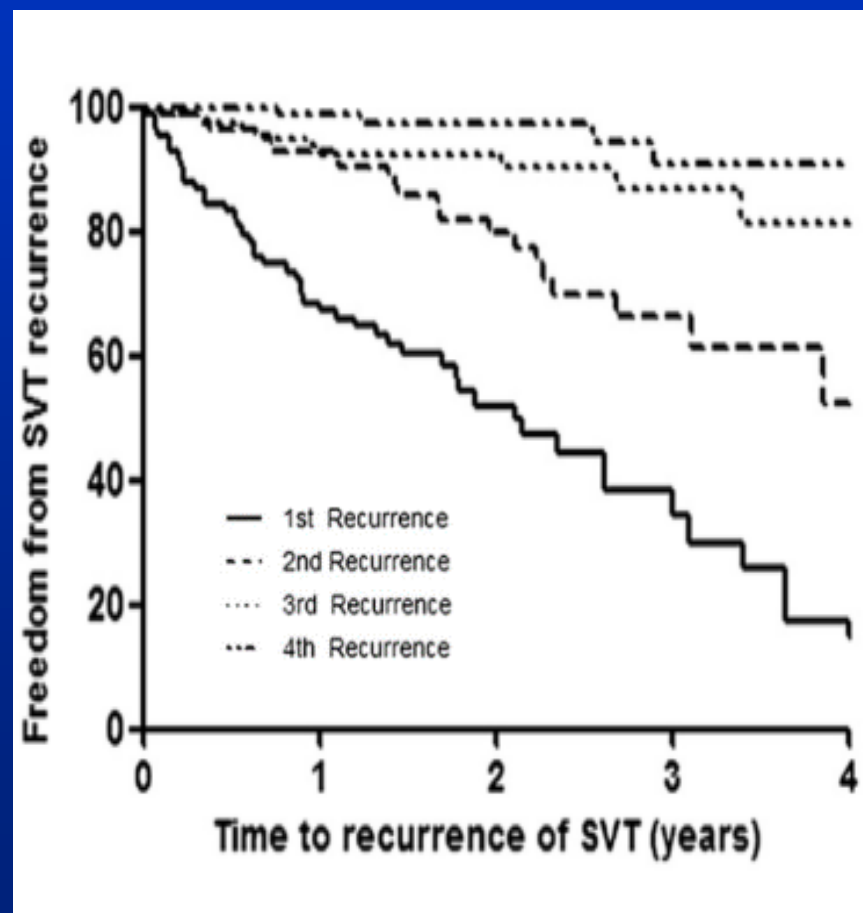
Ablation

26 ablations in 23 patients

Mostly after 1st recurrence

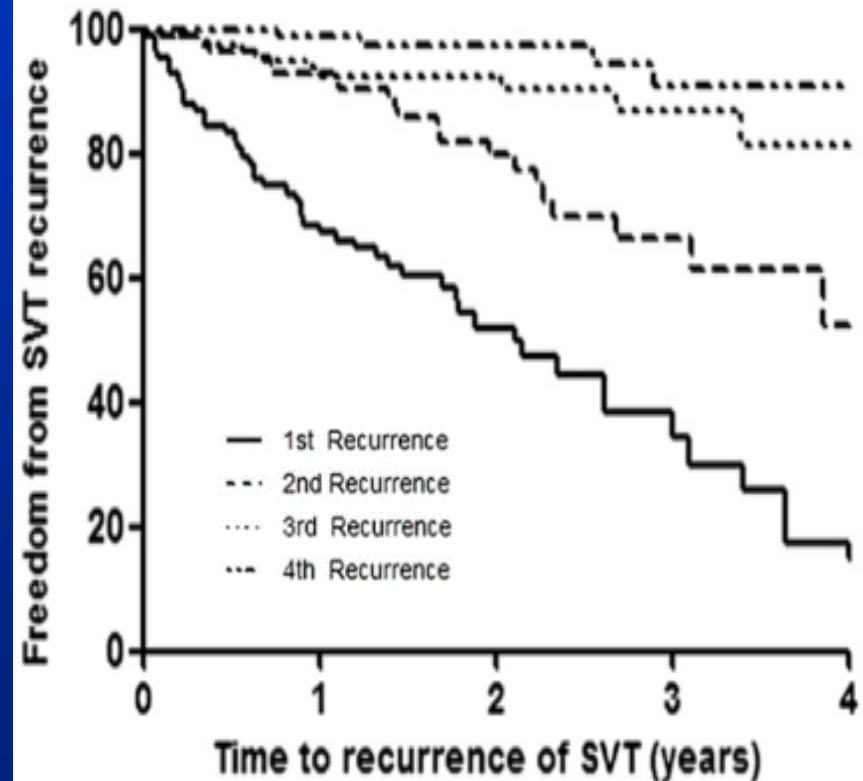
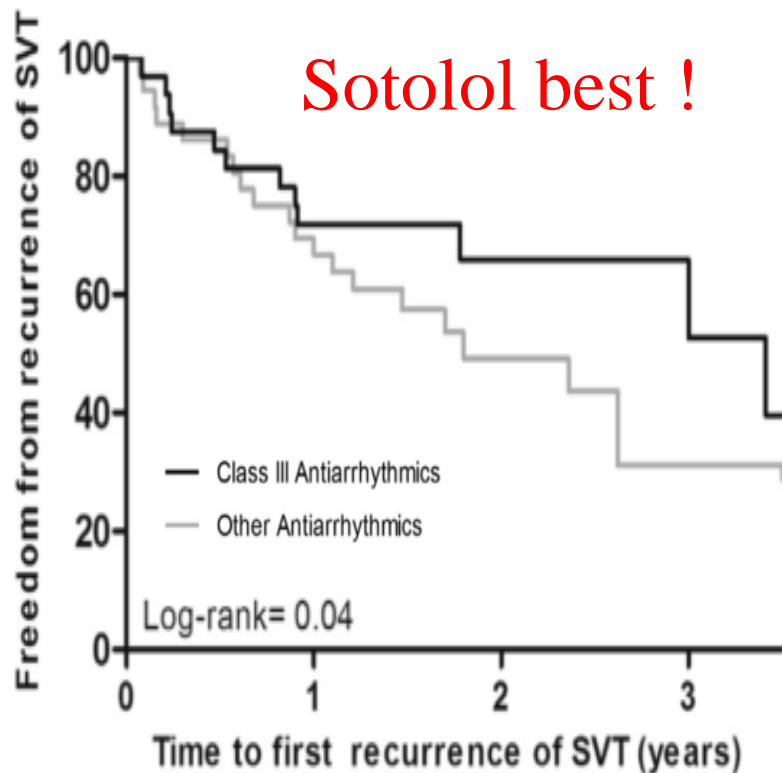
- RF in 31%
- others Maze/mini maze
- 55% Afib +AVRT/Flutter/AVNRT

Acute success 78% (67% at 1yr)



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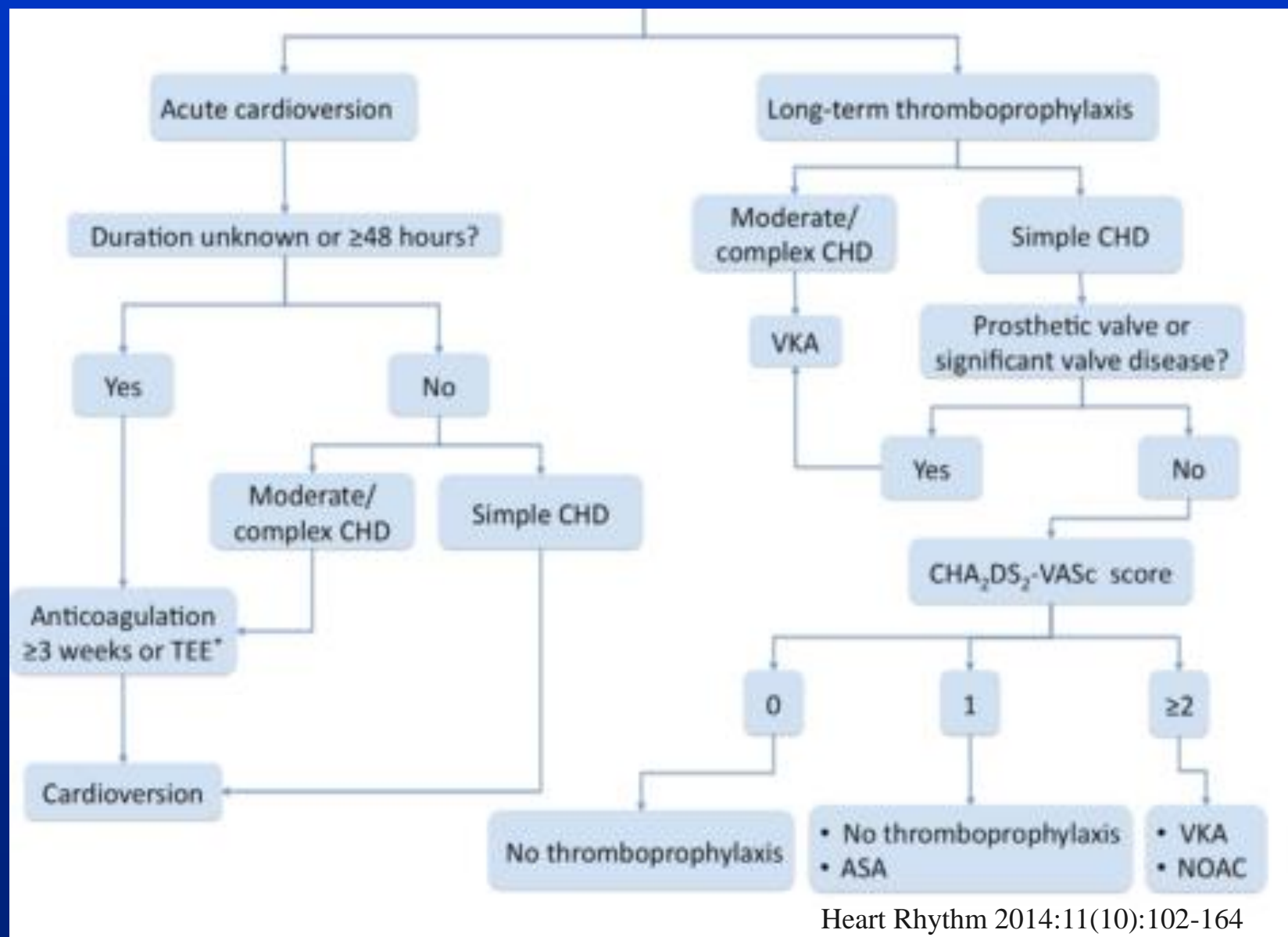
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Conclusion

Class III most effective for SR

Sotalol should be 1st choice for SVT

Thromboprophylaxis in adults with CHD and IART /AFib



GUCH Arrhythmias

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GUCH Arrhythmias

ventricular tachycardia- which drugs are best



“Many of our public debates are happening in what I like to call an evidence-free zone, where ideology trumps data and common sense. That is a recipe for paralysis, not progress.”

-Hillary

- Evidence free zone
- Treat haemodynamics
- Try a beta blocker if symptoms **rarely helps..**
- Consider ICD/ablation

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why, what, which drugs are best

Everyone is entitled to my opinions



If it doesn't make
your patient feel
better or live longer...

DON'T do it !

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Key Issues in Outcomes Research

Circulation 2009;119:3028-3035

Medication Adherence

Its Importance in Cardiovascular Outcomes

P. Michael Ho, MD, PhD; Chris L. Bryson, MD, MS; John S. Rumsfeld, MD, PhD

- No Data in ACHD
- After Myocardial infarction
 - 25% stopped taking some drugs by day 7
 - 34% stopped >1 drug by 1 month
 - 12% stopped ALL drugs by 1 month

Drugs are not without problems!



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GUCH Arrhythmias

why, what and which drugs are best...?



Maybe, with the right
ablation techniques
we might not need
drugs...



Any Questions?



GUCH Arrhythmias

Drugs for SVT

- Flecainide
- Propafenone
- Digoxin
- Propranolol / Bisoprolol / Atenolol/ metoprolol
- Amiodarone
- Mexilitine
- Sotolol

- Use drugs you are familiar with (dose/side effects ...)

GUCH Arrhythmias

why, what ,which drugs are best

Rosenthal

Lowe

Ernst

