



# Arrhythmia Management Update

*Symposium organized by the Canadian Heart Research Centre*



*Friday, May 5, 2006  
Sheraton Centre Toronto Hotel  
Toronto, Ontario*



This educational event has been approved for 7 MAINPRO-M1 credits, and as an Accredited Group Learning Activity under Section 1 of the Framework of CPO options for the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada (7 hours).

Content developed by:



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Coordinated by:





May 2006

Arrhythmia Management Update  
www.chrc.ca/amu

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Dear Colleague,

On behalf of the Planning Committee, our sponsors and the Canadian Heart Research Centre, we wish to thank you for attending the Arrhythmia Management Update Toronto.

With the support of unrestricted educational grants from our industry partners and organizational support from the Canadian Heart Research Centre, this year's program promises to be a strong and extremely well supported meeting. The curriculum and faculty have been set to ensure an interactive and stimulating program for all participants.

As you can see from the agenda, the AMU program consists of structured lectures with question and answer periods lead by an excellent Canadian faculty. This one day program has been designed to review established best practices and recent clinical advances in the management of cardiac arrhythmias. A major goal of the planning group is to focus on the practical application of this knowledge in the real world management of patients with cardiac arrhythmias in Canada.

We are pleased to inform you that this educational even has been approved for 7 MAINPRO-M1 credits and as an Accredited Group Learning Activity under Section 1 of the Framework of CPD options for the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada (7 hours).

We hope that you find this day interesting, educational and enjoyable and we look forward to your feedback

With Best Regards,

Paul Dorian, MD  
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## Scientific Agenda

### Session 1: A Morning with Ventricular Tachyarrhythmias

**Moderator:**

- 08:00 New Clinical Guidelines for Prophylactic ICD Therapy
- 08:30 ACLS Guidelines: What is new? What is the data?
- 09:00 Cardiac Resynchronization Therapy: Changing paradigms of heart failure management
- 09:30 Investigation and Management of the Patient with Recurrent Syncope: New guidelines
- 10:15 Panel Discussion
- 10:45 Break
- 11:00 WORKSHOPS:
  - Case Discussion: Atrial fibrillation
  - Case Discussion: ECG interpretation
  - Case Discussion: CRT
  - Case Discussion: Restriction of driving privileges
- 12:00 Lunch

- Civic Ballroom*
- Brent Mitchell, MD**
- Christopher Simpson, MD*
- Paul Dorian, MD*
- Malcolm Arnold, MD*
- Andrew Krahn, MD*
- Civic Ballroom Foyer*
- George Wyse, MD*
- Civic Ballroom**
- Luigi Casella, MD*
- Kent Room**
- Malcolm Arnold, MD*
- Kenora Room**
- Brent Mitchell, MD*
- Huron Room**
- Civic Ballroom*

### Session 2: An Afternoon with Atrial Fibrillation

**Moderator:**

- 13:00 Clinical Trials of Antithrombotic Therapy for AF: Recent clinical trials and new directions
- 13:30 Management of AF: Rate control or rhythm control?
- 14:00 Optimizing Rate and Rhythm Control
- 14:30 AF and Hypertension: Non-antiarrhythmic drug therapy for AF
- 15:00 Panel Discussion
- 15:30 Break
- 15:50 Debate: For patients with AF in the absence of evidence structural heart disease, therapy with antiarrhythmic drugs should precede consideration of curative ablation therapy
- 16:50 Close

- Civic Ballroom*
- Paul Dorian, MD**
- Stuart Connolly, MD*
- George Wyse, MD*
- Paul Dorian, MD*
- Jeff Healey, MD*
- Civic Ballroom Foyer*
- Brent Mitchell, MD & Allan Skanes, MD*

**Participants will have increased ability to:**

- ✓ Initiate appropriate first line therapy for patients in their practice with cardiac arrhythmias
- ✓ Recognize patients with cardiac arrhythmias which constitute a threat to life and warrant immediate assessment and therapy
- ✓ Recognize patients without cardiac arrhythmias who are at high risk of development arrhythmias that are a threat to life and, therefore, require prophylactic therapy
- ✓ Provide medical therapies to patients with cardiac arrhythmias
- ✓ Understand the use of ancillary medical therapies in patients with cardiac arrhythmias treated with an implantable device
- ✓ Provide an initial trouble-shooting service to patients with cardiac arrhythmias treated with an implantable device
- ✓ Use multiple anti-arrhythmic therapies in complicated patients



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## Session 1 : A Morning with Ventricular Tachyarrhythmias

*Moderator : Brent Mitchell, MD*

New Clinical Guidelines for Prophylactic ICD Therapy	<i>Christopher Simpson, MD</i>	<i>p 1 - 2</i>
ACLS Guidelines: What is new? What is the data?	<i>Paul Dorian, MD</i>	<i>p 3- 6</i>
Cardiac Resynchronization Therapy: Changing paradigms of heart failure management	<i>Malcolm Arnold, MD</i>	<i>p 7 - 8</i>
Investigation and Management of the Patient with Recurrent Syncope: New guidelines	<i>Andrew Krahn, MD</i>	<i>p 9 - 10</i>

## WORKSHOPS

<b>Case Discussion: Atrial fibrillation</b>	<i>George Wyse, MD</i>	<i>p 11</i>
<b>Case Discussion: ECG interpretation</b>	<i>Luigi Casella, MD</i>	<i>p 12</i>
<b>Case Discussion: CRT</b>	<i>Malcolm Arnold, MD</i>	<i>p 13</i>
<b>Case Discussion: Restriction of driving privileges</b>	<i>Brent Mitchell, MD</i>	

## Session 2 : An Afternoon with Atrial Fibrillation

*Moderator : Paul Dorian, MD*

Clinical Trials of Antithrombotic Therapy for AF: Recent clinical trials and new directions	<i>Stuart Connolly, MD</i>	<i>p 14 - 15</i>
Management of AF: Rate control or rhythm control?	<i>George Wyse, MD</i>	<i>p 16 - 17</i>
Optimizing Rate and Rhythm Control	<i>Paul Dorian, MD</i>	<i>p 18 -19</i>
AF and Hypertension: Non-antiarrhythmic drug therapy for AF	<i>Jeff Healey, MD</i>	<i>p 20 - 21</i>
Debate: For patients with AF in the absence of evident structural heart disease, therapy with antiarrhythmic drugs should precede consideration of curative ablation therapy	<i>Allan Skanes, MD Brent Mitchell, MD</i>	<i>p 22 - 24</i>

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# Session I: A Morning with Ventricular Tachyarrhythmias New Clinical Guidelines for Prophylactic ICD Therapy

**CHRISTOPHER SIMPSON, M.D.**

## Biography

Dr. Chris Simpson, originally from Nackawic, New Brunswick, graduated from Dalhousie Medical School in 1992, and then completed Internal Medicine and Cardiology residencies at Queen’s University. He subsequently completed a Heart and Stroke Foundation Research Fellowship in Cardiac Electrophysiology in 1999 in London under the supervision of Dr. George Klein.

He is currently an Associate Professor of Medicine at Queen’s University, where he is the Medical Director of the Kingston Hospital’s Cardiac Program. He is the Chair of the Ontario Cardiac Care Network Arrhythmia Management Working Group, the Co-Chair of the Ontario Electrophysiology Colloquium, and serves as President of the Canadian Heart Rhythm Society.

His research interests include public policy, access to care, medical fitness to drive, atrial fibrillation and rhythm device therapy.

## Abstract

Compelling evidence for the use of implantable cardioverter defibrillators (ICDs) as *prophylactic* therapy for the prevention of sudden cardiac death has been accumulating for the last several years. In 2004, the Canadian Cardiovascular Society (CCS) / Canadian Heart Rhythm Society (CHRS) Position Paper on ICDs in Canada made the “primary prevention” indication a Class I indication with Level A evidence. ICD implants in Canada have been increasing at about 20-25% per year since. In 2006, about 15,000 Canadians are living with an ICD. However, the CCS estimates that approximately 92,000 Canadians meet the new Class I indication.

Is there room for discretion and for individual decision making when applying these new guidelines? This presentation argues that guidelines need not trump individual considerations based on good clinical judgment and, in fact, the CCS/CHRS guidelines show precisely how one can still practice individual-centered medicine in an “evidence-based guidelines” world.

**slide 1**

**slide 2**

CCS/CHRS Class I recommendations		
Recommendation	Level of Evidence	Factors to consider when applying the recommendations to an individual patient
1. Cardiac arrest due to ventricular fibrillation (VF) or ventricular tachycardia (VT) due to a treatable or reversible cause.	A	Subgroup analyses assign most of the benefit of ICD therapy to those patients with LVEF > 35%. Selected patients with LVEF > 35% and/or significant co-morbidity may choose alternative therapy such as amiodarone.
2. Spontaneous sustained VT in association with an acute heart infarction.	B	In some instances, alternative therapy may be appropriate (e.g., ablation for bundle branch reentry VT).
3. Syncope of unknown etiology with clinically relevant, hemodynamically significant sustained VT or VF indicated at electrophysiology study.	B	EP studies in patients with syncope NYD are usually most helpful in patients with evidence of structural heart disease.
4. Spontaneous sustained VT in patients who do not have structural heart disease that is not amenable to other treatments.	B	ICD may be used if pharmacologic treatment and/or ablation is not feasible or has failed.

CCS/CHRS Class I Recommendations		
Recommendation	Level of Evidence	Factors to consider when applying recommendations to an individual patient
5. Patients with ischemic heart disease with or without mild to moderate heart failure symptoms and LV ejection fraction of less than or equal to 30%, measured at least one month post myocardial infarction and at least three months post coronary revascularization procedure (CABG or PCI).	A	Patients with significant co-morbidities may not benefit from an ICD. Use of additional risk stratifiers, such as QRS duration and T wave alternans, are under investigation.

slide 3

CCS/CHRS Class IIA recommendations		
Recommendation	Level of Evidence	Factors to consider when applying recommendations to an individual patient
6. Patients with ischemic heart disease and LV dysfunction (LVEF = 31 - 35%) measured at least one month post myocardial infarction (MI) and have either post-myocardial revascularization procedure with inducible VT sustained VT at electrophysiology study.	B	Subgroup analyses of the primary prevention trials have suggested that the relative and absolute benefits of patients in the LVEF 31-35% range may be smaller. An EP study may help to select higher risk patients in this group.
7. Patients with non-ischemic cardiomyopathy present for greater than or equal to nine months, LVEF less than or equal to 35%, and NYHA functional class II-III heart failure.	B	The LVEF in most patients in the trials assessing device cardiomyopathy patients was very low (average 21-25%) and therefore patients with higher LVEF measurements were underrepresented in the trials showing benefit.
8. Patients with familial or inherited syndromes such as but not limited to long QT syndrome, hyperphosphatase, Brugada syndrome or arrhythmogenic right ventricular cardiomyopathy, and at a high risk for life-threatening ventricular tachyarrhythmias.	B	Factors such as family history of sudden death, inducibility of ventricular arrhythmias at EP study, patient preference, and results of selected non-reversible testing may help to determine appropriateness of ICD therapy.

slide 4

CCS/CHRS Class IB recommendations		
Recommendation	LOE	Factors to consider when applying the recommendations to an individual patient
9. Patients with ischemic heart disease, prior myocardial infarction (MI), LV dysfunction (LVEF = 31 - 35%) with either no inducible VT/sustained VT at electrophysiology study, or without an electrophysiology study.	C	Subgroup analyses of the primary prevention trials have suggested that the relative and absolute benefits of patients in the LVEF 31-35% range may be smaller. An EP study may help to select higher risk patients in this group.
10. Patients with non-ischemic cardiomyopathy present for at least nine months, LV dysfunction (LVEF = 31 - 35%) and NYHA functional class II-III heart failure.	C	The LVEF in most patients in the trials assessing device cardiomyopathy patients was very low (average 21-25%) and therefore patients with higher EP measurements were underrepresented in the trials showing benefit.
11. Severe symptoms (e.g. syncope) attributable to sustained ventricular tachyarrhythmias while awaiting cardiac transplantation.	C	An ICD in this circumstance may be regarded as a "bridge" to transplantation. Atrial fibrillation therapy may be regarded as a reasonable alternative in some cases.

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CCS/CHRS Class III recommendations		
Recommendation	LOE	Factors to consider when applying the recommendations to an individual patient
12. Syncope of undetermined cause in a patient without structural heart disease.	C	Efforts should be made to rule out syncope due to unrelated electrical heart disease particularly in patients with a family history of sudden death.
13. Intermittent VT or VF.	C	An ICD may become appropriate if other treatment renders VT or VF non-sustained.
14. VF or VT resulting from arrhythmias due to a transient or reversible cause (e.g. AMI, electrolyte imbalance, drugs, or trauma) or amenable to surgical or catheter ablation (e.g. AVNRT/atrial VT, idiopathic LV tachycardia).	C	Recognizing the difficulty in defining that VT/VF is due to a reversible cause, mild electrolyte abnormalities and what symptoms may be insufficient evidence to withhold ICD therapy.

slide 6

CCS/CHRS Class III recommendations		
Recommendation	LOE	Factors to consider when applying the recommendations to an individual patient
15. Significant psychiatric illness that may be aggravated by device implantation or may preclude systematic follow-up.	C	A formal psychiatric assessment may be helpful in cases where the potential impact of an ICD on a psychiatric condition is unclear.
16. Terminal illnesses with projected life expectancy of less than one year.	C	Such patients were excluded from all ICD trials.
17. NYHA class IV congestive heart failure in patients who are not expected to improve with any further therapy and who are not candidates for cardiac transplantation.	C	A CRT-ICD in highly selected patients with "end stage" heart failure may be considered to be appropriate on the grounds that CRT-ICD may in itself improve the prognosis.

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Waiting time benchmarks for initial EP consultation	
<b>Emergent or urgent patients:</b>	Refer to ER or EP on call
Patients with structural heart disease (e.g., ejection fraction less than 45%, bundle branch block, hyperphosphatase cardiomyopathy, congenital heart disease, family history of sudden cardiac death, inherited heart disease, etc) referred for symptoms such as syncope that could potentially be associated with a risk of morbidity or mortality.	30 days
Patients referred for consideration of an ICD (replantation (primary prevention) and/or CRT device)	30 days
Patients electively referred for an EP opinion (e.g. palpitations, supraventricular tachycardia, syncope without structural heart disease, or other medical conditions)	90 days

Reprinted in Part 7 Order (2006) in 2009

slide 8

Pacemakers, ICDs and CRT	
Urgent/semi-urgent pacemaker with TTVP	Immediate to 3 days
Urgent/semi-urgent pacemaker with no TTVP	3 days
Scheduled pacemaker with high risk of syncope	2 weeks
Scheduled pacemaker with lower risk of syncope	6 weeks
Secondary prevention ICD	Immediate to 3 days
Primary prevention ICD	8 weeks
CRT	6 weeks



## *ACLS Guidelines: What is new? What is the data?*

**PAUL DORIAN, M.D.**

### *Biography*

Dr. Paul Dorian is currently the Director of the Cardiac Electrophysiology Program at St. Michael's Hospital in Toronto, Canada. He is Professor of Medicine in the Division of Cardiology and in the Division of Clinical Pharmacology at the University of Toronto.

Dr. Dorian received his medical degree from McGill University in Montreal in 1976. He continued training in Internal Medicine and Cardiology at the University of Toronto, and received certification by the Royal College of Physicians and Surgeons of Canada in Internal Medicine in 1983 and certification in Cardiology in 1984. He completed training in Clinical Pharmacology at the University of Toronto in 1982, and received an MSc in Pharmacology from the University of Toronto in 1982. From 1983 to 1985, he completed a Fellowship in Cardiac Electrophysiology at Stanford University Medical Centre in California.

His research interests include factors related to the induction and maintenance of ventricular fibrillation, defibrillation, and antiarrhythmic drug effects on ventricular fibrillation and defibrillation. His other interests also include quality of life in patients with cardiac arrhythmias, and the clinical pharmacology of antiarrhythmic drugs.

He has recently completed a clinical trial in out of hospital cardiac arrest and continues collaborative trials in prehospital care.



## *ACLS Guidelines: What is new? What is the data?*

**PAUL DORIAN, M.D.**

### *Abstract*

In December of 2005, the International Liaison Committee on Resuscitation (ILCOR) published the revised international guidelines on advanced cardiac life support. Major developments in resuscitation science have lead to substantial revision to the prior guidelines. The new guidelines rest largely on the following observations:

Successful resuscitation from cardiac arrest is most closely linked to the promptness and effectiveness of chest compressions and basic life support.

Both in and out of hospital, chest compressions during CPR are performed imperfectly, or for not enough time during cardiac arrest (interrupted too many times).

Artificial ventilation is usually excessive, involving too frequent ventilations applied too vigorously.

Although defibrillation is effective for ventricular fibrillation, the ensuing rhythm is frequently asystole or pulseless electrical activity, unless the heart is “primed” to recover contractile function by sufficient chest compressions prior to or between defibrillation shocks.

### **Summary of New/ Modified ACLS Guidelines:**

1. Push hard and push fast: For optimum CPR, chest compressions should be done vigorously, at about 100 compressions/min. with complete chest recoil between compressions, and interrupted as little as possible for defibrillation, intubation, etc.
2. Be careful not to over ventilate: either using a bag valve mask or endotracheal intubation, ventilation should be kept at about 8/min , and overventilation should be carefully guarded against. For one rescuer CPR, the ratio of compressions to ventilation should be 30:2, and with two rescuers 15:2, but without interrupting chest compression in order to ventilate (adult ACLS).
3. The guidelines de-emphasise pulse checks (since they are time consuming and may be inaccurate) and recommend immediately resuming CPR after every defibrillation shock, rechecking the rhythm only 60 seconds after every shock (as opposed to the previous “stacked” shocks).
4. Drug therapy is de-emphasized, since there is no clear proof from clinical trials that either vasopressors (epinephrine or vasopressine) or antiarrhythmics (eg amiodarone) prolongs survival to hospital discharge. Administration of these drugs can be potentially useful, but basic life support should not be interrupted or delayed in order to administer drug therapy.
5. Randomized clinical trials suggest that prompt institution of therapeutic hypothermia (cooling to 32-34 degrees celcius for 12 to 24 hours) as soon as possible after return of spontaneous circulation in cases of ventricular fibrillation cardiac arrest, can substantially improve survival hospital discharge. Protocols to optimize the timing and delivery of therapeutic hypothermia in hospital are encouraged.

Many unanswered questions remain in resuscitation science. The North American Resuscitation Outcomes Consortium (ROC) is a US / Canadian Multi Centre effort to perform very large scale high quality clinical trials in improving survival from out of hospital cardiac arrest. New trials in 2006 will focus on the potential benefits of the Impedance Threshold Device and the strategy immediate defibrillation (“analyze early”) vs. 2 min of CPR prior to ECG analysis and defibrillation (“analyze late”).

slide 1

**Resuscitation After Cardiac Arrest:  
A 3-Phase Time-Sensitive Model**

**The Electrical Phase:**  
0 - 4 min post VF onset  
- if defibrillation achieved, excellent outcomes  
- little need for ventilation, drugs

**The Circulatory Phase:**  
4 - 10 min post VF onset  
- cardiac, CNS hypoxia  
- poor organ function even if defibrillation achieved  
- provide circulation to 'prime the pump', ± adjuncts  
- reperfusion common - consider antiarrhythmics

**The Metabolic Phase:**  
> 10 min post VF onset  
- consider hypothermia  
- is epinephrine harmful?

Wessfeld et al. JAMA 2002;288:23

slide 4

**ACLS 2006  
What is NEW and WHY**

slide 2

**Delaying Defibrillation to Give CPR in Out-of-Hospital VF: A Randomized Study**

Emergency Response Time	Shock 1st (%)	3 min CPR (%)
< 5 min	~28	~24
> 5 min	~4	~22

Adapted from Wessfeld et al. JAMA 2002; 288:193

slide 5

**VENTILATION**

**PROBLEM**

- Overventilation decreases venous return and cardiac output
- Pause to ventilate interrupts CPR

**SOLUTION**

- 8-10 ventilations/min
- Compression: ventilation 30:2 (one provider)
- 15:2 two providers (no interruptions in compressions)

slide 3

**Are ACLS guidelines being followed?  
Are they optimal?**

**What is wrong with CPR as usually practiced?**

- inadequate compressions (force/depth, frequency)
- inadequate chest recoil
- **\*TOO MUCH HANDS-OFF TIME\***
- too many ventilations

**How can this be improved?**

- mechanical compressions
- new techniques for manual compressions
- reducing ventilations
- improving venous return: ITD & ACD-CPR

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**CPR – Chest compressions**

**PROBLEM**

- Too much hands off time
- Not deep or fast enough
- Heart not "ready" for shock

**SOLUTION**

- Emphasize continuous CPR
- Emphasize rate, depth enough
- CPR pre shocks for long duration VF
- CPR (2 min) between shocks

**slide 7**

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## SHOCKS

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<b>PROBLEM</b> <ul style="list-style-type: none"><li>• Insufficient Shock Energy</li></ul>	<b>SOLUTION</b> <ul style="list-style-type: none"><li>• (Monophasic – 360 J)</li><li>• Prefer Bi-phasic (120-360 J)</li></ul>
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**slide 8**

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## DRUGS

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<b>PROBLEM</b> <ul style="list-style-type: none"><li>• No survival data to support any drug</li></ul>	<b>ACTION</b> <ul style="list-style-type: none"><li>• Vasopressor after 1 failed shock</li><li>• Anti-arrhythmic (prefer amiodarone) after 2 unsuccessful shocks (VF)</li></ul>
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## *Cardiac Resynchronization Therapy: Changing paradigms of heart failure management*

**MALCOLM ARNOLD, M.D.**

### *Biography*

Malcolm Arnold, MD, FRCP, FRCP Edin, FRCPC, FACP, FACC received his medical degree from Queen's University, Belfast and received further postgraduate training in Harvard Medical School, Boston. Presently he is staff cardiologist at London Health Sciences Centre, University Hospital, London, Ontario and Professor of Medicine, Physiology & Pharmacology, University of Western Ontario, London, Ontario, Canada. He holds the position of Director of Research Affairs for the Division of Cardiology and is Program Leader, Circulation Group, Lawson Health Research Institute. He is chair of the Canadian CHF Clinics Network and currently chairs the Canadian Cardiovascular Society Heart Failure Consensus Conference Panels. He has received the UWO Faculty of Medicine Dean's Award of Excellence for both Research and Education. Dr. Arnold's particular areas of research interest are the therapeutic management of patients with heart failure, changes in the sympathetic nervous system and vasculature in patients with heart failure, and in the prevention of ischemic heart disease, and the translation of clinical trials into clinical practice. He is author of 27 book chapters, theses, and reviews, and has published over 160 manuscripts, over 200 abstracts, and over 100 medical education papers and teaching programs.

### *Abstract*

The Canadian Cardiovascular Society has recently published new 2006 Consensus Conference Recommendations on the diagnosis and management of heart failure. These identify the importance of accurate diagnosis, individualized combination drug therapy, patient education, consideration of quality and quantity of life, and timely access to specialist care.

Combination drug therapy begins with low dose diuretic plus ACE-I plus BB in all patients with symptomatic systolic heart failure, unless contraindicated. Drugs used in large scale clinical trials are preferred as the target dose is known as well as the average expected response. Other drugs may include ARB's, spironolactone, digoxin, nitrates plus others as indicated in individual patients. These drugs, when judiciously used, can reduce symptoms and may improve LVEF and thus may reduce the indications for biventricular pacing.

Biventricular pacing is indicated in patients with a widened QRS and low LVEF and persistent moderate symptoms of heart failure despite the above optimized therapies. However, careful selection of patients is still required to achieve best cost effective results. Close collaboration between EP and HF specialists will facilitate best clinical outcomes.

slide 1

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### Principles of Drug Therapy in HF Where to Start?

- Evidence based **combination** drug therapy is recommended in most patients with HF (Class I, Level A)
- All HF patients with LVEF <40% should be treated with an ACE-I **and** a beta-blocker, unless a specific contraindication exists (Class I, Level A)

Amold 2002 et al. Can J Cardiol 2008;22(1):23-33

slide 4

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### When to Use ARBs?

- In patients with persistent HF symptoms, and who are at increased risk of HF hospitalization, despite optimal treatment with other recommended drugs (Class I, Level B)

**DIANEM** - Probability of patients with Cr death or hospital admission for CHF

**Valsart** - Probability of the reduction combined endpoint (all cause mortality, LVMI, and/or HF hospitalization, hospitalization for worsening HF, or the log of HF hospitalizations) over time

Amold 2002 et al. Can J Cardiol 2008;22(1):23-33  
 Packer 2001 et al. Circulation 2001;104:259-67  
 Gosselin et al. N Engl J Med 2001;345:969-75

slide 2

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### When to Use ACE Inhibitors?

All HF patients with LVEF <40% should be treated with an ACE-I and a beta-blocker, unless a specific contraindication exists (Class I, Level A)

**SAVE** (Sildenafil)

**RESOLVD** (Resolvin)

**SARIS** (Sildenafil + ACE-I)

These trials form the basis of ACE-I use in HF with LVEF <40% and post-MI with reduced LVEF and/or HF

Amold 2002 et al. Can J Cardiol 2008;22(1):23-33  
 Gosselin et al. N Engl J Med 2001;345:969-75  
 The SOLVD Investigators. N Engl J Med 1991;325:997-1003  
 Packer 2001 et al. Circulation 2001;104:259-67

slide 5

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### When to Use Aldosterone Blockers?

**Spirolactone:**

- Patients with LVEF  $\geq$ 30% and severe symptoms despite optimized other therapies (Class I, Level B)

**RALES** - Probability of survival

**RALES** - Risk reduction for rehospitalization

Amold 2002 et al. Can J Cardiol 2008;22(1):23-33  
 Pitt B et al. N Engl J Med 2004;351:2591-97

slide 3

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### When to Use Beta-blockers?

- All HF patients with LVEF  $\geq$ 40% (use clinically proven beta-blocker) (Class I, Level A)
- In stabilized HF patients with NYHA Class IV symptoms (Class I, Level C)

**MERIT-HF**

**RESOLVD**

**RESOLVD**

Amold 2002 et al. Can J Cardiol 2008;22(1):23-33  
 MERIT-HF Study Group. N Engl J Med 2004;351:2315-24  
 Gosselin et al. N Engl J Med 2001;345:969-75  
 Packer 2001 et al. Circulation 2001;104:259-67

slide 6

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### Treatment of Heart Failure

If symptomatic consider, refer to specialist centre to evaluate for all classes  
 If HF symptoms not LVEF  $\geq$ 40%, treat cause only, optimize other therapies  
 If LVEF  $\geq$ 40%

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    graph TD
      Start[For all symptomatic patients with systolic HF] --> ACE[ACE-I or beta-blocker]
      ACE --> PrescribeARB[Prescribe ARB]
      ACE --> PrescribeARB2[Prescribe ARB]
      ACE --> Consider[Consider other therapies]
      ACE --> Titrate[Titrate to target doses]
      Titrate --> Stable[Clinically stable Persistent symptoms]
      Titrate --> NYHA[NYHA class III]
      Titrate --> Class[Class III-IV]
      Stable --> Continue[Continue Rx Add ARB]
      NYHA --> Digoxin[Digoxin or nitrate]
      NYHA --> Coniv[Coniv. diuretic]
      NYHA --> Spironolactone[Spironolactone]
      Class --> Digoxin
      Class --> Coniv
      Class --> Spironolactone
    
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Amold 2002 et al. Can J Cardiol 2008;22(1):23-33



## *Investigation and Management of the Patient with Recurrent Syncope: New guidelines*

**ANDREW KRAHN, M.D.**

### *Biography*

Dr. Krahn is currently Professor in the Division of Cardiology with the University of Western Ontario. Dr. Krahn received his MD from the University of Manitoba. His clinical expertise is in management of cardiac arrhythmias. Current research interests include investigation of causes of loss of consciousness and genetic causes of arrhythmias.

His research has been published in scientific journals such as *Circulation*, *Canadian Journal of Cardiology*, *American Journal of Medicine*, *Clinical Investigative Medicine*, *American Journal of Cardiology*, *Cardiac Electrophysiology Monitor*, *European Heart Journal*, *Canadian Medical Association Journal*, *JAMA* and the *American Heart Journal*.

Dr. Krahn is affiliated with several professional associations including the American Heart Association Council on Cardiology, the Royal College of Physicians of Canada, the American College of Cardiology, the Canadian Cardiovascular Society and the Heart Rhythm Society.

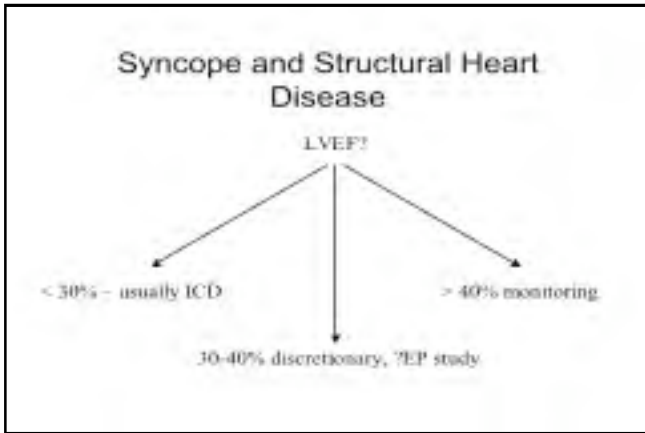
Dr. Krahn's research has been funded by the *Heart and Stroke Foundation of Ontario and Canada*.

### *Abstract*

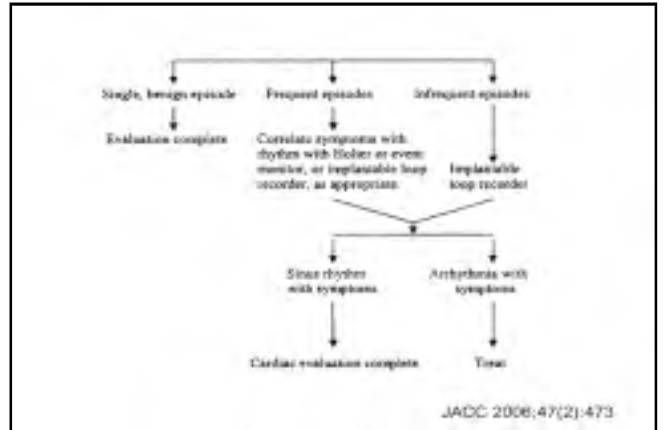
In an era of evidence based medicine, the management of patients with syncope has largely been driven by limited data without North American practice guidelines. A recent American Heart Association Position Paper (1) was a contentious position paper that did not draw on the balance of evidence in syncope, not seek broad buy in from researchers with a focus on syncope. A response letter is in press from the syncope community, emphasizing the thoughtful and thorough ESC Guidelines which were revised in 2004 (2). Management of syncope is driven by assessment of left ventricular function, with consideration of ICD therapy in patients with an ejection fraction < 35%. Patients with preserved left ventricular function typically benefit from consideration of tilt table testing or prolonged monitoring with an external or implantable loop recorder. Electrophysiologic testing has a diminishing role, used in selective patients with intermediate left ventricular function where a tachyarrhythmia is suspected. Therapy in syncope is usually successful once a diagnosis is achieved. Recent evidence in the therapy of recurrent vasovagal syncope suggests a role for beta blockers in patients over 40 years of age (3), and ongoing studies are exploring the promising role of pacemakers in patients with vasovagal syncope and documented marked bradycardia during monitoring.

1. Strickberger SA et al, AHA/ACCF Scientific Statement on the evaluation of syncope: from the American Heart Association Councils on Clinical Cardiology, Cardiovascular Nursing, Cardiovascular Disease in the Young, and Stroke, and the Quality of Care and Outcomes Research Interdisciplinary Working Group; and the American College of Cardiology Foundation: in collaboration with the Heart Rhythm Society: endorsed by the American Autonomic Society. *Circulation*. 2006 Jan 17;113(2):316-27.
2. Brignole M et al, Guidelines on management (diagnosis and treatment) of syncope--update 2004. *Europace*. 2004 Nov;6(6):467-537.
3. Sheldon RS et al, Prevention of Syncope Trial (POST): a randomized, placebo-controlled study of metoprolol in the prevention of vasovagal syncope. *Circulation*. 2006 Mar 7;113(9):1164-70.

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**AHA/ACCF Scientific Statement**

**AHA/ACCF Scientific Statement on the Evaluation of Syncope**

From the American Heart Association Councils on Clinical Cardiology, Cardiovascular Nursing, Cardiovascular Disease in the Young, and Stroke, and the Quality of Care and Outcomes Research Interdisciplinary Working Group; and the American College of Cardiology Foundation In Collaboration With the Heart Rhythm Society Endorsed by the American Autonomic Society

S. Adam Strickberger, MD, D. Woodrow Benson, MD, PhD, Iain Baggioni, MD, David F. Cohen, MD, Michael J. Cohen, MD, Kenneth A. Ellenbogen, MD, Andrew E. Epstein, MD, Paul Friedman, MD, Jeffrey Goldberger, MD, Paul A. Hrademcny, MD, George F. Klein, MD, Bradley P. Knight, MD, Carlos A. Morillo, MD, Robert J. Myerburg, MD, Cathy A. Sika, MD, FAHA

JACC 2006;47(2):473

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**Arrhythmia/Electrophysiology**

**Prevention of Syncope Trial (POST)**

**A Randomized, Placebo-Controlled Study of Metoprolol in the Prevention of Vasovagal Syncope**

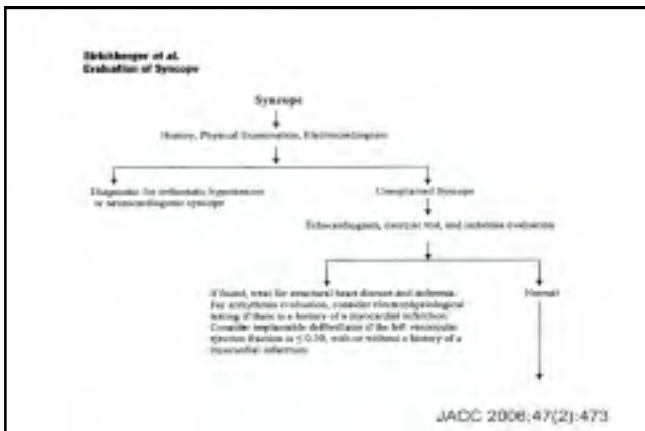
Robert Sheldon, MD, PhD, Susan Connolly, MD, Sarah Isaac, PhD, Thomas Klugheiser, MD, Andrew Kohn, MD, Carlos Morillo, MD, Miroslav Talajic, MD, Teresa Ku, MD, Peter Fontan-Tarot, MD, Debbie Richter, MS, Mary-Lou Kaufman, RN, for the POST Investigators

**Background**—Previous studies that assessed the effects of  $\beta$ -blockers in preventing vasovagal syncope provided mixed results. Our goal was to determine whether treatment with metoprolol reduces the risk of syncope in patients with vasovagal syncope.

**Methods and Results**—The multicenter Prevention of Syncope Trial (POST) was a randomized, placebo-controlled, double-blind, trial designed to assess the effects of metoprolol in vasovagal syncope over a 1-year treatment period. Two prespecified analyses included the relationships of age and annual risk rates to any benefit from metoprolol. All patients had  $\geq 2$  syncopal spells and a positive tilt test. Randomization was stratified according to age ( $\leq 40$  and  $> 40$  years). Patients received either metoprolol or matching placebo at highest tolerated doses (from 25 to 200 mg daily). The main outcome measure was the first recurrence of syncope. A total of 208 patients (mean age 42 $\pm$ 11 years) with a median of 9 syncopal spells over a median of 11 years were randomized, 106 to receive metoprolol and 102 to the placebo group. There were 73 patients with any recurrence of syncope. The likelihood of recurrent syncope was not significantly different between groups. Neither the age of the patient nor the need for supplemental treatment to produce a positive tilt test predicted subsequent significant benefit from metoprolol.

**Conclusions**—Metoprolol was not effective in preventing vasovagal syncope in the study population. (Circulation. 2006; 113:1354-1376.)

slide 3





**WORKSHOP**  
*Case Discussion: Atrial Fibrillation*

**GEORGE WYSE, M.D.**

*Biography*

Dr. Wyse obtained his Ph.D. in Pharmacology from McGill University in 1969 and did two years of postdoctoral research at the University of New Mexico before entering Medical School at the University of Calgary. After obtaining his MD in 1974, he did training in Internal Medicine at Foothills Hospital followed by Cardiology at Oregon Health Sciences University. He joined the Faculty of the University of Calgary in 1978, became Professor in 1985 and was the Chief of Cardiology from 1986 to 1993. He was Associate Dean (Clinical Affairs) from 1993-99. He became Professor Emeritus in 2005. Although originally a vascular biologist, Dr. Wyse is more well known in the area of heart rhythm management, particularly atrial fibrillation. He was the lead investigator for the AFFIRM trial. He has also played a leadership role in the following AF trials: AF-CHF, ACTIVE, ADMADEUS, PACIFIC, CABANA, PAPA BEAR.



## *WORKSHOP*

### *Case Discussion: ECG Interpretation*

**LUIGI CASELLA, M.D.**

#### *Biography*

He obtained his MD degree from the University of Naples, Italy. He came to Toronto in 1959. He joined the Cardiology staff of St. Michael's Hospital in 1965. He has been an Associate Professor of Medicine of the University of Toronto. He has had a major interest in teaching and has had numerous teaching awards, including the year 2000 Distinguished Teacher Award of the Canadian Cardiovascular Society and the Pairo Award. Electrocardiography has been one of his favorite areas of interest since his early postgraduate years. He is at present semi-retired, but still very active in undergraduate and postgraduate teaching.

#### *Abstract*

The advances in the field of electrophysiology in the past two decades have brought fundamental changes in the investigation and treatment of arrhythmias. Despite its limitations, the ECG still remains a most important and affordable clinical tool for the practicing physician.

During this workshop cases of tachyarrhythmias will be presented and discussed, with particular emphasis on the ECG diagnosis.

This is a hands-on seminar. The participants will be provided with copies of the ECG tracings and active audience participation will be strongly encouraged.



**WORKSHOP**  
*Case Discussion: Restriction of driving privileges*

**BRENT MITCHELL, M.D.**

*Abstract*

In Canada, a license is required to drive a motor vehicle. Although many Canadians consider driving to be a basic right, the licensing process considers driving to be a privilege extended only to those citizens who are considered to represent a low risk of harming themselves or others while driving. Individuals with a high risk of sudden incapacitation due to a medical illness will have their motor vehicle license rescinded until such time as the risk of sudden incapacitation while driving becomes acceptable. In Ontario, the Highway Traffic Act mandates that a physician with knowledge that a specific patient could represent a driving risk will so notify the Ministry of Transportation and is protected after having done so. The Canadian Cardiovascular Society has provided each provincial motor vehicle licensing body with consensus-based guidelines for cardiovascular conditions that constitute recommendations for restriction of driving privileges. Using case-based discussion, the latest revision of the CCS Driving Guidelines (Can Journal Cardiol 20:1314-20, 2004) will be reviewed along with the rationale for their derivation and the practicalities of their use.



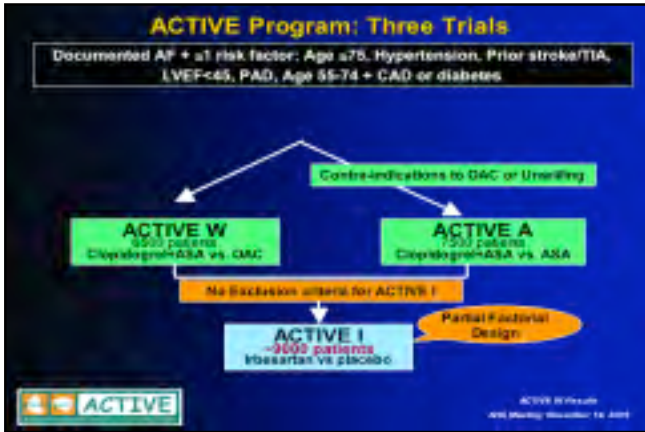
*Session II: An Afternoon with Atrial Fibrillation  
Clinical Trials of Antithrombotic Therapy for AF:  
Recent clinical trials and new directions*

**STUART CONNOLLY, M.D.**

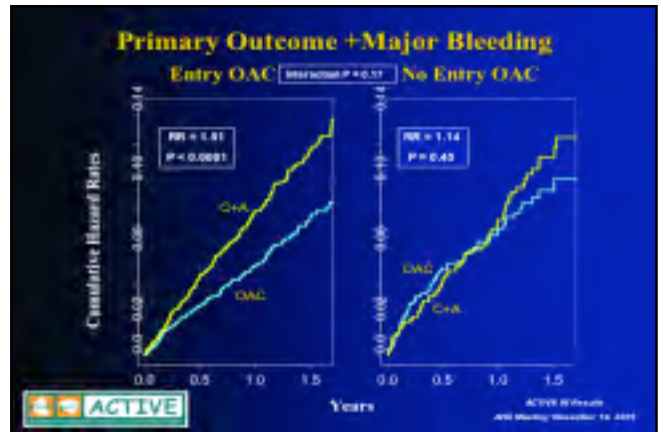
*Biography*

Dr. Stuart Connolly was born in Montreal, Canada in 1949. He received his cardiology training at the University of Toronto and received post graduate training in electrophysiology at Stanford University. In 1983 he joined the faculty at McMaster University where he is now a Professor and is the Director of the Arrhythmia Service and the Electrophysiology Lab. His main research interests have been in the area of randomized clinical trials and he has been involved in the design and implementation of a number of studies related to the management of patients with cardiac arrhythmia. Among the studies of which he was the principal investigator are the Canadian Atrial Fibrillation Anticoagulation (CAFA) Study, The Canadian Amiodarone Myocardial Infarction Arrhythmia Trial (CAMIAT), the Canadian Implantable Defibrillator Study (CIDS), The Canadian Trial of Physiologic Pacing (CTOPP) and two Vasovagal Pacemaker Studies (VPS-1 and VPS-2). Dr. Connolly is principal investigator of the Atrial Fibrillation Clopidogrel Trial With Irbesartan For Prevention Of Vascular Events (ACTIVE).

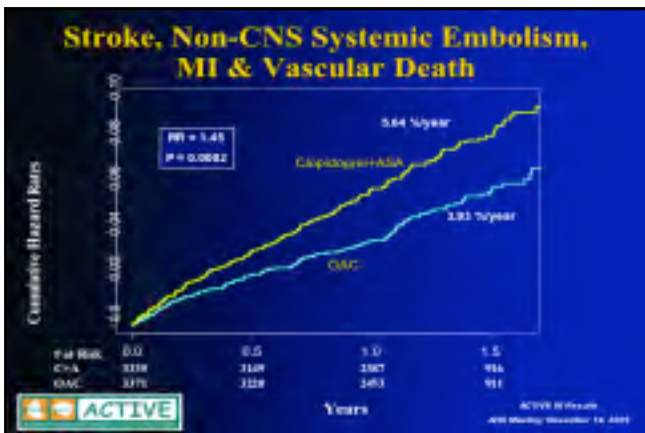
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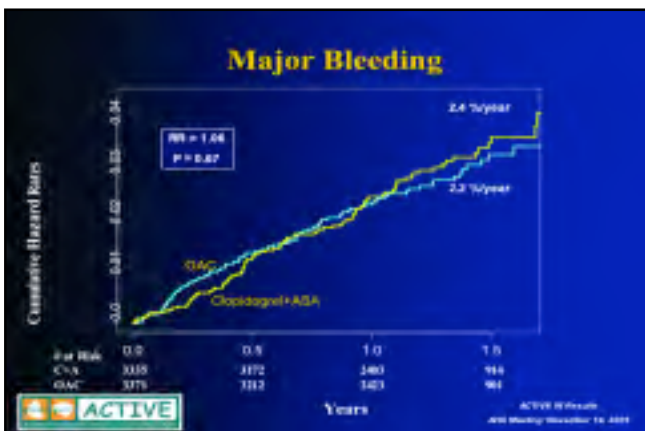
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## *Management of AF: Rate control or rhythm control?*

**GEORGE WYSE, M.D.**

### *Abstract*

The basis for the rate vs. rhythm controversy in AF rhythm management is the inefficacy and adverse effects of drug therapy for restoration and maintenance of sinus rhythm, coupled with the demonstrated efficacy of vitamin K antagonists for reducing the risk of stroke. Seven randomized controlled trials have been completed examining this question and two more are in progress. In this presentation the types of patients included and not included in the trials and the types of therapy that were evaluated, will be briefly reviewed. Such a review is necessary to determine the generalizability of the results from the trials. Some emphasis will be given to the severity of symptoms of those enrolled in the trials as an introduction to the newly proposed CCS Severity of AF (SAF) symptom scale. The results of the trials in general show that the presumed advantages of the pharmacologic rhythm control strategy remain unproven in the types of patients enrolled in these trials and rate control has been raised to the status of primary therapy for many patients. There are relative advantages and disadvantages of each approach. Accordingly, the choice of the initial strategy for rhythm management in AF must be individualized and a schema for doing so will be briefly reviewed.

slide 1




### Some Characteristics of Patients Enrolled in Rate vs. Rhythm Trials


(PIAF, AFFIRM, RACE, STAF, HOT CAFÉ)  
N = 5239

- Elderly; average age about 68 years
- Male; over 60%
- Persistent AF (>48h); about 75-80%
- Few with CHF and poor LV function
- 90% symptomatic

Prog Cardiovasc Dis 2005;48:125



slide 4




### Therapies Studied Within Each Strategy

(PIAF, AFFIRM, RACE, STAF, HOT CAFÉ)

- Rate Control (N = 2609)
  - >95% pharmacologic: beta blockers, calcium blockers, digoxin
  - <5% ablate and pace
- Rhythm Control (N = 2630)
  - >99% pharmacologic: amiodarone ~60%; sotalolol ~15%; propafenone/flecainide ~15%
  - <1% nonpharmacologic

slide 2




### CCS SAF Symptom Class

Definitions


**Class 0** = Asymptomatic with respect to AF

**Class 1** = Symptoms attributable to AF have minimal effect on patient's general QoL.

**Class 2** = Symptoms attributable to AF have a minor effect on patient's general QoL.




slide 5




### Rate Vs. Rhythm

- The only apparent reasons for using **pharmacologic** rhythm control in elderly patients with stroke risk factors and persistent AF would appear to be **relief of symptoms** and **informed patient preference**



slide 3




### CCS SAF Symptom Class

Definitions


**Class 3** = Symptoms attributable to AF have a moderate effect on patient's general QoL.

**Class 4** = Symptoms attributable to AF have a severe effect on patient's general QoL.

CCS SAF Symptom Class includes type of AF and integration of effect of AF on QoL over a period of time, usually the last few weeks  
e.g. CCS SAF Class 2, Paroxysmal AF or CCS SAF Class 1, Permanent AF



slide 6




### CCS Consensus Conference AF Guidelines 2005

Both are acceptable – Individualize!

Considers Rate Control	Favors Rhythm Control
Persistent AF	Paroxysmal AF
Recurrent AF	First Episode of AF
Less Symptomatic	More Symptomatic
>65 years of age	<65 years of age
Hypertension	No Hypertension
No History of Congestive Heart Failure	History of Congestive Heart Failure
Previous Antiarrhythmic Drug Failure	No Previous Antiarrhythmic Drug Failure
Patient Preference	Patient Preference

Can J Cardiol 2005;21:15B



**PAUL DORIAN, M.D.**

## Abstract

Once a decision has been made to manage a patient with Atrial Fibrillation by the rhythm or rate control strategies, the following steps are useful:

First, determine if the atrial fibrillation is caused by a reversible disorder (eg acute infection, alcohol excess, etc) and that it is not atrial flutter (which can easily be treated with radio frequency ablation).

If rhythm control is the desired strategy, drugs that are most often used are amiodarone, flecainide, propafenone, sotalol. Clinical trials have shown that amiodarone is more likely to be associated with freedom of recurrent atrial fibrillation than the alternatives. However, amiodarone is associated with well understood adverse effects, and patients on amiodarone need to be followed very closely.

Preliminary studies suggest that some “non antiarrhythmic” interventions may be useful in preventing atrial fibrillation recurrence, including angiotensin receptor blockers or ACE inhibitors: polyunsaturated fatty acids (such as found in fish oils); and possibly statins in patients with elevated LDL cholesterol.

If the decision is made to embark on a rate control strategy, drugs most commonly used include digoxin, beta blockers and rate limiting calcium blockers. Digoxin has modest effects on rate at rest, and has very little effect on controlling ventricular response during exercise or activity. Beta blockers are probably most effective at slowing rates, but in blinded randomized studies are more often associated with a reduction in or no improvement in exercise tolerance than calcium blockers, which are more often associated with the maintenance of or improvement in exercise tolerance. “Controlled” resting heart rate does not necessarily imply that exercise or activity ventricular rates are at the desired level. Although ideal rates are patient specific, it is generally recommended that resting heart rate should be < 80 bpm at rest, and < 110 bpm during moderate activity such as walking.

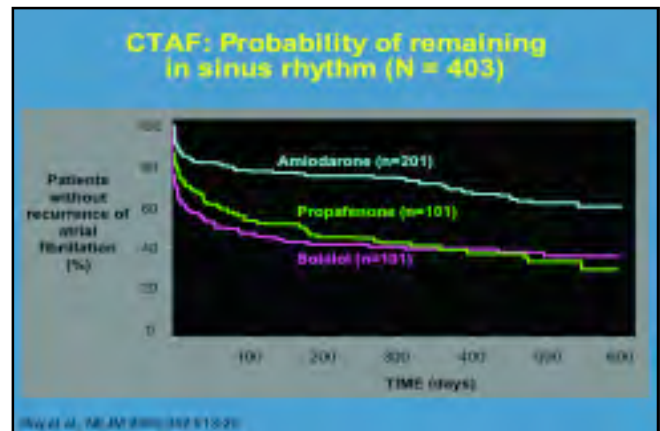
The Canadian Cardiovascular Society recommendations suggest using digoxin as the initial therapy for ventricular rate control in elderly patients or in active patients, and using calcium channel or beta blocking agents as the primary rate controlling drugs in younger and more active patients (class IIa recommendation).

### slide 1

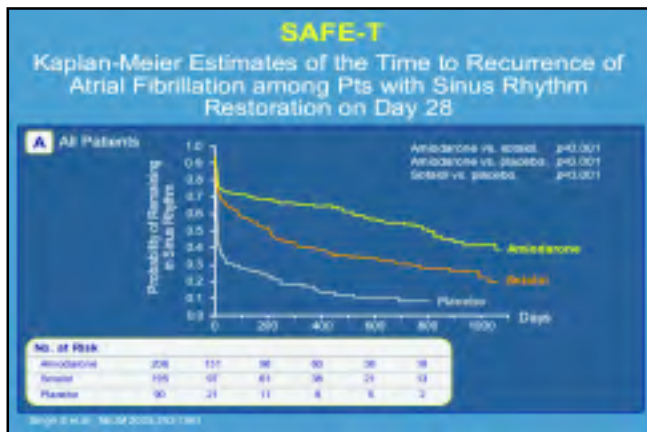
**Atrial Fibrillation (AF) is not One Disease**

- SVT or A Flutter leading to AF
- PV ectopy
- CHF / fibrosis-related AF
- Electrically and structurally remodelled atria
- Autonomic AF - vagal  
- sympathetic
- Familial AF - ? channelopathy  
- ? inherited structural disease

### slide 2



slide 3



slide 6

- Rate Control Strategy in AF**
- When is rate control necessary?
    - For symptoms only
    - To prevent tachycardiomyopathy
  - What drug(s) are preferred?
    - Digoxin, BB, Ca blockers, combinations
  - What are the appropriate endpoints for rate control?
    - Resting rate
    - Average rate during daytime activities
    - Exercise heart rate
    - Symptom control
- The answers to these questions are NOT known

slide 4

- Other treatment options**
- New antiarrhythmic drugs
  - Ablation (pulmonary vein isolation)
  - Rate control
  - Nontraditional**
    - Anti-hypertensives – ACE/ARB
    - Statins
    - Steroids
    - Fish oils
    - ↓ ETOH
    - Treat bradycardia
    - Treat sleep apnea

slide 7

- Pharmacological and Non-pharmacological Methods for Rate Control: Recommendations**
- Class Ia:**
- 1. Assess ventricular rate at rest and during exercise and modify target rates depending on patients' symptoms. (Level of Evidence: C)
  - 2. Administer digoxin as initial therapy in elderly, inactive patients (Level of Evidence: C) or as adjunctive therapy to calcium channel or beta blocking agents in younger and active patients. (Level of Evidence: C)

slide 5

- If you decide on the rhythm control strategy:**
- Go for the bronze
  - Assess global quality of life not the ECG
  - Consider reversible causes of AF
  - Occasional cardioversion is OK
  - Use BB or CCB with class Ic drugs (Propafenone, flecainide)
  - Progressively lower the dose of Amiodarone

slide 8

- Suggested algorithm for rate control:**
- Are the symptoms caused by rapid / irregular ventricular rate? **if yes:**
- Use  $\beta$ -blocker or Ca channel blocker.
    - Titrate upwards until resting V rate < 80 bpm
    - Symptoms still present?
      - If yes, titrate drugs until activity heart rate (eg. walking briskly) or daytime average (on Holter) V rate < 100-110 bpm
  - If adverse effects (eg. fatigue) reduce dose or change Rx**
  - If incomplete efficacy:**
    - Add digoxin
    - Add third drug
- If no or minimal symptoms:**
- Treat rate only if LV dysfunction present (target rate 100 bpm daytime) or average daytime rate > 120 bpm



## *AF and Hypertension: Non-antiarrhythmic drug therapy for AF*

**JEFF HEALEY, M.D.**

### *Biography*

Dr. Healey received his medical degree in 1995 at the University of Ottawa. He then did his clinical training in cardiology and electrophysiology at the Ottawa Heart Institute. He then moved to McMaster University, where he completed his Master's degree in clinical trial methodology and biostatistics. Currently, he is an Assistant Professor of Medicine at McMaster University, performing catheter ablation and cardiac device implantation. He is also the recipient of a CIHR grant to develop a program of clinical trials in arrhythmia management.

### *Abstract*

In North America, the majority of patients with atrial fibrillation (AF) have established cardiovascular disease or risk factors; hypertension being the most common. Several randomized trials have demonstrated that certain classes of anti-hypertensive medications may reduce the frequency of AF. Limited data suggest that other non-traditional, "anti-arrhythmic" therapies, such as the treatment of sleep apnea, corticosteroids and cholesterol-lowering medications may also prevent AF. The clinical role of these novel therapies is not yet established; however, many patients with AF have established indications for these therapies. Comprehensive risk factor evaluation and treatment, in accordance with current guidelines (JNC-6, NCEP-3, HOPE), may not only reduce the frequency of AF, but prevent serious cardiovascular events. Ongoing research will determine if current guidelines need to be revised for patients with AF.

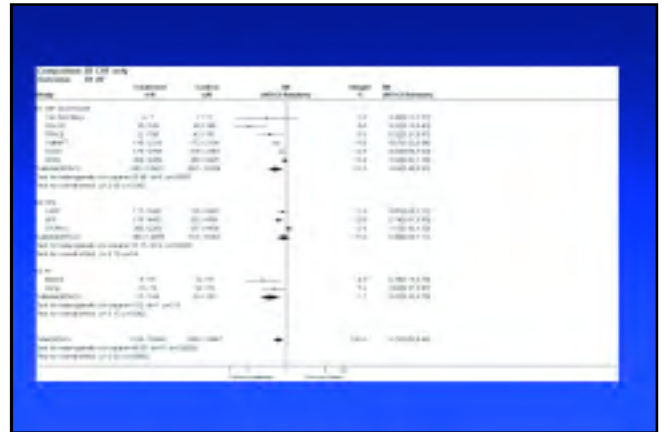
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### The Framingham Study: Factors Associated with AF

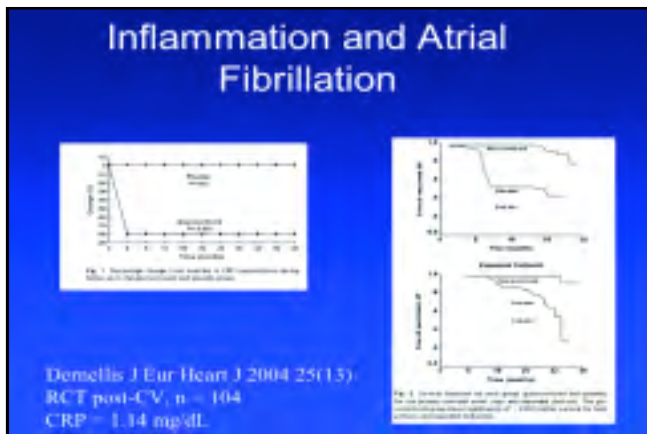
	Prevalence in Men (%)	Risk Ratio for AF
Stroke	2.4	4.2
Coronary Attacks	8.6	2.0
Cardiac Failure	0.8	17.5
Rheumatic Heart Dis.	1.2	8.3
<b>Hypertensive Heart</b>	<b>28.3</b>	<b>2.1</b>

N Engl J Med 1982;306:1018-22

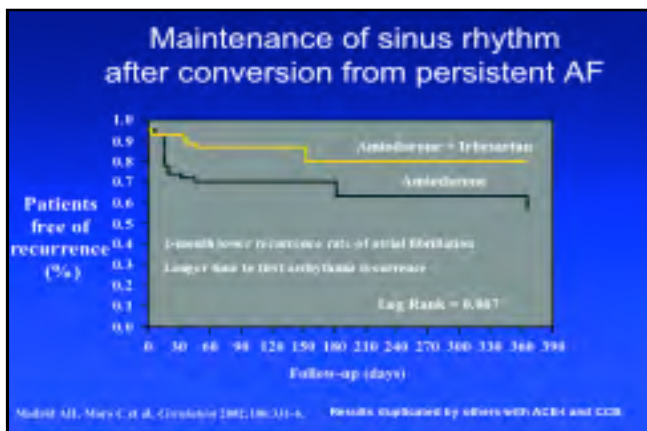
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***For Patients with AF in the Absence of Evident  
Structural Heart Disease, Therapy with Antiarrhythmic Drugs  
Should Precede Consideration of Curative Ablation Therapy***

**ALLAN SKANES, M.D.**

*Biography*

Dr. Allan C. Skanes is currently the Director of the Electrophysiology Laboratory at London Health Sciences Centre, University Campus, London, ON, Canada and Associate Professor of Medicine at the University of Western Ontario. He received his medical degree in 1990 from the University of Toronto where he also completed his Internal Medicine training. He completed his Cardiology and Electrophysiology training at the University of Ottawa Heart Institute before a research fellowship in Syracuse New York investigating the underlying mechanisms of arrhythmia especially atrial fibrillation.

Non-pharmacologic therapy for arrhythmia has been a main clinical and research interest. Currently, he holds a Heart and Stroke grant to investigate new ablative therapies for atrial fibrillation and is Principal Investigator for a team of investigators developing a minimally-invasive robotic surgical approach to atrial fibrillation at the Canadian Surgical Technologies and Advance Robotics (CSTAR). He has published 78 peer-reviewed papers and 5 book chapters.

***For Patients with AF in the Absence of Evident Structural Heart Disease, Therapy with Antiarrhythmic Drugs Should Precede Consideration of Curative Ablation Therapy***

**BRENT MITCHELL, M.D.**

*Abstract*

The goals of therapy for patients with atrial fibrillation are:

- 1) to identify and correct reversible causes of atrial fibrillation
- 2) to optimize the treatment of the cause of atrial fibrillation and associated structural heart disease
- 3) to prescribe appropriate anticoagulant/antithrombotic therapy
- 4) to slow the ventricular response rate to atrial fibrillation
- 5) to consider establishing and maintaining sinus rhythm

At present, there is no highly effective and safe therapy that accomplishes the latter goal. Despite the shortcomings of currently available antiarrhythmic drug therapy for maintenance of sinus rhythm, they remain the mainstay of therapy for this purpose. Curative trans-catheter ablation procedures have potential for the goal of maintenance of sinus rhythm in selected patients. To date, there are no satisfactory trial data permitting comparison of the initial use of antiarrhythmic drugs and the initial use of trans-catheter ablation in this setting. Current guidelines reflect the prevalent opinion that ablation approaches are still too ineffective and too unsafe as to be recommended as first line therapy.

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### ATRIAL FIBRILLATION - TREATMENT

**Treatment Goals**

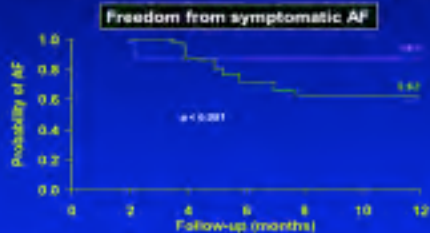
- identify and correct reversible causes of atrial fibrillation
- optimize treatment of cause / underlying structural heart disease
- appropriate anticoagulation / antithrombotic therapy
- slow ventricular response rate
- consider establishment / maintenance of sinus rhythm




slide 4

### Randomized Comparison of Ablation / ADD for AF

- 70 AF pts (96% paroxysmal) with no previous AAD Rx
- randomized to PVI versus AAD (Rf in 77%; sot in 23%)
- outcome = symptomatic AF after 2 mo blanking period



Wilson et al. JAMA 291(24):48-55, 2004



slide 2

### ATRIAL FIBRILLATION - TREATMENT

**Therapy to Establish / Maintain Sinus Rhythm**

**Potential Advantages**

1. improve LV function
2. decrease CHF symptoms
3. decrease arrhythmia symptoms
4. prevent electrical remodeling
5. prevent thromboembolism
6. decrease mortality

**Potential Disadvantages**

1. frequently impossible
2. treatment side-effects
3. increase mortality



slide 5

### Worldwide Survey of Catheter Ablation for AF

**Purpose:**

- to evaluate global experience with catheter ablation for AF
- in terms of methods used, efficacy of ablation, and safety


**Methods:**

- questionnaire sent to 777 EP labs around the world in 2002
- 43 questions regarding catheter ablation of atrial fibrillation
- 181 / 777 (23%) centers responded (equivalent by continent)

**Results:**

- 160 / 181 (55%) centers did AF ablation (11,762 procedures)
- mean of 1.3 procedures / patient
- dominant method was PVI (70%) then WACO (16%)
- most common energy source was RF (84%) then cryo (8%)

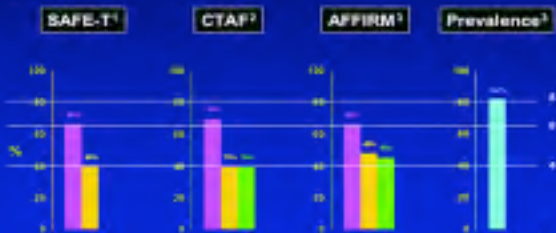
Chen et al. Circulation 117:1186-9, 2008




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### Efficacy of AAD Rx for Maintenance of Sinus Rhythm

**One-Year Actuarial Probability of Sinus Rhythm:**  
amiodarone, sotalol, Class I



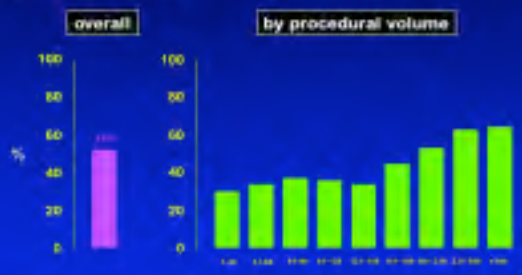
1. N Engl J Med 343:181-7, 2000    2. In Europ J Heart 142:11-20, 2000    3. J Am Coll Cardiol 42:204-8, 2003




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### Worldwide Survey of Catheter Ablation for AF

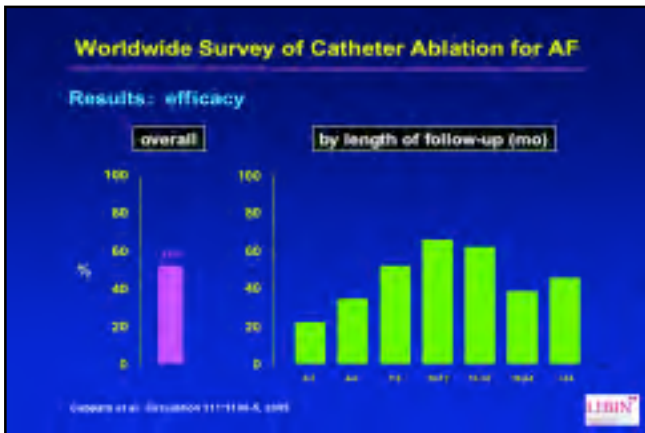
**Results: efficacy**



Chen et al. Circulation 117:1186-9, 2008



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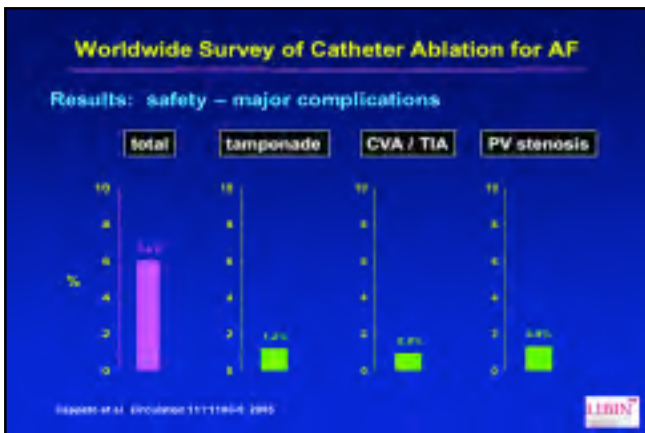
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### ATRIAL FIBRILLATION - TREATMENT

NASPE Policy Statement on Catheter Ablation

Atrial Fibrillation Curative Ablation:

- Class I Indications - none
- Class IIa Indications - none
- Class IIb Indications - after AA drug therapy failure

Schoneveld et al. PAGE 26:159-69, 2003

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## *An Academic Research Organization*

*The Canadian Heart Research Centre is a federally incorporated not-for-profit academic clinical research organization dedicated to the conduct of clinical trials and education in the treatment and prevention of cardiovascular disease in Canada.*

*The Canadian Heart Research Centre is a multi-faceted organization that has an intimate understanding of the needs of physicians and industry. Growing rapidly, with an emphasis on information technology and operations infrastructure, the Canadian Heart Research Centre is now on the leading edge of cardiovascular research and education.*

*As an academic research organization, Canadian Heart Research Centre is engaged in a full scope of activities from establishing new therapies in clinical trials to professional development through physician education and patient management oriented registries.*



**CANADIAN  
HEART  
RESEARCH  
CENTRE**

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Coordination,  
monitoring, Data  
Coordination**

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