CANADA'S PREMIER CARDIOVASCULAR CME

PROGRAM AGENDA & SYLLABUS

March 11-14, 2012
Banff, Alberta, Canada

CANADA'S PREMIER
CARDIOVASCULAR CME

WWW.ACCROCKIES.COM

Slides, videos, and a post-conference report will be available at the Conference website after the meeting.

Rockies
CANADA'S PREMIER CARDIOVASCULAR CME

Dear Colleague,

WELCOME TO THE 28TH ANNUAL CARDIOVASCULAR CONFERENCE IN THE ROCKIES (FORMERLY ACC LAKE LOUISE)

We are excited to be here in beautiful Banff, Alberta for the first time with ACC Rockies. We have been looking forward to the start of this year's conference in this exceptional new venue. We believe that the Rimrock fulfills all the needs of our participants with many added benefits, as well as all the amenities of the town of Banff.

Along with the change in locale, we've made changes to this year's program. To better accommodate the busy schedules of our participants, the meeting has been transitioned to full-day educational sessions. During the week, the program will now run for the full day on Monday and Tuesday, ending at noon on Wednesday. We understand our participants are busy and have made this adjustment to allow you to get the most from the program in a shorter time frame. The program will focus on the latest diagnostic, therapeutic, and preventative approaches to heart health and disease, highlighting ground breaking clinical trials, updated national guidelines, and common clinical challenges.

This year also marks the 17th anniversary of the **Residents' Research Competition**. The submissions are always impressive and this year is no exception – don't miss the Competition on Monday evening from 4:00pm to 6:00pm.

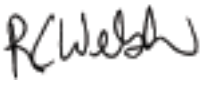
You also won't want to miss the **ACC Rockies Social Evening**. "Tastes of the World" begins Monday evening at 7:30pm in the Wildrose room. This informal event will focus on relaxed mingling with friends and colleagues – and, of course, excellent food.

We welcome back the **Canadian Cardiovascular Society (CCS) National Workshop Initiative**. Their interactive, case-based workshops on Tuesday and Wednesday will address atrial fibrillation and heart failure, respectively.

The goal of the ACC Rockies Organizing Committee is to continue to enhance the meeting's position as the premier cardiovascular CME event in Canada. We trust this meeting will maintain the collegial atmosphere and tradition that you have come to expect. We'll strive to exceed your expectations by providing the highest quality cardiovascular continuing heath education. Most importantly, ACC Rockies will continue to uphold the long-standing tradition set by ACC Lake Louise as a high quality educational program encompassing presentations from national and international key opinion leaders.

We thank each member of our distinguished faculty. We thank each of our sponsors for their support of continuing medical education. Finally, thank you for participating in this year's Conference. Please enjoy all that the 28th Annual Cardiovascular Conference in the Rockies has to offer.

Sincerely,



Dr. Robert Welsh Dr. Jacques Genest

Table of Contents

Meeting Objectives

The objective of the ACC Rockies meeting is to enhance clinicians' knowledge through a combination of key presentations from recognized national and international opinion leaders blended with interactive case based discussion, question and answer periods, and knowledge translation workshops. The learning objectives for 2012 are to aid participants to:

- Identify potential care gaps in their own practice across the spectrum of cardiovascular medicine.
- Evaluate new therapeutic options in the treatment of Acute Coronary Syndromes, structural heart disease, heart failure, atrial fibrillation, pulmonary hypertension, and hypertension.
- Interpret the latest guidelines on atrial fibrillation, heart failure, Acute Coronary Syndromes, and trans-catheter aortic valve implantation.
- Describe appropriate strategies for the primary prevention and management of hypertension, Acute Coronary Syndromes, and supraventricular tachycardia.

Accreditation

This event is an accredited group learning activity under Section 1 as defined by the Royal College of Physicians & Surgeons of Canada for the Maintenance of Certification program.

Certificates of attendance for CME purposes will be available at the Hospitality Desk upon submission of your conference evaluation. Each physician can only claim those hours of credit that he or she actually spent in the educational activity.

This program has been approved by the Canadian Cardiovascular Society File #2012-07 for a maximum of 25 credits.

Canadian Cardiovascular Society
Leadership. Knowledge. Community.

Société canadienne de cardiologie
Communauté. Connaissances. Leadership.

Faculty Listing

Todd Anderson
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Scientific Agenda

Topic		Faculty
Sunday, March 11, 2012		
15:50 - 16:00	ACC Rockies Opening Remarks – Welcome Address	R. Welsh
Theme: Prevention – J. Genest		
16:00 - 16:30	Global Burden Of Cardiovascular Health	B. Gersh
16:30 - 17:00	Management of Lipids in Patients with Chronic Kidney Disease	M. Tonelli
17:00 - 17:30	Novel HDL Therapies – A Promising Future?	J. Genest
17:30 - 18:00	Practical Approaches To The Treatment Of Obesity	D. Lau
18:00 - 18:30	**ACC Rockies Lecture** Translating Molecular Insights Into New Clinical Therapies For Cardiovascular Disease	D. Stewart
18:30 - 19:00	Question/Discussion Period	
19:00 - 20:00	Welcome Reception	All Participants
Monday, March 12, 2012		
Theme: Acute Coronary Syndromes – R. Welsh		
08:00 - 08:30	Walking The Tight Rope In ACS: Balancing Safety And Efficacy	S. James
08:30 - 09:00	New Role For An Old Friend: Contemporary Insights From The ECG	P. Armstrong
09:00 - 09:30	STEMI Management In 2012: Facilitating Timely Reperfusion Therapy For Urban And Rural Patients	R. Welsh
09:30 - 10:00	Update In Interventional Cardiology	E. Schampaert
10:00-10:15	Nutrition Break	
10:15 - 10:45	Microvascular Angina's Current Relevance To Clinical Practice	T. Anderson
10:45 - 11:15	Practical Application Of New Developments In Antithrombotic And Antiplatelet Therapy In ACS	S. James
11:15 - 12:15	Audience Questions/Panel Discussion – **Interactive ACS Case Presentation**	R. Zimmermann
12:15 - 12:30	Break	
12:30 - 14:00 Lunch Provided	**Interactive Case Based Imaging Symposium** Non-Invasive Imaging For Assessment Of Chest Pain – Is There A Best Test?	J. Choy, P. Raggi R. Coulden
Theme: Structural HD – T. Anderson		
14:00 - 14:30	Percutaneous Aortic Valves – The Canadian Perspective	R. Welsh
14:30 - 15:00	Surgical Approaches To CHF: Implications Of STICH And The VAD	B. Gersh
15:00 - 15:30	Current Challenges In HF Care – Impact Of Hyponatremia In HF Care	P. Liu
15:30 - 16:00	Question/Discussion Period	
16:00 - 18:00	Resident Research Competition	J. Genest
19:30 - 22:30	Social Evening	All Participants

Tuesday, March 13, 2012		
Theme: Arrhythmia Management – J. Genest		
08:00 - 08:30	Supraventricular Arrhythmias – Bread And Butter Or Toast And Jam	D. Exner
08:30 - 09:00	Living Better Electrically: Which ICD and/or CRT Device for Which Patients and When	B. Mitchell
09:00 - 09:30	The Current Status Of Cardiac Resynchronization	A. Tang
09:30 - 10:15	Audience Questions - Panel Discussion – **Interactive Arrhythmia Case Presentation**	D. Exner
10:15 - 10:30	Nutritional Break	
10:30 - 11:15	Anticoagulation For Stroke Prevention In Atrial Fibrillation: A Changing Landscape	B. Mitchell
11:15 - 11:45	Pharmacogenomics in Cardiovascular Diseases: Ready for Prime Time?	S. de Denus
11:45 - 12:00	Question/Answers – Panel Discussion	
12:00 - 12:15	Break	
12:15 - 14:45 Lunch Provided	The Canadian Cardiovascular Society - **Atrial Fibrillation Guidelines Interactive Workshop**	B. Mitchell, J. Cairns
14:45 - 15:00	Break	
Theme: General Cardiology – R. Welsh		
15:00 - 15:30	Update On Current Concepts And Treatment Of Pulmonary Hypertension	D. Stewart
15:30 - 16:00	Reassessing The Definition And Treatment Of Severe Hypertension	B. Herman
16:00 - 16:30	Question/Answers – Panel Discussion	

Wednesday, March 14, 2012		
Theme: Heart Failure		
08:00 - 10:30	The Canadian Cardiovascular Society – **Heart Failure Guidelines Interactive Workshop**	J. Ezekowitz, A. Ducharme
10:30 - 10:45	Break	
10:45 - 11:30	Key Cardiovascular Late-Breaking Trials 2011-12	T. Anderson, J. Genest, R. Welsh
11:30 - 12:00	ACC Rockies – Closing Remarks	

Activities & Events

The 28th Annual Cardiology Conference in the Rockies has a wide variety of recreational activities and social events. The following information can help you enjoy all that Banff has to offer. We hope your experience this year is educational, memorable, and inspiring. Enjoy!

WELCOME RECEPTION

On Sunday, March 11th, at 7:00 PM, the Welcome Reception will be held in the Wildrose room -5th floor, following the ACC Rockies Lecture. The Welcome Reception provides an excellent opportunity for registrants and guests to mingle in a comfortable atmosphere.

SOCIAL EVENING

The ACC Rockies Social Evening "Tastes of the World" will be held on Monday, March 12th at 7:30 in the Wildrose room. This informal event will focus on relaxed mingling with family, friends, and colleagues – and, of course, excellent food. A variety of mouth-watering dishes from around the world will be showcased. With a sommelier offering insights and tastings of featured wines, this evening promises something for everyone. All conference participants and their guests are invited to attend. Casual attire is recommended.

Tickets are $50 per person. They can be purchased at the ACC Rockies Hospitality Desk (cash or cheque only, please).

We regret that we cannot accommodate children at this event. Babysitting services can be arranged through the Rimrock; please contact Karen Baker at the ACC Rockies Hospitality Desk for assistance.

ACC ROCKIES NIGHT AT DIVAS

On Tuesday March 13, 2012 in Divas lounge, the Rimrock will offer ACC Rockies delegates special discounts on food and beverages.

Conference participants will also have an opportunity to showcase their skiing prowess - Wii style!

SKI PACKAGE INFORMATION

The Rimrock Resort Hotel has generously worked with Mt. Norquay to provide ACC Rockies delegates with the following discount packages.

Mt. Norquay

LIFT TICKETS	Full Day	Half Day (12-4pm)	Night Skiing
Adults (18+)	$47 + HST	$36 + HST	$17 + HST
Youth (13-17)	$35 + HST	$28 + HST	$17 + HST
Child (6-12)	$14 + HST	$12 + HST	$8 + HST

Mount Norquay will also offer a 25% discount on all ski lessons.

In order to take advantage of these discounts, **your ACC Rockies name badge must be presented at the time of purchase.**

WINTER ACTIVITIES

There is so much to experience in Banff all year long, but the winter is particularly exciting. In addition to world class skiing, Banff offers many other fabulous winter activities, including:

- snowmobiling tours
- dog sledding
- ice walks
- snowshoeing

If you are interested in any of these activities, please do not hesitate to contact the concièrge at the Rimrock for additional information.

17th Annual Residents' Research Competition

MONDAY, MARCH 12, 2012

Poster Presentation Competition 4:00-5:00 PM
Oral Presentation Competition 5:00-6:00 PM

The ACC Rockies Residents' Research Competition is open to all residents and fellows in training programs in Canada. Applicants submit a one-page abstract that identifies a case-based clinical question. The question can be addressed through basic research, clinical research, or a review of evidence-based medicine. The abstract should explain the research hypothesis and resultant work completed to test the hypothesis.

We thank the residents and fellows who submitted abstracts to the 2012 competition. They will be presenting their research in the Poster Presentation Competition from 4:00-5:00 PM. Please join us in supporting their excellent work by attending this session.

Congratulations to the three finalists, who will also present their abstracts at the Oral Presentation Competition from 5:00-6:00 PM.

- **Dr. Emilie Belley-Cote, Université de Sherbrooke (Sherbrook, QC)**
  "Hemodynamic parameter variations in relation to different levels of positive end-expiratory pressure in a post-operative context"
- **Dr. Robin Ducas, University of Manitoba (Winnipeg, MB)**
  "How accurate are paramedics in the pre-hospital diagnosis of STEMI?"
- **Dr. Christopher Labos, McGill University (Montreal, QC)**
  "Do SSRIs increase the risk of bleeding when added to anti-platelet therapy in patients post myocardial infarction?"

2012 JUDGES

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Senior Scientist at the Toronto General Research Institute, University Health Network

Scientific Director of the CIHR Institute of Circulatory and Respiratory Health
Toronto, Ontario, Canada

Boehringer Ingelheim

The 17th Annual Residents' Research Competition is sponsored by Boehringer Ingelheim Canada. Thank you!

THE FINAL ABSTRACTS

Hemodynamic parameter variations in relation to different levels of positive end-expiratory pressure in a post-operative context

Belley-Côté, EP, D'Aragon, F, Tzouannis, N, Paulin, M, Lepage, S, Coutu, S, Essadiqi, B, Coutu, M, Farand, P.

Clinical relevance: The benefit of pulmonary artery catheter use is controversial but it is considered the gold standard for hemodynamic monitoring. Variations of hemodynamic parameters in relation to positive end-expiratory pressure (PEEP) are not well documented. These variations can influence the management of mechanically ventilated patients. Diastolic pulmonary artery pressure (PAP) is frequently used as an approximation for pulmonary capillary wedge pressure (PCWP), but the effect of varying levels of PEEP on these two values is unknown.

Method: After approval by the ethics committee, 20 patients scheduled for cardiac surgery with pulmonary artery catheter installation were recruited. Patients with severe chronic obstructive pulmonary disease, severe valvular heart disease not corrected during the current surgery or with an intra-aortic balloon pump postoperatively were excluded. Immediately following surgery, hemodynamic measures were taken with varying levels of PEEP (0, 5, 10 and 15 cmH2O) after a 10 minute delay. Vital signs, central venous pressure (CVP), PAP, PCWP, cardiac index (thermodilution) and indexed peripheral vascular resistances were measured 3 times at each level of PEEP. The means for each level of PEEP were compared overall with the Friedman test and then in pairs with the Wilcoxon signed rank test. A Rho Spearman correlation was done between PCWP and diastolic PAP. A Bland-Altman plot was used to describe the relationship between the PCWP and the diastolic PAP.

Results: PCWP, diastolic PAP and CVP augment significantly (p< 0,000 ; p<0,001; p<0,002) with increasing levels of PEEP. The other variables did not vary significantly in relation to PEEP with the exception of systolic blood pressure (p = 0,006). Diastolic PAP is strongly correlated with PCWP (r= 0,668, p=0,000). Regardless of the level of PEEP, diastolic PAP is always about 5 mmHg higher than the PCWP.

PEEP (cm H2O)	0	5	10	15
PCWP (mmHg)	13,18	13,87	15,91	17,48
CVP (mmHg)	11,32	11,8	12,97	14,56
Diastolic PAP(mmHg)	18,42	19,4	22,28	23,24

Conclusion: In the post-operative context, increasing levels of PEEP are associated with increases in the hemodynamic indicators of volemia (CVP, PCWP, diastolic PAP). Elucidating the contribution of PEEP to a given indicator of volemic status would permit for a more accurate estimation of real volemic status itself. The creation of such a predictive model for this will require a larger study.

How accurate are paramedics in the pre-hospital diagnosis of STEMI?

RA Ducas, AW Wassef, RK Philipp, DS Jassal, R Grierson, JW Tam - Winnipeg, Manitoba

Background: There is growing use of pre-hospital electrocardiograms (ECG) in establishing early diagnosis of ST segment myocardial infarction (STEMI) to facilitate early reperfusion. This study aimed to determine the predictive value of pre-hospital ECGs interpreted by non-physician paramedics or emergency medical services (EMS) in chest pain presentations.

Methods: In our urban centre of 658,700 people, EMS received 21 hours of instruction on acute coronary syndrome (ACS) management as well as ECG acquisition and interpretation for suspected STEMI. Suspected STEMI ECGs were wirelessly transmitted to and discussed with a cardiologist for possible therapy. ECGs deemed negative for STEMI by EMS were not transmitted; patients were transported to the closest

hospital without pre-hospital physician involvement.

Results: From July 21, 2008 to July 21, 2010, there were 5426 chest pain calls to EMS for patients aged 18 - 85, of which 380 were suspected STEMI cases. The remaining ECGs were deemed negative for STEMI by EMS. To audit the non-transmitted ECGs, we analyzed 323 consecutive patients over 2 selected months (January and June 2010) for comparison. Table 1 outlines data from the transmitted and non-transmitted groups. Of non-transmitted cases there was 1 missed and 2 subsequent STEMIs. Based on 380 transmitted and 323 non-transmitted cases, the sensitivity and specificity of EMS detecting STEMI were 99.6% and 67.9%, respectively. The positive and negative predictive values for STEMI were 60% and 99.7%, respectively.

Conclusions: Our findings demonstrate non-physician EMS interpretation of STEMI on pre-hospital ECG has excellent sensitivity and high negative predictive value. This finding supports the use of prehospital ECGs interpreted by EMS to help identify and facilitate treatment of STEMI. These results may have worldwide implications on staffing models for paramedic/EMS units.

	Transmitted [n=380]	Non-Transmitted [n=323]	P value
Median age, years (+/- SD)	64 (14.9)	60 (16)	<0.001 (t test)
Male gender	207 (71%)	159 (49%)	<0.001
Any acute coronary syndrome	261 (69%)	42 (13%)	<0.001
Any cardiac diagnosis	328 (86%)	82 (25%)	<0.001
Survival	340 (90%)	318 (98%)	<0.001

Do SSRIs increase the risk of bleeding when added to anti-platelet therapy in patients post myocardial infarction?

Case: A previously healthy 52 year old man presented to our emergency department with 3 hours of retrosternal chest pain. Physical exam was unremarkable. His ECG showed ST depressions in the lateral leads and his troponin was positive at 0.75. He was diagnosed with a non-ST elevation MI and was treated with aspirin, clopidogrel, enoxaparin, and metoprolol. He was booked for angiography the following morning. Prior to discharge, the patient stated that he had been significantly depressed over the past few months and the psychiatry consultant diagnosed him with major depressive disorder for which we opted to treat him with an SSRI. However, we were concerned about the risk of bleeding with SSRIs when added to dual antiplatelet therapy.

Question: Do SSRIs increase the risk of bleeding when added to anti-platelet therapy in patients post myocardial infarction?

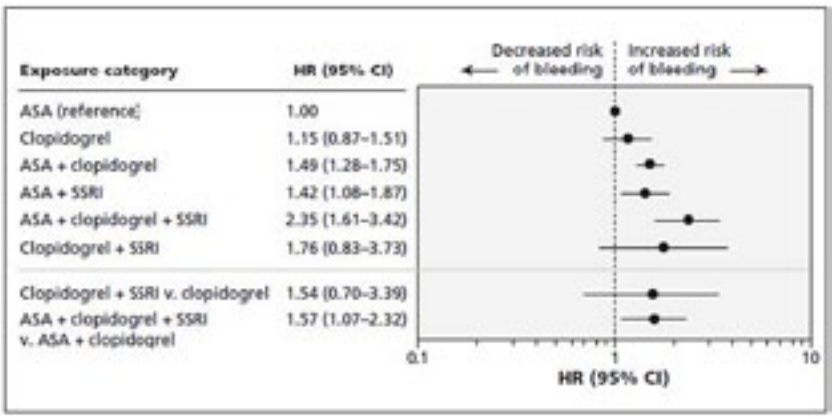
Background: Patients prescribed antiplatelet treatment to prevent recurrent acute myocardial infarction are often also given a selective serotonin reuptake inhibitor (SSRI) to treat coexisting depression. Use of either treatment may increase the risk of bleeding. We assessed the risk of bleeding among patients taking both medications following acute myocardial infarction.

Methods: We conducted a retrospective cohort study using hospital discharge abstracts, physician billing information, medication reimbursement claims and demographic data from provincial health services administrative databases. We included patients 50 years of age or older who were discharged from hospital with antiplatelet therapy following acute myocardial infarction between January 1998 and March 2007. Patients were followed until admission to hospital due to a bleeding episode, admission to hospital due to recurrent acute myocardial infarction, death or the end of the study period.

Results: The 27 058 patients in the cohort received the following medications at discharge: acetylsalicylic acid (ASA) (n = 14 426); clopidogrel (n = 2467); ASA and clopidogrel (n = 9475); ASA and an SSRI (n = 406); ASA, clopidogrel and an SSRI (n = 239); or clopidogrel and an SSRI (n = 45). Compared with ASA use alone, the combined use of an SSRI with antiplatelet therapy was associated with an increased risk of bleeding (ASA and SSRI: hazard ratio [HR] 1.42, 95% confidence

interval [CI] 1.08-1.87; ASA, clopidogrel and SSRI: HR 2.35, 95% CI 1.61-3.42). Compared with dual antiplatelet therapy alone (ASA and clopidogrel), combined use of an SSRI and dual antiplatelet therapy was associated with an increased risk of bleeding (HR 1.57, 95% CI 1.07-2.32).

Interpretation: Patients taking an SSRI together with ASA or dual antiplatelet therapy following acute myocardial infarction were at increased risk of bleeding.



Faculty Information

(ARRANGED BY FACULTY SURNAME)

Todd J. Anderson MD FRCPC

Dr. Anderson is a Professor of Medicine at the University of Calgary, in Calgary, Alberta, Head of the Department of Cardiac Sciences, Director of the Libin Cardiovascular Institute of Alberta, Senior Scholar of the Alberta Heritage Foundation for Medical Research, the Scientific Chair of the Heart and Stroke Foundation of Canada and the Merck Frosst Chair for Cardiovascular Research.

Dr. Anderson was awarded his medical degree from the University of Calgary in 1985 before completing his residency in internal medicine in 1988, his clinical fellowship in cardiology in 1990 and his interventional fellowship in cardiology in 1991 at Foothills Medical Centre. In 1994, Dr. Anderson completed a research fellowship at Brigham and Women's Hospital, Harvard Medical School in Boston, Massachusetts.

Dr. Anderson has received funding from the Alberta Heritage Foundation for Medical Research, the Alberta Heart and Stroke Foundation, the Canadian Institutes of Health Research, the Canadian Diabetes Association and various pharmaceutical companies. His current research interests include the assessment and treatment of endothelial dysfunction, cardiovascular risk factor assessment and treatment, interventional cardiology and diabetic endothelial dysfunction.

Paul W. Armstrong MD FRCPC

Paul Armstrong is a Distinguished University Professor with the Department of Medicine (Cardiology) at the University of Alberta in Edmonton, Alberta, Canada and is the Director of the Canadian VIGOUR Centre (Virtual Coordinating Centre for Global Collaborative Cardiovascular Research). He serves in a broad range of consultative editorial and research review roles and has received numerous awards for scholarly contributions. He served formerly on the FDA Cardiovascular and Renal Drug Advisory Committee and on the American College of Cardiology/American Heart Association's ST Elevation Myocardial Infarction Guidelines Writing Committee. He has published extensively, frequently lectures in academic forums nationally and internationally, and plays a leadership role in a number of ongoing cardiovascular clinical trials. Dr. Armstrong has a lifelong commitment to the enhancement of health care and the education and training of cardiovascular research professionals. He is an attending Cardiologist at the University of Alberta Hospital, with particular interest and expertise in acute coronary care and heart failure.

John Cairns MD FRCPC

John Cairns is a cardiologist whose research has focused on the modification and non-invasive measurement of myocardial infarct size in humans and dogs, antithrombotic therapies for acute ischemic syndromes and for atrial fibrillation, and post-myocardial infarction arrhythmias. He practiced cardiology for many years in Ontario, focusing on acute coronary care and invasive cardiology. He a member of the CCS group which developed the 2010 Atrial Fibrillation Guidelines and the 2012 Update, chairing the chapter on stroke prevention. He has held a number of academic leadership roles, including Chair of Medicine, McMaster University (1988-96), Dean of Medicine, UBC (1996-2003), where he worked closely with UBC and the provincial government to build the rationale and plans for the two-fold expansion of the Medical School in partnership with the Universities of Victoria and Northern BC. He is currently co-chair of the Steering Committee of CANNeCTIN, a Canadian and international clinical trials network funded by CFI and CIHR and headquartered at McMaster University.

Jonathan Choy MD FRCPC FACC

Dr. Choy completed his Cardiology training at the University of Alberta in 1999. He went on to pursue subspecialty training in advanced echocardiography in Edmonton and Bonn, Germany, and joined the Division of Cardiology in July 2000.

Subsequently he was appointed as the Medical Director of the Adult Echocardiography Laboratory in 2005, and together with his team, has grown the facility into one of the most technologically advanced cardiac ultrasound departments in the world.

His dedication to medical education has led him to lecture to medical students on EKG interpretation on an annual basis, as well as mentor many students and fellows in clinical research. In 2011, he took over as Course Director for the annual Cardiology Update, and has endeavored to build this into a well received education program for health care providers involved in cardiac care.

More recently, he has also assumed directorship of the Cardiology Preceptorship program at the Mazankowski Alberta Heart Insitute, a one day informative session for referring physicians and allied healthcare providers.

His main clinical and research interests are in the field of 3D and contrast perfusion stress echocardiography, as well as process improvement in the healthcare system.

Richard Coulden MBBS FRCP FRCR

Dr. Coulden went to medical school at the University of London and qualified in 1981. After three years in internal medicine, he spent five years training in radiology in Cambridge. This was followed by three years of Fellowships in cardiac imaging in Manchester and Chicago. He returned to Cambridge in 1993 as a cardio-thoracic radiologist where he was director of cardiovascular imaging. He was recruited by UAH for the newly created Chair in Cardiac Imaging in 2009. He has been in Edmonton for two years and is director of the newly opened Elko Cardiac MRI unit.

His research interests cover all aspects of non-invasive cardiac imaging (MR, CT, echo and nuclear medicine) and he has published over 50 original papers and book chapters.

Simon de Denus B. Pharm MSc(Pharm) PhD

Mr. Simon de Denus completed his Bachelor of Pharmacy at the Université de Montréal in 1999 and completed his degree in hospital pharmacy practice at the Université de Montréal in 2000. He then completed a residency in cardiovascular pharmacotherapy at the Hôpital du Sacré-Coeur in Montreal, a first Fellowship University of the Sciences in Philadelphia and a second at the Montreal Heart Institute. He then obtained his PhD in pharmaceutical sciences at the Université de Montréal. He has been an assistant professor in the Faculty of Pharmacy, Université de Montréal since 2006 and a pharmacist and researcher at the Montreal Heart Institute. He holds the Université de Montréal Beaulieu-Saucier Chair in Pharmacogenomics.

The research interests of Mr. de Denus are mainly in the areas of cardiovascular pharmacotherapy and personalized medicine. Mr. de Denus has published over 40 articles and book chapters, and more than thirty abstracts.

Anique Ducharme MD MSc

Dr. Anique Ducharme is an associate professor of medicine at Université de Montréal. She is also the founding director of the Heart Failure Clinic at the Montréal Heart Institute.

Dr. Ducharme graduated from Université de Montréal in 1991. She completed her residency in cardiology at Université de Montréal in 1996, as well as a research fellowship in research and clinical practice in echocardiography at the Montréal Heart Institute in 1998, and a fellowship in molecular biology, echocardiography and heart failure at Brigham & Women Hospital, Harvard Medical School in Boston under the guidance of Dr. Marc Pfeffer in 1999. Since her return, she has worked as a cardiologist and with the non-invasive techniques service at the Montréal Heart Institute. She is the founder as well as the medical director of the heart failure clinic of MHI.

Dr. Ducharme has published more than 50 articles in peer-reviewed journals, 5 book chapters and 70 abstracts. She is currently a member of the North-American Committee for the WARCEF and CARRESS (NIH) studies. She has served as or is currently a member of several steering committees and end-point committees for major studies including EARTH, AF-CHF, CANSAVER MOXCON and CHARM. She is also a reviewer for many journals, including Circulation, Journal of the American College of Cardiology (JACC), Canadian Medical Association Journal (CMAJ), FASEB journal and Canadian Journal of Cardiology.

Derek Exner MD MPH FHRCPC FHRS

Dr. Derek Exner is a Professor in the Libin Cardiovascular Institute at the University of Calgary and Medical Director of the Arrhythmia Program in Calgary. He is the Canada Research Chair in Cardiovascular Clinical Trials and an Alberta Heritage Foundation for Medical Research Scholar.

Dr. Exner is a heart rhythm specialist and clinical trials expert. His clinical work and research focus on the optimal use of device therapy for patients with heart failure and the identification of people at risk for serious cardiac arrhythmias. He is presently leading several international clinical trials.

Dr. Exner's research is supported by the Canadian Institutes of Health Research, the Alberta Heritage Foundation for Medical Research, Western Economic Diversification, Alberta Advanced Education and Technology, the Heart and Stroke Foundation, the JC Anderson Legacy Foundation, and industry partners.

Dr. Exner has authored or co-authored more than 200 articles, book chapters, and abstracts, including publications in leading medical journals such as the New England Journal of Medicine, Journal of the American Medical Association, Circulation, and the Journal of the American College of Cardiology related to device therapy and heart failure.

Justin Ezekowitz MB BCH MSc FRCPC FACC FAHA

Dr. Justin Ezekowitz obtained his undergraduate medical training at the Royal College of Surgeons in Ireland, achieving an honors degree. He completed his internal medicine residency at the University of Texas Southwestern Medical Centre in Dallas, Texas. He then returned to Canada to do a heart failure fellowship and research training, completed a Masters of Science in Clinical Epidemiology at the University of Alberta Public Health Sciences and cardiology fellowship at the University of Alberta. He is currently on faculty as Assistant Professor of Medicine in the Division of Cardiology. He is the Director of the Heart Function Clinic at the University of Alberta Hospital and Mazankowski Alberta Heart Institute. He is a Population Health Investigator of AHFMR and a New Investigator of the CIHR.

His research focus is on heart failure. He is involved in numerous clinical trials in heart failure both at a local investigator initiated level as well as multicenter international trials. Primary interests include clinical research into heart failure with a preserved systolic function, population health of heart failure, devices in heart failure, and novel processes or treatments of care for acute heart failure.

Dr. Ezekowitz is involved with the Canadian Cardiovascular Society (on the Heart Failure Guidelines committee), the Heart and Stroke Foundation of Alberta, the Canadian Institutes of Health Research and on the guidelines for the Heart Failure Society of America.

Jacques Genest, Jr. MD FRCPC

Jacques Genest was born in Montréal, Canada. He obtained his MD at McGill University Medical School and did a residency in Internal Medicine at McGill then a cardiology fellowship at Tufts University New England Medical center in Boston. He did Post-doctoral studies in Boston in lipoprotein metabolism and molecular genetics at Tufts University. Since 2000, he is Professor of Medicine and holds the McGill/Novartis Chair in Medicine at McGill. From 2000-10, he was Head of Cardiology at McGill University. He is currently the Scientific Director of the Center for Innovative Medicine at the McGill University Health center (MUHC).

His research focuses on the metabolic and genetic basis of premature coronary artery disease and the role of high density lipoproteins (HDL) in atherosclerosis. His research team has contributed to the identification of several genes involved in the metabolism of HDL. His research funding comes from the Canadian Institutes of Health Research and the Heart and Stroke Foundation of Canada. He has been involved in designing and running several large clinical trials (HOPE-2, homocysteine; the JUPITER trial) and is a member of the steering committees of currently on-going trials (CANTOS, REVEAL, Capree). He sits on several advisory boards for the pharmaceutical and biotechnology companies and is a reviewer for many scientific journals and granting agencies. He has published over 230 peer-reviewed manuscripts in journals such as Nature Genetics, Circulation, Circulation Research, New England Journal of Medicine, Journal of Biological Chemistry and The Lancet and has written 18 book chapters.

For the past 16 years, he has participated in the elaboration of Canadian Cholesterol Guidelines and has contributed the chapter on lipoprotein disorders and cardiovascular disease in the last 4 editions of Braunwald's Textbook of Cardiovascular Disease, the major book in cardiovascular medicine.

Bernard J. Gersh MB ChB DPhil FRCP FACC

Professor of Medicine at Mayo Clinic College of Medicine, Consultant in Cardiovascular Diseases and Internal Medicine and Associate Chair of Academic Affairs and Faculty Development in the Division of Cardiovascular Diseases at Mayo Clinic. His past positions include The W. Proctor Harvey Teaching Professor of Cardiology and Chief of the Division of Cardiology at Georgetown University Medical Center. Dr. Gersh received his MB, ChB, from the University of Cape Town in South Africa. He received his Doctor of Philosophy Degree from Oxford University where he was a Rhodes Scholar. Dr. Gersh is a Fellow of the South African College of Physicians and Royal College of Physicians in the United Kingdom as well as a Fellow of the American College of Cardiology, and the American Heart Association.

Dr. Gersh's wide interests include the natural history and therapy of acute and chronic coronary artery disease, clinical electrophysiology and, in particular, atrial fibrillation and sudden cardiac death, the cardiomyopathies and the clinical implications of molecular genetics in hypertrophic cardiomyopathy, cardiac stem cell therapy and the epidemiology of cardiovascular disease in the developing world. He has written 683 articles and 129 book chapters. Dr. Gersh is the editor of 13 books and is on the editorial board of 25 journals including Circulation, Journal of the American College of Cardiology (Senior Consulting Editor), Nature Cardiovascular Medicine, and The European Heart Journal (2009 Deputy Editor). He is a member of the Advisory Board of the Reynolds Foundation, a Past Chairman of the Council of Clinical Cardiology of the American Heart Association, an at large member of the World Heart Federation's Scientific and Policy Initiatives Committee (SPIC), and a former Member of the Board of Trustees of the American College of Cardiology. He has served on the Steering Committees and Data Safety Monitoring Boards of multiple clinical trials, sponsored by the National Lung and Blood Institute and other organizations. He is currently Chairman of the WHO Cardiovascular Working Group on ICD 11 Reclassification.

Dr. Gersh's honors include Teacher of the Year Award from the Division of Cardiovascular Diseases, Mayo Clinic and numerous Visiting Professorships and Invited Lectures both nationally and internationally including the 2009 Henry Russek ACC lecture, Rene Laennec Invited Lecture and Silver Medal of the 2010 ESC, and the Hatter Award for "Advancement in the Cardiovascular Science" from the University College London and the University of Cape Town. He is an Honorary Member of the South African Cardiac Society and The South African Heart Association, and he is an Honorary Fellow of the Sociedad Chilena De Cardiologia Y Cirugia Cardiovascular. He is an Honorary Professor of Medicine at the University of Cape Town, South Africa. Dr. Gersh is a member of the Advisory Board of the Hatter Cardiovascular Research Institute, University of Cape Town.

Dr. Gersh was the 2004 recipient of the Distinguished Achievement Award of the AHA Council of Clinical Cardiology and the 2007 recipient of the ACC Distinguished Service Award. He received the degree of Ph.D. (honoris causa) from The University of Coimbra, Portugal in 2005.

Robert J. Herman MD FRCPC

Dr. Herman obtained his MD from the University of Saskatchewan in 1977, and his license in Internal Medicine in 1981. He has a certificate in Clinical Pharmacology, obtained from Vanderbilt Medical University, Nashville, TN in 1983.

He is currently a Professor in the Division of General Internal Medicine, Department of Medicine, University of Calgary. Prior to this appointment, he was a Professor in Medicine and Pharmacology at the University of Saskatchewan.

Interests include clinical pharmacology, drug metabolism and disposition, bioequivalence (Expert Advisory Committee to Health Canada), drug interactions, formulary review (current co-chair of ABC Drug Benefit List), hypertension, diabetes, hyperlipidemia, weight management, and smoking cessation. Current research is focused in the areas of hypertensive emergencies, preeclampsia/eclampsia and measurement and diagnosis of intracranial hypertension.

However, his true passions are caring for sick patients with complex medical problems and teaching as he attends on the Medical Teams and Internal Medicine Consult services at all three Calgary adult, acute care hospitals.

Stefan James MD PhD

Stefan James, MD, PhD is Senior Consultant Cardiologist and head of the Department of Interventional Cardiology at Uppsala University in Uppsala, Sweden. He is an associate professor of cardiology at Uppsala University and a graduate of Orebro University in Orebro, Sweden, with MD and PhD degrees from Uppsala University Medical School. Dr. James has also served as an interventional cardiology specialist at Karolinska University Hospital in Stockholm, a consultant cardiologist at Orebro University Hospital, and a visiting associate professor at Duke Clinical Research Institute, Duke University School of Medicine, in Durham, North Carolina. His extensive clinical investigations have included the GUSTO IV study, the SYNTAX study, the Nordic Bifurcation Studies, the TARGET study, and the APEX-AMI, EARLY ACS, PLATO, TOPAS, and Appraise 2 trials. The author of over 100 peer-reviewed articles and books, Dr. James is a frequently invited reviewer for such cardiovascular publications as Circulation, American Heart Journal, European Heart Journal, Annals of Internal Medicine, British Medical Journal, and the International Journal of Cardiology. He is chairman of the Swedish Coronary and Angioplasty Register, a fellow of the European Society of Cardiology, a member of its task force for European Guidelines on revascularization, and the co-chair of the task force for ST elevation myocardial infarction. In 2010, he received the Swedish Heart and Lung Foundation's highest research grant.

David Lau MD PhD FRCPC

Dr. David Lau is Professor of Medicine, Biochemistry and Molecular Biology, and Cardiac Sciences at the University of Calgary. He is currently the Editor-in-Chief of the Canadian Journal of Diabetes and President of Obesity Canada. Dr. Lau is a practising endocrinologist who specializes in diabetes, obesity, and lipid disorders. His research interests include fat cell biology in health and obesity, development of insulin resistance in obesity and diabetes, and cellular mechanisms of diabetic vascular complications. He is also involved in population health and clinical research programmes in diabetes, obesity, and lipid disorders. Dr Lau has published more than 100 scientific papers in peer-reviewed medical journals, periodicals, and books.

Dr. Lau was Chair of the evidence-based Obesity Canada Clinical Practice Guidelines (CPG) Steering Committee and Expert Panel, and lead author of the 2007 CPG publication in the Can. Med. Assoc. Journal. Dr. Lau was a member of the 1998, 2003 and 2008 Canadian Diabetes Association Clinical Practice Guidelines Expert Panel, as well as the expert panel of the 2009 and 2012 Canadian Cardiovascular Society Canadian Guidelines for the diagnosis and treatment of dyslipidemia and prevention of cardiovascular disease in the adult.

In 2004, Dr. Lau was honored as one of the top 20 notable Calgarians, and in the top 50 Albertans for his exemplary contributions to improve the health of Albertans.

Peter Liu MD FRCPC

Dr. Liu graduated from the University of Toronto Faculty of Medicine. During his cardiology training, he also pursued a post-doctoral fellowship in cardiovascular imaging and immunology at the Massachusetts General Hospital of Harvard Medical School, and clinical epidemiology at McMaster University. In 1985 he joined the Division of Cardiology at the Toronto General Hospital, University of Toronto. Since 1999, he has been the Heart & Stroke/Polo Chair Professor at the University Health Network, and serves as Director of the Heart & Stroke/Richard Lewar Centre of Excellence in Cardiovascular Research at the University of Toronto. Since 2005, he was the Scientific Director at CIHR's Institute of Circulatory & Respiratory Health, where he designed a number of innovative research programs and leveraged funding for several major research networks and consortia across the country and internationally. He served on the executive committee and provided research leadership for the Canadian Heart Health Strategy, Canadian Lung Health Framework, and National Sodium Reduction Strategies with the federal and provincial governments and multi-sectorial partners.

Dr. Liu focuses his own research on the pathophysiology and clinical outcomes of heart failure from bench to bedside. His team has elucidated the role of inflammation in changing heart structure and function and identified potential novel treatment targets in heart failure. His laboratory has also identified how viruses and bacteria can accelerate heart failure and coronary artery disease and is developing novel vaccines to prevent these complications. With support from Genome Canada, CIHR group and team programs, and Ontario Research Global Leadership Fund, he is also pursuing novel biomarkers and therapeutic targets for early cardiovascular disease identification and intervention.

He has published over 320 peer reviewed articles in high impact journals and his work has been cited over 20,000 times in the literature. In addition, he co-chaired a series of Canadian Cardiovascular Society Consensus Guideline Recommendations for heart failure care.

He is the recipient of numerous awards in recognition of his scientific contributions and accomplishments including the Rick Gallop Research Award Recognizing Research Excellence from the Heart & Stroke Foundation of Ontario (2003), the Research Achievement Award from the Canadian Cardiovascular Society (CCS, 2003), Visiting Research Professor Award from the Royal College of Physicians and Surgeons (2005), Extramural Award of Merit from the American College of Cardiology (2005), the Jean Davignon Cardiometabolic Award (2008), and Annual Lifetime Achievement Award from CCS, amongst others. He has served as the scientific program chair for the Canadian Cardiovascular Society, Heart Failure Society of America, International Human Proteomic Organization, and World Heart Federation. He was chair for several CIHR, CFI, NIH and NASA scientific review panels.

Currently, he is the Director of the National C-CHANGE Initiative, harmonizing and integrating cardiovascular preventive guidelines for both the professional and patients, and develops strategies for implementation. He is President of the International Society of Heart Failure of the World Heart Federation (WHF) and also serves on the Research and Policy Committees of WHF, coordinating the global fight against heart disease and promoting its prevention.

Brent Mitchell MD FRCPC FACC

Dr. L. Brent Mitchell obtained his B.Sc. (Hon) in Biochemistry (1972) and his M.D. (1975) degrees from the University of Calgary. After a Fellowship in Clinical Cardiology at Dalhousie University, Halifax, Nova Scotia, he undertook a Fellowship in Clinical Cardiac Electrophysiology at Stanford University Medical Centre, California. He returned to Calgary in 1982. He is the Past Head of the Department of Cardiac Sciences at the University of Calgary / Calgary Zone of Alberta Health Services and is the Past Director of the Libin Cardiovascular Institute of Alberta. Dr. Mitchell's clinical practice and research interests are in the area of clinical cardiac electrophysiology, particularly in the clinical science of tachyarrhythmias – their mechanisms, their investigation, and their management. His preferred tool in the science of clinical cardiac electrophysiology is the randomized clinical trial. He has contributed to many pivotal trials in clinical cardiac electrophysiology.

Paolo Raggi MD FACP FACC

Paolo Raggi is a Professor of Medicine-Cardiology and Professor of Radiology at Emory University in Atlanta, GA and recently accepted a new position as the Chief Academic Officer and Director of the Mazankowski Alberta Heart Institute in Edmonton, AB. Dr. Raggi received his doctor of medicine and surgery degree Summa Cum Laude from the University of Bologna Medical School in Bologna, Italy. He pursued his Internal Medicine and Cardiology training in New York and then moved to the University of Virginia in Charlottesville and Tulane University in New Orleans, prior to joining Emory University.

Dr. Raggi is primarily involved with interpretation and coordination of cardiac imaging (echocardiography, nuclear imaging, computed tomography, and magnetic resonance) for the diagnosis of coronary artery disease, congenital cardiac anomalies, and evaluation of left ventricular function and viability. He is a regular lecturer in several seminars in the division of Cardiology and the Department of Radiology and is a research mentor for several clinical fellows.

Erick Schampaert MD FRCPC

Dr. Schampaert is an associate professor of Medicine at the University of Montreal and an interventional cardiologist at Hopital du Sacré-Cœur de Montreal since 1997, serving as director of the cardiac catheterization laboratories and of the clinical cardiovascular research unit since 2001 and head of the Division of Cardiology since 2006.

His research interests are stents (BMS and DES), Left Main PCI, coronary physiology (FFR), and imaging (IVUS and OCT), ACS (including STEMI), and, more recently, platelet function studies with clopidogrel and aspirin under the leadership of Drs. Pharand and Diodati.

From 2001 to 2008, he acted as the principal investigator of C-SIRIUS and a steering committee member for E-SIRIUS.

His current research interests are:

1: An important multi-center randomized controlled trial comparing PCI with DES (Xience, Abbott Vascular) vs. CABG for unprotected LM disease, named EXCEL, acting as the interventional cardiologist Country Leader for Canada and Steering PCI committee member.

2. A new biodegradable polymer Sirolimus-eluting stent, acting as Canadian P.I. for the International NEVO Program (Cordis, JJMP). Research program halted in June 2011.

3. RIVER PCI: Ranolazine in patients post-PCI with incomplete revascularization: a phase III trial (Gilead Sciences). Canadian country leader.

He has authored or co-authored more than 40 manuscripts in peer-reviewed journals such as NEJM, Lancet, Circulation, JACC, and EHJ and over 100 abstracts at major CV meetings.

He has been the local PI for more than 45 clinical trials since 1997.

He is the director for the Annual Canadian Coronary Physiology (FFR) and Imaging (IVUS and OCT) workshop since 1998, co-director for the Tremblant Interventional Cardiology (TIC) since 2009, a faculty

member of the Montreal Interventional Cardiology Symposium since 1999 and an invited international faculty member to the TCT since 2003. He has become the Canadian representative for the French FFR International Club, presided by Dr. Bernard De Bruyne, in 2010.

Over the last 2 years, he has been intensely collaborating with numerous colleagues from the 4 Integrated University Health Networks (RUIS) in Quebec to establish a provincial prospective STEMI database.

Finally, he served as the president of the Canadian Association of Interventional cardiology (CAIC) from 2007-2011, currently working to establish a CAIC - CCS National Cardiac Catheterization Laboratories Database.

Duncan Stewart MD FRCPC

Dr. Duncan Stewart is a pioneering Canadian cardiovascular researcher who is recognized for his many important discoveries in blood vessel biology as well as his dedication to translating these discoveries into benefits for patients and society. After beginning his career in academic cardiology at McGill University in Montreal, he moved to Toronto as Head of Cardiology at St. Michael's Hospital and later Director of the Division of Cardiology and Executive Director of the McLaughlin Centre for Molecular Medicine at the University of Toronto. He was recruited to lead the Ottawa Hospital Research Institute (OHRI) in 2007. Dr. Stewart has made a number of seminal discoveries elucidating the importance of endothelial factors in health and disease, notably the role of nitric oxide system in angiogenesis and such endothelin-1 in pulmonary hypertension. He is also a leader in developing cell and gene based therapies for cardiovascular disease. He led the first Canadian clinical trial to test an angiogenic gene therapy – using VEGF to try to stimulate heart repair in people who had suffered heart attacks. He is also spearheading the world's first clinical trial of a gene-enhanced cell therapy for pulmonary hypertension, using endothelial progenitor cells engineered to over-express the endothelial nitric oxide synthase. He is also poised to launch the first enhanced progenitor cell therapy trial for post heart-attack repair and is leading a Canadian effort to initiate the world's first trial of mesenchymal stem cells for the treatment of acute lung injury and acute respiratory distress syndrome. Dr. Stewart has published more than 200 peer-reviewed manuscripts and has received a number of distinctions and prizes, including the Dexter Man Chair of Cardiology and Research Achievement Award of the University of Toronto and the Research Achievement Award of the Canadian Cardiovascular Society. Throughout his career, Dr. Stewart has demonstrated leadership in bringing diverse groups of clinicians and scientists together to put Canada on the world stage for translational cardiovascular and regenerative medicine research.

Anthony Tang MD FRCPC

Dr. Anthony Tang is Professor of Medicine in the Faculty of Medicine at the University of British Columbia and Adjunct Professor of Medicine in the Faculty of Medicine at the University of Ottawa. He obtained his MD from the University of Toronto and his clinical training in internal medicine and cardiology at the University of Ottawa. He then obtained a Heart and Stroke Research Fellowship to receive electrophysiology research training at Duke University Medical Centre. Dr Tang is presently Staff Electrophysiologist, Division of Cardiology for the Vancouver Island Health Authority, Royal Jubilee Hospital. He is a Fellow of the Heart Rhythm Society.

Dr. Tang is a well published investigator, recognized nationally and internationally for his research in device therapy for cardiac arrhythmia and heart failure. He has been awarded funding from the Heart and Stroke Foundation and CIHR for a number of research projects, including effects of medication on defibrillation and evaluating the effects of cellular telephones on defibrillators. Dr. Tang is the recipient of the CIHR Chair in Device Therapy for Cardiac Arrhythmias, which funds the project of development of new clinical electrophysiology researchers in Canada.

His recent focus of research was funded by CIHR and Medtronic of Canada through the Clinical Trials University/Industry program. This research involved determining the efficacy of pacing therapy in patients with advanced heart failure and conduction abnormality. He was also recently awarded a CIHR grant to fund research that examines treatment options for patients in atrial fibrillation with heart failure.

Dr. Tang is an internationally renowned researcher, has been an invited speaker at national and international meetings, and is a peer reviewer for scientific journals, as well as grant reviewer for Heart and Stroke and Canadian Institute of Health Research. He has published over 100 peer-reviewed papers, over 200 abstracts, and 4 book chapters.

Marcello Tonelli MD SM FRCPC

Dr. Marcello Tonelli received an MD from the University of Western Ontario, specialist certification in nephrology (FRCPC) at Dalhousie University, and an SM in epidemiology from Harvard University. He is a nephrologist and Associate Professor at the University of Alberta. He serves as Associate Editor of American Journal of Kidney Diseases, the Cochrane Renal Group, and the Journal of Nephrology, and is a member of the Editorial Board for JASN. Dr. Tonelli is the President of the Canadian Society of Nephrology, a Councillor of the International Society of Nephrology and a past member of the Minister's Expert Committee for Drug Evaluation for the Province of Alberta. In March 2010, Dr. Tonelli was named the chair of the Canadian Task Force for Preventive Health Care, a national panel of experts that will make recommendations about preventive health services to Canada's more than 36,000 family physicians.

Dr. Tonelli holds a Health Scholar award from the Alberta Heritage Foundation for Medical Research (AHFMR) and a Canada Research Chair in the optimal care of people with chronic kidney disease. He is a founding member of the Alberta Kidney Disease

Network and co-leader of the AHFMR Interdisciplinary Chronic Disease Collaboration (ICDC) research team. Since 2005, Dr. Tonelli has been the co-leader of a joint initiative between the University of Alberta and the Hospital Civil de Guadalajara, aimed at prevention of kidney failure among the poor of Jalisco, Mexico.

Dr. Tonelli has more than 180 peer-reviewed publications, has an H-index of 33, and currently holds more than $8M in peer-reviewed research funds as PI or co-PI. His research is aimed at improving the care of people with chronic kidney disease and its major causes (hypertension, diabetes mellitus, and atherosclerosis). Specific areas of focus within these clinical populations include: identification and management of novel risk factors; designing new strategies to improve the efficiency of healthcare delivery; and, determinants of access to high quality care. A unique aspect of Dr. Tonelli's research program includes partnering with regional, provincial, and national decision-makers to ensure that the findings will be used to produce rational health policy.

Robert Welsh MD FRCPC FACC FAHA

Robert Welsh is an associate professor and academic interventional cardiologist at the Mazankowski Alberta Heart Institute and University of Alberta in Edmonton, Alberta, Canada. He is the director of Adult Cardiac Catheterization and Interventional Cardiology program; co-director of the University of Alberta Chest Pain Program; co-chair of Vital Heart Response, a regional reperfusion program for early treatment of STEMI patients; and, co-chair of the Mazankowski Alberta Heart Institute Transcatheter Aortic Valve Implantation program (TAVI).

Clinical research interests are focused on the management of the full spectrum of Acute Coronary Syndromes and Interventional Cardiology in general. Further research interests include Diabetes Mellitus and cardiac physiology. He has published 80 peer reviewed articles, several book chapters and greater than 100 scientific abstracts. In collaboration with colleagues, he has received a CIHR-CMAJ Top Canadian Achievements in Health Research Award.

Nationally, Robert Welsh serves as the Prairie Provinces representative on the executive committee of the Canadian Association of Interventional Cardiology. He is co-director of the Annual Cardiovascular Congress in the Rockies. He initiated and organizes the Edmonton Heartbeat Run to increase awareness of cardiovascular disease and risk factor management and raise funds for the Hospital Foundation.

Rodney Zimmermann MD FRCPC FACC

Dr. Rodney Zimmermann is a Clinical Professor of Medicine at the University of Saskatchewan, Regina Campus. He is the Head, Section of Cardiology, in the Regina Qu'Appelle Heath District. He is a general and interventional cardiologist with his practice based at the Regina General Hospital, Regina, Saskatchewan where he also serves as Director of the Cardiac Catheterization Laboratory.

Dr. Zimmermann received his MD from the University of Saskatchewan in 1988, graduating with Great Distinction. He completed his internship at the Saint Thomas Medical Center in Akron, Ohio, USA in 1989. He did his Internal Medicine residency at the University of Calgary, Alberta between 1989 and 1992. He subsequently completed his residency in Cardiology and his Fellowship in Interventional Cardiology from 1992 to 1995 at the University of Calgary. He has been in private practice in Regina, Saskatchewan since that time.

Dr. Zimmermann has been a Fellow of the Royal College of Physicians and Surgeons of Canada in Internal Medicine since 1993 and received his Certificate of Specialty in Cardiology in 1994. He has been a Fellow of the American College of Cardiology since 1997. He is currently ACC Governor for the Prairie Provinces, Board of Governors for the American College of Cardiology. He chairs the Specialty Committee for Cardiology in Canada for the Royal College of Physicians and Surgeons of Canada. He is a member of both the Canadian Cardiovascular Society (and sits on Council for the CCS) and the Canadian Association of Interventional Cardiology and as well is a member of the American College of Physicians.

Syllabus Information

Sunday, March 11

SUNDAY, MARCH 11 - 16:00–16:30 - DR BERNARD GERSH

GLOBAL BURDEN OF CARDIOVASCULAR HEALTH

Recent data highlight that cardiovascular disease accounts for approximately 16.7 million of total global deaths of 57 million. 87% of worldwide cardiovascular deaths occur in the developing countries and at a younger age than the developed world. In contrast, total deaths due to HIV, tuberculosis, and malaria were approximately 5 million. Future projections are a concern in that it is estimated that death rates from stroke and coronary heart disease in the developing countries would be two to threefold greater than in the developed world. The cost of countries dealing with the dual burdens of communicable and degenerative diseases in terms of loss of productivity and the impact upon the public and private sector is enormous and could be catastrophic. It is likely that the pace of the "epidemiologic transition" underlying the epidemic will vary according to the rapidity of economic development or the lack thereof and the role of genetic vulnerability needs to be determined.

Nonetheless, the combination of a hostile cardiovascular environment as defined by changing diet, tobacco, lack of exercise, an aging society, air pollution, and the psychosocial and economic stresses in the developing worlds in conjunction with limited national resources and possible genetic vulnerability (the thrifty gene) is likely to lead to an explosion of the epidemic in the next 20 years.

The key question is whether population-based strategies based upon community public health programs and high risk clinic-based strategies can stem the tide or even halt the epidemic. It is likely that the epidemic will involve all developing countries in the future, but the time course is unpredictable, and there is a dire need for prospective data since the implications for resource allocation are profound. Not all developing nations are at the same stage of the "epidemiologic transition" and the shifting of resources from dealing with communicable diseases to cardiovascular disease needs to be based upon actual as opposed to perceived needs.

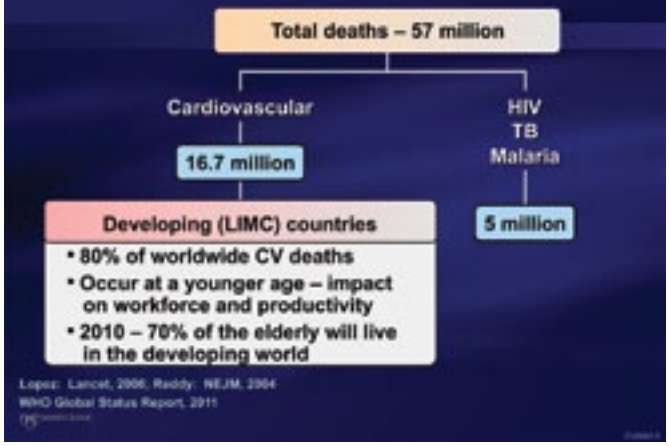
The low priority of cardiovascular and chronic diseases on the global health agenda is a cause for concern and integrating the treatment and prevention of chronic diseases into health systems dealing with communicable diseases will contribute to the strengthening of weak health systems and overall community health.

References:

Fuster V, et al. Low priority of cardiovascular and chronic diseases on the global health agenda: a cause for concern. *Circulation* 2007; 116:1966-1970.

Gersh BJ, Sliwa K, Mayosi BM, Yusuf S. Novel therapeutic concepts: the epidemic of cardiovascular disease in the developing world: global implications. *Eur Heart J*. 2010 Mar; 31(6):642-648.

Global Burden of Cardiovascular Disease – 2002



Lopez: Lancet, 2006; Reddy: NEJM, 2004
WHO Global Status Report, 2011

Changing Distribution of the Causes of Death in P Rep of China

Yang: Lancet, 2008

Stages of Epidemiologic Transition

Description	Life expectancy	Proportion of death due to CVD (%)	Dominant form of CVD death
Stage 1 Pestilence and famine			
• Malnutrition • Infectious diseases	35 yr	<10	Infectious (RHD) Nutritional
Stage 2 Receding pandemics			
• Improved nutrition and public health	50 yr	10-35	Infectious (RHD)
• Chronic disease			Stroke – hemorrhagic
• Hypertension			

Omran: Milbank Mem Fund Q, 1971
Olshansky: Milbank Mem Fund Q, 1998
Gaziano: Circ, 2003
Yusuf: Circ, 2005

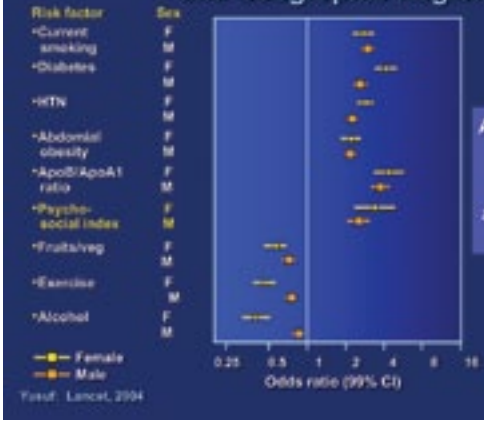
Stages of Epidemiologic Transition

Description	Life expectancy	Proportion of death due to CVD (%)	Dominant form of CVD death
Stage 3 Degenerative and man-made diseases			
• ↑ fat and caloric intake • Tobacco use • Chronic disease deaths > infections, malnutrition	>60 yr	35-65	IHD* Stroke — Hemorrhagic Ischemic
Stage 4 Delayed degenerative diseases			
• Leading causes of mortality CV and cancer deaths • Prevention and Tx delays onset • Age-adjusted CV death reduced	>70 yr	40-50	• IHD** • Stroke — Ischemic • CHF

*Greater in high socioeconomic groups
**Younger pt – lower socioeconomic status
Elderly – higher socioeconomic status

Omran: Milbank Mem Fund Q, 1971
Olshansky: Milbank Mem Fund Q, 1998
Gaziano: Circ, 2003
Yusuf: Circ, 2005

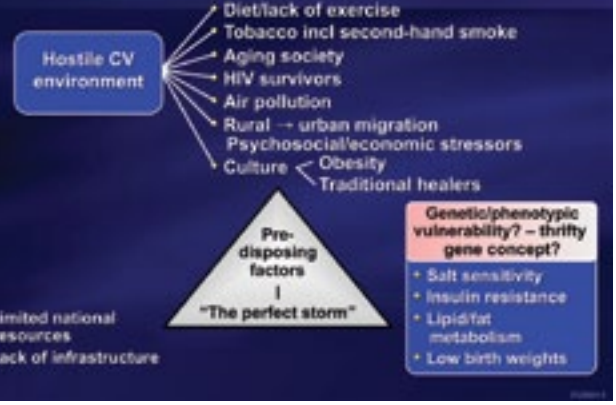
Risk of AMI After Adjustment for Age, Sex, and Geographic Region

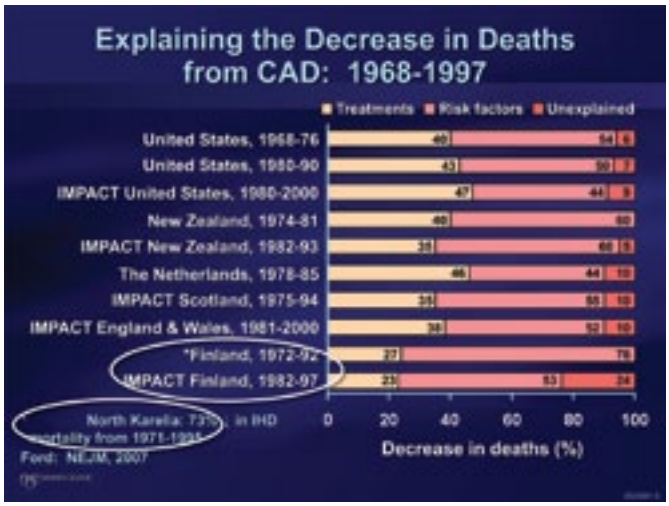


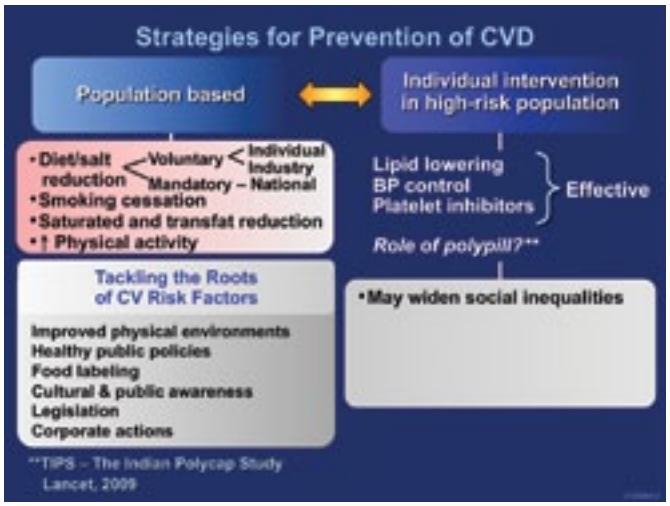
All 9 risk factors account for 90.4% of population attributable risk (PAR)

Yusuf: Lancet, 2004

The Potential Epidemic of CVD in Developing Countries



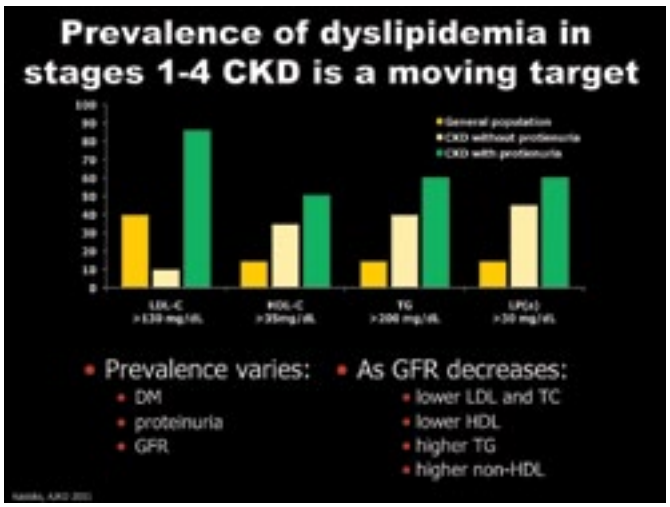


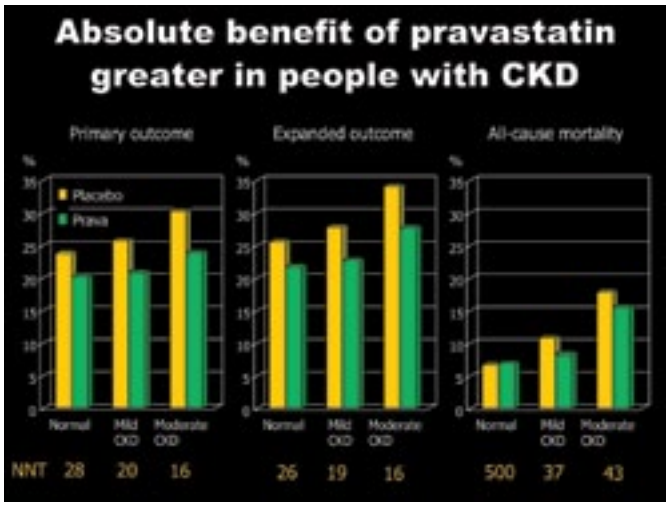


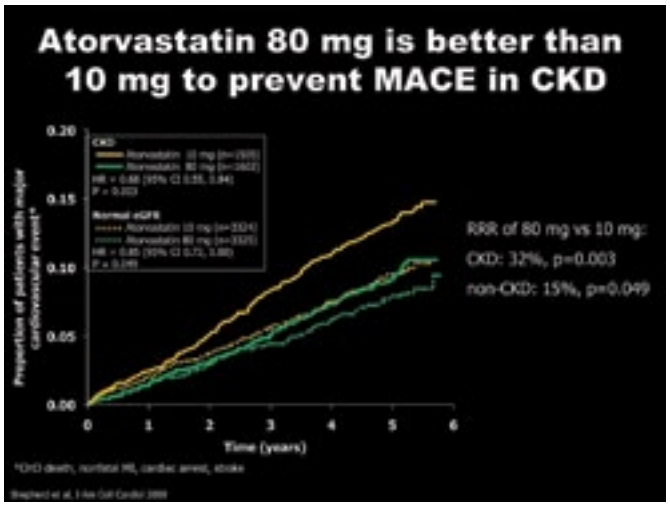
SUNDAY, MARCH 11 - 16:30–17:00 - DR MARCELLO TONELLI

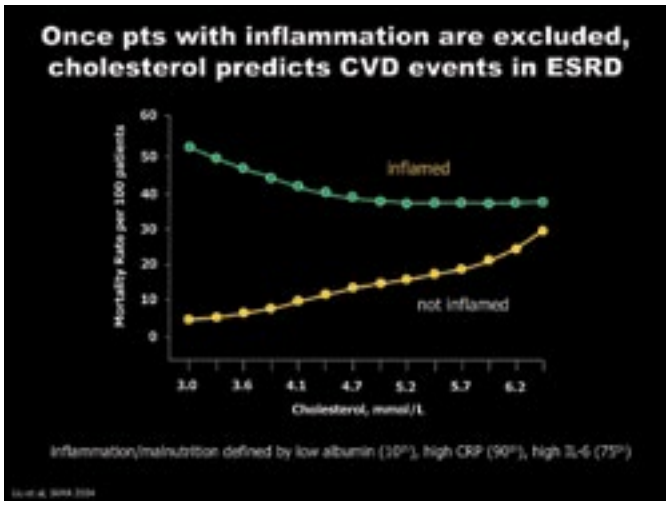
MANAGEMENT OF LIPIDS IN PATIENTS WITH CHRONIC KIDNEY DISEASE

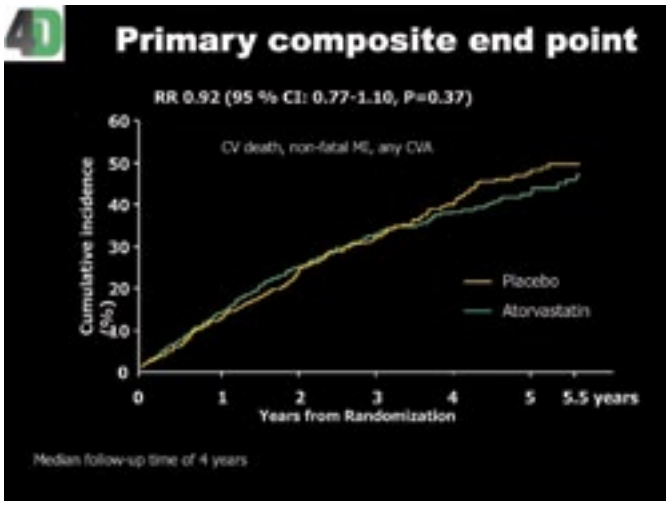
Patients with chronic kidney disease are at very high cardiovascular risk. In addition, quantitative and qualitative forms of dyslipidemia are common at all stages of chronic kidney disease, but especially in patients with heavy proteinuria or treated with chronic dialysis. Post hoc analyses of previously done clinical trials suggest that the relative risk reduction associated with statin treatment for prevention of cardiovascular events is similar in patients with and without chronic kidney disease. Accordingly, there has been tremendous clinical enthusiasm for use of lipid modifying treatment in this high-risk population. However, clinical trial data in dialysis populations has been somewhat disappointing. This lecture will review evidence for the use of statins in patients with different forms of chronic kidney disease, focusing on new information from the recently published SHARP trial.

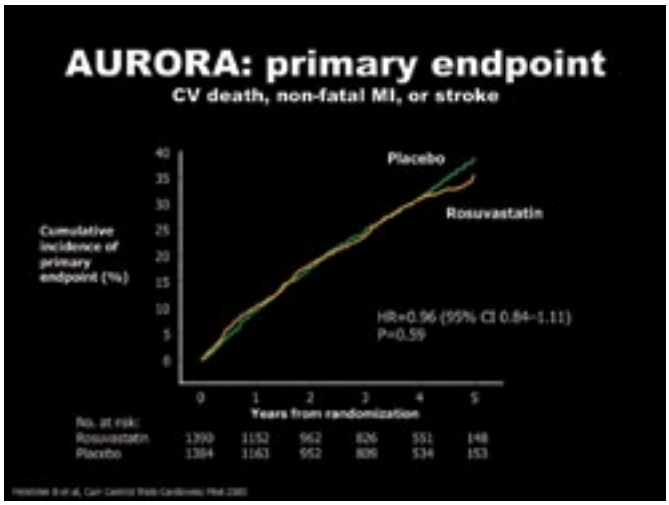


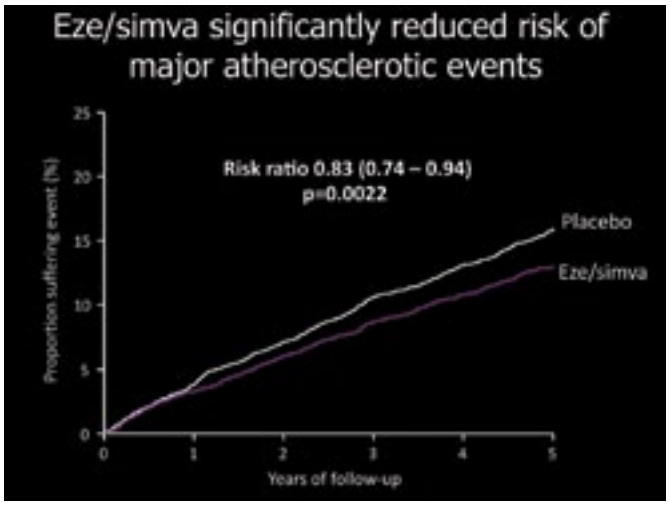

Absolute benefit of pravastatin greater in people with CKD
Primary outcome
Expanded outcome
All-cause mortality
Placebo
Prava
Normal
Mild CKD
Moderate CKD
NNT 28 20 16 26 19 16 500 37 43


Atorvastatin 80 mg is better than 10 mg to prevent MACE in CKD
Proportion of patients with major cardiovascular event*
Time (years)
RRR of 80 mg vs 10 mg:
CKD: 32%, p=0.003
non-CKD: 15%, p=0.049


Once pts with inflammation are excluded, cholesterol predicts CVD events in ESRD
Mortality Rate per 100 patients
inflamed
not inflamed
Cholesterol, mmol/L
Inflammation/malnutrition defined by low albumin (10th), high CRP (90th), high IL-6 (75th)


4D
Primary composite end point
RR 0.92 (95 % CI: 0.77-1.10, P=0.37)
CV death, non-fatal MI, any CVA
Cumulative incidence (%)
Placebo
Atorvastatin
Years from Randomization
5.5 years
Median follow-up time of 4 years

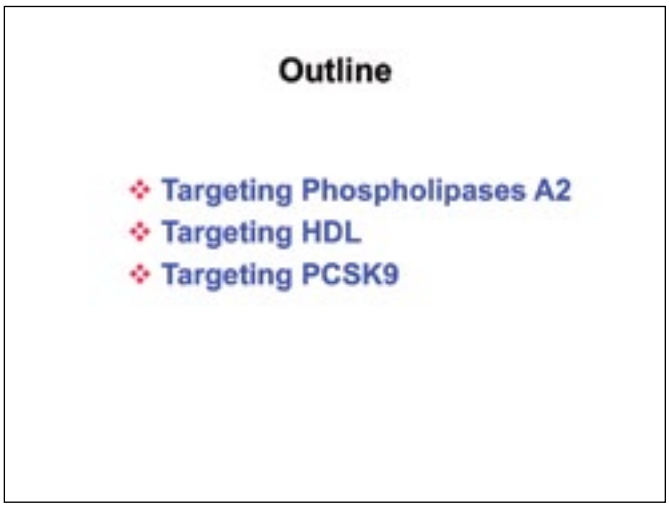

AURORA: primary endpoint
CV death, non-fatal MI, or stroke
Cumulative incidence of primary endpoint (%)
Placebo
Rosuvastatin
HR=0.96 (95% CI 0.84–1.11)
P=0.59
Years from randomization
No. at risk:
Rosuvastatin 1390 1152 962 826 551 148
Placebo 1384 1161 952 809 534 153

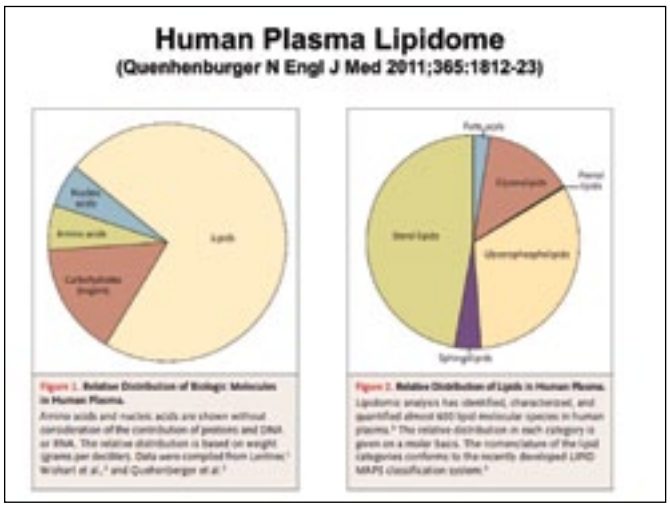

Eze/simva significantly reduced risk of major atherosclerotic events
Proportion suffering event (%)
Risk ratio 0.83 (0.74 – 0.94)
p=0.0022
Placebo
Eze/simva
Years of follow-up

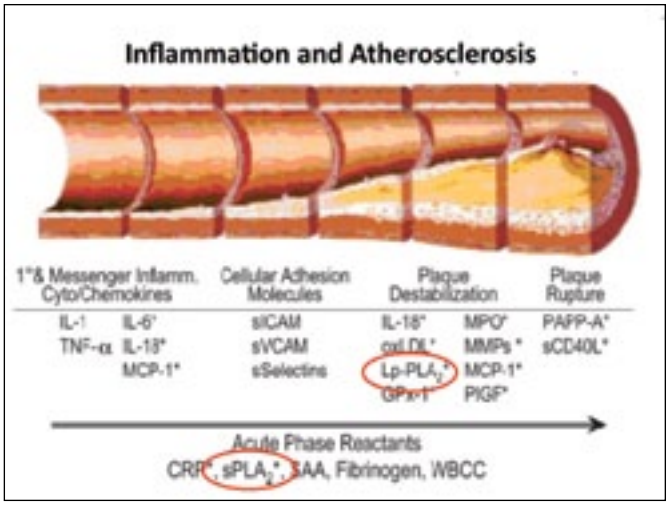
SUNDAY, MARCH 11 - 17:00–17:30 - DR JACQUES GENEST

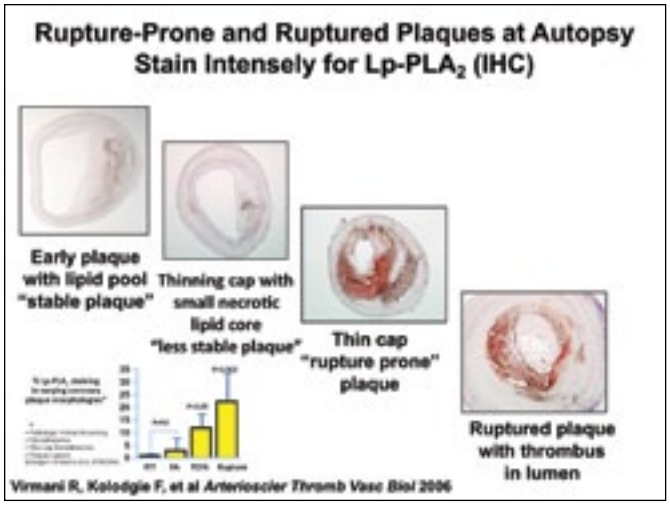
NOVEL HDL THERAPIES – A PROMISING FUTURE?

Human plasma is composed, surprisingly, of approximately 70% lipids. Cholesterol present on low-density lipoproteins plays a causal role in atherosclerosis and reducing LDL-C is associated with decreased cardiovascular events. High density lipoprotein cholesterol is strongly inversely associated with CAD but the tenets of the "HDL hypothesis", namely that raising HDL-C pharmacologically decreases CAD, have not been confirmed in clinical trials to date. New agents that raise HDL-C, especially inhibitors of CETP, are in phase III studies. Other agents that raise HDL-C are currently being investigated. It should be kept in mind that sterols account for slightly less than 50% of lipids in plasma. Glycerophospholipids (phospholipids), glycerolipids (triglycerides), and sphingolipids have remarkably critical roles in many aspects of vascular disease. Novel techniques now allow the characterization of an incredibly wide array of lipid molecules that have a role in the regulation of vascular function. Specific inhibitors designed to prevent the action of phospholipases have the potential to modulate the vulnerable plaque.









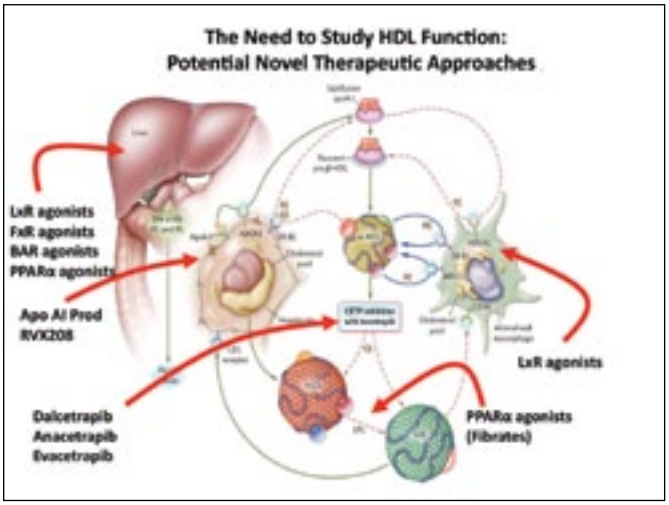
Outline

- Targeting Phospholipases A2
- Targeting HDL
- Targeting PCSK9

HDL Protects the Vascular System

- HDL mediate reverse cholesterol transport
- Potent antioxidant effects
- Potent anti-inflammatory effects
- Improves vascular endothelial function (•NO)
- Promotes vascular endothelial progenitor cells
- Anti-apoptosis
- Anti-thrombotic effects

- Anti trypasonomial activity (apo L1 and haptoglobin)



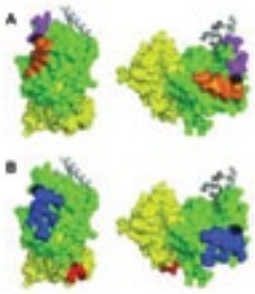
Outline

- Targeting Phospholipases A2
- Targeting HDL
- Targeting PCSK9

Familial Hypercholesterolemia

- LDL-R gene (19p13) (Familial Hypercholesterolemia)
  - LDL-Receptor Defects
- Apo B gene (2q23) (Familial Defective apo B)
  - Apolipoprotein B Mutations
- PCSK9 (proprotein convertase subtilisin/kexin type 9) (1p32)
  - Autosomal Dominant Hypercholesterolemia
- ARH gene (1p35-36.1) (Autosomal Recessive Hypercholesterolemia)
  - LDL-R internalization defect
- LDL Overproduction Defects (1q21)(Familial Combined Hyperlipidemia)

PCSK9 – LDL-R Interactions



To date, PCSK9 is considered an "undrugable" target

DUFF CJ. Antibody-mediated disruption of the interaction between PCSK9 and the low-density lipoprotein receptor Biochem. J. 2009;419:577–584

$PCSK9_{mAB}$ Phase I studies

- **REGN727/SAR236553**

  LDL-C reductions from baseline of 65% with depending on dosing regimen of REGN727

- **Amgen AMG 145**

  American Heart Association 2011. Single dose of AMG145 reduced levels LDL-C by 64% compared to placebo

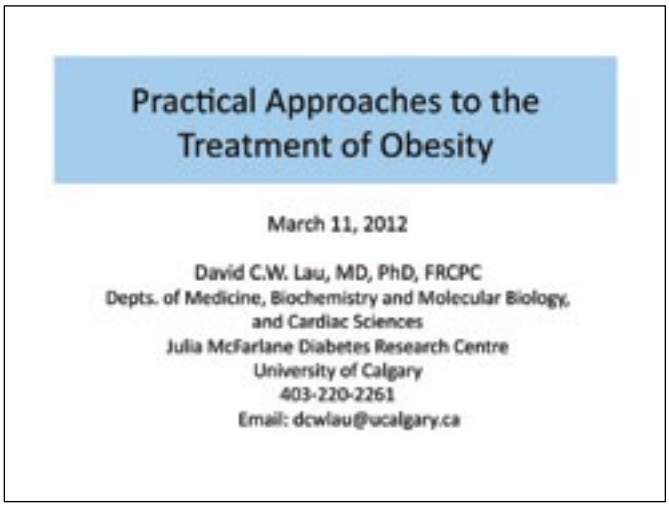
Conclusions

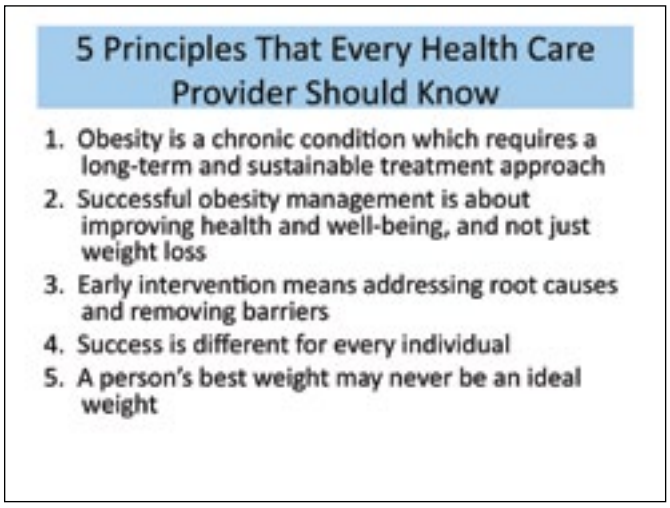
- Modulation of phospholipases A2 is currently under investigations in acute coronary syndromes
- CETP inhibitors are in advanced phase III trials. Effect on LDL-C is not insignificant
- PCSK9 inhibitors represent the next therapeutic approach to decrease LDL-C

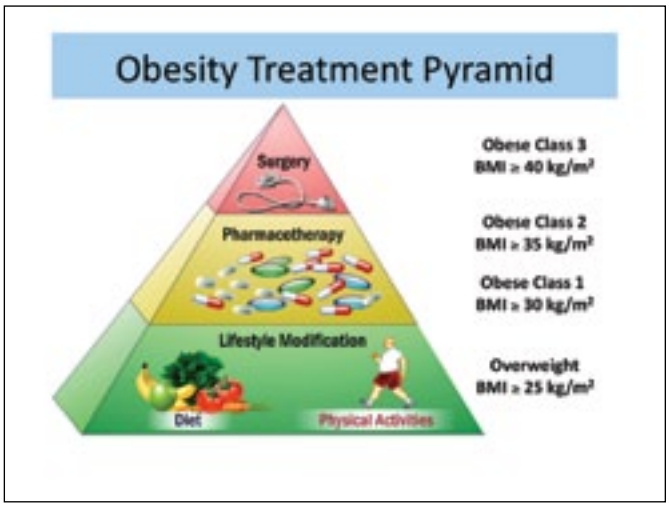
SUNDAY, MARCH 11 - 17:30–18:00 - DR DAVID LAU

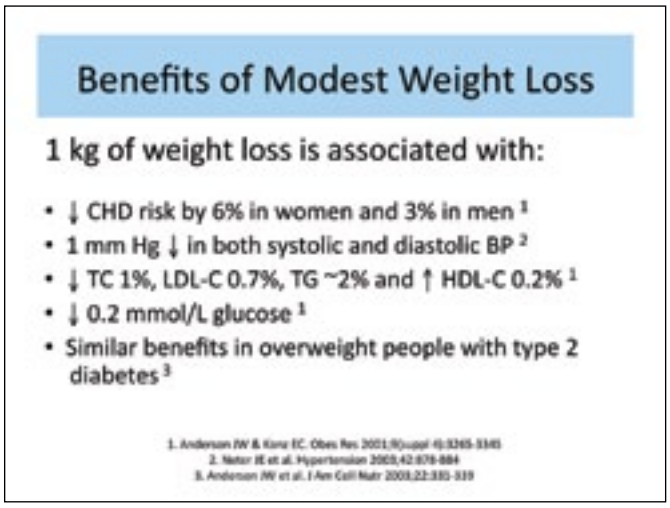
PRACTICAL APPROACHES TO THE TREATMENT OF OBESITY

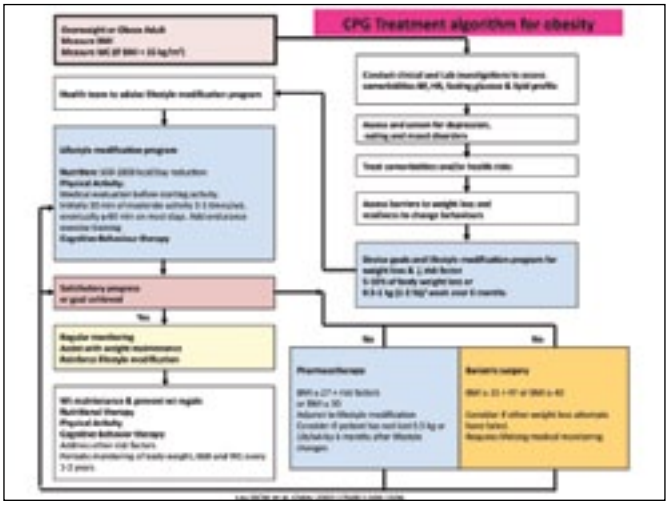
Obesity is the most prevalent public health hazard associated with increased cardiometabolic risks. Obesity is assessed by body mass index (BMI) and waist circumference values, along with appropriate clinical and laboratory investigations to screen for co-morbidities. A modest 5-10% of body weight loss through calorie reduction of 500-600 Cal/day, along with 150 minutes of moderate physical activity a week, can lead to significant improvement in blood glucose, lipid and blood pressure values, and cardiovascular risk factors. Pharmacotherapy and bariatric surgery are adjunct obesity treatment options when health behaviours fail to achieve weight loss and health goals. This presentation will review evidence-based clinical practice guidelines on the practical management and prevention of obesity, and therapies for the management of obesity-related cardiometabolic risks.











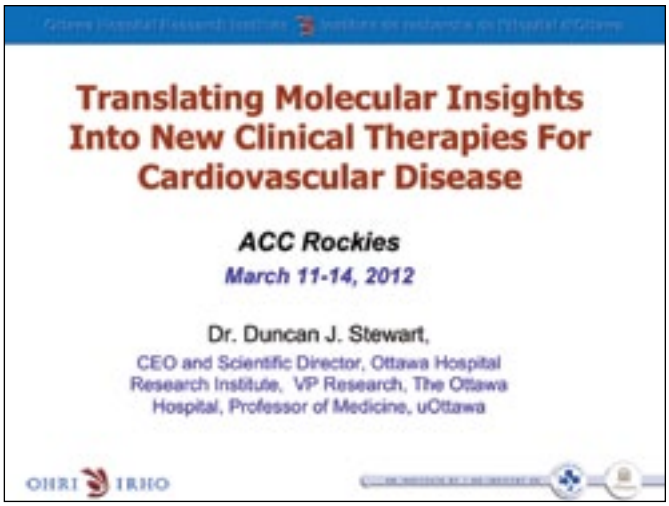
Key Messages

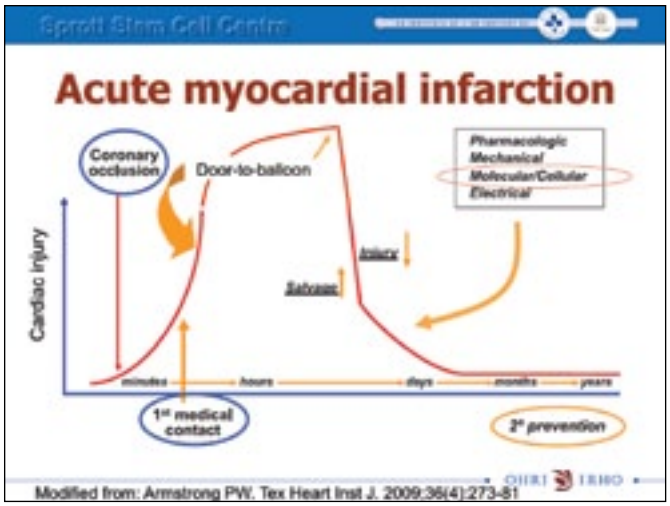
- Assess obesity and related health risks by measuring BMI and waist circumference, BP and appropriate lab tests (FBG, lipid profile)
- Identify triggers for overeating and barriers to health behaviour changes and weight management
- Decrease caloric intake by 500-600 Cal/day and combine with 150 minutes of physical activity a week
- A modest 5-10% body weight loss confers health benefits by reducing diabetes and cardiovascular disease risks
- Focus on weight maintenance and prevention of weight regain as long-term goals

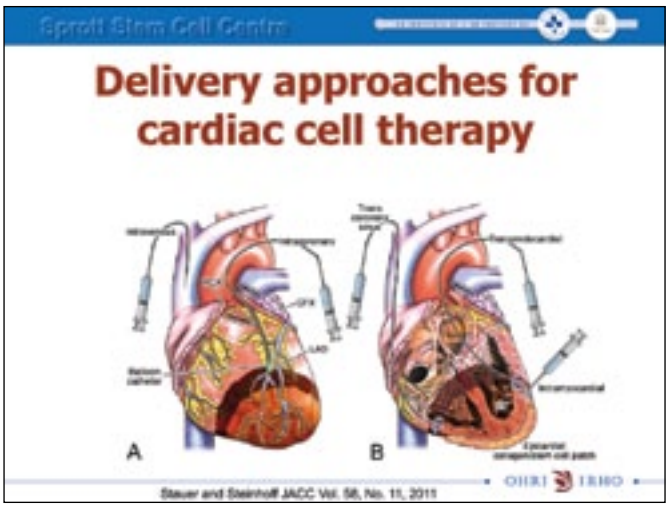
SUNDAY, MARCH 11 - 18:00–18:30 - DR DUNCAN STEWART

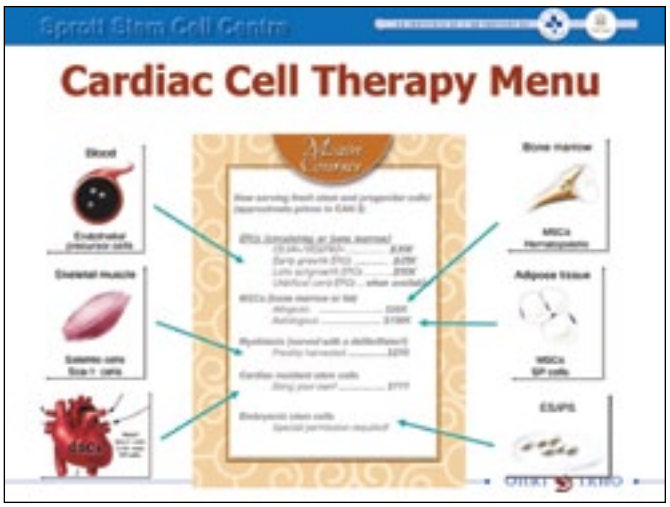
ACC ROCKIES LECTURE - TRANSLATING MOLECULAR INSIGHTS INTO NEW CLINICAL THERAPIES FOR CARDIOVASCULAR DISEASE

Chronic heart failure is increasingly becoming a major societal problem and a tremendous strain on health care resources. Heart transplantation has proven to be an effective treatment; however, its role has been restricted to a relatively small proportion of heart failure patients due to limitations in the supply of donor organs. Recent major advances in molecular and stem cell biology have led to new hope that stem cells and other regenerative technologies may soon provide much needed tools to repair and regenerate the injured heart. This presentation will introduce some of the key concepts in regenerative medicine and review the results of recent trials of the use of cell therapy for acute myocardial infarction and chronic heart failure. Limitations of current approaches to use stem cells to repair the heart will be discussed and promising new approaches to enhance cell therapy by preconditioning, gene transfer, and the use of biomaterials will be reviewed. Finally, an update of ongoing and soon to be initiated "next generation" clinical trials using novel stem cell types (i.e. resident cardiac stem cells) or enhancement strategies will be provided.



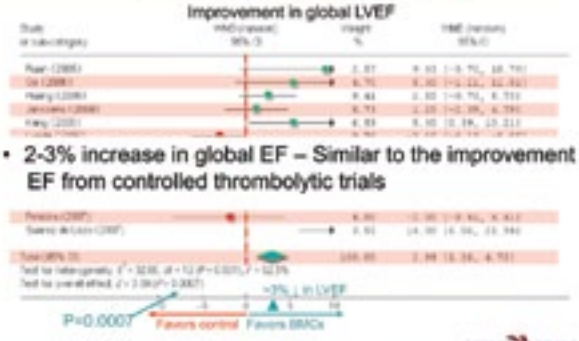






Sprott Stem Cell Centre

Systematic Review of Bone Marrow Cell Therapy for AMI



- 2-3% increase in global EF – Similar to the improvement in EF from controlled thrombolytic trials

Martin-Rendon et al. European Heart Journal (2008) 29, 1807–1818

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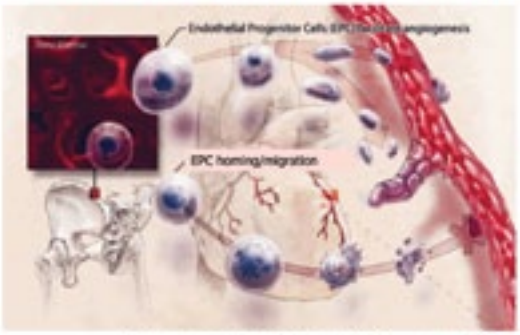
Sprott Stem Cell Centre

Endothelial Progenitor Cell Dysfunction



From: Kutryk and Stewart, 2004

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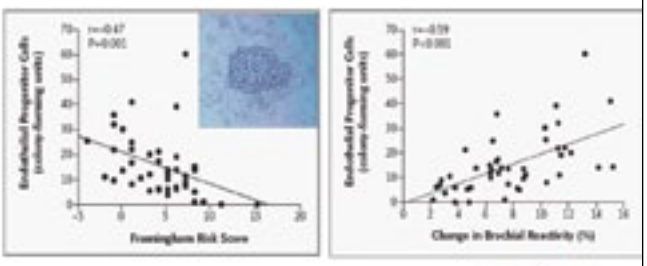
Cardiac Risk Factors and Endothelial Progenitor Cells



Hill et al. N Engl J Med 348;7 2003

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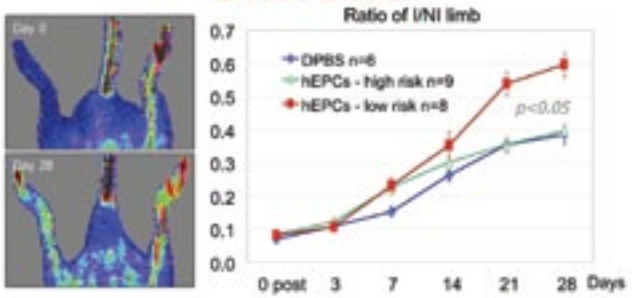
Reduced neovascularization capacity in immune-deficient xeno-transplant mouse model



Mike Ward, MD/PhD candidate, AHA 2006

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Cell-enhancement strategies for the treatment of ischemic heart disease

Table 1 Pretreatment methods to augment cell number and function.

Method	Function	Cells
Gene therapy		
VEGF	Survival, paracrine effects	EPC
TERT	Survival, proliferation, anti-senescent	EPC
AKT	Survival, paracrine effects	MSC
GSK3β inhibition	Survival, proliferation	EPC
ILK	Survival	EPC
eNOS	Homing, Angiogenic activity	EPC
Small molecules		
p38 inhibitors	Differentiation, proliferation	EPC
AVE9488 (eNOS-enhancer)	eNOS enhancement, homing	BMC/EPC
Statins	Function, survival, antisenescent	EPC
PPARγ	Function	EPC

Abbreviations: BMC, bone marrow derived mononuclear cells; eNOS, endothelial nitric oxide synthase; EPC, endothelial progenitor cells; GSK3β, glycogen synthase kinase β; ILK, integrin linked kinase; MSC, mesenchymal stem cells; PPARγ, peroxisome proliferative activated receptor γ; TERT, telomerase reverse transcriptase; VEGF, vascular endothelial growth factor.

IRHO

Sprott Stem Cell Centre

The Enhanced Angiogenic CellTherapy – Acute Myocardial Infarction (EnACT- AMI)

- Phase IIA/B (100 patients)
- Multicentre randomized double blind controlled trial
- 3 cities in eastern Canada – 5 sites
  - Ottawa
    - University of Ottawa Heart Institute (Chris Glover)
  - Toronto
    - St. Michael's Hospital (Mike Kutryk)
    - Sunnybrook HSC (Sandy Dick – MRI core)
  - Montreal
    - Jewish General Hospital (Dominique Joyal)
    - Montreal Heart Institute (Hung Ly Qroc)

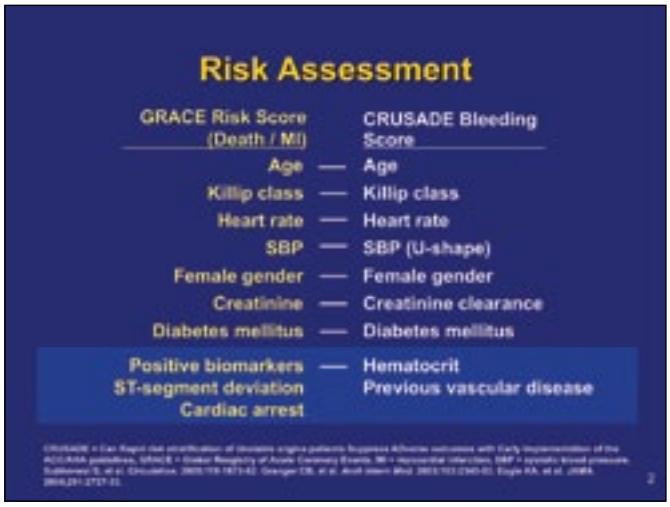
AHJ Am Heart J. 2010 Mar;159(3):354-60

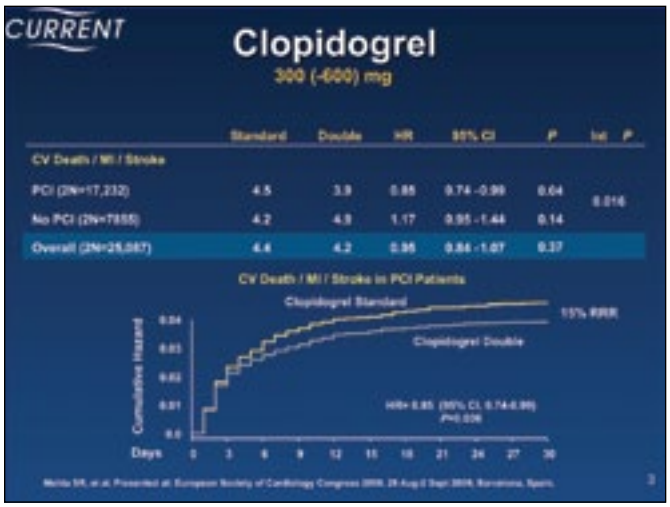
OHRI IRHO

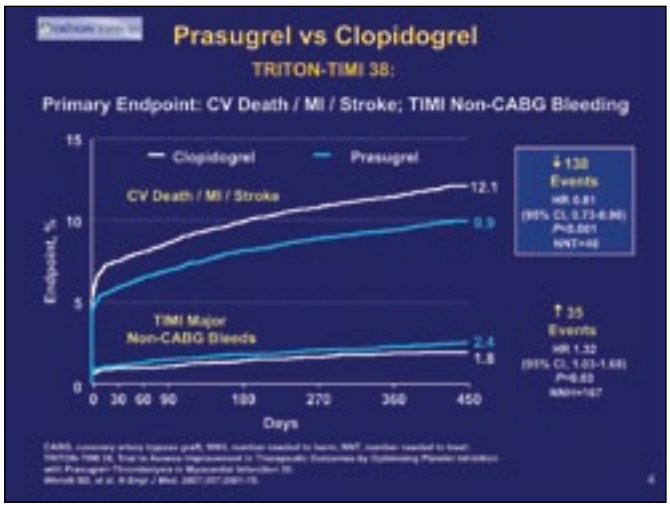
Monday, March 12

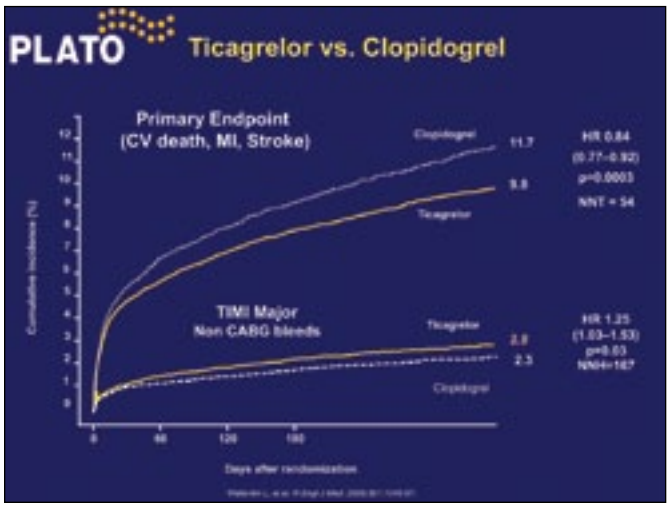
MONDAY, MARCH 12 - 08:00–08:30 - DR STEFAN JAMES

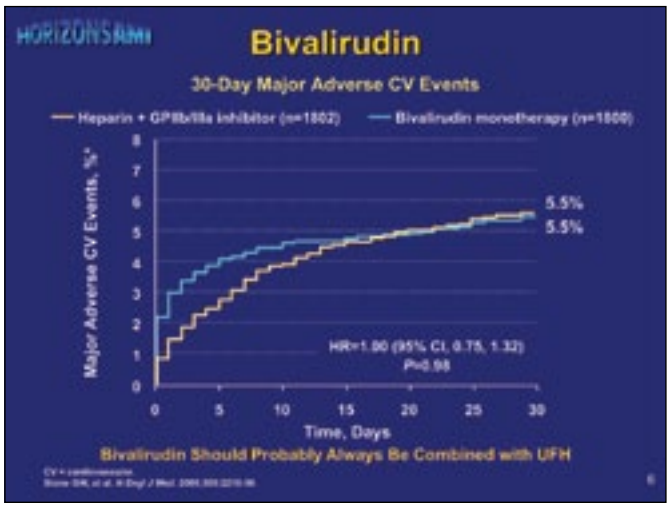
WALKING THE TIGHT ROPE IN ACS: BALANCING SAFETY AND EFFICACY

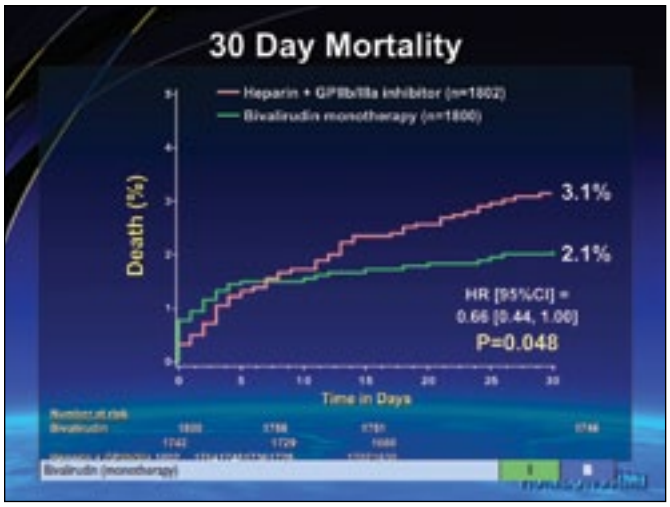


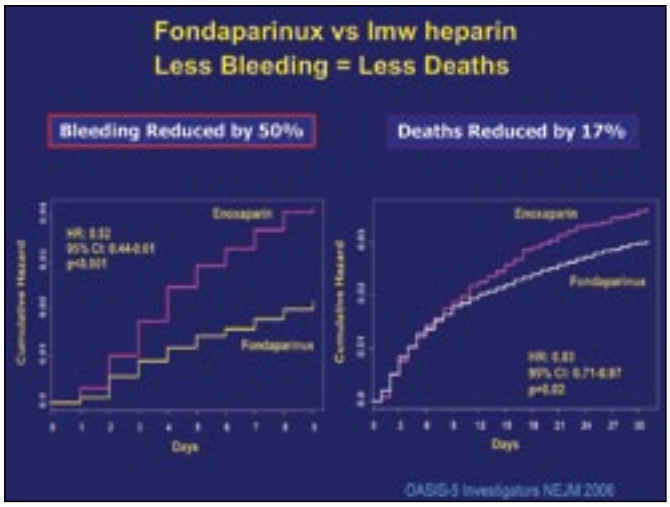


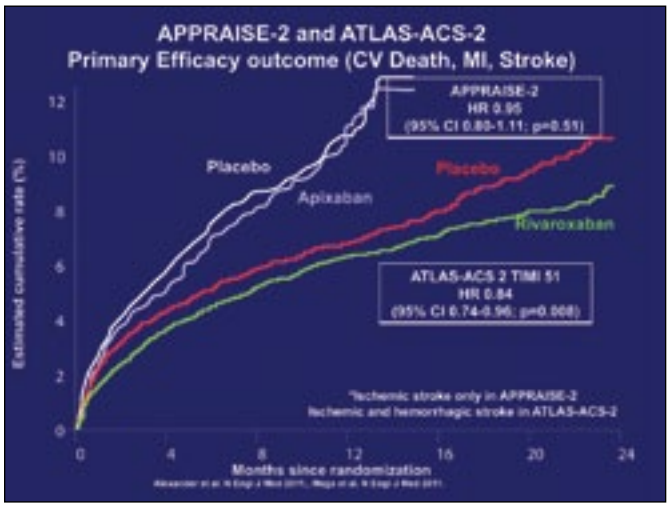


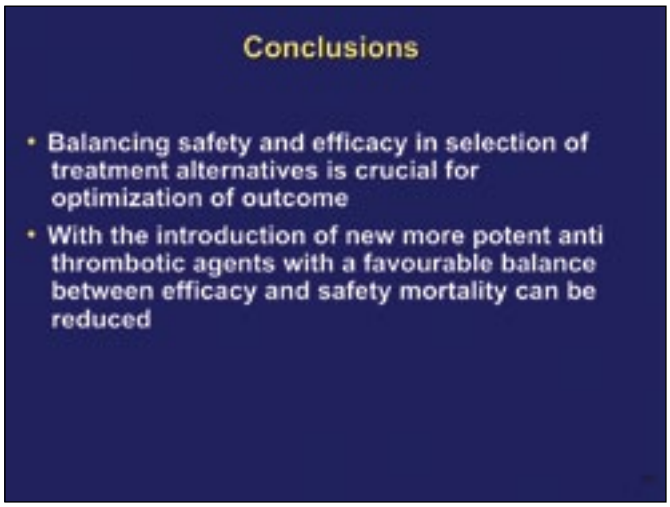

PLATO
Ticagrelor vs. Clopidogrel
Primary Endpoint
(CV death, MI, Stroke)
Clopidogrel
Ticagrelor
11.7
9.8
HR 0.84
(0.77–0.92)
p=0.0003
NNT = 54
TIMI Major
Non CABG bleeds
Ticagrelor
Clopidogrel
2.8
2.3
HR 1.25
(1.03–1.53)
p=0.03
NNH=167
Days after randomization


HORIZONS-AMI
Bivalirudin
30-Day Major Adverse CV Events
Heparin + GPIIb/IIIa inhibitor (n=1802)
Bivalirudin monotherapy (n=1800)
Major Adverse CV Events, %*
5.5%
5.5%
HR=1.00 (95% CI, 0.75, 1.32)
P=0.98
Time, Days
Bivalirudin Should Probably Always Be Combined with UFH


30 Day Mortality
Heparin + GPIIb/IIIa inhibitor (n=1802)
Bivalirudin monotherapy (n=1800)
Death (%)
3.1%
2.1%
HR [95%CI] =
0.66 [0.44, 1.00]
P=0.048
Time in Days
Bivalirudin (monotherapy)


Fondaparinux vs lmw heparin
Less Bleeding = Less Deaths
Bleeding Reduced by 50%
Deaths Reduced by 17%
Enoxaparin
Fondaparinux
Cumulative Hazard
Days
OASIS-5 Investigators NEJM 2006


APPRAISE-2 and ATLAS-ACS-2
Primary Efficacy outcome (CV Death, MI, Stroke)
APPRAISE-2
HR 0.95
(95% CI 0.80-1.11; p=0.51)
Placebo
Apixaban
Placebo
Rivaroxaban
ATLAS-ACS 2 TIMI 51
HR 0.84
(95% CI 0.74-0.96; p=0.008)
*Ischemic stroke only in APPRAISE-2
Ischemic and hemorrhagic stroke in ATLAS-ACS-2
Estimated cumulative rate (%)
Months since randomization


Conclusions
• Balancing safety and efficacy in selection of treatment alternatives is crucial for optimization of outcome
• With the introduction of new more potent anti thrombotic agents with a favourable balance between efficacy and safety mortality can be reduced

MONDAY, MARCH 12 - 08:30–09:00 - DR PAUL ARMSTRONG

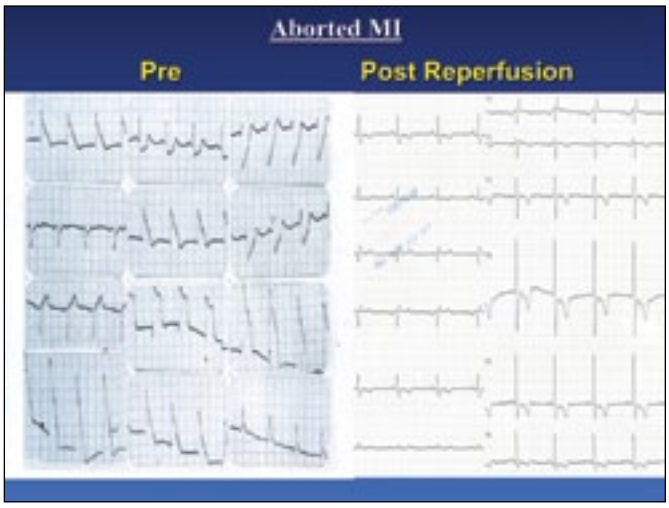
NEW ROLE FOR AN OLD FRIEND: CONTEMPORARY INSIGHTS FROM THE ECG

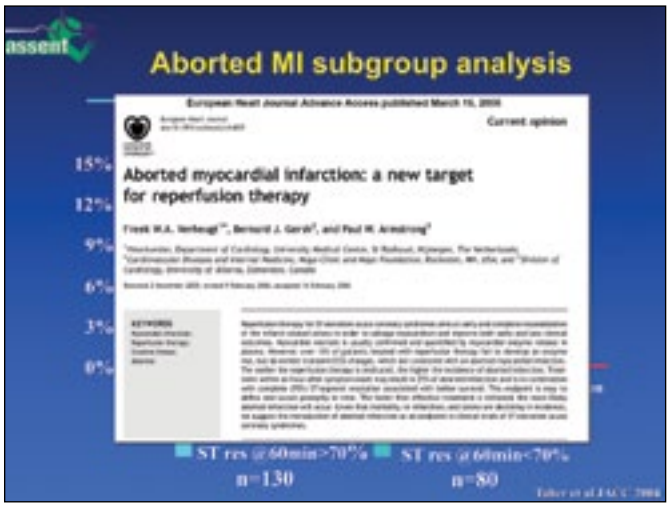
The standard ECG has experienced a renaissance in the modern era of contemporary care of acute ischemic heart disease. Its remarkable simplicity, availability, versatility, and portability coupled with its cost effectiveness constitute one of the most valuable yet underappreciated bioassays at the clinician's disposal.

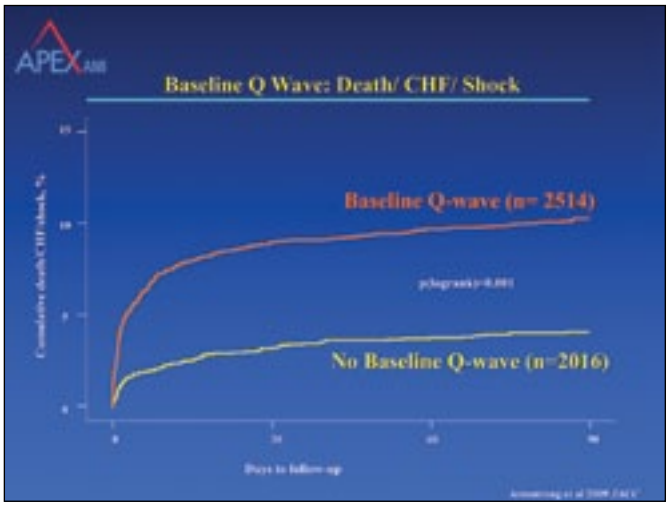
At an early point in time, the extent of ST shift amongst both ST elevation and Non ST elevation acute coronary syndromes provides excellent prognostic value that can be quantified. Moreover, the absence of a Q wave in the distribution of ST elevation adds additional insight into the state of MI evolution and both its response to reperfusion therapy and ultimate outcome waves remote from the ST elevation in patients without a history of MI reflect prior silent MI that carries an adverse prognosis.

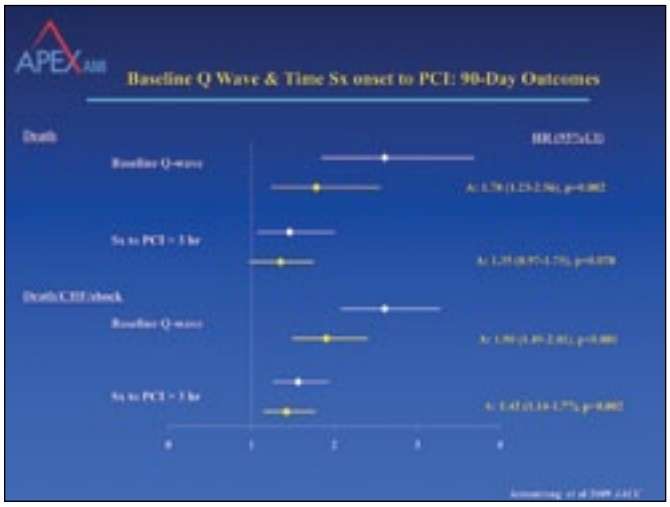
Once reperfusion therapy has been delivered, the ECG can identify the likelihood of success (including the possibility of aborting the MI), the need for rescue PCI in patients receiving initial fibrinolytic therapy, as well as failure of myocardial reperfusion post PCI even when TIMI 3 epicardial flow has been achieved.

Representative examples of these phenomena and the evidence supporting them will be shown during this presentation.









ST-Segment Recovery and Outcome After Primary Percutaneous Coronary Intervention for ST-Elevation Myocardial Infarction

Insights From the Assessment of Pexelizumab in Acute Myocardial Infarction (APEX-AMI) Trial

Christopher E. Buller, MD; Yuling Fu, MD; Kenneth W. Mahaffey, MD; Thomas G. Todaro, MD; Peter Adams, MD; Cynthia M. Westerhout, PhD; Harvey D. White, MD; Arnoud W.J. van 't Hof, MD; Frans J. Van de Werf, MD; Galen S. Wagner, MD; Christopher B. Granger, MD; Paul W. Armstrong, MD

Buller et al Circulation 2008

Resolution of ST-segment depression: a new prognostic marker in ST-segment elevation myocardial infarction

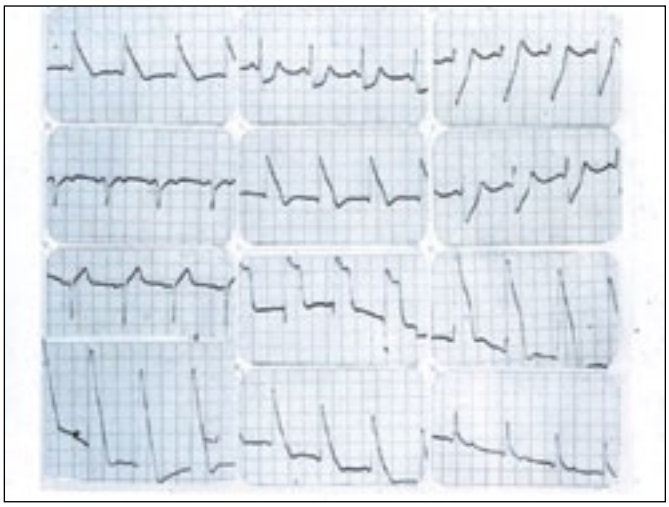
Michael C. Tjandrawidjaja[1], Yuling Fu[1], Cynthia M. Westerhout[1], Harvey D. White[2], Thomas G. Todaro[3], Frans Van de Werf[4], Kenneth W. Mahaffey[5], Galen S. Wagner[6], Christopher B. Granger[1], and Paul W. Armstrong[1]* on behalf of the APEX-AMI Investigators

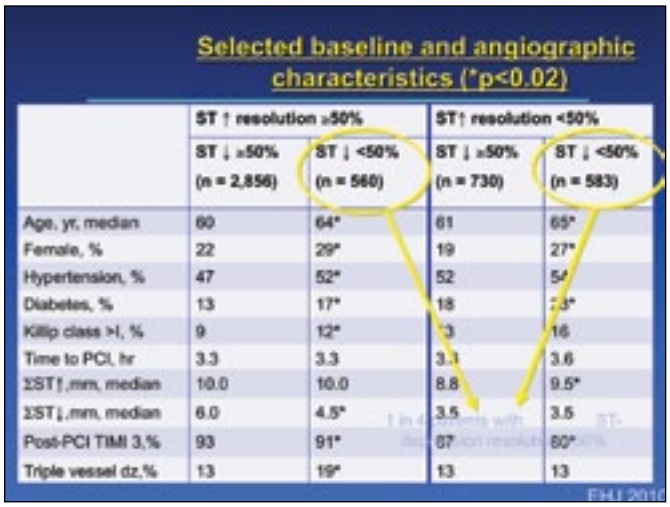
Aims

Methods and results

Conclusion

EHJ 2010





Selected baseline and angiographic characteristics (*p<0.02)

	ST ↑ resolution ≥50%		ST↑ resolution <50%	
	ST ↓ ≥50% (n = 2,856)	ST ↓ <50% (n = 560)	ST ↓ ≥50% (n = 730)	ST ↓ <50% (n = 583)
Age, yr, median	60	64*	61	65*
Female, %	22	29*	19	27*
Hypertension, %	47	52*	52	54
Diabetes, %	13	17*	18	23*
Killip class >I, %	9	12*	13	16
Time to PCI, hr	3.3	3.3	3.1	3.6
ΣST↑,mm, median	10.0	10.0	8.8	9.5*
ΣST↓,mm, median	6.0	4.5*	3.5	3.5
Post-PCI TIMI 3,%	93	91*	87	80*
Triple vessel dz,%	13	19*	13	13

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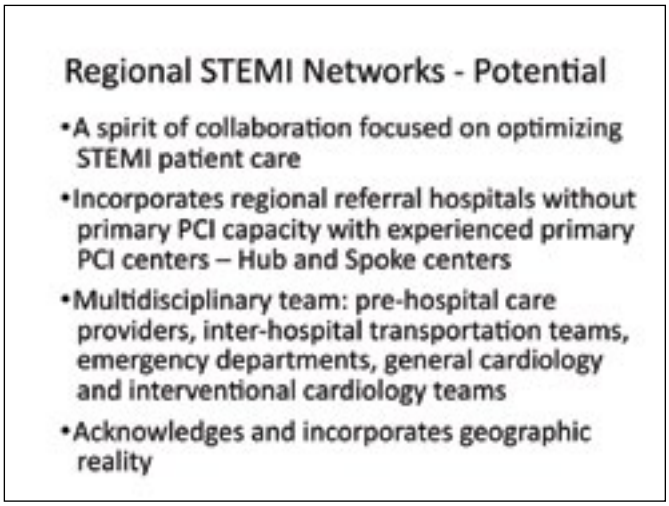
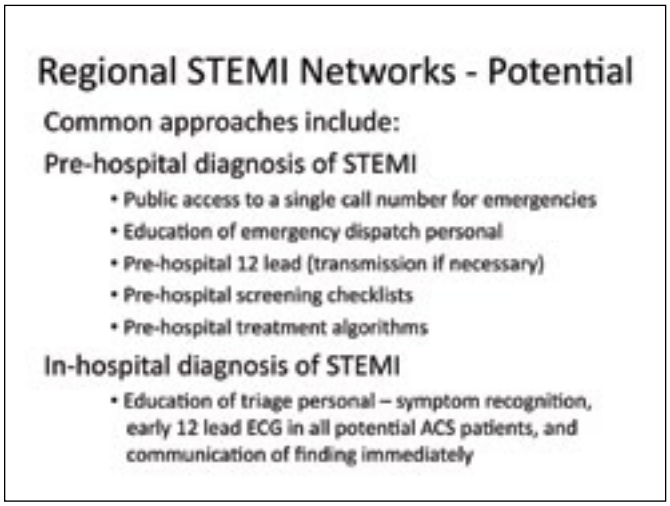
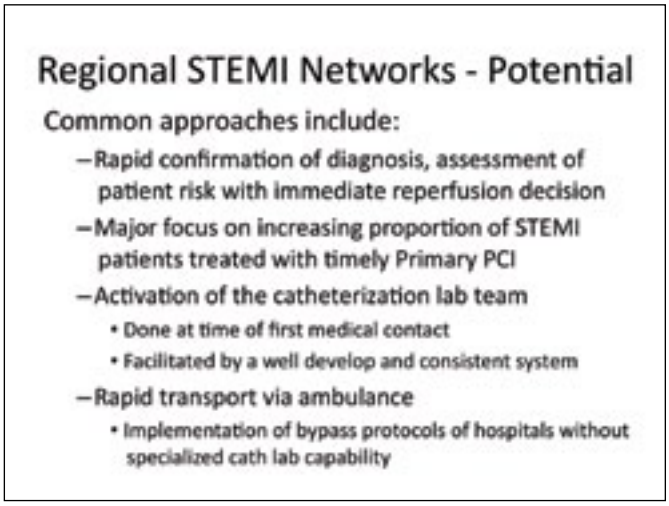
MONDAY, MARCH 12 - 09:00–09:30 - DR ROBERT WELSH

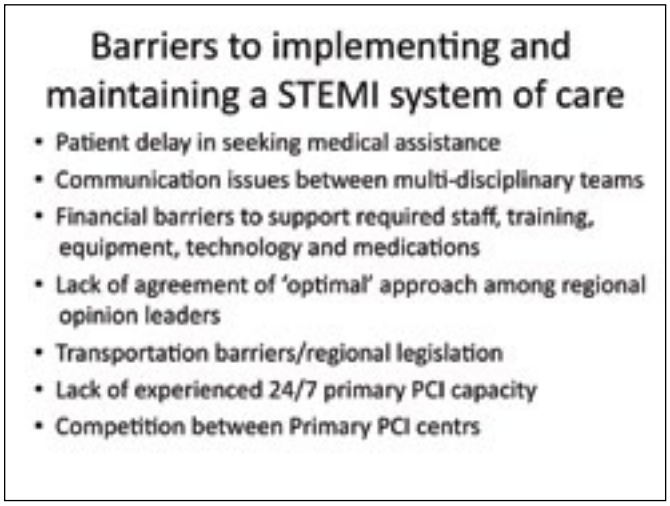
STEMI MANAGEMENT IN 2012: FACILITATING TIMELY REPERFUSION THERAPY FOR URBAN AND RURAL PATIENTS

STEMI systems of care focused on expediting reperfusion and increasing the utilization of mechanical reperfusion have been developed in urban and suburban settings across Canada with recognized success. Despite the substantial investment of intellectual sweat equity and financial resources, it remains challenging to achieve timely reperfusion in all STEMI patients in our country. Registry data continues to support the contention that achieving timely reperfusion is critical to improved patient outcomes. These realities are especially true for patients who initially present to a community hospital without a cardiac catheterization laboratory and for rural patients. A discussion regarding systematic dual reperfusion strategies for patients who present outside of tertiary care centres will occur.



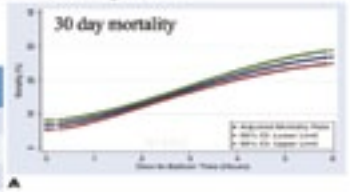


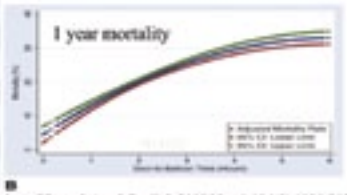




Primary Percutaneous Coronary Intervention Door-to-Balloon Time and Mortality in Patients Hospitalized with ST-Elevation Myocardial Infarction: Is 90 Minutes Fast Enough?

Time (min)	30-d Mortality	1-Year Mortality
	Adjusted	Adjusted
30	7.3 (6.1–8.6)	8.8 (7.0–10.7)
60	8.8 (7.8–9.9)	12.9 (11.6–14.2)
90	10.7 (9.8–11.6)	16.6 (15.6–17.6)
120	12.8 (12.0–13.5)	19.9 (19.1–20.8)
150	15.0 (14.3–15.7)	22.9 (22.0–23.7)
180	17.2 (16.4–18.0)	25.5 (24.5–26.5)
210	19.4 (18.3–20.4)	27.7 (26.5–28.9)
240	21.4 (20.1–22.6)	29.5 (28.1–30.9)
270	23.2 (21.7–24.6)	30.9 (29.4–32.5)

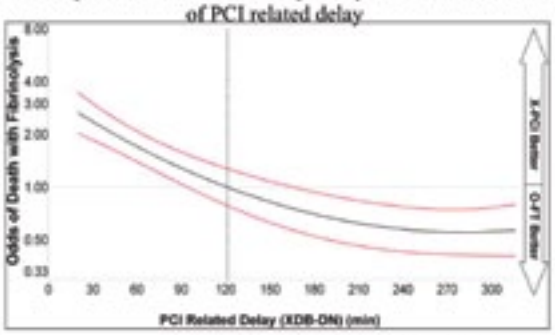




Rathore SS, et al, Am J Cardiol. 2009 Nov 1;104(9):1198-203

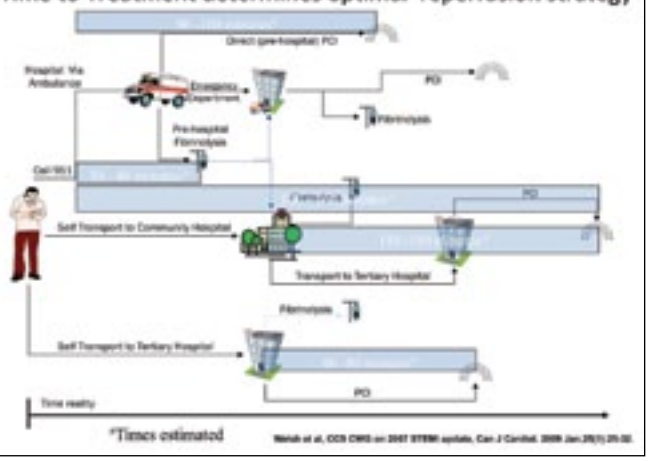
Benefit of Transferring ST-Segment-Elevation Myocardial Infarction Patients for Percutaneous Coronary Intervention Compared With Administration of Onsite Fibrinolytic Declines as Delays Increase

Median door to balloon time within this analysis was 160 minutes and 48% of patients failed to receive primary PCI within 120 minutes of PCI related delay



Pinto, D et al. Circulation. 124(23):2512-2521, December 6, 2011.

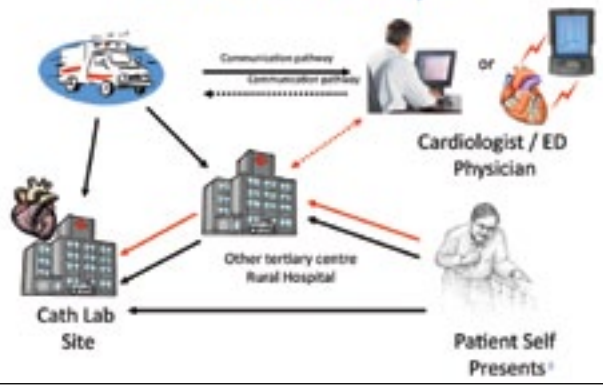
Time to Treatment determines optimal reperfusion strategy



*Times estimated

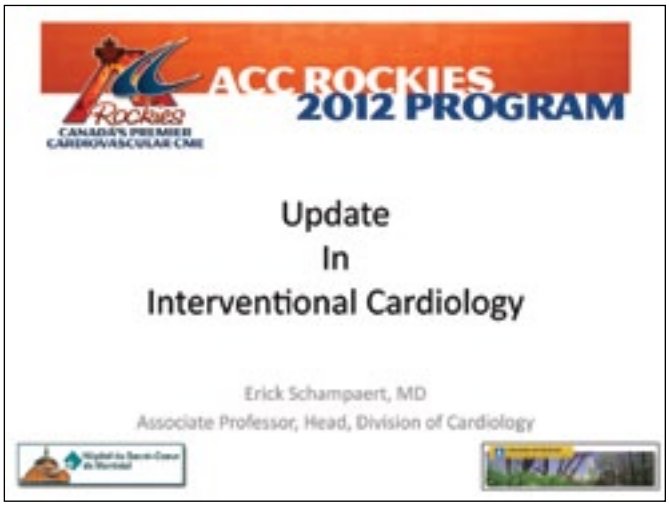
Welsh et al, CCS CWG on 2007 STEMI update. Can J Cardiol. 2008 Jan;24(1):25-32.

Heart Attack Pathway's



MONDAY, MARCH 12 - 09:30–10:00 - DR ERICK SCHAMPAERT

UPDATE IN INTERVENTIONAL CARDIOLOGY



Vascular Access

- Femoral
- Radial vs. Femoral

Anti-Thrombotics in the Cath. Lab.

- Anticoagulants
- Antiplatelets

Stents

- New Generations Drug-eluting Stents (DES)
- Bioresorbable Polymer DES
- Bioresorbable Vascular Scaffolding (BVS)

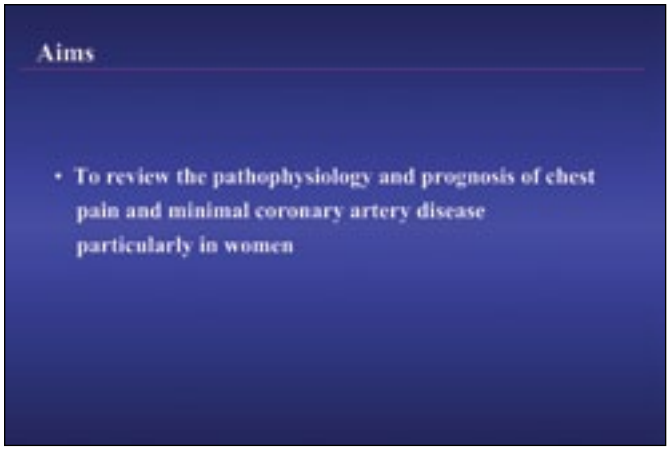
Adjunctive Modalities in the Cath. Lab.

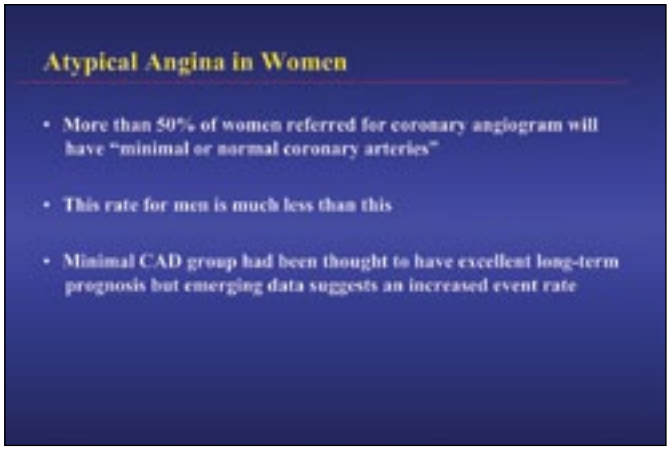
- Rotational Angiography
- FFR
- IVUS
- OCT

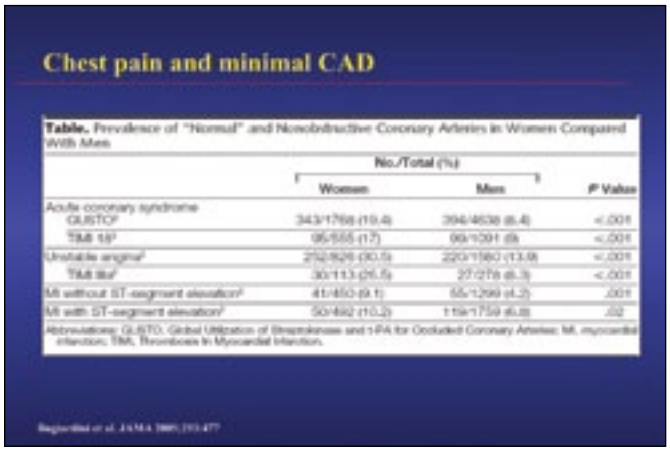
MONDAY, MARCH 12 - 10:15-10:45 - DR TODD ANDERSON

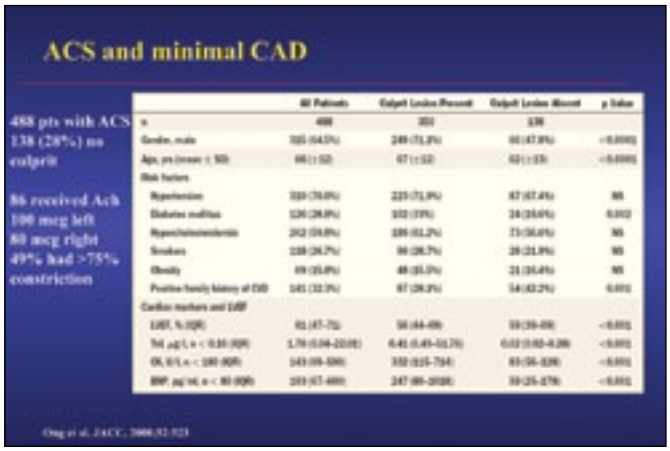
MICROVASCULAR ANGINA'S CURRENT RELEVANCE TO CLINICAL PRACTICE

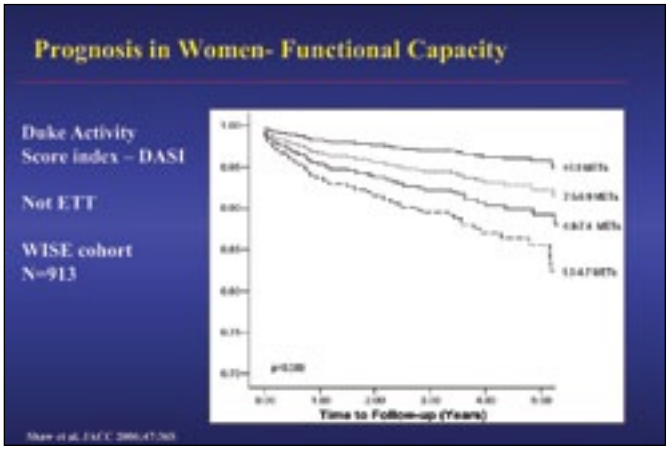
There are a group of patients with chest pain syndromes or documented ischemia who do not have flow limiting conduit vessel coronary artery disease. They may or may not have typical angina symptoms. Many, particularly women, will have very atypical symptoms that lead physicians away from the diagnosis of coronary disease. Up to 50% of women referred for coronary angiography have minimal CAD, including up to 20% of those presenting with an acute coronary syndrome. Over the past 20 years, there has been a growing recognition that a great many of these individuals have abnormalities of coronary vasomotor control accounting for chest pain. The pathophysiology includes large vessel endothelial dysfunction as detected by diffuse vasospasm to acetylcholine. Impaired microvascular endothelial and smooth muscle cell function may also be present. These individuals also have enhanced pain perception and many have concomitant pain syndromes such as fibromyalga, migraines, chronic fatigue syndrome, and POTS. Diagnosis is difficult yet important to try to reduce the emotional strain that undiagnosed chest pain has on these individuals. Resource utilization remains much higher than for subjects with documented epicardial CAD. And finally, there is now clear evidence that subjects with impaired endothelial function are at increased risk of developing traditional atherosclerosis and its associated morbidity and mortality. This presentation will review the features of what has been labelled as endothelial dysfunction, microvascular angina, or cardiac syndrome X.

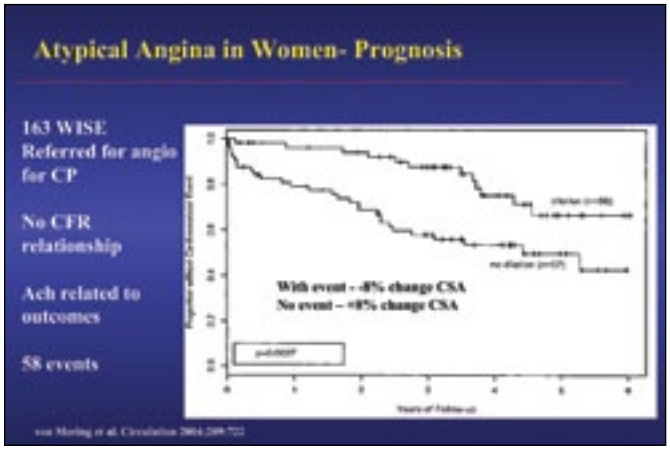


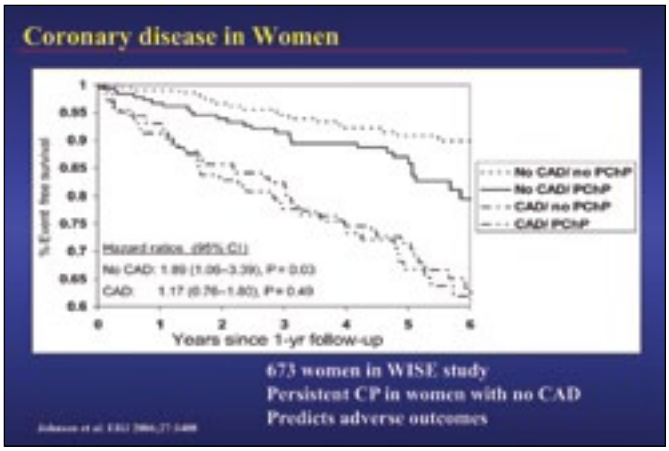






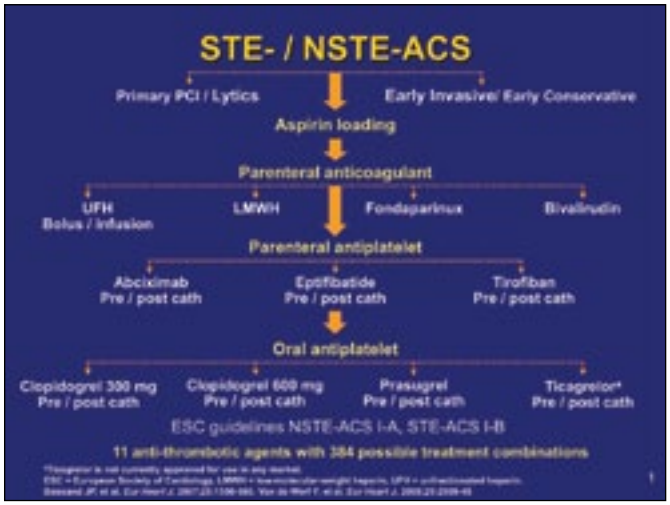


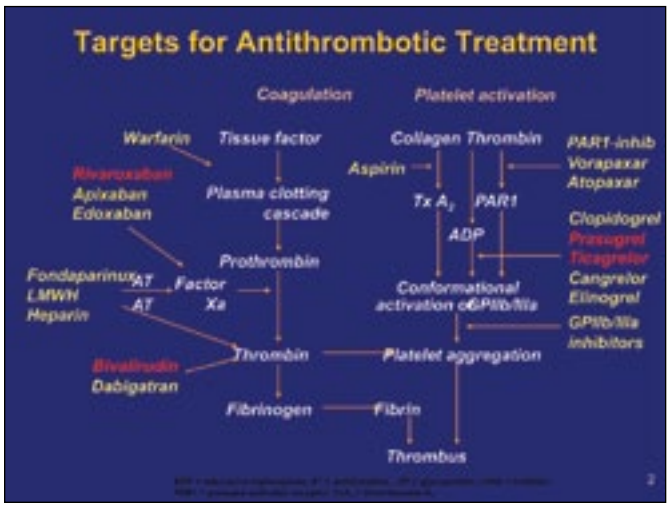


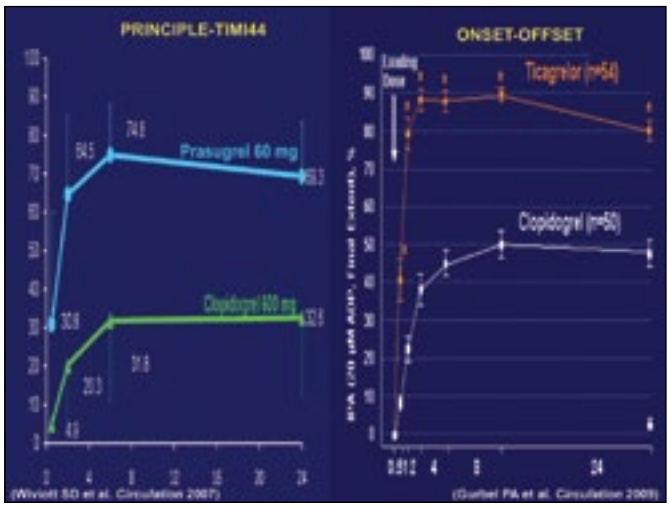


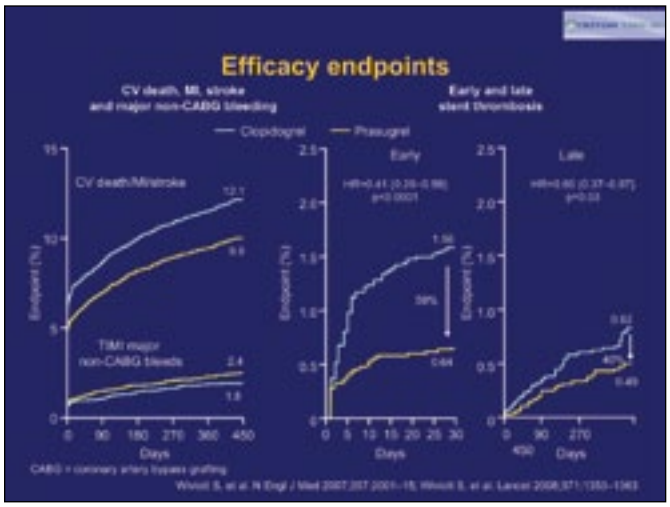
MONDAY, MARCH 12 - 10:45–11:15 - DR STEFAN JAMES

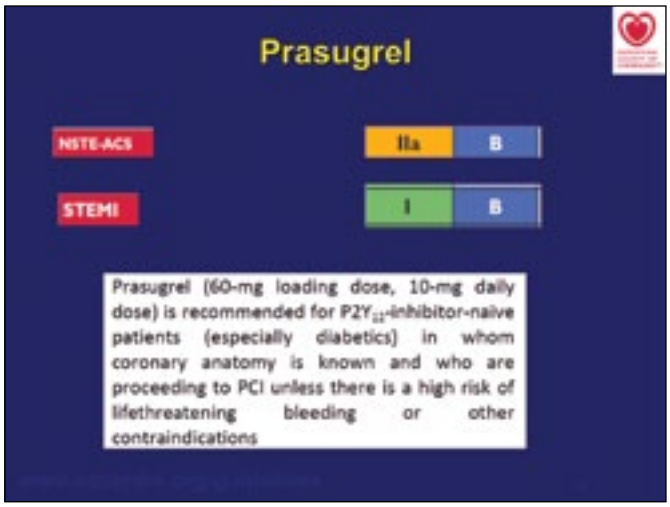
PRACTICAL APPLICATION OF NEW DEVELOPMENTS IN ANTITHROMBOTIC AND ANTIPLATELET THERAPY IN ACS

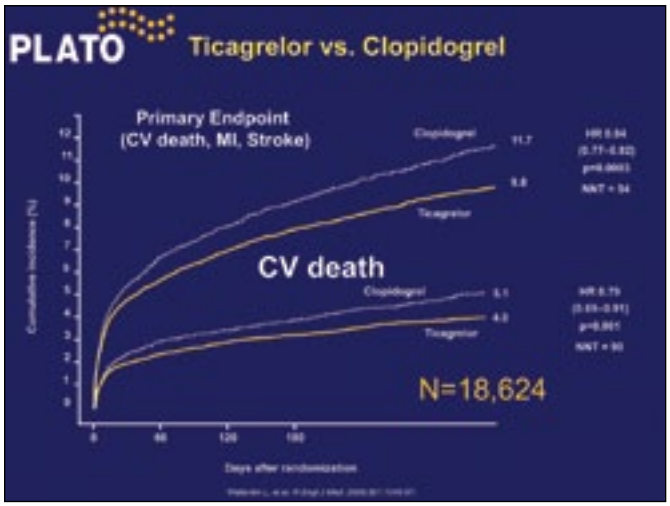


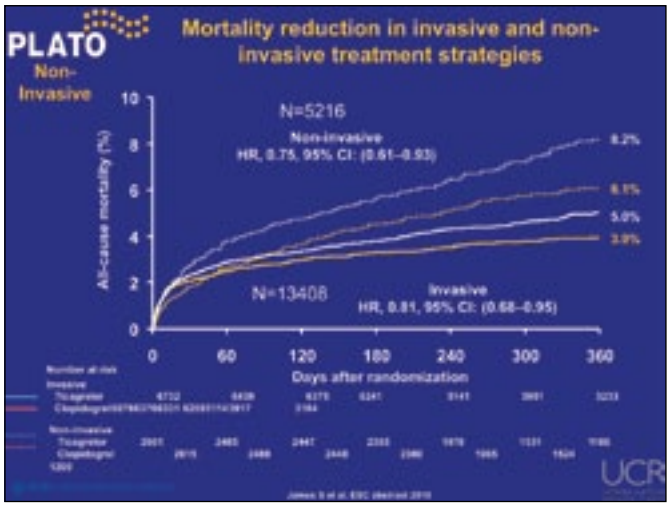

Targets for Antithrombotic Treatment
Coagulation
Platelet activation
Warfarin
Tissue factor
Collagen Thrombin
PAR1-inhib
Vorapaxar
Atopaxar
Aspirin
Rivaroxaban
Apixaban
Edoxaban
Plasma clotting cascade
Tx A2
PAR1
ADP
Clopidogrel
Prasugrel
Ticagrelor
Cangrelor
Elinogrel
Prothrombin
Fondaparinux
LMWH
Heparin
AT
Factor Xa
Conformational activation of GPIIb/IIIa
GPIIb/IIIa inhibitors
Bivalirudin
Dabigatran
Thrombin
Platelet aggregation
Fibrinogen
Fibrin
Thrombus

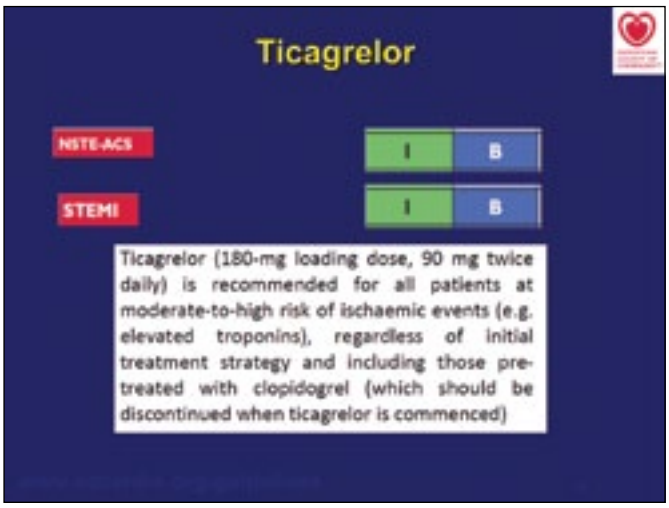

PRINCIPLE-TIMI44
ONSET-OFFSET
Prasugrel 60 mg
Clopidogrel 600 mg
Ticagrelor (n=54)
Clopidogrel (n=50)
Loading Dose
(Wiviott SD et al. Circulation 2007)
(Gurbel PA et al. Circulation 2009)

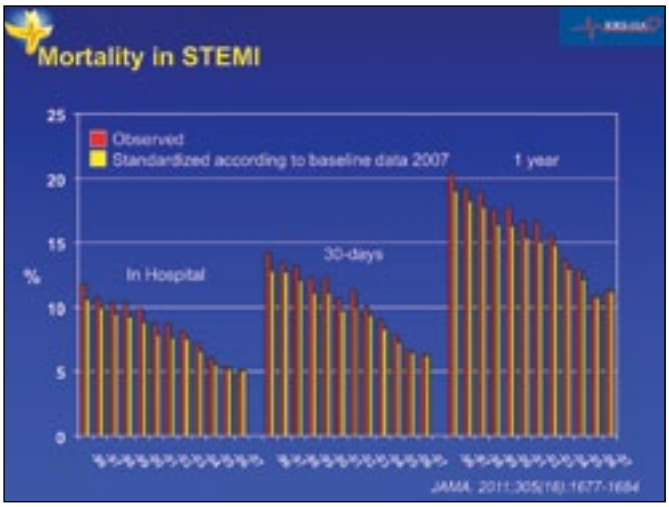

Efficacy endpoints
CV death, MI, stroke and major non-CABG bleeding
Early and late stent thrombosis
Clopidogrel
Prasugrel
CV death/MI/stroke
TIMI major non-CABG bleeds
Early
Late
Endpoint (%)
Days
CABG = coronary artery bypass grafting
Wiviott S, et al. N Engl J Med 2007;357:2001–15; Wiviott S, et al. Lancet 2008;371:1353–1363

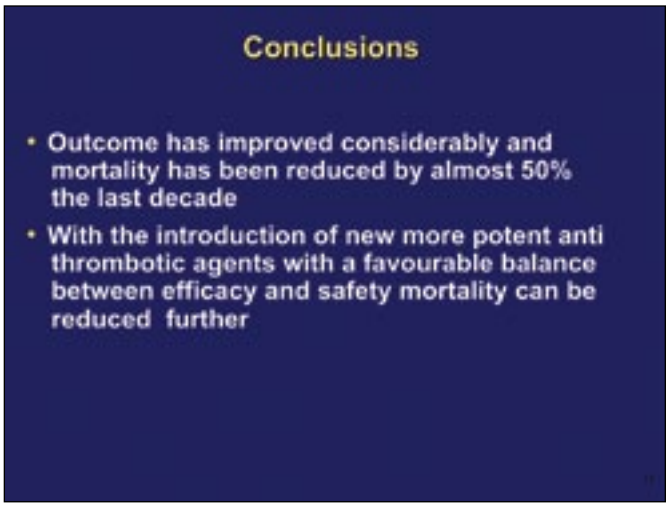

Prasugrel
NSTE-ACS
IIa
B
STEMI
I
B
Prasugrel (60-mg loading dose, 10-mg daily dose) is recommended for P2Y12-inhibitor-naive patients (especially diabetics) in whom coronary anatomy is known and who are proceeding to PCI unless there is a high risk of lifethreatening bleeding or other contraindications


PLATO
Ticagrelor vs. Clopidogrel
Primary Endpoint
(CV death, MI, Stroke)
Clopidogrel
Ticagrelor
CV death
N=18,624
Days after randomization


PLATO
Non-Invasive
Mortality reduction in invasive and non-invasive treatment strategies
N=5216
Non-invasive
HR, 0.75, 95% CI: (0.61–0.93)
8.2%
6.1%
N=13408
Invasive
HR, 0.81, 95% CI: (0.68–0.95)
5.0%
3.9%
All-cause mortality (%)
Days after randomization
UCR







MONDAY, MARCH 12 - 12:30-14:00
DR JONATHAN CHOY, DR PAOLO RAGGI, DR RICHARD COULDEN

INTERACTIVE CASE BASED IMAGING SYMPOSIUM: NON-INVASIVE IMAGING FOR ASSESSMENT OF CHEST PAIN – IS THERE A BEST TEST?

The Patient With Chest Pain – Which Imaging Test Should I Order?

In the era of multimodality imaging, it can often become confusing as to which imaging test to order to confirm or refute coronary artery disease as the cause of chest pain symptoms.

Recent concerns over radiation exposure have further increased the need for careful selection of imaging tests to minimize harm and provide best patient outcomes.

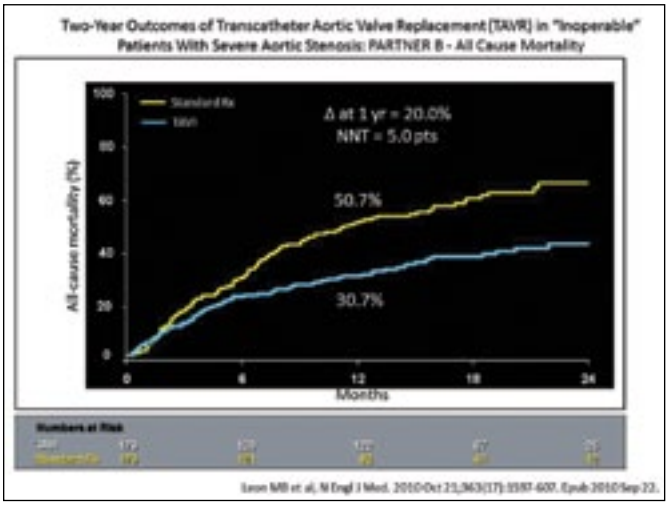
This 90 minute case-based interactive workshop is designed to raise discussion over which modality is best suited for a variety of case scenarios.

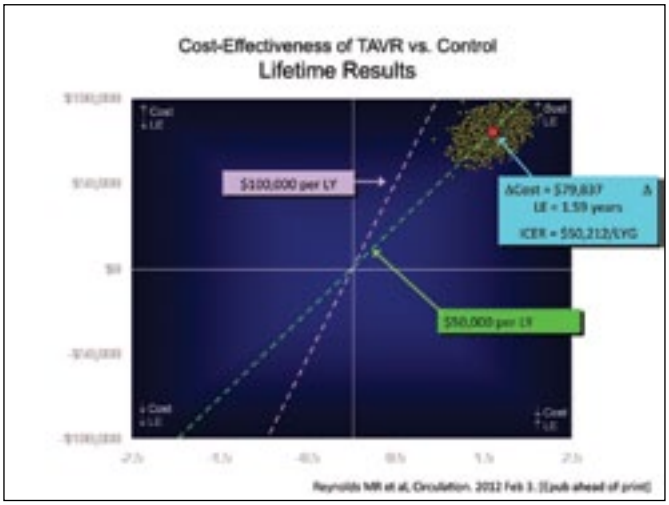
Participants will have the opportunity to discuss with the panel the pros and cons of various imaging techniques, the advantages and limitations, as well as issues of cost, accessibility, and radiation exposure.

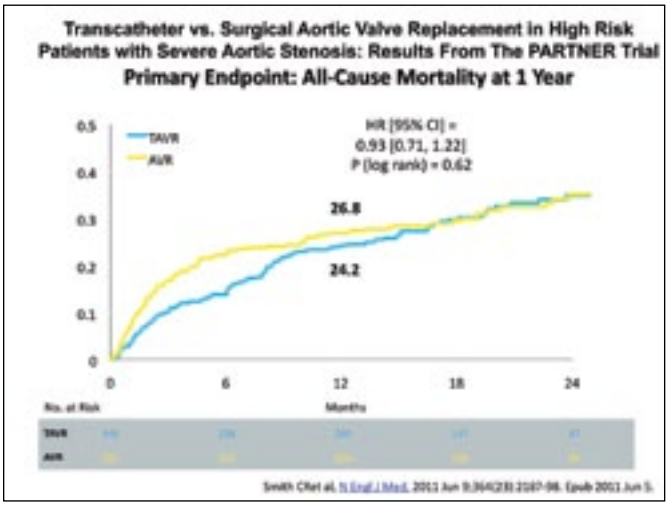
MONDAY, MARCH 12 - 14:00-14:30 DR ROBERT WELSH

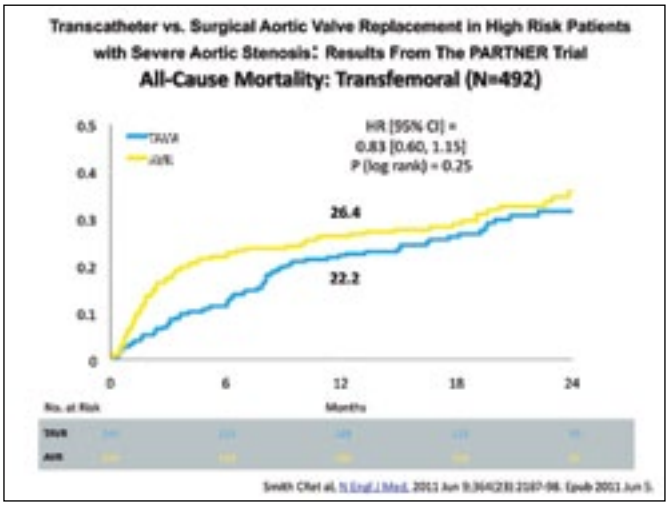
PERCUTANEOUS AORTIC VALVES – THE CANADIAN PERSPECTIVE

Patients with severe symptomatic aortic stenosis have a poor prognosis with medical management alone and balloon aortic valvuloplasty has failed to provide durable clinical benefit. Open surgical replacement of the aortic valve can improve symptoms and survival, but many patients with severe symptomatic aortic stenosis are elderly with multiple co-morbidities and therefore have high surgical risk. Recently, transcatheter aortic valve implantation (TAVI) has been demonstrated to improve survival, quality of life, and functional status in non-operable patients and to be a viable option for patients for whom the risk of open surgical morbidity or mortality is high. This presentation will discuss the current role of TAVI from a Canadian perspective.









MONDAY, MARCH 12 - 14:30-15:00 DR BERNARD GERSH

SURGICAL APPROACHES TO CHF: IMPLICATIONS OF STICH AND THE VAD

Heart failure is a global epidemic, and despite advances in medical therapy the prognosis remains dismal for the majority. In specific subsets of patients with coronary artery disease, the potential for revascularization to improve left ventricular function and, hopefully, prognosis must be weighed against the higher periprocedural risks. On the other hand, there is a paradox in that although the risk is greater, so is the long-term potential for gain because the major benefit of coronary revascularization is in "sicker" patients, including those with left ventricular dysfunction.

The rationale for assessing viability in dysfunctional myocardial segments is based upon the major determinants of prognosis. In patients with left ventricular dysfunction, the severity of coronary artery disease/ischemia is a major prognostic factor, and in patients with coronary artery disease, the severity of left ventricular dysfunction is crucial.

Manifestations of left ventricular dysfunction in response to ischemia include hibernation, repetitive stunning, and scar, and the first two reflect viability. The extent of viability as opposed to irreversible scar is probably dependent upon a cascade of events in which an initial biochemical signal results in a reduction of contractility and reduced energetics to prevent necrosis followed by altered gene and protein expression, which may result in varying degrees of fibrosis and apoptosis. Measurements of myocardial contraction in association with perfusion and metabolism can help to distinguish between areas of normality, repetitive stunning, hibernation, and scar.

The clinical indications for viability testing in patients with coronary artery disease and severe left ventricular dysfunction (EF less than 0.35) include the presence of severe coronary disease and no history of myocardial infarction, absent Q-waves on the electrocardiogram, significant angina or stress-induced ischemia, and the presence of subtotal occlusions and collaterals.

Imaging modalities which have been assessed include conventional nuclear testing, echocardiography, PET, and CMR, and although nuclear testing is more sensitive than echocardiography, it is also less specific and perhaps the current gold standard is PET and CMR. Nonetheless, it has been pointed out repeatedly that all non-invasive techniques currently available have limitations.

The mechanisms of improved prognosis following revascularization obviously include an improvement in resting left ventricular ejection fraction, but also a reduction in inducible ischemia, ventricular remodeling, and diastolic dysfunction, which in turn may reduce symptoms of heart failure and prevent left ventricular arrhythmias. Nonetheless, there are a number of unresolved issues in regard to patient selection based upon the extent of viability, ischemia, ejection fraction, the extent of remodeling, the extent of scar, and the duration of hibernation. There is a great need for prospective trials, but meta-analyses from nonrandomized studies certainly point towards a strong benefit from revascularization versus medical therapy in patients in whom viability is present and very little benefit from revascularization compared to medical therapy in those in whom viability is absent. Nonetheless, the confidence intervals are wide, and there is evidence from other studies that surgical revascularization may improve prognosis without any improvement in ejection fraction.

The viability substudy on STICH is confusing, but suggests that routine viability testing need not be performed in all patients with severe LV dysfunction undergoing coronary revascularization. For the present, we should rely on the ACC/AHA 2004 guideline update for CABG, which incorporated viability in its class IIA recommendations by stating that "CABG might be performed in patients with poor LV function with significant viable non-contracting revascularizable myocardium -----" and recognized that a subgroup of patients might experience benefits. It is suggested that, in patients who are suitable for revascularization and who have significant ischemia or symptoms, revascularization be performed without the need for viability testing. In patients who are revascularizable candidates, but who have severe left ventricular dysfunction and mild or no overt ischemia, viability testing might be helpful to assess myocardial jeopardy in relationship to coronary anatomy.

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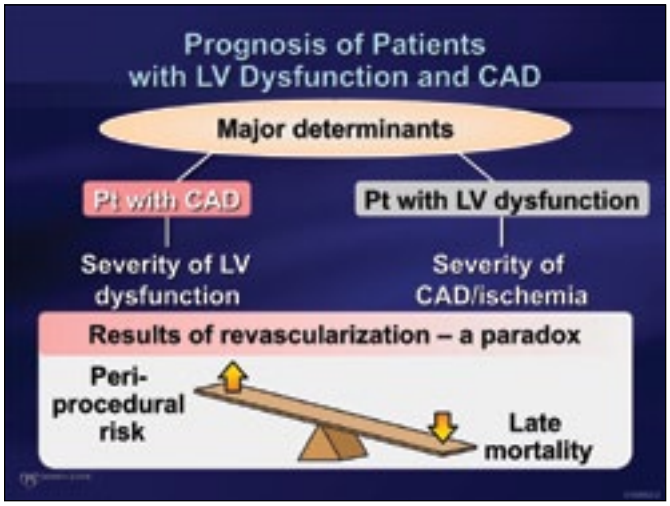

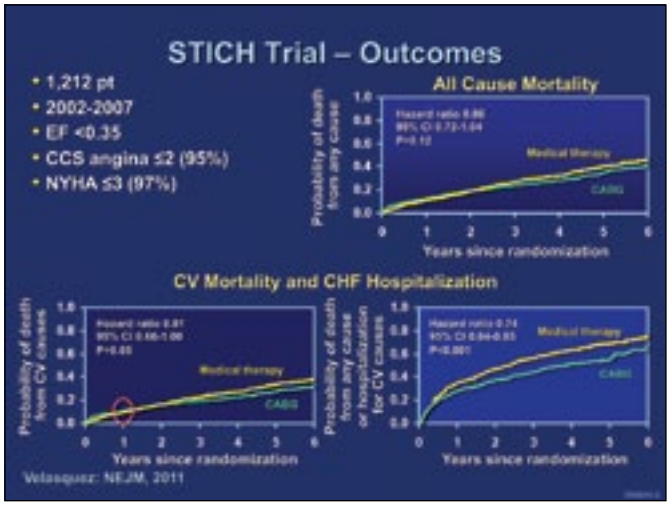

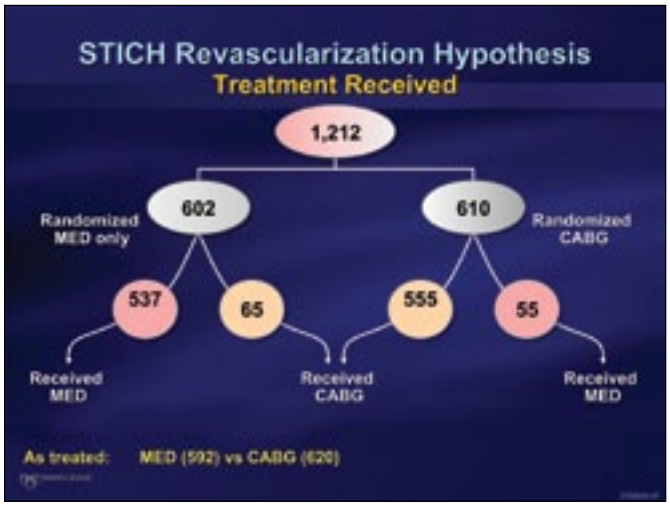

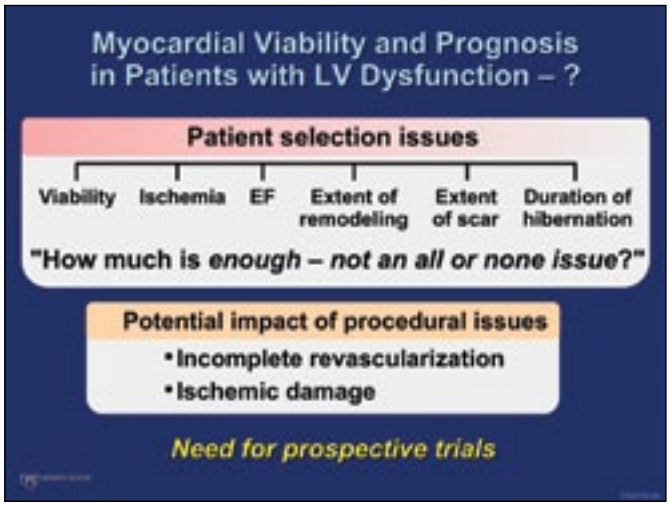

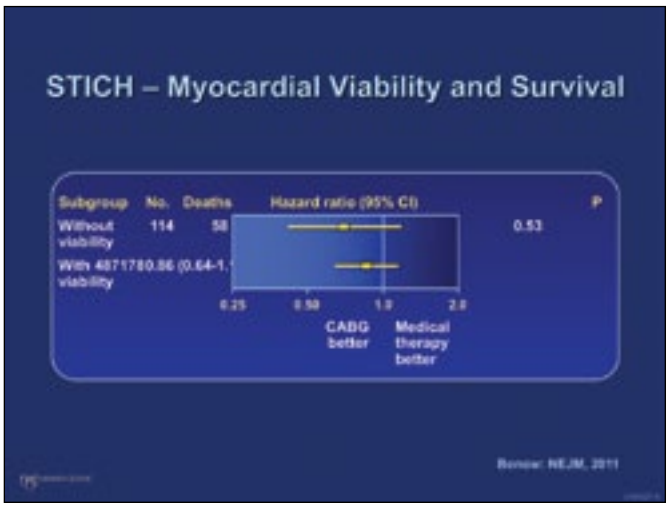

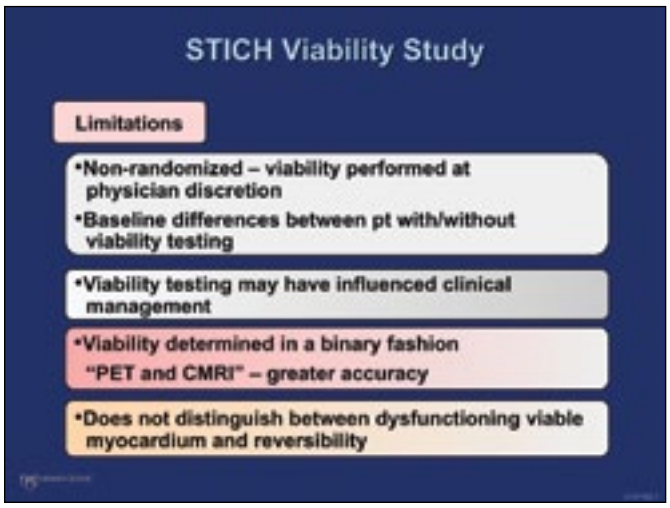

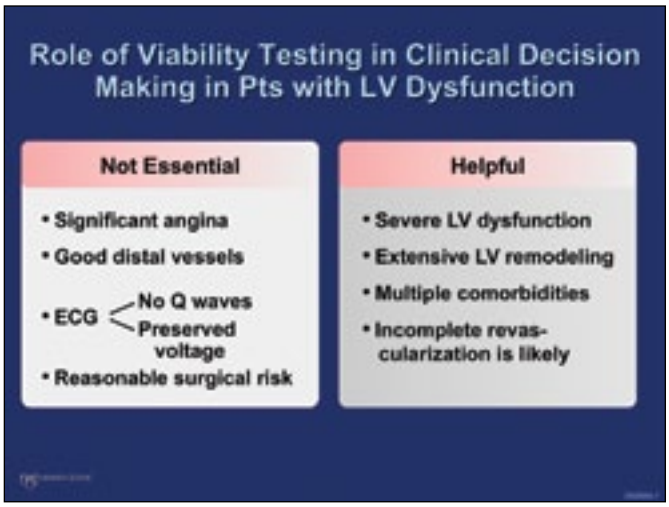

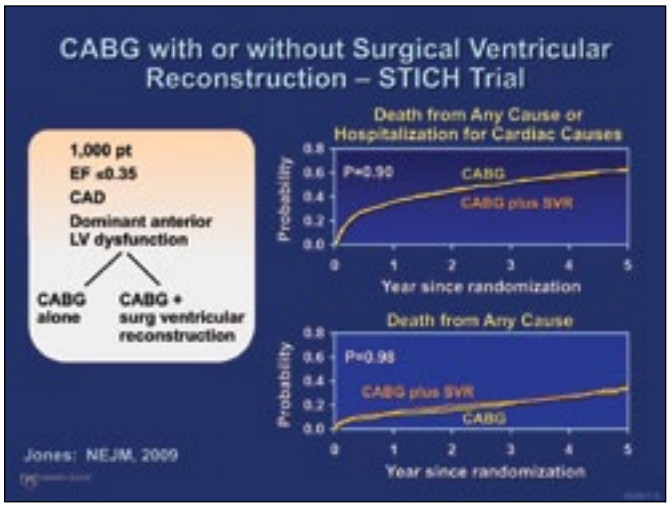

MONDAY, MARCH 12 - 15:00-15:30 - DR PETER LIU

CURRENT CHALLENGES IN HF CARE – IMPACT OF HYPONATREMIA IN HF CARE

Objectives

1. To appreciate that patients admitted with acute heart failure are at risk for death and rehospitalization, particularly those with sodium abnormalities such as hyponatremia

2. To learn that hypervolemic hyponatremic patients can benefit from fluid restriction, careful diuresis, and aquaresis through vasopressin antagonists and disease modifying agents

3. To understand that patients with heart failure are at risk for embolic phenomena and stroke, but that the choice of stroke prevention in these patients is open and should be individualized

Acute Decompensated Heart Failure (ADHF) is Deadly, Nasty, and Costly

Acute decompensated heart failure constitutes one of the most common causes of medical admissions, incurs high medical costs in Canada, and is associated with an annual mortality of 20%-30% and up to 60% risk of rehospitalization within one year[1-4]. Data on troponin release suggest that this is associated with low grade myocardial stress and injury, and most patients are

discharged overloaded with fluid, setting the stage for further decompensation[5-7].

Risk Factors for Acute Heart Failure and Role of Hyponatremia

Acute heart failure is associated with a number of risk factors for adverse outcomes, as delineated from the ADHERE database[8], EFFECT (Canadian) database[9], OPTIME study[10] and the most recent Duke database[11]. Most risk profiles would include the usual demographic factors such as age and number of co-morbidities, but also include importantly (1) low blood pressure, (2) poor renal function, (3) higher heart rate, and less realized to now - the importance of (4) hyponatremia.

Hyponatremia is usually defined as moderate when serum sodium (Na) is <135 mmol/L or severe when sodium < 130 mmol/L. The most recent Duke Databank study found that hyponatremia occurs in about 10% of heart failure patients[11]. Hyponatremic patients tend to be older, anemic, have higher heart rate, lower blood pressure, and worse renal function – all of the hallmarks of poor outcome. In multivariate Cox model adjusted for other risk factors, hyponatremia independently contributed more than 40% of the risk for all-cause mortality at 4.5 years (HR 1.42, 95% CI 1.07-1.88) and CV deaths/hospitalization at 4.5 years of follow up (HR 1.45, 95% CI 1.14-1.86). These risks are very similar to that identified in the EFFECT/Canadian study (HR 1.53)[9].

The high frequency of hyponatremia in heart failure is consistent with the overall activation of the neurohormonal system, including vasopressin. Elevation of vasopressin is predictive of mortality, and this was most recently demonstrated in the Biomarkers in Acute Heart Failure (BACH) study using copeptin (stable c-terminal fragment of the pre-pro-vasopressin)[12]. In 1641 patients with heart failure, patients in the highest quartile of copeptin had increased 90 day mortality (HR=3.85) and those with concurrent severe hyponatremia had HR of 7.36.

Approaches to Treating Hypervolemic Hyponatremia in ADHF

The most commonly used approach for hyponatremia and heart failure is fluid restriction, but this is often slow and ineffective. Yet, significant symptomatic improvement, effective volume removal, and improvement in electrolytes are important endpoints for treatments in acute heart failure[13].

The use of diuretics such as furosemide has been studied in the DOSE trial, but whether this is beneficial in hyponatremic patients is debated[14]. The results showed that there was no advantage of furosemide infusion over bolus regimen. However, higher bolus dose strategy was associated with favourable outcomes in symptomatic improvement and reduction in BNP, associated with transient worsening of renal function that had no long term impact.

In most severe cases where diuretics are ineffective, ultrafiltration has been used in selective patients with resistant volume overload. The UNLOAD trial demonstrated that ultrafiltration using a venous-venous canulation approach produced greater degree of fluid loss and less rehospitalization at 90 days, with no difference in symptoms or renal function[15].

A more specific alternative is the use of selective V_2 vasopressin antagonists, which are aquaretic agents, because of their ability to selectively mediate effective renal water clearance without sodium loss, thus correcting both hyponatremia and volume overload without compromising renal function. Of the V_2 antagonists available, conivaptan (IV use only) and tolvaptan (oral) have been approved by the FDA, and tolvaptan is now approved also in Canada for clinical use. In the SALT 1 and 2 trials, patients with different causes of hyponatremia, including heart failure, when exposed to tolvaptan, showed significant improvements in their hyponatremia and mental status at 30 days without change in renal function when compared to placebo[16].

In the smaller phase II heart failure trial in patients with fluid overload, patients randomized to tolvaptan showed greater weight loss at 24 hours when compared to standard care and decreased 60 day mortality in those with abnormal renal function[17]. However, in the larger EVEREST trial involving 4133 patients with acute heart failure (mostly without hyponatremia), tolvaptan was shown to decrease dyspnea and body weight more effectively at 24 hours and improve serum sodium by 7 days, and these effects persisted long after discharge. Overall, there was no difference in mortality or hospitalization, attesting to tolvaptan's safety[18]. In

the subgroup with hyponatremia on secondary analysis, there was a significant reduction in mortality in the tolvaptan group (HR 0.60, 95% CI 0.37- 0.98). There was also a trend towards reduced hospitalization[18].

Summary on Hyponatremia and ADHF

Therefore, hyponatremia occurs commonly in heart failure, is prognostic, and is associated with worse heart failure, worse renal function, and severe symptoms. The treatment options are limited and the availability of vasopressin antagonist effectively facilitates its management.

Risk of Embolic Stroke in Patients with Heart Failure

Patients with heart failure in sinus rhythm are at risk for thromboembolic complications. With the combination of stasis in blood flow, heightened prothrombotic/ proinflammatory blood factors, and abnormal vasculature, there is increased risk of emboli, such as stroke. Previous clinical trial studies such as SOLVD, SAVE and V-HeFT trials suggested an annual incidence of thromboembolic complications of 1.5-3.4% per year in patients with normal sinus rhythm (NSR) and HF[19,20].

The questions of what is the appropriate therapeutic prophylaxis for the embolic risk is, however, unanswered. Smaller trials such as WASH (N=279) compared warfarin vs aspirin, and suggested that there was more HF hospitalization with ASA and more major bleeding with warfarin[21]. The larger WATCH trial (N=1587) evaluated warfarin, aspirin, and clopidogrel, confirmed WASH findings, but did find fewer strokes with warfarin[22]. Clopidogrel appears to be effective in reducing mortality, through an unknown mechanism.

Anticoagulation in Heart Failure in NSR – WARCEF Trial

The results of the largest trial to date on this question (WARCEF) have been presented. This trial involved 2305 patients with LVEF <35% who were randomized to ASA 325 mg/day vs warfarin (INR of 2-3.5) and followed for 3.5 years for the combined primary endpoint of death, ischemic stroke, or intracerebral hemorrhage. Overall, the primary endpoint occurred in 7.9% of patients on ASA and 7.5% of patients on warfarin with a HR of 0.93 (95% CI of 0.79-1.10). There was an interaction with duration of follow up, in that after 4 years, there appears to be an advantage in favour of warfarin, but the numbers became smaller. However, similar to the WATCH trial, there was a significant reduction in stroke (0.72%/yr vs 1.36%/yr, p=0.005) in favour of warfarin treatment. There was no difference in intracerebral hemorrhage.

Therefore, while the study is overall negative, there is room for tailoring of therapy. For those patients at greater risk for stroke, warfarin may be worthwhile. But for patients who are stable, ASA is likely the drug of choice for its safety. However, the role of the newer antithrombotic agents will need to be evaluated in the future.

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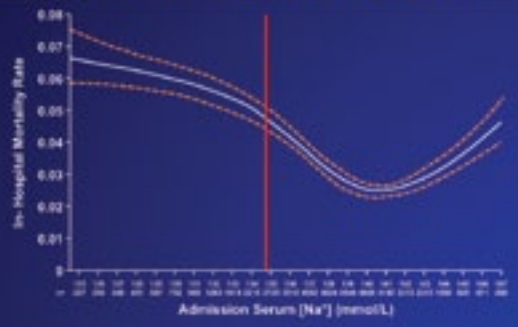
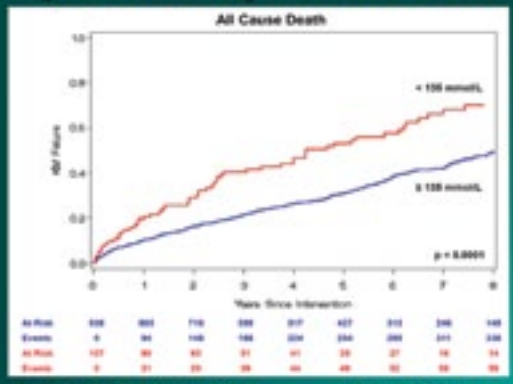
Relationship Between Serum [Na+] and In-hospital Mortality in OPTIMIZE-HF



Mean admission serum [Na+] in the total cohort was 138 ± 5 mmol/L, and 19.7% of patients had values <135 mmol/L.

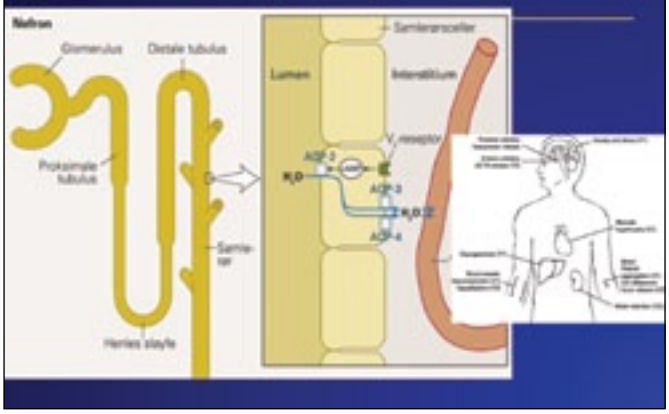
[Na] & Mortality in HF Cohort



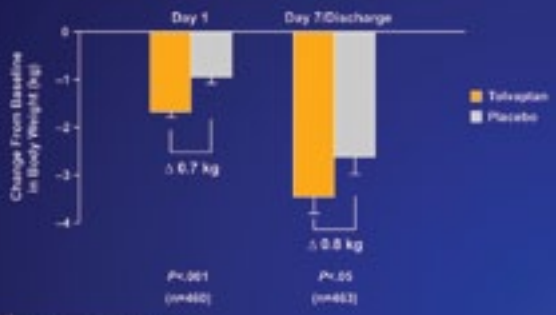
Beltaro L, et al., J Cardiac Fail 2012; 18:74-81

Duke HF Database

Action of Vasopressin



Body Weight Reduction – Hyponatremic Subgroup

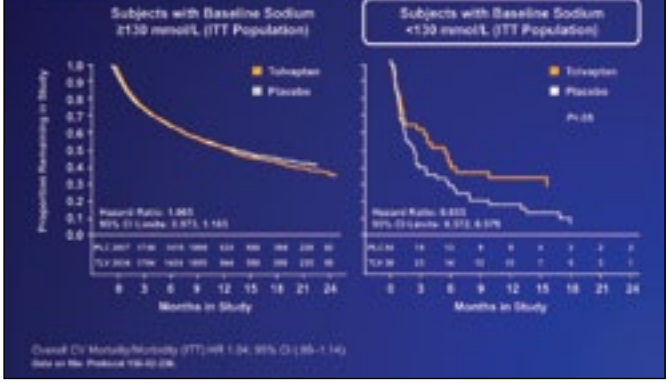


P<.001 (n=460)

P<.05 (n=463)

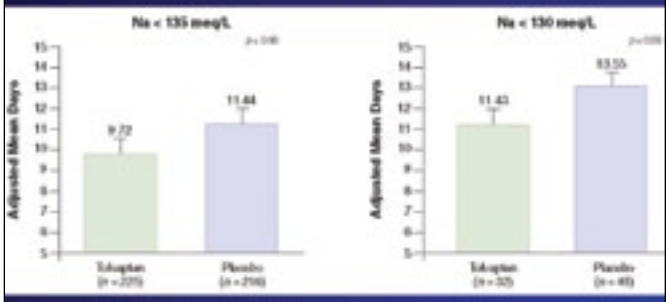
CC Analysis

CV Mortality/Morbidity in Pts with Hyponatremia (Sodium < 130 mmol/L)



Overall CV Mortality/Morbidity (ITT) HR 1.04; 95% CI (.95–1.14)

Effect of Tolvaptan Rx on Mean Lengths of Stay in Pts with Hyponatremia



EVEREST Trial of Tolvaptan vs Placebo in ADHF

Cyr PL, Haupdman PJ, et al., Am J Health System Pharm 2011; 68:328-33

Conclusions

- Hyponatremia is frequent in HF pts, and is a new major risk factor for mortality
- Hyponatremia results from release of vasopressin, leading to vasoconstriction (V1a), & water resorption & low Na (V2R)
- Hyponatremia treated by fluid restriction & reduction of diuretics, but generally ineffective
- Vasopressin antagonists have shown to be safe, well tolerated and effective in reducing body weight in HF patients, and raising serum [Na]

WARCEF 1° Results

Endpoint	Aspirin	Warfarin	HR (95% CI)	p Value
Death, Stroke or IC Bleed	320 (7.9%)	302 (7.5%)	0.93 (0.79-1.10)	0.40
Deaths	268 (6.6%)	263 (6.5%)	1.01 (0.85-1.21)	0.91
Isch Stroke	29 (0.7%)	55 (1.4%)	0.52 (0.33-0.82)	0.005
IC Bleed	5 (0.12%)	2 (0.05%)	2.22 0.43-11.66)	0.35

N = 2305 in 11 countries, FU of 3.5 years, NIH = sponsor

Homma S, et al., International Stroke Conference, 2012

Guideline for Anticoagulation in HF

Table 3. Guidelines for Antithrombotic Therapy in HF

Society	Recommendations	Evidence
ACC/AHA, 2009	Anticoagulants in patients with HF and paroxysmal or persistent AF or previous VTE	I-A
	Antiplatelet agents for MI and death prevention in patients with HF and CAD	I-B
	Anticoagulants in patients with underlying disorders that may be associated with increased VTE risk (eg, amyloidosis) and in patients with familial DCM and history of VTE in first-degree relatives	IIb-B

Tuesday, March 13

TUESDAY, MARCH 13 - 08:00-08:30 - DR DEREK EXNER

SUPRAVENTRICULAR ARRHYTHMIAS – BREAD AND BUTTER OR TOAST AND JAM

Overview

Unraveling the lexicon
- Back to the basics
- Mind your Ps and Qs

Bread and Butter
- Approach to a Wide QRS Tachycardia

Toast and Jam
- Approach to a Narrow QRS Tachycardia

Putting knowledge into action

Exner - ACC Rockies 2012

EP 101

Mechanisms

Characteristics
- Rate
- Regularity
- Morphology
  - Narrow & Wide Complex Rhythms
- P & R Relationship
  - Short & Long RP Tachycardia

Exner - ACC Rockies 2012

Classification Based on Mechanism

Impulse Formation
- Atrial tachycardia
- Atrial fibrillation
- Ventricular
- Accelerated junctional
- Digitalis toxicity
- Extrasystole

Impulse Propagation
- Atrial flutter
- Atrial fibrillation
- Ventricular tachycardia
- AV reciprocating
- AV node re-entrant
- Incisional re-entrant

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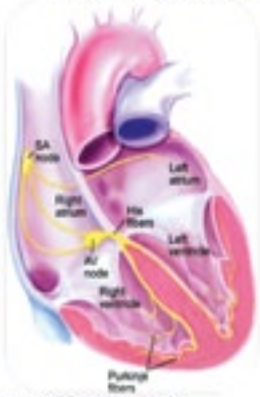
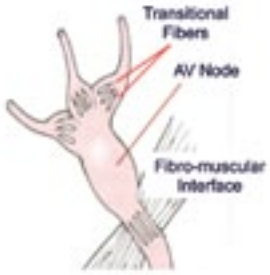
Classification Based on Anatomy





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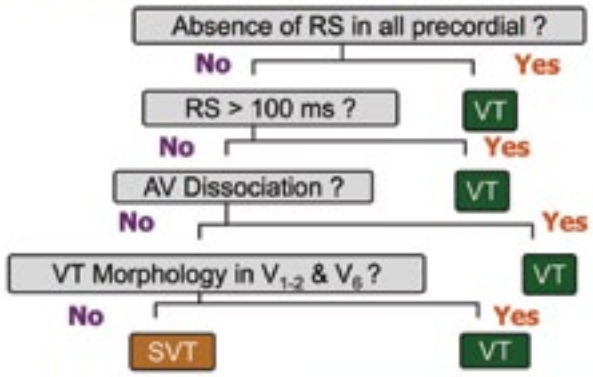
Regular Wide Complex Tachycardia



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Brugada P. Circulation **1991**;83:1649-59.

Regular WCT: Summary of Four Studies

285 consecutive stable patients (teritary care centers)

- 230 had VT (81%)
- 180 with VT had prior MI (78%)
- Regular WCT + Prior MI = VT *98% of the time*

Tchou, P et al. Am J Med, 1988
Steinman et al. JAMA 1989
Baerman JM et al. Ann Emerg Med 1987
Akhtar M et al. Ann Int Medi 1988

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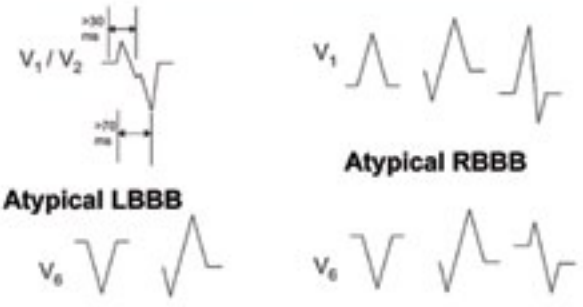
QRS Morphology

VT if morphology does NOT resemble a typical BBB



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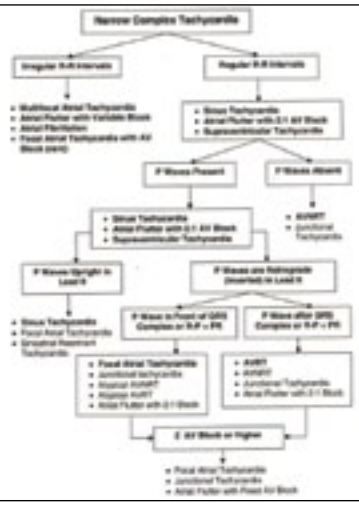
Approach to Narrow Complex Tachycardia



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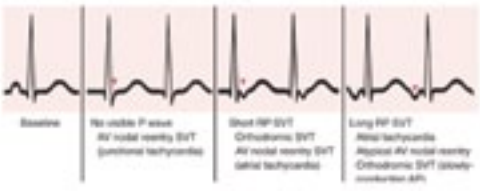
Simple Clues



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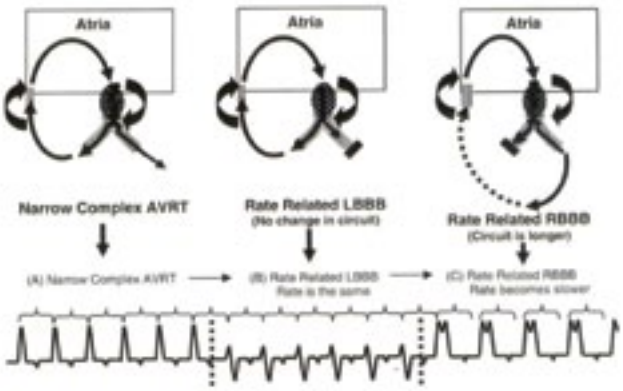
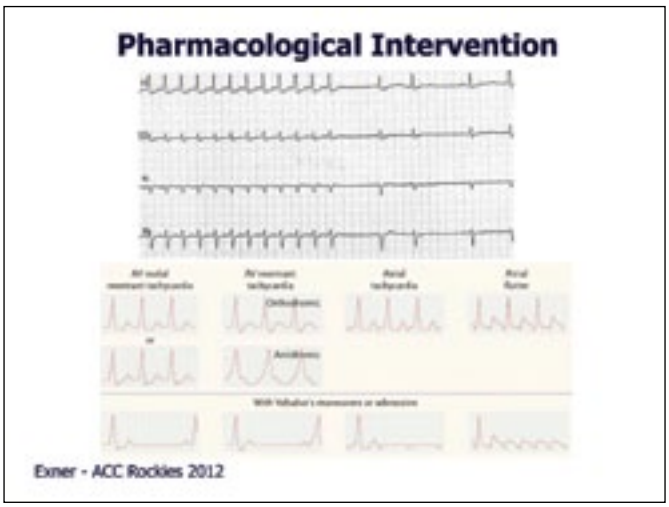
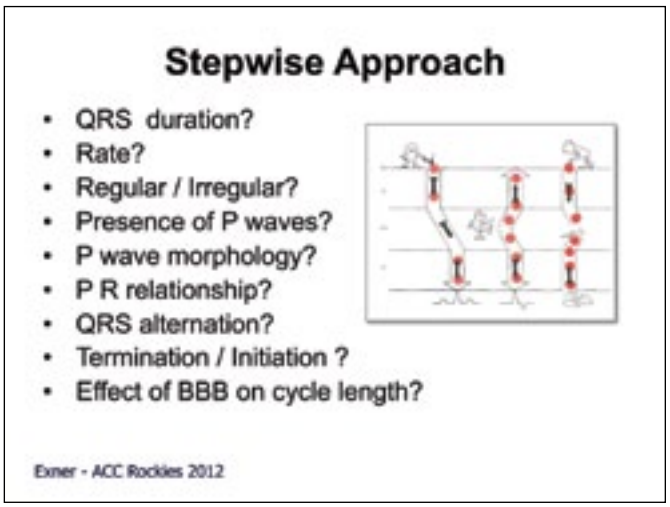


Exner - ACC Rockies 2012





TUESDAY, MARCH 13 - 08:30-09:00 - DR BRENT MITCHELL

LIVING BETTER ELECTRICALLY: WHICH ICD AND/OR CRT DEVICE FOR WHICH PATIENTS AND WHEN

Patients at risk of sudden cardiac death are best treated by optimal medical (and/or surgical) therapy for their underlying structural heart disease. When significant risk of sudden cardiac death persists, an implantable cardioverter defibrillator (ICD) is commonly recommended. The guidelines for indications for ICD therapy are complex and different in different jurisdictions. Nevertheless, simply put, an ICD is indicated in a patient with an annual risk of sudden cardiac death that warrants the potential hazards of receiving the ICD. In general, the annual risk of sudden death that often leads to recommendation to receive an ICD is on the order of 3 – 5%. Of course, ICD therapy is only appropriate when one of the goals of therapy is the prevention of sudden death.

Cardiac resynchronization therapy (CRT) refers to the use of biventricular pacing to reverse the deleterious effects of delayed left ventricular free wall contraction on overall cardiac performance. Current guidelines recognized the utility of CRT for the improvement of heart failure symptoms in patients with NYHA Class III and ambulatory NYHA Class IV symptoms. More recently, the MADIT-CRT and RAFT trials indicate that, in aggregate, CRT in patients with NYHA Class II symptoms (and perhaps patients with NYHA Class I symptoms) with left ventricular systolic dysfunction (especially LVEF ≤ 0.35) and QRS durations ≥ 0.12 sec (especially if LBBB) benefit from CRT with reversal of adverse ventricular structural remodelling, improvement in ventricular systolic function, reduction in hospital admissions for heart failure, and reduction in all-cause mortality.

There is a substantial overlap in the patient populations for which an ICD or CRT should be recommended. Accordingly, many patients are benefited by a combined device. In the absence of a current or anticipated indication for bradycardia pacing, the evidence for overall benefit from an ICD is strongest of a single chamber (VVI) ICD with efforts to avoid RV pacing. Since atrioventricular resynchronization is an important component of CRT, patient in sunus rhythm who receive a CRT device usually receive an atriobiventricular CRT platform.

ICDs and CRTs – Who, What, When

Who Should Receive an ICD?

- Patients at a annual risk of sudden death that exceeds the hazard of having an ICD
- Provided that the patient agrees with the goal of preventing sudden death
- Preferably in a scenario where use of the ICD has been proven effective in an RCT

ICDs and CRTs – Who, What, When

Who Should Receive CRT?

- Patients with symptomatic CHF, low LVEF and evidence of contractile dys-synchrony
- Unfortunately, at present, CRT response occurs in only 2/3 treated patients
- CRT is often associated with reversal of adverse LV remodelling (importance?)

ICDs and CRTs – Who, What, When

Who Should Receive CRT - Defibrillator?

- Patients with symptomatic CHF, low LVEF and evidence of contractile dys-synchrony that have an annual risk of sudden death that exceeds the hazard of having an ICD
- Provided that the patient agrees with the goal of preventing sudden death and understands that symptom improvement occurs in only 2/3 treated patients
- Preferably in a scenario where use of CRT-ICD has been proven effective in an RCT

ICDs and CRTs – Who, What, When

With Or Without an Atrial Lead?

- In the absence of a current or anticipated indication for brady pacing, ICD only pts are best treated with a VVI - ICD
- AV resynchronization is an important part of cardiac resynchronization; CRT only pts are best treated with atrio-biV CRT
- Similarily, CRT-D pts are best treated with an atrio-biV device

ICD Indications ACC/AHA/HRS (2008)

Secondary Prevention - Class I Indications

1. Cardiac arrest due to VF or VT not due to a transient or reversible cause. (Level of Evidence: A)
2. Spontaneous sustained VT in association with structural heart disease, whether hemodynamically stable or unstable (Level of Evidence: B)
3. Syncope of undetermined origin with clinically relevant, hemodynamically significant sustained VT or VF induced at EPS (Level of Evidence: B)

Secondary Prevention - Class IIa Indications

1. Syncope of undetermined origin in pts with significant LV dysfunction and nonischemic dilated cardiomyopathy (Level of Evidence: C)
2. Sustained VT in pts with normal or near-normal LV function (Level of Evidence: C)

Epstein AE et al. Circulation 117:e350-e408, 2008

ICD Indications ACC/AHA/HRS (2008)

Primary Prevention - Class I Indications

1. LVEF ≤ 0.35 due to prior MI who are at least 40 days post-MI and are in NYHA Class II or III. (Level of Evidence: A)
2. LVEF ≤ 0.30 due to prior MI who are at least 40 days post-MI and are in NYHA Class I. (Level of Evidence: A)
3. LVEF ≤ 0.40 due to prior MI with nonsustained VT and with inducible VF or sustained VT at electrophysiologic study. (Level of Evidence B)
4. LVEF ≤ 0.35 due to nonischemic dilated cardiomyopathy who are in NYHA Class II or III. (Level of Evidence: B)

Primary Prevention - Class IIa Indications

1. Outpatients awaiting cardiac transplantation (Level of Evidence: C)
2. Uncommon cardiac conditions with risk factors for sudden cardiac death. (Level of Evidence: B or C)

Epstein AE et al. Circulation 117:e350-e408, 2008

ICD Indications ACC/AHA/HRS (2008)

Secondary Prevention - Class III Indications

1. Notwithstanding indications an ICD is not indicated for patients with no reasonable expectation of survival with acceptable function for one year. (Level of Evidence: C)
3. Pts with incessant VT / VF. (Level of Evidence: C)
5. Pts with significant psychiatric illnesses that may be aggravated by an ICD or that may preclude device follow-up. (Level of Evidence: C)
6. Pts with Class IV CHF symptoms who are not candidates for cardiac transplantation or CRT-D. (Level of evidence C)

Epstein AE et al. Circulation 117:e350-e408, 2008

ICD Indications CCS Consensus (2004)

Class I Indications

1. Cardiac arrest due to VF or VT not due to a transient or reversible cause. (Level of Evidence: A)
2. Spontaneous sustained VT in association with structural heart disease. (Level of Evidence: B)
3. Syncope of undetermined origin with clinically relevant, hemodynamically significant sustained VT or VF induced at EPS when drug therapy is ineffective, not tolerated, or not preferred. (Level of Evidence: B)
4. Spontaneous sustained VT in patients who do not have structural heart disease that is not amenable to other treatments. (Level of Evidence: B)
5. Patients with ischemic heart disease ± mild to moderate CHF symptoms and LVEF ≤ 0.30, measured at least one month post-MI and 3 months post revascularization. (Level of Evidence: A)

Tang AS et al. Can J Cardiol 21:11A-18A, 2005

ICD Indications CCS Consensus (2004)

Class I Indications

1. Patients with ischemic heart disease and LVEF 0.31 – 0.35 measured at least one month post-MI and three months post-revascularization with inducible VF / sustained VT at EPS (Level of Evidence: B)
3. Patients with non-ischemic cardiomyopathy ≥ 9 months, LVEF ≤ 0.30, and NYHA Class II-III CHF. (Level of Evidence: B)
3. Patients with familial or inherited conditions such as but not limited to long QT syndrome, hypertrophic cardiomyopathy, Brugada syndrome, or ARVD, and at high risk for life-threatening tachyarrhythmias. (Level of Evidence B)

Tang AS et al. Can J Cardiol 21:11A-18A, 2005

ICD Indications CCS Consensus (2004)

Class II Indications

1. Patients with ischemic heart disease, prior MI, LVEF 0.31 – 0.35 with either no inducible VF / sust VT at EPS, or without an EPS. (Level of Evidence C)
3. Patients with non-ischemic cardiomyopathy ≥ nine months, LVEF 0.31 – 0.35 and NYHA Class II-III CHF. (Level of Evidence C)
3. Severe symptoms (e.g. syncope) attributable to sustained VT/VF while awaiting cardiac transplantation. (Level of evidence C)

Tang AS et al. Can J Cardiol 21:11A-18A, 2005

ICD Indications CCS Consensus (2004)

Class III Indications

1. Syncope of undetermined cause in a patient without structural heart disease. (Level of Evidence: C)
3. Incessant VT / VF (Level of Evidence: C)
3. VT / VF due to a transient or reversible disorder (e.g. AMI, electrolyte imbalance, trauma) or VT amenable to surgical catheter ablation (e.g. RV outflow tract VT, idiopathic LV VT) (Level of Evidence: C)

Tang AS et al. Can J Cardiol 21:11A-18A, 2005

CRT Indications ACC/AHA/HRS (2008)

Class I Indications

1. Fn Class III / IV CHF and LVEF ≤ 0.35 and QRS duration ≥ 0.12 sec in sinus rhythm. (Level of Evidence: A)

Class IIa Indications

1. Fn Class III / IV CHF and LVEF ≤ 0.35 and QRS duration ≥ 0.12 sec in atrial fibrillation. (Level of Evidence: B)
2. Fn Class III / IV CHF and LVEF ≤ 0.35 and QRS duration ≥ 0.12 sec with frequent right ventricular pacing. (Level of Evidence: C)

Class IIb Indications

1. Fn Class I / II CHF and LVEF ≤ 0.35 about to receive a pacing device with the expectation of frequent right ventricular pacing. (Level of Evidence: C)

Epstein AE et al. Circulation 117:e350-e408, 2008

TUESDAY, MARCH 13 - 09:00-09:30 - DR ANTHONY TANG

THE CURRENT STATUS OF CARDIAC RESYNCHRONIZATION

Cardiac resynchronization therapy (CRT) is an accepted therapy for patients with heart failure, left ventricular systolic dysfunction (low LV ejection fraction), and ventricular dyssynchrony (wide QRS duration) who have been treated optimally with medical therapy. Several clinical studies and randomized controlled trials have demonstrated its effectiveness in advanced heart failure and in patients with less symptomatic heart failure. These data will be reviewed in the 2012 ACC Rockies program.

The majority of the information on the effectiveness of CRT was derived from heart failure patients in sinus rhythm. However, many heart failure patients are in atrial fibrillation (AFib). These patients have high mortality and morbidity. Since these patients are in AFib, atrial pacing will not be necessary. The question is whether bi-ventricular pacing in these patients would be beneficial in reducing mortality, reducing heart failure hospitalization, and improving cardiac performance. Results from several observational studies suggest that CRT could be applied to these patients with AFib and heart failure. This will be reviewed in more detail and the RAFT data pertaining to this population will be reviewed at the 2012 ACC Rockies program.

TUESDAY, MARCH 13 - 10:30-11:15 - DR BRENT MITCHELL

ANTICOAGULATION FOR STROKE PREVENTION IN ATRIAL FIBRILLATION: A CHANGING LANDSCAPE

Atrial fibrillation is the most common sustained cardiac tachydysrhythmia and its incidence and prevalence is increasing. Atrial fibrillation increases the risk of stroke by a factor of 5, is responsible for 15-20% of all strokes, and atrial fibrillation related strokes are usually severe. Anticoagulation with adjusted dose warfarin (INR 2.0-3.0) has been demonstrated to be superior to all known anti-platelet therapies for stroke prevention in patients with nonvalvular atrial fibrillation. Nevertheless, the shortcomings of warfarin therapy, particularly its bleeding risk, have led to recommendation for its use only in patients at moderate or high risk of stroke. This risk is predicted by a number of indexes with $CHADS_2$ being recommended by the Canadian Cardiovascular Society.

Recent pivotal trials of two doses of dabigatran (RE-LY), of rivaroxaban (ROCKET-AF), and of apixaban (ARISTOTLE) have suggested that each is superior to adjusted dose warfarin in terms of efficacy (stroke prevention), in terms of safety (bleeding), or both. These trials have resulted in approval for use for stroke prevention in patients with nonvalvular atrial fibrillation of dabigatran (Pradax® or Pradaxa®) and rivaroxaban (Xarelto®) with the expectation that similar approval will shortly be forthcoming for apixaban (Eliquis®).

This presentation will compare and contrast the results of RE-LY, ROCKET-AF, and ARISTOTLE to evaluate the relative advantages and disadvantages of stroke prevention in patients with atrial fibrillation using adjusted dose warfarin (INR 2.0-3.0), dabigatran, rivaroxaban, or apixaban.

This presentation will also highlight the relevant portions of the 2012 update to the 2010 Canadian Cardiovascular Society Atrial Fibrillation Guidelines.

STROKE PREVENTION IN ATRIAL FIBRILLATION

General Observations

- AFib is an independent predictor of stroke (RR = 5)[1]
- AFib accounts for 15% - 20% of all strokes[2]
- equal risk for paroxysmal, persistent, permanent AFib
- in 1/3 AF strokes the AF is not diagnosed until after CVA
- often severe: 25% mortality, 40% bedridden, 60% disabled
- risks highest in RHD (especially mitral stenosis), with CV, and "nonvalvular" AFib with risk factors

1. AFib Invest Group Arch Intern Med 1994 2. Singer DE et al. Chest 2008

STROKE PREVENTION IN ATRIAL FIBRILLATION

Anticoagulation Therapy Generally Recommended for:

- atrial fibrillation secondary to rheumatic heart disease
- atrial fibrillation with mechanical heart valve(s)
- non-valvular atrial fibrillation with risk factors
- any atrial fibrillation with hyperthyroidism
- any atrial fibrillation for planned cardioversion
- any atrial fibrillation for transcatheter LA/PV ablation

- no distinctions made for atrial fibrillation versus atrial flutter
- no distinctions made for paroxysmal / persistent / permanent

STROKE PREVENTION IN ATRIAL FIBRILLATION

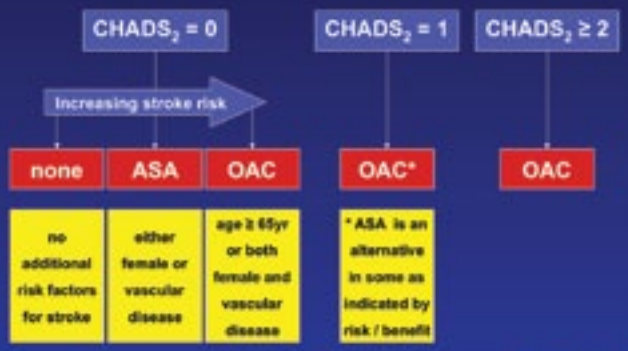
Prediction of stroke in AF: $CHADS_2$

- 1773 patients from National Registry of Atrial Fibrillation

FACTOR	POINTS
C = CHF	1
H = HT	1
A = age ≥ 75	1
D = diabetes	1
S = stroke/TIA	2

Gage BF et al. JAMA 285:2864-70, 2001

STROKE PREVENTION IN ATRIAL FIBRILLATION



CCS 2012 Update to 2010 AF Guidelines

Dabigatran (Pradax®)

Pharmacology

- pro-drug (dabigatran etexilate) packaged with tartaric acid
- bioavailability 6-8% not affected by food (20% ↓ with PPIs)
- C_{max} 1.5-3.0 hours, $T_{1/2}$ 12-17 hours, V_{dist} 60-70L
- 85% unchanged renal clearance, no interaction CYP450
- dosage reduction for CrCl 30-50 ml/min (older or female)
- ecarin CT > TT > PTT > PT(INR)
- dialyzable: no "antidote" (activated prothrombin complex)
- few drug-drug interactions
  - ↓ by P-gp inducers: rifampin, St John's Wort
  - ↑ by P-gp inhibitors: ketoconazole, verapamil, amiodarone
- no food-drug interactions

Dabigatran (Pradax®)

Clinical Use

- usual dosage is 150 mg bid
- use 110 mg bid for patients over the age of 75 years
- use 110 mg bid if CrCl 30 – 50 ml/min
- don't use if CrCl less than 30 ml/min
- transiently anticoagulated within 6 – 8 hours of first dose
- permanently anticoagulated 6 – 8 hours after second dose
- offset faster than warfarin onset (and vice versa)
- to switch start (stop) dabigatran (warfarin) at INR ~ 2.0
- no anticoagulation monitoring is otherwise required

Rivaroxaban (Xarelto®)

Pharmacology

- selective, reversible, direct Factor Xa inhibitor
- bioavailability high (90%): 20 mg dose ↑ by food
- C_{max} 2-4 hours, $T_{1/2}$ 7-11 hours, V_{dist} ~50L
- 33% unchanged renal clearance, 33% CYP 3A4 or 5 / 2J2
- dosage reduction for CrCl 30-50 ml/min (older or female)
- Factor Xa activity > PTT > PT(INR)
- not dialyzable: no "antidote" (activated prothrombin complex)
- some drug-drug interactions
  - CYP 3A4 and / or P-gp
  - ketoconazole, rifampin, some anticonvulsants, St John's Wort
- grapefruit juice is CYP 3A4 inhibitor

Rivaroxaban (Xarelto®)

Clinical Use

- usual dosage is 20 mg od
- no age warnings other than to watch CrCl
- use 15 mg od if CrCl 30 – 50 ml/min
- don't use if CrCl less than 30 ml/min
- don't use in setting of significant hepatic disease
- transiently anticoagulated within 6 – 8 hours of first dose
- permanently anticoagulated 6 – 8 hours after second dose
- offset faster than warfarin onset (and vice versa)
- to switch start (stop) rivaroxaban (warfarin) at INR ~ 2.0
- no anticoagulation monitoring is otherwise required

Apixaban (Eliquis®)

Pharmacology

- selective, reversible, direct Factor Xa inhibitor
- bioavailability moderate (66%); effect of food?
- C_{max} 0.5-2 hours, $T_{1/2}$ 8-15 hours, V_{dist} ~25L
- 30% unchanged renal clearance, 70% CYP 3A4
- dosage reduction for two of ≥ 80 years, ≤ 80 kg, Cr ≥ 133um/L
- Factor Xa activity > PTT > PT(INR)
- not dialyzable?: no "antidote" (activated prothrombin complex)
- some drug-drug interactions
  - CYP 3A4 and / or P-gp
  - ketoconazole, rifampin, some anticonvulsants, St John's Wort
- grapefruit juice is CYP 3A4 inhibitor

Apixaban (Eliquis®)

Clinical Use

- usual dosage is 5 mg bid
- use 2.5 mg bid if two of ≥ 80 yrs, ≤ 80 kg, Cr ≥ 133 um/L
- don't use if CrCl less than 25 ml/min
- don't use in setting of significant hepatic disease
- transiently anticoagulated within 6 – 8 hours of first dose
- permanently anticoagulated 6 – 8 hours after second dose
- offset faster than warfarin onset (and vice versa)
- to switch start (stop) apixaban (warfarin) at INR ~ 2.0
- no anticoagulation monitoring is otherwise required

ATRIAL FIBRILLATION – STROKE PREVENTION

CCS 2012 Update to 2010 AF Guidelines

We suggest that when oral anticoagulation therapy is indicated,

most patients should receive dabigatran, rivaroxaban, or apixaban*

in preference to warfarin (CR, HQE).

CCS 2012 Update to 2010 AF Guidelines

STROKE PREVENTION IN ATRIAL FIBRILLATION

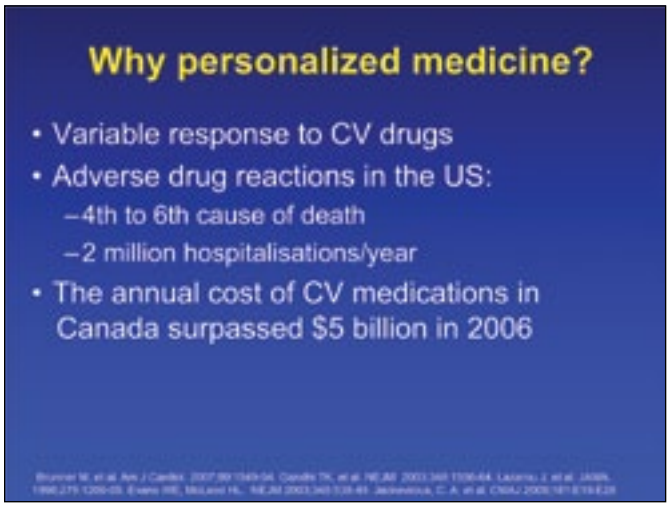
Possible Differentiators – A Personal Viewpoint

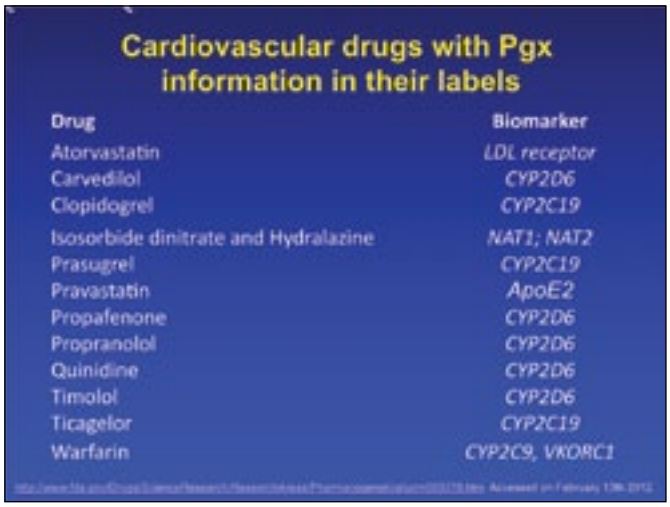
	D110	RIVARO	APIXA	D150
renal failure	no	no	no	no
once daily	no	yes	no	no
most effective	no	no	no	yes
least bleeding	no	no	yes	no
prevent TE stroke	no	no	no	yes
mortality benefit	no	no	yes	yes
GI Upset	yes	no	no	yes

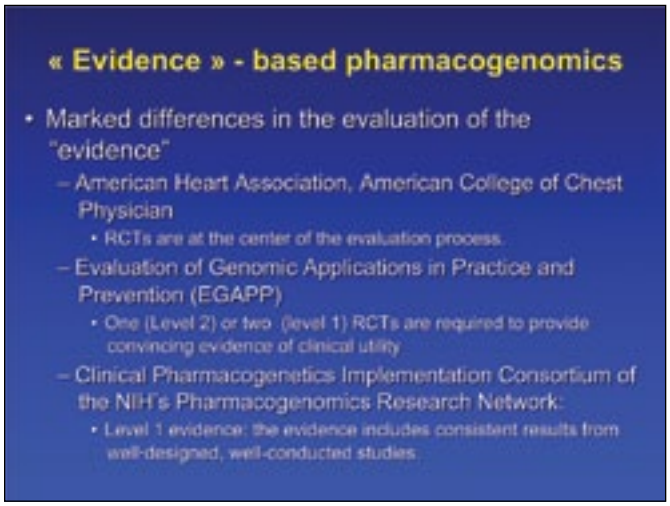
TUESDAY, MARCH 13 - 11:15-11:45 - DR SIMON DE DENUS

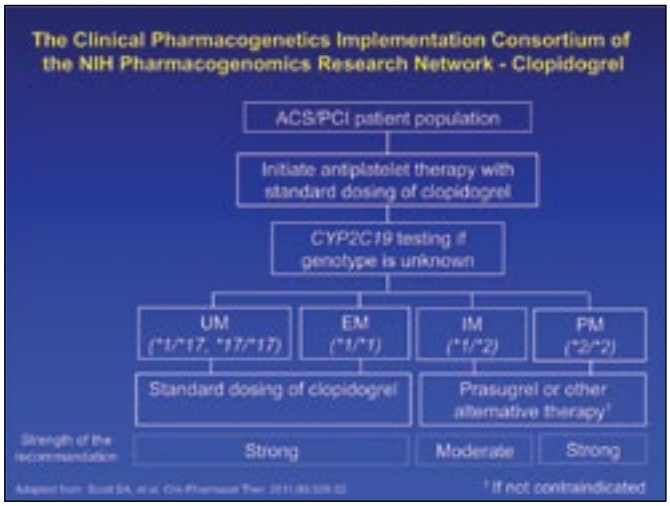
PHARMACOGENOMICS IN CARDIOVASCULAR DISEASES: READY FOR PRIME TIME?

It is currently difficult for clinicians to precisely identify patients most likely to benefit or to experience adverse drug reactions from specific drugs. Hence, the initiation of a pharmacological treatment is primarily based on the efficacy and safety of the drug in a given population and only to a limited extent based on an individual's potential risks and benefits. The field of cardiovascular pharmacogenomics aims to identify genetic predictors of drug response with the ultimate objective to give the right drug, at the right dose, to the right patient at the right time.









TUESDAY, MARCH 13 - 12:15-14:45 - DR BRENT MITCHELL, DR JOHN CAIRNS

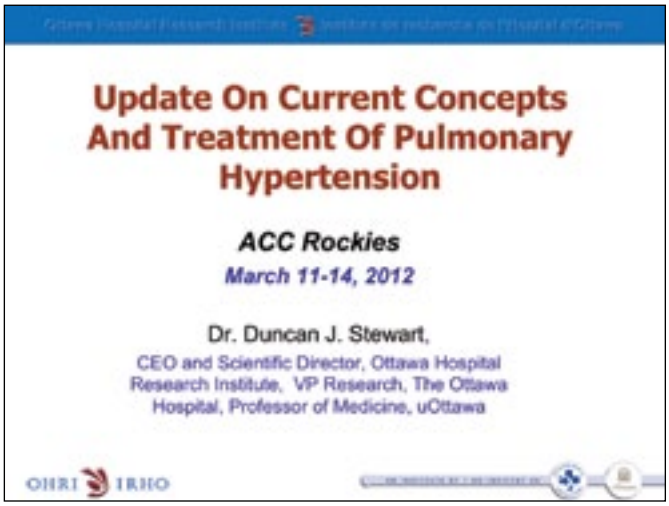
THE CANADIAN CARDIOVASCULAR SOCIETY - ATRIAL FIBRILLATION GUIDELINES INTERACTIVE WORKSHOP

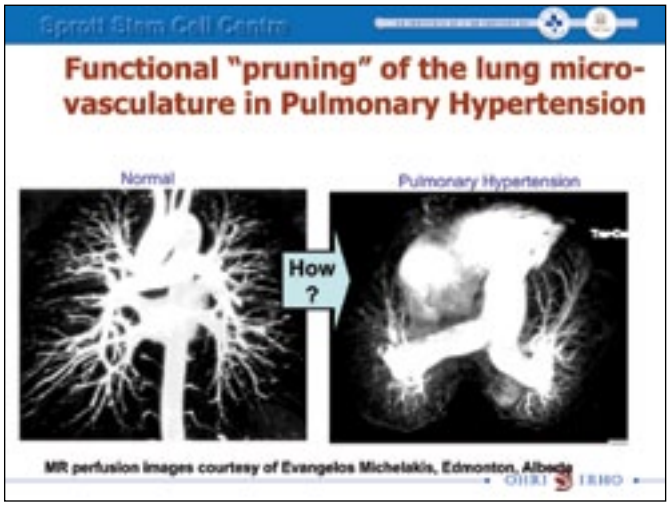
During this interactive Workshop, Drs. Cairns and Mitchell will first briefly review new information which has been published since the 2010 CCS Guidelines and which was the basis for the 2012 Update process and modified recommendations. They will then explore the management of patients using several cases which will illustrate application of the CCS Guidelines and the challenges of everyday management of Atrial Fibrillation.

TUESDAY, MARCH 13 - 15:00-15:30 - DR DUNCAN STEWART

UPDATE ON CURRENT CONCEPTS AND TREATMENT OF PULMONARY HYPERTENSION

Pulmonary arterial hypertension (PAH) remains a therapeutic challenge despite some progress in the last two decades. Although a number of classes of pharmaceutical agents have been successfully introduced for the treatment of PAH, including prostacyclins, endothelin receptor antagonists, and phosphodiesterase inhibitors, their efficacy is modest and most patients will progress to refractory right heart failure, with a 5-year survival of less than 50%. A lack of understanding about the fundamental mechanisms underlying the initiation and progression of PAH has hampered the development of truly effective new treatments. This presentation will provide an update on new concepts concerning the pathogenesis of this disease, linking the recently identified mutations in the *Bmpr2* gene to changes in vascular cell survival and proliferation. Next generation therapies based on these new ideas will be discussed, including progenitor cells to enhance lung vascular repair and regeneration and the use of tyrosine kinase inhibitors to reverse abnormal cell growth and proliferation.





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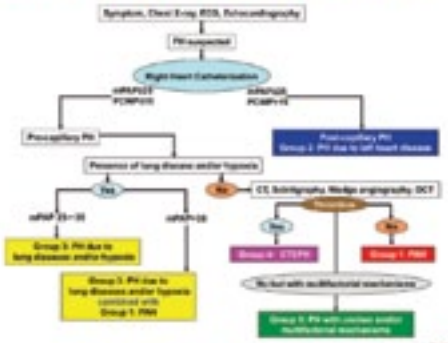
Work up of a PAH patient



OHRI IRMO

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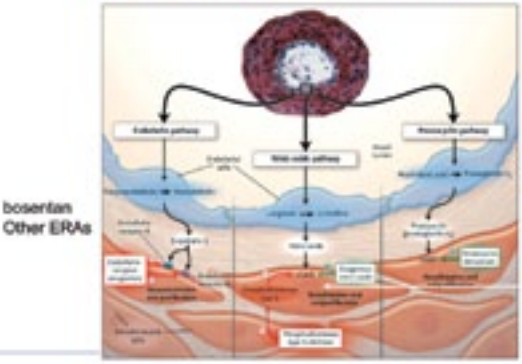
PAH therapies today ...



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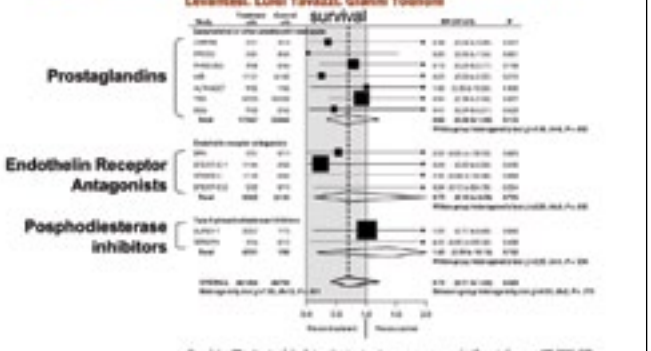
A meta-analysis of trials of pulmonary hypertension: A clinical condition looking for drugs and research methodology

Alejandro Macchia, Roberto Marchioli, RosaMaria Marfisi, Marco Scarano, Giacomo Levantesi, Luisi Tavazzi, Gianni Tognoni



American Heart Journal, Volume 153, Issue 6, June 2007, Pages 1037–1047

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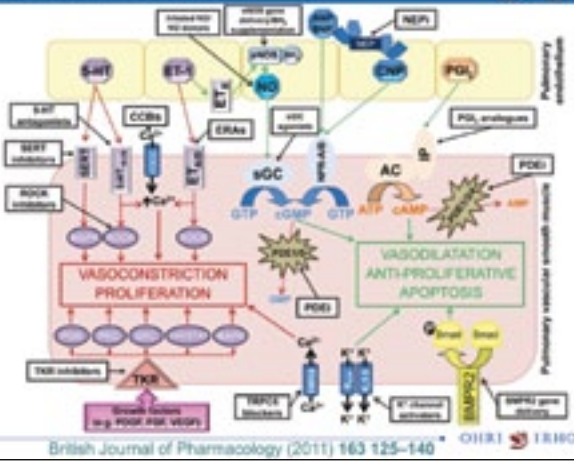

British Journal of Pharmacology (2011) 163 125–140

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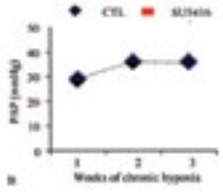
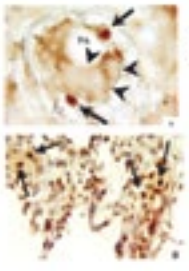
The Hypoxia-SU5416 Model of Severe PAH is Dependent on EC Apoptosis

Effect of VEGF receptor antagonist (SU5416)





Effects of SU5416 reversed by z-ASP

Taraseviciene-Stewart et al. FASEB J. 15:427,2001

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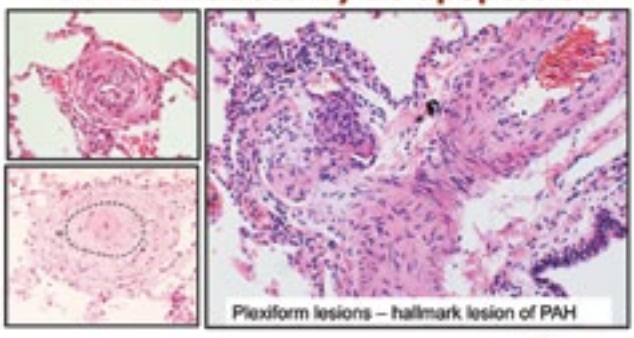
Can the characteristic lesions of PAH be induced by EC apoptosis?



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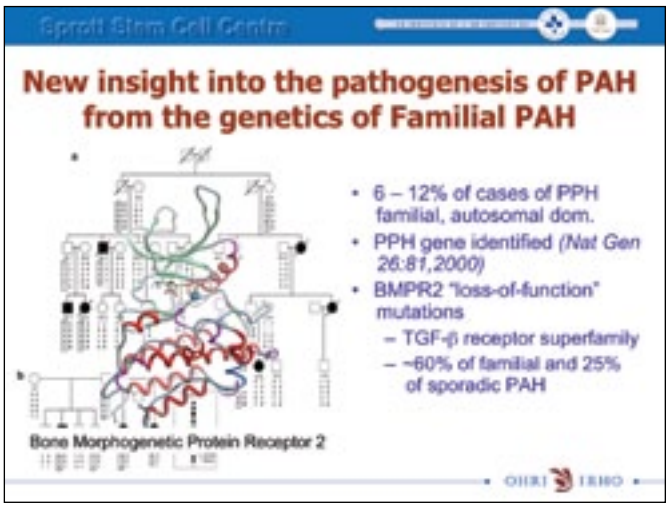
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New insight into the pathogenesis of PAH from the genetics of Familial PAH
• 6 – 12% of cases of PPH familial, autosomal dom.
• PPH gene identified (Nat Gen 26:81,2000)
• BMPR2 "loss-of-function" mutations
– TGF-β receptor superfamily
– ~60% of familial and 25% of sporadic PAH
Bone Morphogenetic Protein Receptor 2
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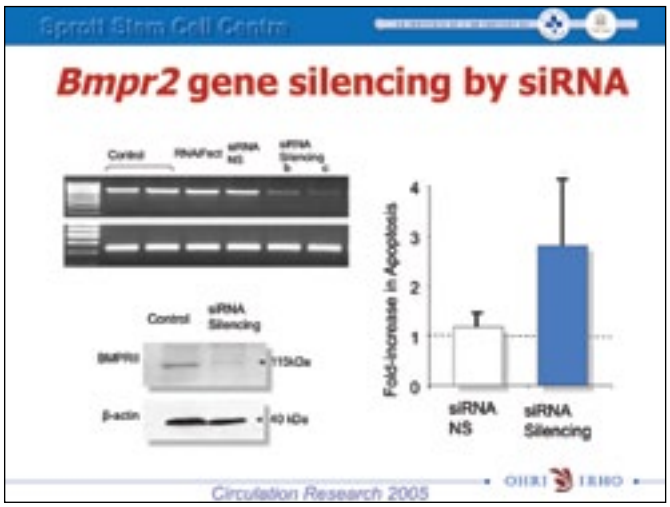
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Bmpr2 gene silencing by siRNA
Control
siRNA Silencing
BMPRII
β-actin
Fold-increase in Apoptosis
siRNA NS
siRNA Silencing
Circulation Research 2005
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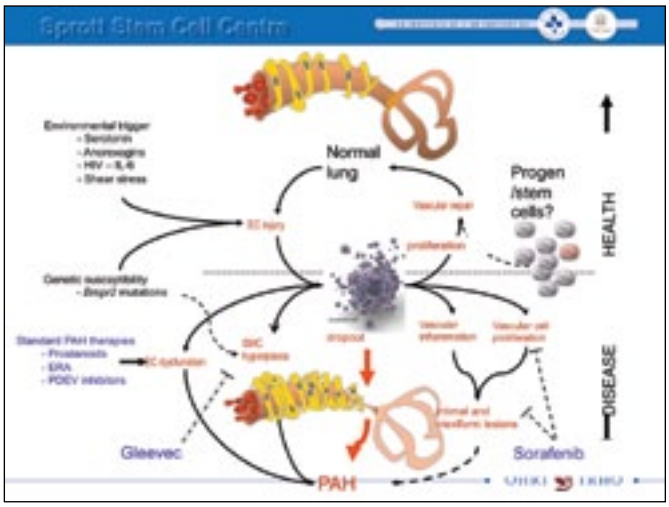
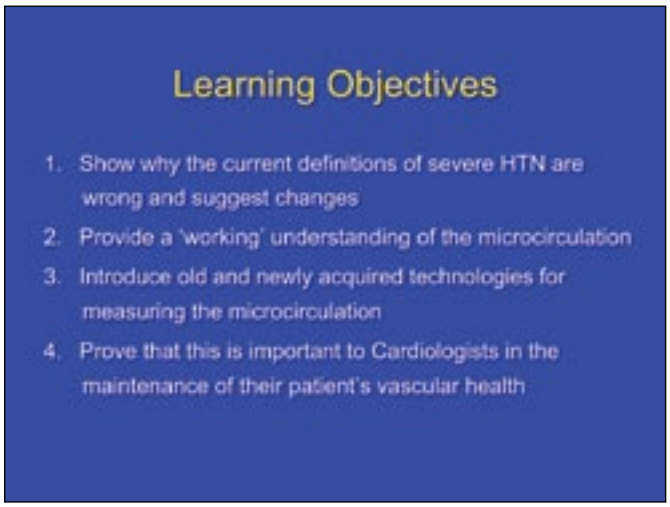
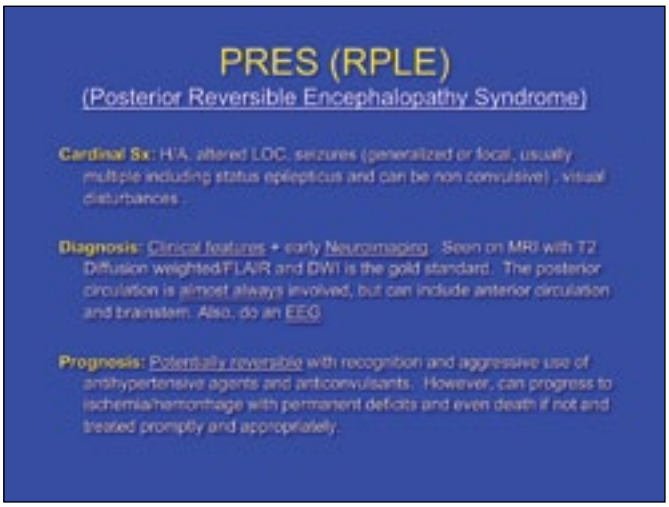

Sprott Stem Cell Centre
Normal lung
Progen /stem cells?
HEALTH
DISEASE
Gleevec
Sorafenib
PAH

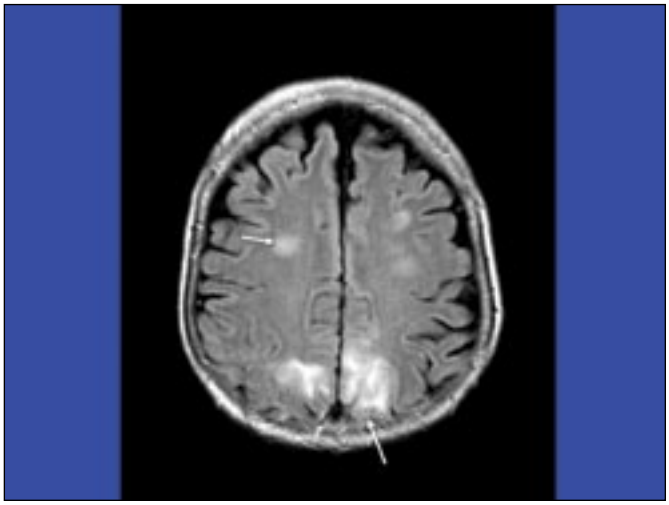
TUESDAY, MARCH 13 - 15:30-16:00 - DR ROBERT HERMAN

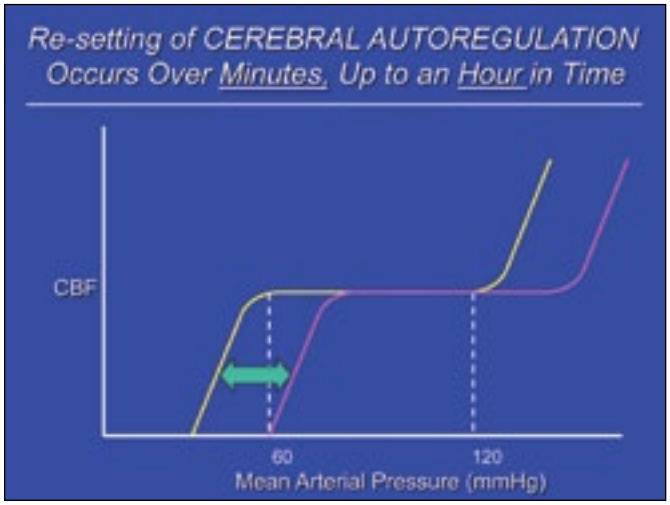
REASSESSING THE DEFINITION AND TREATMENT OF SEVERE HYPERTENSION

The macrovascular consequences of hypertension, including stroke, coronary and peripheral arterial disease, and aortic aneurism/dissection, are well known and there is substantive clinical trial evidence to guide management. However, recognition of the consequences of a failed microcirculation, namely hyperperfusion/hyperfiltration injury with edema formation and the micro-vasculopathies of diseases such as chronic renal failure and dementia that frequently accompany longstanding, severe hypertension, have received much less attention. Posterior reversible encephalopathy syndrome (PRES) is an acute, life-threatening neurologic disorder associated with vasogenic cerebral edema. For most patients, PRES is synonymous with hypertensive encephalopathy and is due to a breach in the autoregulatory control of cerebral blood flow resulting from elevated systemic pressures. However, hypertensive encephalopathy with PRES can occur in patients with only modest absolute elevations in BP, particularly if the baseline BP is low or the rise in pressures is rapid. PRES has also been described in other conditions such as sepsis, autoimmune disease, and following administration of various (cisplatin- and cyclophosphamide-based) cytotoxic and immuno-modulatory (calcineurin and VEGF inhibitors) agents where BP is not infrequently normal or even low. What is important to recognize is that 1) the clinical and radiological features and the outcomes of patients with PRES are identical whether the BP is 120/80 or 320/170 at the time of the event, and 2) even in patients with PRES where the BP is low, pressure is still the key driving force moving intravascular fluid out into the brain. Thus, PRES is a cogent example of hypertensive injury to the microcirculation and our understanding of this relatively common clinical presentation leads us to conclude that new definitions are needed to define hypertensive crises so that physicians recognize and appropriately manage all types of hypertensive microvascular injury.









Systematic Review of All Cohort Studies and Case Reports of Hypertensive PRES 2005-2011

149 HTN	MAP PRES	MAP Baseline	Delta MAP	Median Delta MAP
Mean	147	100	37	38
95% CI	143-150	93-106	31-45	
BP equiv	205/118 (200-209/114-121) from an ↑ baseline **BP**			

ASSESSMENT OF SEVERE HYPERTENSION

1. **Is there evidence of critical organ damage?**
2. **Has there been a blood pressure elevation high enough and long enough to account for that organ injury?**
3. **What was the patient's baseline BP in the days or weeks prior to the event?**
4. **Has the BP been poorly controlled for any length of time in the past?**

TOD Indicative of a Hypertensive Emergency

Major Criteria	Supporting Evidence
Hypertensive encephalopathy/PRES	Proteinuria/microalbuminuria
Acute stroke - ischemic/hemorrhagic	Thrombocyopenia
Acute coronary syndrome	Schistocytosis
Acute LV dysfunction/pulmonary edema	Elevated LDH
Acute aortic dissection	Elevated Urate
Acute renal failure	Coagulopathy
Pregnancy + symptoms of PRES	Fx impairment of any other organ
Pregnancy + HELLP syndrome	Significant troponin leak
Pregnancy + capillary leak (↑ BP not req'd)	P_{max} and PWD on ECG
Intractable bleeding	Pressure Natriuresis
Syndromes of catecholamine excess	

A Severe BP Rise Should be Defined:

a) In all patients, as a persistent rise in MAP of greater than 30-45 mmHg over baseline MAP, or if baseline MAP is not known, above an MAP of 90 mmHg developing over the course of several hours to days, or a rise in MAP of 40-60 mmHg lasting longer than 1 hour.

b) In patients with sepsis/SIRS or those receiving immune modulating or cytotoxic chemotherapy that potentially impair cerebral autoregulation or vascular permiability, BP elevations less than these levels may similarly cause a hypertensive emergency.

Wednesday, March 14

WEDNESDAY, MARCH 14 - 08:00-10:30
DR JUSTIN EZEKOWITZ, DR ANIQUE DUCHARME

THE CANADIAN CARDIOVASCULAR SOCIETY – HEART FAILURE GUIDELINES INTERACTIVE WORKSHOP

Session description

Celebrating 7 years of continued collaboration with the Annual Cardiovascular Conference in the Rockies, Dr. Anique Ducharme and Dr. Justin Ezekowitz welcome the opportunity to present this highly interactive, case-based heart failure extended workshop which focuses on challenging issues of heart failure in a background of varied clinical settings, providing delegates with practical and solutions driven patient-based approaches to heart failure management.

The workshop will offer a mix of didactic review supported by interactive case-based clinical vignettes and cases, calling on audience participation via audience response system (touchpads).

Topics to be addressed include use of BNP, cardiorenal syndrome and heart failure, mechanical circulatory support, and end of life heart failure management.

Learning objectives

- Describe and review evidence-based application of BNP in the diagnosis and management of patients with heart failure
- Review optimal management of heart failure patients with a cardiorenal syndrome
- Discuss opportunities and challenges of mechanical circulatory support options for heart failure patients – when, what, where, how long
- Recognize the importance of end of life management in heart failure

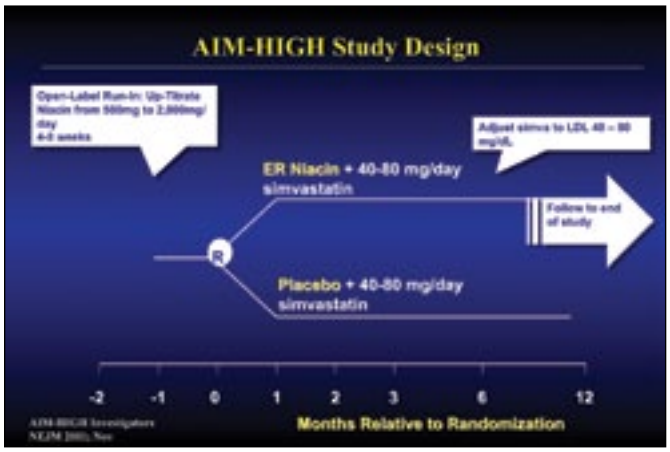
WEDNESDAY, MARCH 14 - 10:45-11:30
DR TODD ANDERSON, DR JACQUES GENEST, DR ROBERT WELSH

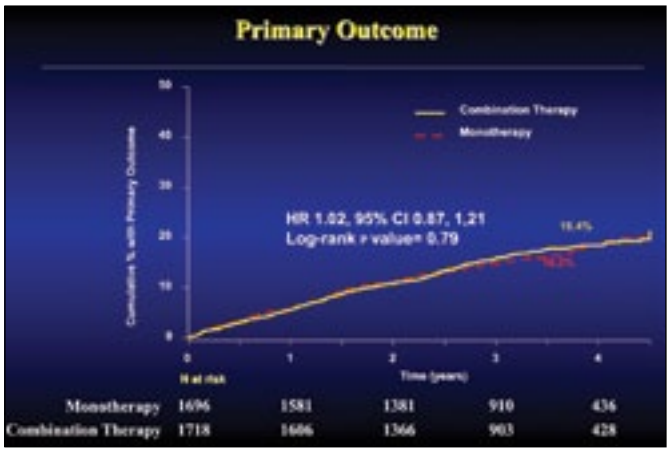
KEY CARDIOVASCULAR LATE-BREAKING TRIALS 2011-12

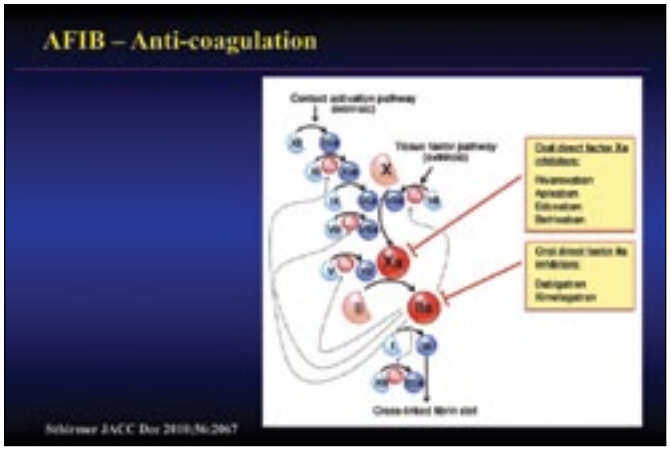
Clinical trial activities in cardiology remain very active. Some of the highlights of studies presented at the most recent European Society of Cardiology and American Heart Association will be presented. As is often the case, these trials have the potential to dramatically change clinical practice, particularly if they show benefit or harm from a therapy. Neutral studies also direct our care. The long awaited AIM-HIGH study was published and presented at the AHA. It was a relatively small study in a highly select phenotype of subjects with vascular disease with very well treated LDL (1.5-1.6 mmol/L) and a metabolic syndrome type phenotype. A significant number had diabetes. They had to have low HDL and higher triglyceride levels. On top of optimal LDL lowering, the study demonstrated that the addition of Niaspan 1500-2000 mg per day did not decrease cardiovascular outcomes. This was surprising given previous work with niacin, however in those studies, LDL was at much higher levels. This study is only applicable to that small proportion of subjects with long standing excellent treatment of LDL and a metabolic syndrome phenotype. The HPS-2 Thrive study will evaluate a much larger cohort with more general lipid values.

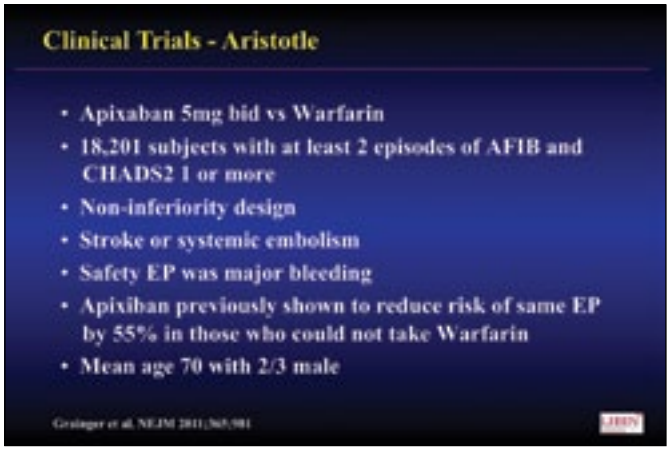
Much work is ongoing with the new oral anti-coagulants in both AFib and coronary disease. The Aristotle study was presented at the ESC in Sept 2011. In a large cohort of subjects with AFib and a $CHADS_2$

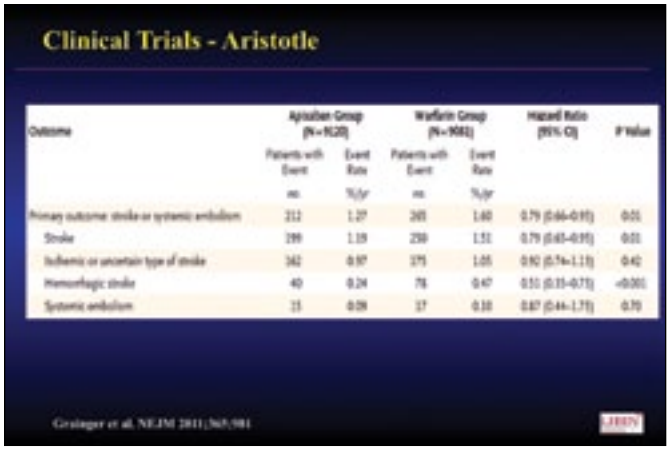
risk score of 1 or more, the new oral Xa inhibitor, apixaban, was not inferior to warfarin (HR 0.79) for the stroke/embolism end-point. It was also associated with a decreased rate of bleeding complications. This study adds very nice data to that previously published with the other two newly available oral anti-coagulants. The Atlas- TIMI 51 study evaluated the addition of rivaroxaban to standard therapy in ACS for a mean duration of 13 months. There was a reduction in the triple endpoint of CV death, MI, or stroke (HR 0.84), including a reduction in death from any cause in the 2.5 mg bid dose (2.5 and 5 mg bid doses studied). These trials bring new information to our use of anti-platelet and anti-coagulant therapies in cardiovascular conditions. Other studies published over the past year will be presented as well.

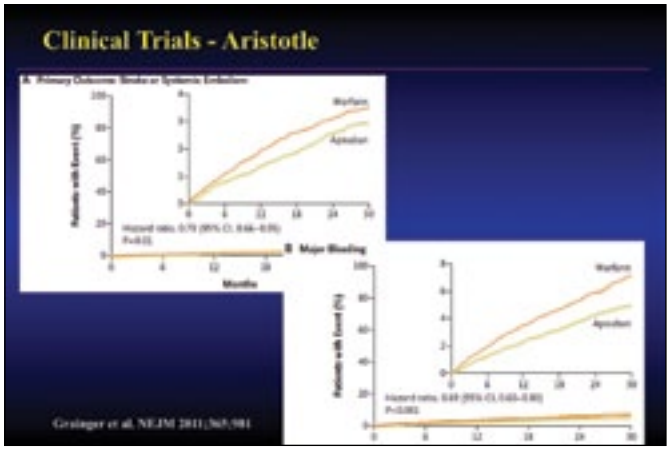










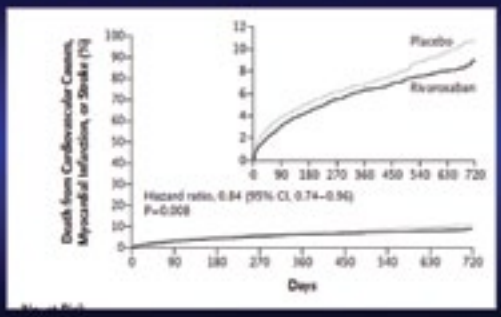


Clinical Trials – Atlas TIMI 51

- Rivaroxaban 2.5 or 5 mg bid vs placebo
- 15,526 ACS patients for mean of 13 months
- Primary EP of CV death, MI or stroke
- Mean age 61
- 50% STEMI and 60% had PCI or CABG with index event
- >90% on ASA and Plavix

Mega et al. NEJM 2011;365 (Nov 2011)

Clinical Trials – Atlas TIMI 51



Mega et al. NEJM 2011;365 (Nov 2011)

Clinical Trials – Atlas TIMI 51

End Point	Rivaroxaban			Placebo
	2.5 mg Twice Daily	5 mg Twice Daily	Combined	
	number (percent)			
Efficacy				
Death from cardiovascular causes, myocardial infarction, or stroke — primary end point	313 (5.1)	313 (5.0)	626 (5.0)	376 (6.0)
Death from cardiovascular causes	94 (1.7)	132 (2.5)	226 (2.1)	143 (2.7)
Myocardial infarction	205 (3.7)	179 (3.3)	384 (3.5)	229 (4.4)
Stroke				
Any	46 (0.8)	54 (1.0)	100 (0.9)	45 (0.8)
Ischemic	39 (0.8)	35 (0.7)	65 (0.7)	34 (0.7)
Death from any cause, myocardial infarction, or stroke — secondary end point	328 (5.3)	322 (5.1)	641 (5.2)	386 (7.3)
Death from any cause	195 (3.3)	142 (2.4)	345 (2.7)	211 (3.7)
Stent thrombosis	47 (1.2)	51 (1.3)	98 (1.3)	72 (1.9)
	(No=3,113)	(No=3,110)	(No=10,225)	(No=3,125)
Safety				
TIMI major bleeding not associated with CABG	65 (1.0)	82 (1.4)	147 (1.2)	19 (0.6)

Mega et al. NEJM 2011;365 (Nov 2011)

Increased IC bleeding 0.6 vs 0.2 %

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Notes

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