

Interventional Cardiology 2010  
25<sup>th</sup> Annual International Symposium  
Snowmass Village, CO March 7-12, 2010

The 25<sup>th</sup> annual Snowmass interventional cardiology meeting was held March 7-12, 2010. During this time 106 faculty from 19 countries presented papers on topics including coronary artery disease, structural heart disease, electrophysiology and peripheral vascular disease. This meeting is unique in its organization in that scheduling is by country as opposed to topic. Members of the scientific committee are charged with the task of choosing faculty and topics that are special to the expertise and research interests within each country. Over the years this has led to the presentation of continually fresh material, introduction of new faculty including rising (but unknown) superstars and a global perspective on the subspecialty of interventional cardiology. It has also created a spirit of competition between the various countries with each striving to outdo the others. Most interesting is how people in various countries with different social imperatives and economic capabilities approach similar problems from dissimilar angles, yet generally wind up with the similar results. In keeping with the spirit of the meeting, the talks are reviewed by country.

**Australia/New Zealand Session**

**Chronic Total Occlusions: Another Way Forward** *Mark Pitney, MD Australia*

Dilate entrance into false channel; bring patient back in four weeks for definitive procedure.

**Very Late Changes Seen 17 Years after Coronary Balloon Angioplasty: A Serial Quantitative Angiographic Study** *Patrick Kay, MD New Zealand*

Regression of stenosis and improvement in MLA between one and five years, and slow progression after five years.

**Is there an Obesity Paradox in Patients Undergoing PCI?** *David J. Clark, MBBS Australia*

Obese patients have better prognosis post PCI; ultra high-risk group is underweight patients.

**Assessment of Diastolic Function and Conduction Abnormalities after CoreValve** *Darren Walters, MD, MPhil Australia*

Diastolic function may improve rapidly following TAVR as evidenced by reduction in LA volume seen in this patient cohort. Changes are sustained out to 1 year follow-up. LA Volume measurement could emerge as a simple and important tool for assessment of patient response to TAVI Surveillance guide for follow up.

**American Session I**

**Congenital Cardiac Anomalies and their Therapy** *Thomas Knickelbine, MD*

Second greatest cause of sudden death in young athletes. RCA from left coronary sinus is most common anomaly by CT angiography.

**Mini-symposium on PFO**

**PFO, a Neurologist's Viewpoint: Who should be Closed?** *Peter J. Goadsby, MD, PhD*

MIST trial was completely negative (an opinion with which I hardily disagree); Dr. Goadsby has never sent a migraine patient for PFO closure.

### **Closing the PFO Tunnel: The Coherex Flatstent** *Brian Whisenant, MD*

The Coherex FlatStent is a low mass, minimally invasive, in-tunnel, PFO specific device. Growing experience suggests PFO closure with the Coherex FlatStent is safe and effective. New clinical investigations underway: Sleep apnea registry; migraine registry; migraine study,

### **Columbia Symposium**

#### **Ultra-low Contrast: A Novel Approach to PCI that uses Little or No Contrast** *Paul S. Teirstein, MD*

Ultra-low Contrast Angiography: Low Tech – High Success

3 cc contrast syringe – 6 Fr guide if possible; biplane angiography if available; avoidance of left ventriculography; liberal use of road-mapping; “no dye without the cine’s eye;” pre-intervention = 2cc; post wire placement = 1 cc; stent placement – 1cc x 3 = 3 cc; post-intervention – 2 cc; total contrast = 8 cc; liberal use of IVUS; keep catheter “flushed;” “back-bleed” contrast during procedure.

#### **The Value of PCI (vs. CABG and Medical Rx) in Chronic Angina** *Jeffrey W. Moses, MD*

How Should You Assess and Treat CAD? Evaluate symptoms and likelihood for CAD; evaluate ischemia; obtain anatomic delineation of all positive studies or very high likelihood patients (CTA and/or Cath); revascularization is clearly preferred for moderate to severe symptoms, moderate to severe ischemia or hemodynamically significant lesions in critical locations (and can be offered as an alternative to all others without an increase in death and MI).

#### **Second Generation DES (Endovascular/Resolute and Xience/Promus) are Safer and More Effective than First Generation DES** *Martin B. Leon, MD*

Unlike BMS technologies, DES are uniquely differentiated with active/dynamic properties resulting in both early and late clinical effects (adjust for delayed time horizons – both safety and efficacy); different anatomies, lesion subsets, and patient factors influence DES clinical outcomes (e.g. diabetics, AMI pts, etc.); despite some of the past “negative press”, the anti-restenosis impact of DES is dramatic when system design induces optimal vascular biology reactions for a given anatomy; advanced 2<sup>nd</sup> generation DES technologies with improved deliverability and more biocompatible drug carriers with optimized drug dosing/kinetic release patterns are clearly preferred. *Honestly, other than for cost reasons, I can't imagine why anyone would currently use a 1<sup>st</sup> generation DES!!!*

### **Washington Hospital Center Symposium**

#### **FFR/IVUS Correlations** *Itsik BenDor, MD*

Anatomic parameters of intermediate coronary lesions obtained by IVUS showed a moderate correlation to the FFR values in medium and large vessel diameters. IVUS cut-off parameter for ischemia: Left main; MLD <2.8mm and MLA <6 mm<sup>2</sup>; major epicardial coronary artery changes with reference vessel diameter and MLA <4 mm<sup>2</sup> does not always imply physiological ischemia. In patients with MLA >4mm<sup>2</sup> the cardiac event rates are low. Treatment decisions based on FFR measurements are associated with excellent clinical outcomes (FAME, DEFER). IVUS has a role in treatment decision beyond detecting ischemia (positive remodeling, plaque burden, TCFA).

#### **PPI-Plavix Interaction: Outcomes on a few Thousand Patients** *Ron Waksman, MD*

Scientific basis – yes; *Ex – vivo* evidence – yes; no direct effect; rare thrombocytopenia; most observational studies indicate PPI effect, except those with propensity adjustments; randomized trial analyses do not indicate PPI effect; experts split; FDA appropriately cautious; providers confused.

### **Tailoring Antiplatelet Therapy in DES** *Laurent Bonello, MD*

Platelet reactivity monitoring is not only feasible but also clinically beneficial; platelet reactivity monitoring together with new agents have the potential to greatly improve the outcome by enabling tailored therapy to decrease ischemic events without increasing bleedings.

### **Update on Bioabsorbable Stents** *Ron Waksman, MD*

Early results in both coronary and peripheral vessels are encouraging, but formulation, drug concentration, coating, etc. all affect performance.

### **Optimal Stent Deployment Principles Learned with IVUS** *Ron Waksman, MD for Gus Pichard*

“Bigger is better” is valid in drug eluting stents. A minimum area > 5.5 mm<sup>2</sup> is associated with less restenosis and less thrombosis. A fully expanded balloon does not insure that the stent is fully expanded. High pressure is required for full stent expansion. Optimal stent expansion can only be proven with IVUS. Non-compliant balloon required for rigid plaques. IVUS guidance allows for exact definition of lesion length. Optimal stenting is much more likely. IVUS detects unsuspected calcification that would lead to unexpanded stents. IVUS allows: Optimal planning and outcome of stenting in ostial and bifurcation lesions. This results in less chance of restenosis and/or thrombosis. These concepts derived from IVUS data lead to better understanding, diagnosis and treatment of coronary lesions. These concepts also allow for better prognostic predictions based on plaque morphology.

### **Pudendal Artery Stenting for Patients with Erectile Dysfunction: the ZEN trial** *Krishna Rocha-Singh, MD*

1 in 10 in the general population >45 yrs old have ED. Up to 75% of men with CAD have ED. Erectile dysfunction not responsive to PDE-5 inhibitors may be due to severe IPA disease. ZEN study will evaluate the safety and efficacy of the Medtronic Zotarolimus-Eluting Peripheral Stent System to improve erectile function in males with sub-optimal response to PDE5i.

### **RF Ablation to Cure Systemic Hypertension** *Krishna Rocha-Singh, MD*

Percutaneous, catheter based, therapeutic renal sympathetic denervation is simple and safe. Significant and sustained reductions in blood pressure were achieved in patients with multi-drug resistant hypertension. No significant decline in (and suggestion of preservation of) renal function with renal denervation. Prospective RCT data required to definitively determine the role of this therapy in patients with refractory hypertension; this study is currently underway (Symplicity HTN-2). Renal denervation causes reduction of central sympathetic drive and therefore may have a role in managing chronic kidney disease, heart failure, and insulin resistance (diabetes).

### **Mini-symposium on Aortic Valve Replacement**

#### **Outcome of Patients with Severe AS who could not be Randomized in the Percutaneous Protocol** *Itsik BenDor, MD*

For lower risk patients, surgery is the best option. TAVI is a good option for high-risk patients and perhaps for intermediate-risk patients. Most of the patients referred for TAVI are not eligible for the trial. Patients not eligible for TAVI are faring poorly: extremely high mortality rate, especially in the non-surgical group; loss of quality of life and higher rates of non-cardiac death in the surgical group. Smaller profile TAVI should make access easier and increase the eligibility for this new modality. Alternative access (subclavian...) should increase eligibility. The potential benefits of TAVI in complex

patients are supported by encouraging preliminary data; its future will ultimately be defined in the PARTNER trial.

**Asymptomatic Aortic Stenosis: New Perspectives for Evaluation and Prognosis** *Ron Waksman, MD*

PTS with severe AS and no symptoms are at higher risk of events if: symptoms during exercise test. AVA <1.0 cm<sup>2</sup>; jet velocity >4 m/sec; increase in jet velocity >.3 m/s x year; severe valve calcification; disproportionate LVH; elevated BNP, elevated Zva, etc. Why Operate Early: severe AS, even asymptomatic, has up to 6% incidence of SD; very low surgical mortality/morbidity; higher surgical mortality when more symptomatic. Severe AS is a serious condition associated with high mortality. Some patients “report” no symptoms in spite of significant limitations. Follow these patients with yearly echo-doppler and ETT. All patients with severe AS should be evaluated for possible AVR, independent of symptoms.

**TAVI Apical Experience** *Friedrich-W. Mohr, MD, PhD*

Conventional AVR remains standard in regular risk patients of any age. TA-AVI: truly minimally invasive option for high risk patients, good outcomes, antegrade positioning advantageous. Team-cooperation of Anaesthetists, Cardiologists and Cardiac Surgeons.

**Transcatheter Aortic Valve Implantation: Polish Experience** *Dariusz Dudek, MD, PhD*

Polish experience November 2008 – February 2010: Edwards Sapien 41 valves successfully implanted (84% procedural success); transfemoral - 27% (11 pts), transapical – 73% (30 pts). CoreValve: 28 valves implanted; transsubclavian – 10.7% (3 pts), transfemoral – 89.3% (25 pts).

**Siegburg Experience** *Eberhard Grube, MD*

450 CoreValve patients: 2006 mortality 9.8%, strokes 2.9%; 2009 mortality 3%; strokes 1.5%. Conclusions: the results of TAVI improved annually due to experience, device improvement and patient selection; the long-term results so far are very promising; still the indication of TAVI should stick with the study entry criteria and not be diluted.

**What will it take to Extend Percutaneous Aortic Valve Replacement to Standard Risk Cohorts?**

*Martin B. Leon, MD*

15,000 patients treated thru 2009 in > 400 interventional centers around the world! Undoubtedly, TAVI procedures are rapidly evolving from the standpoint of operator technique and device development which should result in improved clinical outcomes and device durability. Therefore, as a natural consequence, TAVI procedures which have been restricted to high risk AS pts should also be made available as an alternative therapy for more standard risk pts. However, scaling down the risk strata should not be rushed, arbitrary or chaotic; industry, regulatory authorities, reimbursement agencies, and medical societies should agree on an orderly process of transitioning to standard risk pts. Clinical research methodologies and device approval standards need to be rigorous, yet reasonable, from the standpoint of study populations, sample sizes, and duration of follow-up for critical endpoints. If we follow this patient deliberate path, in the next ten years, TAVI will be validated as a legitimate alternative therapy for the significant majority of adult pts with AS! (...and it will be a joint effort with both surgeons and interventionalists participating).

## **American Session IV**

### **Mitral and Tricuspid Percutaneous Devices: New Devices and Design Considerations**

*Stanton J. Rowe*

Only a few companies are focused on DMR, with Evalve leading this effort with early encouraging results and the EVEREST Trail data released at ACC. FMR presents complex patients and whether devices have approached mitral repair from coronary sinus, annulus, or sub-annularly, redesigns are common addressing fracture or efficacy. Even with modest improvements in FMR, the clinical effects have been encouraging and sustained, although much more data is required. New entrants have focused on MR replacement or gap filling. Tricuspid regurgitation is a common disease with MR, and if untreated may affect survival. Tricuspid repair is common in some centers/regions. Few innovative efforts have focused on TR.

### **Piedmont Symposium**

#### **Biological Insights from the Atherosclerosis Imaging: Non-invasive and Invasive Techniques**

*Szilard Voros, MD*

Cardiac CT has significant correlation with genomics. Lipoproteins significantly determine plaque by CT. Increasing ApoB particles shift calcified toward non-calcified plaque. Effective reverse cholesterol transport decreases plaque and stenosis. Overall, CT-based plaque measurements correlate with IVUS-VH. With time, coronary calcification progresses - driven by the appearance of new calcified lesions and driven by a shift of non-calcified to calcified plaque. CT can reasonably predict obstructive FFR. CT perfusion is an emerging modality.

#### **Device Support: The PHI TandemHeart Experience *Vivek Rajagopal, MD***

20 patients in *extremis*, 60% survival.

#### **The How's and Why's in Healing of Intracardiac Devices *Robert S. Schwartz, MD***

Healing of Atrial Appendage Implants follows the same histologic course as healing of coronary artery stents: thrombus/fibrin, inflammation, lymphocytes and macrophages, collagen and ECM formation, endothelialization. Implications are significant for percutaneous valves, leads, PFO closure, etc. Results awaiting confirmation by other human/clinical examinations.

### **Symposium on Drug-eluting Balloons**

#### **Paclitaxel: The Prequel *Andreas Baumbach, MD***

The idea of local drug delivery was initially tested in rabbits at the University of Tubingen in the mid 90's. Results were positive as reported in multiple articles in the late 90's. However, the project was not pursued due to a number of logistical factors.

#### **Paclitaxel Elution with Perforated Balloon in 100 Patients with In-stent Restenosis *Nicolaus***

*Reifart, MD*

Local delivery of PTX (1.2 mg i.e. ~ 6 mcg/qmm in humans with porous balloon) is safe and promising for in-stent restenosis (non-randomised trial). With 25% TVR there is room for improvement.

## Scandinavian/Baltic Session

### **Treatment of Bifurcation Lesions: Moving Beyond One or Two-stent Technique** *Andrejs Erglis, MD, PhD*

The main challenge in complex lesions is optimal stent deployment, preparation of the lesion and confirmation of accurate post-stent placement as necessary. Plaque modification with CB may give positive impact on TLR after 8 months. A strategy of routine kissing balloon dilatation of side branch through the MV stent did not improve the 6-month clinical outcome as compared to a strategy of no kissing balloon dilatation.

### **PCI Operators' Radiation Habits: Can Old Dogs Learn New Tricks?** *Kari Saunamäki, MD, PhD*

X-ray radiation during interventional cardiology procedures is associated with a small but definite stochastic risk of inducing a malignant disease. The risk increases with increasing cumulative dose. There is no threshold value. Great variation in radiation dose between different experienced operators. Operator dependent modifiable factors influence radiation dose. In a given procedure the radiation dose is determined by the operator. Different operator's habitual radiation dose is between 40 to 90 cGy/cm<sup>2</sup> per PCI procedure. 7/8 operators maintained dose through 10 years. Only 1/8 initially high dose operators had a steady decline of dose. The radiation behaviour is induced during the initial learning phase. Bad radiation habits are acknowledged by the operators but seldom changed. Adequate radiation behaviour is given low priority by most operators. "Old dogs feel comfortable with old tricks."

### **Event Detection in the SORT-OUT III Randomized Trial: Comparison of Zotarolimus and Sirolimus-eluting Coronary Stents in Everyday Clinical Practice** *Jens F. Lassen, MD, PhD*

Routine clinically driven event detection is a new approach in cardiology that may enable large randomized clinical studies to cover a broad range of patients, facilitate prolonged and complete unbiased follow-up and thus better reflect everyday clinical practice.

### **Mechanisms of Late Stent Thrombosis: What Can we Learn from OCT?** *Maria Radu, MD*

The pathophysiology of LST is multifactorial. With its high resolution, OCT may contribute with new information regarding the mechanisms and predictors of LST. It remains to be settled whether OCT-detected mal- and pseudoapposition together with evaluation of the degree of strut coverage, may be of additional value for predicting LST.

### **Cardioprotective Effects of Mechanical Postconditioning in Patients Treated with Primary PCI Evaluated by Magnetic Resonance Imaging** *Thomas Engstrøm, Dsci, PhD*

Post-conditioning = 30 second balloon inflations alternating with 30 second balloon deflations. In patients with STEMI, mechanical post-conditioning reduces infarct size and improves functional class. The treatment is independently effective for all areas at risk. Post-conditioning should be tested in larger clinical trials.

## British/Swiss Session

### **Virtual Histology Evaluation in ACS Treatment: Novel Insights from the Liverpool V-HEART Study** *Scott Murray, MD*

"A blind man knows he cannot see, and is glad to be led; but he that is blind in his understanding, believes he sees best and scorns guidance." "The recipe for ignorance is to be satisfied with your

opinions and content with your knowledge, but the greatest ignorance is to reject something you know nothing about.”

Angiography does not tell the whole story. Correlation between positive remodeling and plaque related to sudden coronary death (Virmani et al 2005). One can't see positive remodeling on an angiogram! 68% of MIs are caused by plaques that are less than 50% occluded. These lesions are “insignificant” or not visible on an angiogram! 6% of PCI patients will have clinical plaque progression requiring non-target lesion PCI by 1 year. (Glaser, 2005). One can't detect these plaques on an angiogram! Consider that the angiographic “culprit” MLD point may not be at the centre of the unstable disease. Be mindful that the true culprit disease may be over 1cm proximal to the MLD in some cases. Residual uncovered plaque exists frequently and can have high risk features. Non-Culprit disease has features suggesting it may have the highest risk. Some stable angina plaques may be compositionally more important than others.

### **How Important is IVUS in Treatment of Left Main Disease?** *Michael Pieper, MD*

When MLA  $\geq 6.5 \text{ mm}^2$  there is no need to measure FFR. Patients with MLA  $\geq 6.5 \text{ mm}^2$  or FFR  $\geq 80$  need no revascularization. The long-term clinical outcome of patients with an LMCA stenosis in whom surgery was deferred on the basis of FFR values  $>0.80$  is favorable. The correlation between angiographic assessment, by either QCA or visual estimate, and FFR is poor. Rapid progression of LMCA lesions is rare.

### **Peripheral Session II: Critical Limb Ischemia**

#### **Innovative Approaches for Peripheral CTOs** *Dierk Scheinert, MD*

Successful recanalization of fem-pop CTOs up to 100%. Most important: experience, diversity of guidewires and catheters, reentry-devices.

#### **Endovascular and Surgical Treatment of Critical Limb Ischemia** *Adnan Z. Rizvi, MD*

Clinical success after lower extremity revascularization for tissue loss is determined by intrinsic patient factors and not by method of revascularization.

#### **Stem Cells in Critical Limb Ischemia** *Hans Krankenberg, MD*

Intraarterial administration of BM-MNC significantly promotes ulcer healing and reduces rest pain until 3 months versus Placebo. Successful ulcer healing associated with improved limb salvage requires repeated administration of functionally competent BM-MNC. Patients with thrombangiitis obliterans generally responded well, critically ill patients with extensive gangrene and impending amputation did not derive any benefit.

#### **Quo Vadis: Laser Assisted Peripheral Angioplasty** *Jörn O. Balzer, MD, PhD*

Improvement in technical success rates in long occlusions and successful in debulking of In-stent restenosis and occlusion. So far published data indicate that the new laser catheter generation is more powerful in debulking. BTK – several studies indicate that the need for stenting is reduced. But: no proven influence on reduction of restenosis rate in comparison to PTA.

#### **Critical Limb Ischemia: Percutaneous Bypass, a New Option and a New Approach** *Richard R. Heuser, MD*

Re-entry catheters combined with endografts make it possible to complete a lower extremity bypass using a percutaneous technique. Significant “tool set” development is underway to reduce this

technique to general practice. Further study on a larger scale will be needed to determine the true utility of this novel approach.

### **Central/Eastern European Session I**

#### **DES vs. BMS for Plaque Stabilization: Results of Prospective Comparison** *Aleksander Żurkowski, MD*

Old and moderately diseased SVGs presented a significant and very rapid (within 12 months) disease progression at the sites exhibiting moderate lesions. Sealing such lesions with paclitaxel-eluting stents prevented this process without inducing any deleterious effect on the atherosclerotic disease of non-stented SVG segments. SVG plaque sealing with paclitaxel-eluting stents was associated with a very low rate of procedural complications (3%), restenosis (3%) and stent thrombosis (0%) after a median follow-up of 3 years ( $\geq 24$  months). The plaque sealing strategy was associated with a lower rate of SVG clinically driven revascularization and a trend towards a lower rate of MACE after a minimum follow-up of 24 months.

#### **Bio-mechanical Approach for Local Treatment of Atheroma** *Wojciech Wojakowski, MD*

Stent implantation may seal the inflammatory response in pts with ACS. CD40L levels represent a clinical marker for vulnerable plaques. Blood samples for CD40L analysis were drawn from 40 pts at the beginning of the procedure and 24 h after. 20 had stable CAD while 20 had non-ST elevation ACS presentation. A significant reduction of CD40L levels after coronary stenting in non-ST-elevation ACS patients as compared to stable subjects.

#### **New Generation DES in the “Real World”: Three-year Follow-up of 500 Patients Treated with Endeavor or Xience V Stents** *Maciej Lesiak, MD, PhD*

Real-world patients treated with DES represent significantly more complex and higher risk population than patients treated in BMS era. Both generations DES, as compared with BMS reduce not only the incidence of repeat interventions but also mortality. In three-year observation patients treated with implantation of II<sup>nd</sup> gen. DES show low incidence of death, myocardial infarction, TLR, and stent thrombosis. 12 months dual antiplatelet therapy after II<sup>nd</sup> generation DES implantation seems to be sufficient to prevent late and very late ST.

#### **Three-year Follow-up of 300 Patients after PCI LMCA in the Krakow Center** *Dariusz Dudek, MD, PhD*

Provisional side-branch stenting strategy for elective unprotected left main stenosis in patients with stable and unstable angina is safe and effective, with low in-hospital and long-term mortality. In contrary, mortality after emergency stenting of unprotected left main stenosis in patients with myocardial infarction (STEMI, NSTEMI) remains high, mainly due to the high in-hospital mortality in patients presenting with cardiogenic shock.

#### **Primary PCI and Mild Induced Hypothermia: An Experience from more than 100 Comatose Survivors of Cardiac Arrest with STEMI** *Marko Noc, MD, PhD*

Automated Peritoneal Lavage System (APLS). Intraperitoneal placement of catheter through the abdominal wall. Fully automated system with cold saline. Interventional cardiologist has free access to groin and can work (CAG, prepare for PCI) while patient temperature is decreasing to  $<34$  C.

## **Influence of Different Antiplatelet Treatment Regimens for Primary Percutaneous Coronary Intervention on All-cause Mortality** *Adam Witkowski, MD, PhD*

In this non-randomized, large cohort (7,000 patient), multicentre STEMI registry in-cath-lab use of GP IIb/IIIa inhibitors and clopidogrel alone or in combination was associated with the reduction of all-cause mortality in the setting of primary PCI in comparison with aspirin alone. The benefit of antiplatelet treatment in the reduction of all-cause mortality was independent of the underlying clinical and angiographic risk factors. However, we also found that the use of GP IIb/IIIa inhibitors on top of 300 mg loading dose of clopidogrel did not further reduce mortality.

## **Femoral or Radial Approach in Percutaneous Coronary Interventions: Single Center Experience of 2000 Patients** *Maciej Lesiak, MD, PhD*

Radial approach for coronary interventions, without routine Allen test is safe and effective when performed by operators with the experience of more than 50 procedures. Radial access is associated with similar bleeding complication rate but more thrombotic complications as compared with fluoro-guided femoral approach. After procedures via radial approach ambulation time is very short and patients comfort is much improved. Learning curve is very important, proper training may significantly reduce the time of the procedure, fluoro time and contrast use.

## **Korean Session**

### **A Randomized Comparison of Zotarolimus-Eluting Stent versus Sirolimus-Eluting Stent for Percutaneous Coronary Intervention in Chronic Total Occlusions** *Ki Bae Seung, MD*

In terms of intimal hyperplasia volume, percent intimal hyperplasia obstruction & late luminal loss, SES is better than ZES. In terms of safety concerns such as stent malapposition, stent fracture, aneurysmal formation & stent thrombosis, ZES has a tendency to be better than SES. Major clinical events at 12 months between ZES and SES are similar.

### **The impact of very early invasive intervention in the outcome of patients with non-ST-segment elevation myocardial infarction and high N-terminal pro B-type natriuretic peptide level** *Ki Bae Seung, MD PhD*

NT-proBNP level has prognostic power in patients with NSTEMI who underwent invasive treatment within 48 hours, and is a very useful serum biomarker to identify NSTEMI patients who derive great benefits from very early intervention similar to those of primary PCI in STEMI patients.

### **ZEST Trial (Comparison of the Efficacy and Safety of Zotarolimus-Eluting Stent versus Sirolimus-Eluting Stent and PacliTaxel-Eluting Stent for Coronary Lesions): ZEST- Angiography, IVUS- substudy** *Young-Hak Kim, MD, PhD*

ZES has a comparable long-term angiographic outcome in terms of late loss and restenosis as compared with the PES, but inferior to the SES. Restenosis in the ZES and PES showed more complex morphology as compared to the SES. Lesion length and acute lumen gain were major predictors of restenosis after DES implantation. Neointimal growth in ZES was similar to PES, but greater than SES. ZES had no late stent malappositions. Lack of late stent malapposition may contribute to the long-term safety of ZES.

### **Cilostazol: An Alternative or Additive Antiplatelet Agent for Clopidogrel Hyporesponders, CYP 2C19 Polymorphism or High-risk Patients to Reduce DES Thrombosis?** *Seung-Whan Lee, MD, PhD*

Compared with responders, Clopidogrel non-responders have > 12 times risk of cardiovascular events and 8 times risk of stent thrombosis. Cilostazol has a different antiplatelet action mechanism

than Clopidogrel. •Triple antiplatelet therapy (ASA+Clopidogrel+Cilostazol) showed higher platelet inhibition than standard or high dose clopidogrel, even in HPPR or CYP2C19 polymorphism patients. Triple antiplatelet therapy significantly reduced stent thrombosis and ischemic events after bare-metal or drug-eluting stent in a broad range of population and even in patients with high-risk profiles. Triple antiplatelet therapy significantly reduced mid-term ischemic events after DES or BMS in patients with ACS or primary stenting. Prolonged use of triple antiplatelet therapy reduced stent thrombosis and MI after drug-eluting stent implantation.

**CiloTax™ Dual-drug Eluting Stent: A Prospective, Randomized, Controlled Trial of a Stent Eluting Cilostazol and Paclitaxel** *Seung-Jung Park, MD, PhD*

*Seung-Jung Park, MD, PhD*  
FIM trial comparing DES with combined coating of Paclitaxel and Cilostazol to Taxus Liberte showed excellent efficacy and safety, in which study the in-stent late loss was 0.19mm at 6 month & no stent thrombosis was observed. Cilotax™ stent was superior to conventional PES, suggesting a promising new dual-drug DES system.

**MAIN COMPARE Registry, PRE-COMBAT Randomized Study and PRE-COMBAT2 for Left Main Disease Treatment** *Seung-Jung Park, MD, PhD*

STENT vs CABG for Left Main Disease: no difference of Death/QMI/Stroke; higher Rate of TVR in STENT group. In selected groups of LM disease - isolated LM disease, ostial and shaft LM disease, LM with 1 vessel disease - STENT group may have even better clinical outcomes.

**SYNTAX, FAME, COURAGE, PROSPECT: What the Interventional Cardiologist Wants and Needs to Know**

Theme: Are the lessons of these studies that we need to stop treating lesions that we normally treat, or that we need to treat them better?

**SYNTAX: Three Vessel Disease Data Revisited at Two Years** *Friedrich-W. Mohr, MD, PhD*

Two year MACCE rates were significantly higher for PCI than CABG, driven mainly by higher repeat revascularization and MI in the PCI arm: significant increase of MI compared to CABG between years 1-2: cardiac mortality significantly higher with PCI. CVA rates were still significantly higher at 2 years for CABG than for PCI but, majority of CVAs in CABG arm occurred in year 1. Patients with a low (0-22) or intermediate (23-32) baseline SYNTAX score had equivalent MACCE rates at 2 years between PCI and CABG, but the curves tend to cross. More complex disease does clearly better with surgery and must undergo surgery.

**FAME and SYNTAX: Lessons for the Current Practice of Interventional Cardiology** *Pim Tonino, MD*

PCI results in MVD patients can be improved by functional complete revascularization: i.e., stenting only the ischemic lesions and leaving the non-ischemic lesions for medical treatment, thereby avoiding unnecessary collateral damage from stenting these low-risk non-ischemic lesions.

**COURAGE: An Interventional Cardiologist's Perspective** *Steven R. Bailey, MD*

Courage is the *best case* scenario for medical therapy in a very low risk population. In this low risk, low symptom group, one third of patients with medical therapy *still* required PCI for symptom relief. Risk stratification for ischemic burden is critical and identifies patients likely to benefit from PCI even in low risk subgroups. PCI, even when mediocre with incomplete revascularization, did not increase the risk of death, MI or CABG. In this “chaff” instead of “wheat” population hard outcomes still favor PCI. Revascularization in stable angina is beneficial for: moderate to severe symptoms, moderate to

severe ischemia >10%, hemodynamically significant lesions in critical locations, PCI may be offered as a beneficial alternative to medical therapy to lower risk patients without an increase in death and MI.

### **Industry Perspective** *Keith D. Dawkins, MD*

Growing number of physicians aligning with hospitals. Changing procurement & influence of "economic buyers." Margin compression in all sectors of healthcare industry. Increasing regulatory burden on technology innovation. More rules and regulations: spells more time to market, more restrictions and more complex selling environment. More scrutiny: of industry marketing & physician practices. More pressure: on margins, cost-cutting/price transparency. More restructuring: within device industry (all players).

### **SYNTAX, FAME, COURAGE, PROSPECT: What the Interventional Cardiologist Wants and Needs to Know** *James R. Margolis, MD*

You use I-phones. You use I-pods. You are thinking about buying an I-pad. Why not use I-VUS.

### **Japanese Session**

#### **OCT: Useful and Necessary for the Future of PCI** *Takashi Kubo, MD*

OCT enables real-time, full tomographic, in-situ visualization of coronary vessel microstructure with a unique high axial resolution. OCT provides significant details of coronary microstructure and stent architecture, which could be harnessed to improve procedural and clinical outcomes. Continued advances in the technology of Fourier-domain OCT promise to improve the ease of use and to broaden the applications of OCT imaging in coronary intervention.

### **German Session**

#### **The Biotronik Magnesium Stent: Current Status and Clinical Experience** *Michael Haude, MD*

BIOTRONIK's Absorbable Metal Stent technology is based on a specialty Magnesium alloy that offers superior stent mechanics and biocompatibility. The first generation of Absorbable Metal Stents (AMS-1) showed promising results regarding mechanical properties as well as safety in several human applications (150 cases). Optimization of the stent platform has led to AMS-2 which shows improved scaffolding based on a more slowly degrading Magnesium alloy and an optimized stent design. The current, third generation (AMS-3.0, "DREAMS") implements the elution of an anti-proliferative drug and has shown safety and efficacy in animal. If preclinical results continue to show positive results, the clinical program will resume in 2010 with a FIM study.

#### **Renal Denervation: A New Concept to Treat Arterial Hypertension** *Horst Sievert, MD*

Renal denervation is a simple and very safe percutaneous procedure. Significant and sustained reductions in blood pressure. Achievement of denervation supported by significant reduction in renal noradrenalin spillover. Significant reduction of systemic sympathetic drive (MSNA). These beneficial effects may have implications for other diseases like LV hypertrophy and diabetes. The randomized trial has finished enrolment.

#### **Percutaneous closure of left atrial appendage in patients with atrial fibrillation - Experiences with the Amplatzer Cardiac Plug** *Hans Störger, MD*

We now have proof of concept: Left atrial appendage closure prevents stroke as effectively as anticoagulation. There are more early safety events after LAA closure due to pericardial effusions:

4.8% serious, 1.8% non serious. Under anticoagulation therapy there are more late safety events due to stroke and bleeding.

### **Stenting of the Popliteal Artery: Is this a Good Idea? Data of a Mono Centre Study** *Gunnar Tepe, MD*

Bail-out stenting in the popliteal artery far from optimal: Adequate acute result; high restenosis/ re-occlusion rate within the first year; all stents failed. Predictor of superior long-term data: shorter lesions/stenting, calcification.

### **Update on DES and DEB in CTOs** *Gerald Werner, MD*

The potential role of DEB in CTOs: DEB for CTOs seem inferior to modern DES, but yield clearly better results than we experienced in the BMS era; they may be an option for patients with need for shortened DAPT or for patients requiring Coumadin.

### **Update on Modern Non-DES** *Marcus Wiemer, MD*

Modern BMS showed remarkable improvements concerning their profile and strut thickness. Although difficult to compare, late lumen loss data are similar to some DES (Endeavor™) with 0.58 (Prokinetic), 0.55 (Titan) and 0.44 mm (Tecno™ - Jupiter – Study). MACE rates in different registries are 10% or even lower. Passive coatings of BMS seem to have advantages concerning thrombogenicity and neointimal coverage. Randomized trials of modern BMS against DES are missing. Better BMS make better DES platforms. If the design helps to inhibit restenosis, the required drug dose may be decreased, thereby reducing vessel toxicity.

### **Techniques for Successful Treatment of CTOs of Infrapopliteal Arteries** *Thomas Zeller, MD*

#### **Dutch Session I**

### **PCI Strategy in STEMI Patients with Multi-vessel Disease** *Pieter C. Smits, MD, PhD*

Revascularization of non-IRA seems logical although actual evidence is controversial. Defining the real ischemic and high-risk non-IRA lesions and patients might be of crucial importance. Prospective, randomized data for early and complete revascularization after STEMI is very limited. A lot of questions remain unanswered – more and proper sized prospective randomized - studies are required. Questions to be answered: will treatment of non-IRA lesions reduce mortality and if so in which time span? Which MVD STEMI patients will benefit most from complete revascularization? When will MVD STEMI patients need complete revascularization? Will DES make a difference in MACE in STEMI patients with multi-vessel PCI? Which criteria should be followed to define the non-IRA lesions that should be treated.

### **Pre-hospital Abciximab Administration in STEMI Patients** *Wouter Jukema, MD, PhD*

In patients with STEMI treated with PPCI, early abciximab administration in the ambulance compared with late abciximab administration in the hospital significantly improves pre-procedural IRA patency (TIMI flow 2-3) and post-procedural ST-segment resolution. Early abciximab therapy within the first 2 hours after symptoms onset (golden period) is associated with more aborted infarctions, a smaller infarct size, improved LV function at 3-month, and a lower risk of heart failure through a median of 7-month clinical follow-up.

### **A Network-based Strategy of Direct Field Referral and Interhospital Transfer for Primary PCI: Reperfusion Intervals and Clinical Outcome** *Karel T. Koch, MD, PhD*

A tailored approach of either local direct or inter-hospital area referral of patients for primary PCI may result in treatment delays within current benchmarks for a substantial number of AMI patients. Improvement of logistics for primary PCI can only be obtained in close collaboration with local hospitals, ambulance and emergency room staff. Rather than “door-to balloon time”, first medical contact-to-balloon time should be the benchmark to evaluate primary PCI.

### **Immediate ST Segment Recovery after Primary PCI is a Strong Predictor of Long-term Prognosis in STEMI and Hemodynamic End-points in MI Studies** *R.J. de Winter, MD, PhD*

ST-segment recovery on 12-lead ECG is a strong and independent predictor of long-term mortality, if measured immediately end PCI at the catheterization laboratory in STEMI patients. ST-segment recovery at the catheterization laboratory enables physicians to instantly identify high-risk patients.

### **What Platelet Function Test is Best in Predicting Thrombotic Complications after PCI** *J.M. ten Berg, MD, PhD*

Popular first study with multiple platelet function tests. Provides cut-off values for LTA, VerifyNow and Plateletworks based on ROC analysis. LTA, VerifyNow and Plateletworks are able to identify patients at higher risk. IMPACT-R, IMPACT-ADP, PFA-100 COL/ADP and INNOVANCE® PFA P2Y\* are unable to identify higher-risk patients. None of the tests was able to identify high-risk patients for bleeds..The predictive accuracy of the 4 tests was only modest in this low-risk population undergoing elective stenting. We should wait for studies as GRAVITAS, DANTE and TRIGGER-PCI before adopting platelet function testing to guide clinical practice. 75% of the patients tested have a residual platelet reactivity below cut-of value (<50% aggregation LTA, <240 PRU VerifyNow). Those patients are at very low risk of thrombotic events (tests have high [>90% NPV]. Thus clopidogrel (generic low cost) works fine in this low-risk group. If you treat those patients with Prasugrel the absolute risk reduction would be relatively small, at the cost of an increased bleeding hazard.

### **Imaging Techniques for Vulnerable Plaque/High-risk Plaque** *Joanna Wykrzykowska, MD*

More accurate definition of high risk plaque will likely require imaging with a combination of light and ultrasound technologies. Whether combination of OCT and IVUS-VH or NIR and IVUS will prove to be more accurate will require further trials. Focal treatment in addition to better targeted systemic treatment of high risk plaque and patient may be possible in the future.

### **Bifurcation Stenting: AXCESS and Stentys** *Stefan Verheye, MD, PhD*

Use of a BA9 eluting self expanding stent effectively reduces clinical events and restenosis in all types of bifurcation lesions. Four year follow up suggests that the results are durable. Optimizing outcomes in the Side Branch decreases overall bifurcation restenosis, and appears to improve late clinical outcomes. Self expanding stents grow over time, and with an effective antiproliferative, also increase the lumen. Like SST stents, vessel volume increases over time. However, the stent also induces plaque layer compression. The Stentys platform: Is safe and feasible in complex lesions; delivers very good outcome both clinically and angiographically; could eliminate late acquired stent malapposition; provides side branch access and allows provisional treatment of branch vessels with excellent “cross-over” results.

## **MSCT in Preparation/Planning of CoreValve Implantation: The Experience in Rotterdam** *Carl J. Schultz, MD, PhD*

The anatomical definition of the annulus can be reproduced on MSCT. This allows axial diameter measurements of the non-circular annulus. Differences in the minimum and maximum diameter can lead to substantial differences in sizing (undersizing or oversizing). Using a mean diameter from MSCT ( $D_{CSA}$  or  $D_{mean}$ ): Best matches prosthesis size/shape to anatomy; maximizes the proportion of patients eligible for a 26 or 29mm inflow CRS; is likely to reduce both over and under-sizing. Industry guidelines for sizing currently do not recognize annulus non-circularity. Availability of more prosthesis sizes may exacerbate any adverse effects of inaccurate sizing.

**The Impella device: Not Just a Toy for Boys** *Jose P.S. Henriques, MD, PhD* Cardiogenic shock occurs in 10% of STEMI but accounts for 90% of mortality. The goal is myocardial and organ recovery. Mechanical circulatory support and complete revascularization may be the answer.

## **Dutch Session II**

### **Gender Differences in ACS: Do they Exist?** *Yolande Appelman, MD, PhD*

Women have worse prognosis due to: age and co-morbidity; variation in hormonal status; different presentation symptoms; different pathophysiology; more non-significant coronary disease; insufficient awareness women and doctors; lack of treatment according to guidelines. Women have worse prognosis especially in high-risk ACS (positive troponin) and younger age group (<50-55yrs).

### **Microtissues to Repair the Heart!** *Pieter Doevendans, MD, PhD*

After 7.5 years, OPCAB was associated with: a comparable safety profile as PCI; a lower risk of coronary re-interventions; a better cognitive performance.

### **e-HEALING Registry: Post Marketing Registry of the Genous Bio-engineered R stent, final clinical results at 1 year follow up** *Robbert J de Winter MD PhD FESC*

The final data from the e-HEALING Registry demonstrate that the Genous Bio-engineered R stent is safe and effective. Excellent 12 months outcome: composite primary endpoint 8.4%, MACE 7.9% in a worldwide, all comers population. Clinically driven TLR 5.7% overall, diabetics 6.4%. The 1.1% stent thrombosis rate at 12 months was low, in view of a 1 months recommendation of DAPT. Thus, the EPC stent might be a reasonable alternative to DES, especially in patients not suitable for a prolonged dual platelet inhibition.

## **Primary and Secondary CAD Prevention**

### **Is it Enough to Treat Only LDL?** *Dean A. Bramlet, MD*

“With an excess of fat diabetes begins and from an excess of fat diabetics die . . .” EP Joslin 1927. 60% of post-MI patients demonstrate evidence of diabetes or pre-diabetes when studied by GTT at three months. Treatment of LDL alone is not enough. It is essential to treat HDL, triglycerides and diabetes for meaningful primary and secondary prevention.