**S10**

**Device Motion Indicator, a New Feature to Evaluate Relative Stent Movement Inside Coronary Artery**

*Frimerman, Aharon; Levi, Yaniv; Meisel, Simcha; Malka, Rinat; Shochat, Michael; Shotan, Avi*
*Hillel Yaffe Medical Center, Cardiology, Hadera, Israel*

Background: The cyclic movement of the heart and the coronary arteries induces relative axial movement between the artery and a pre-deployed intra-luminal device such as balloon or stent which may cause mal-positioning of these devices. The exact nature and extent of this phenomenon is not known yet. The Sync-Rx System is an add-on image processing system with unique enhancement and stabilization power. A new feature of this system, the Device Motion Indicator (DMI), can detect the intra-luminal device in the X-Ray image stream and measure its relative axial movement in an enhanced and stabilized background.
Purpose: Using the DMI feature in patients undergoing PCI, we measured the pre-deployment, relative, intra-luminal stent axial movement in the different coronary arteries and their sub-segments.
Preliminary Results: In an on-going study, 50 patients underwent regular PCI with the support of the Sync-Rx image processing system. Twenty five with MI, ACS, or primary PCI, 14 with chest pain and objective evidence of ischemia, and 11 with chest pain only. The DMI feature identified relative stent axial movement in 64 treated segments: 26 in LAD, 14 in LCX, and 24 in RCA and measured the proximal and distal markers (over the stent carrying balloon) displacement span (DS in millimeters), as displayed in the table:

| segment | proximal LAD | mid LAD | proximal LCX | OM1 OM2 | proximal RCA | mid RCA | distal RCA |
|---|---|---|---|---|---|---|---|
| proximal marker DS | 2.1±1.6 | 1.2±1.8 | 1.8±0.8 | 2.5±1.5 | 1.8±0.1 | 3.4±1.8 | 4±2.2 |
| distal marker DS | 2.4±1.7 | 1.4±2.5 | 1.2±0.7 | 3.4±0.2 | 1.8±0.1 | 3.5±2 | 3.7±1.8 |

Conclusions: Intra luminal relative axial movement of a stent during its positioning at a lesion site, prior to deployment, is a significant phenomenon seen mainly at the distal and mid RCA, OM1/OM2, and proximal LAD segments (in decreased order). This movement can cause stent mal-positioning. To minimize the relative movement effect, a possible solution to optimize, stent deployment site, may be an ECG-gated balloon inflation device.

**Stent Thrombosis According to Clinical Syndrome Acuity in Everolimus- and Paclitaxel-Eluting Stents**

*Planer, David[1]; Smits, Pieter C.[2]; Kereiakes, Dean J.[3]; Kedhi, Elvin[2]; Fahy, Martin[4]; Xu, Ke[4]; Serruys, Patrick W.[5]; Stone, Gregg W[4]*

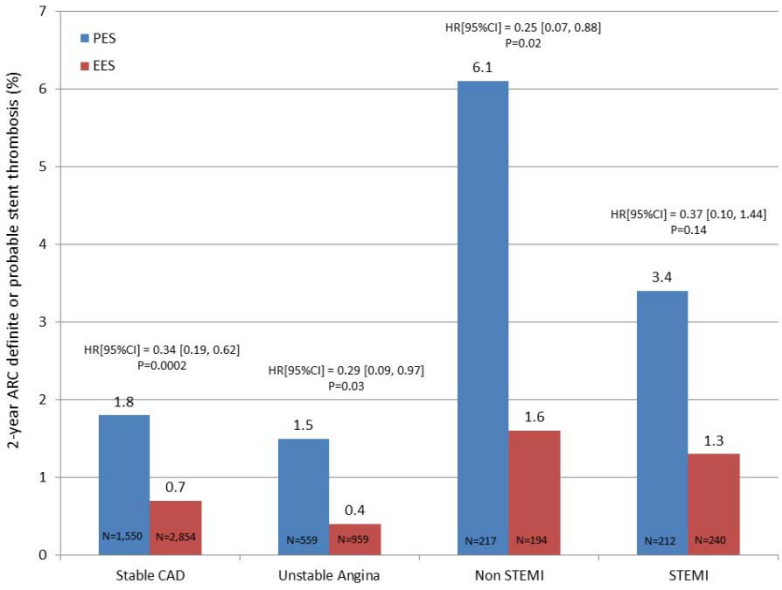
*[1]Hadassah - Hebrew University Medical Center, Heart Institue, Cardiovascular Research Foundation, Jerusalem, Israel; [2]Maasstad Ziekenhuis, Department of Cardiology, Rotterdam, Netherlands; [3]The Christ Hospital, Heart and Vascular Center, Cincinnati, Ohio, USA; [4]Columbia University Medical Center and The Cardiovascular Research Foundation, Cardiology, New York, USA; [5]Erasmus Medical Center, Thoraxcenter, Rotterdam, Netherlands*

Background: Although the risk of stent thrombosis is increased in patients with acute coronary syndromes (ACS), drug eluting device specific outcomes relative to clinical syndrome acuity are absent.

Methods: We performed a patient-level pooled analysis from the prospective, randomized SPIRIT II, III, IV and COMPARE trials in which 2,381 pts with ACS and 4,404 pts with stable CAD were randomized to everolimus-eluting stent (EES) vs paclitaxel eluting stent (PES). Kaplan-Meier estimates of stent thrombosis rates were assessed at 2 years, stratified by the stent used and clinical presentation (stable angina, unstable angina, non-ST elevation MI (NSTEMI), and ST elevation MI (STEMI)).

Results: Although there were no differences in baseline characteristics between patients randomized to EES vs PES, both unadjusted and adjusted hazards for ARC definite or probable stent thrombosis at 2-year were significantly lower in patients randomized to EES, irrespective of the clinical presentation (adjusted HR (95%CI) = 0.24(0.11-0.49) and 0.36 (0.19-0.68) in patients with ACS and stable coronary artery disease, respectively). While in patients treated with EES the rate of stent thrombosis was similar across the clinical syndromes (p for trend =0.19), patients treated with PES had a significantly higher rates of stent thrombosis in patients with non-STEMI and STEMI (p for trend = 0.0004).

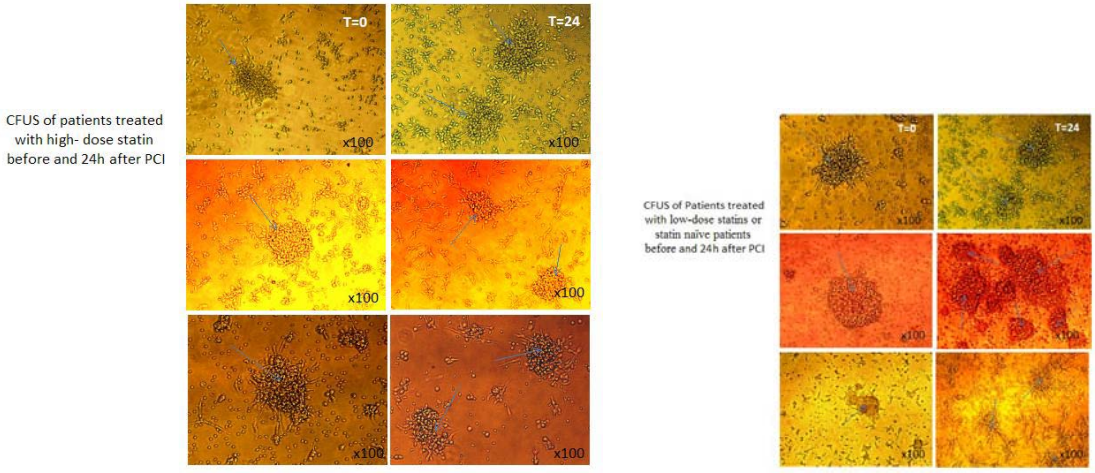
Conclusions: In patients treated with EES the risk for stent thrombosis remains relatively low independent of the clinical syndrome acuity, while treatment with PES was associated with increased risk of stent thrombosis particularly in STEMI and non-STEMI patients.



**Effect of High Dose Statin Pretreatment on Endothelial Progenitor Cells after PCI (HIPOCRATES Study)**

*Eisen, Alon[1]; Leshem- Lev, Dorit[2]; Orvin, Katia[1]; Daddush, Oshrat[2]; Battler, Alexander[1]; Lev, Eli Israel[1]*

*[1]Rabin Medical Center, Cardiology Department, Petah-Tikva, Israel; [2]Rabin Medical Center, The Felsenstein Medical Research Institute, Petah-Tikva, Israel*




Background: Pretreatment with high-dose statins given before percutaneous coronary intervention (PCI) has been shown to have beneficial effects. The mechanism of these lipid-independent beneficial statin effects is unclear. Circulating endothelial progenitor cells (EPCs) have an important role in the process of vascular repair, by promoting re-endothelialization following injury. We hypothesized that statins can limit the extent of endothelial injury induced by PCI and promote re-endothelialization by a positive effect on EPCs. We, therefore, aimed to examine the effect of high-dose statins given prior to PCI on EPC profile.

Methods: Included were patients, either statin naïve or treated chronically with low-dose statins, with stable or unstable angina who underwent PCI. Patients were randomized to receive either high-dose atorvastatin (80 mg the day before PCI and 40mg 4 hours before PCI) or placebo. EPCs profile was examined before PCI and 24 hours after it. Circulating EPC levels were assessed by flow cytometry as the proportion of peripheral mononuclear cells co-expressing VEGFR2, CD133 and CD34. The capacity of the cells to form colony forming units (CFUs) was quantified after 1 week of culture.

Results: Sixteen patients (mean age 61.8±7.9 years ,14 men) were included in our preliminary data, of which 8 received high-dose atorvastatin prior to PCI. The number of EPCs CFUs before PCI was 196.0± 69.9 vs. 107.9± 40.8 CFUs/plate in patients treated with high-dose atorvastatin vs. placebo, respectively (p=0.02). The number of EPC's CFUs after 24h was 233.6± 68.7 vs. 175.0± 51.3 CFUs/plate in patients treated with high-dose atorvastatin vs. placebo (p=0.1). There were no differences in FACS levels between the groups.

Conclusion: In these preliminary results, there is a trend towards higher EPC CFU levels in patients treated with high-dose atorvastatin, both before and after PCI. These findings could account for the beneficial effects of statins given prior to PCI.

**Coronary Artery Perforations During PCI: Incidence, Causes and Treatment**

*Balkin, Jonathan; Jubeh, Rami; Meerkin, David; Almagor, Yaron; Tzivoni, Dan; Dratva, Dmitry*
*Shaare Zedek Medical Center, Cardiology Department, Jerusalem, Israel*

Coronary artery perforation (CAP) is a rare but potentially catastrophic complication of percutaneous coronary interventions (PCI). We conducted a review of our computerized database of over 14,000 PCI's and identified 40 cases of CAP. All patient case records, cath and PCI reports as well as angiograms underwent detailed review to confirm the diagnosis, cause, treatment and outcome

Results: CAP was caused by guide wire perforation in 18 patients, balloon (10) or stent (8) dilatation, and in 3 cases the cause was undetermined. 13 CAP occurred in patients with multivessel disease, and in 5 CAP occurred after multiple wires were used. In 15 patients CAP resolved spontaneously, 5 with intramyocardial staining. In 15 patients CAP caused pericardial tamponade: 13 underwent percardiocentesis. In 8 CAP patients the tamponade occurred up to 8 hours after leaving the cath lab. 7 had a stent placed at the CAP site: 6 with attempted covered stent, 4 of which failed to stop the leak. In 8 patients CAP was treated with prolonged balloon inflation. 5 patients with CAP due to balloon or stent had cardiovascular collapse with resuscitation: 1 with medical treatment, 4 were sent for emergency operation under CPR of whom 2 survived.

Conclusions: Almost 50% of CAP are due to distal perforation by the guide wire and are probably avoidable. If recognized promptly, CAP can be successfully treated with a combination of pericardiocentesis, balloon or stent inflation and if necessary emergency operation.

**Hyperglycemia in the Cath Lab is Related to Background Dysglycemia and Less to Acute Stress**

*Arbel, Yaron[1]; Shmueli, Hezzy[1]; Halkin, Amir[1]; Berliner, Shlomo[2]; Herz, Itzhak[1]; Revivo, Miri[1]; Keren, Gad[1]; Finkelstein, Ariel[1]; Banai, Shmuel[1]*

*[1]Tel Aviv Medical Center, Cardiology, Tel Aviv, Israel; [2]Tel Aviv Medical Center, Internal Medicine E, Tel Aviv, Israel*

Background: Increased serum glucose concentration during acute coronary syndromes (ACS) is associated with adverse clinical outcome. This hyperglycemia is usually attributed to acute stress reaction. We examined the determinants of glucose levels in patients with and without ACS, and with and without the metabolic syndrome.

Methods: We recruited 3998 consecutive patients. Arterial blood was obtained from all participants via their arterial access puncture sites as a part of the coronary angiography procedure. To assess which variables affect serum glucose levels, a linear regression model was created. The regression included HbA1c, ACS status, inflammatory biomarkers, metabolic and anthropometric biomarkers.

Results: We found that HbA1c was the most significant variable (beta=0.62,p<0.0001). ACS status had little effect on glucose or HbA1c levels (beta=0.04, p=0.02). The effect of ACS on glucose levels was non-significant in patients without the metabolic syndrome (100±35mg/dl versus 103±35mg/dl, p=0.07) while in patients with the metabolic syndrome it was significant (130mg±60 mg/dl versus 143±65mg/dl, p=0.003) .

Conclusions: Hyperglycemia during angiography should be attributed to chronic background dysglycemia and might single out patients in need of treatment.

**Complications of Wrist Arteries Catheterization in High Volume Laboratory - Prospective Registry**

*Suleiman, Khaled; Feldman, Alexander; Ilan Bushari, Limor; Or, Tzafrir; Jabaren, Mohamed; Turgeman, Yoav*
*Heart Institute, Emek Medical Center, Heart Institute, Afula, Israel*

Wrist arteries access catheterization (WAAC) has the advantage of low incidence of bleeding and vascular complications. However there are no large multicenter registries examining complication of this approach.
Objectives: To describe the incidence of complications during and after WAAC.
Methods: Single center prospective registry of high volume WAAC. Complications were collected prospectively from November 2005 through October 2011.
Results: We performed 8608 catheterizations via wrist arteries in 6 years: 7754 (90.1%) transradial and 854(9.9%) trasulnar. Mean age (60.9±11.7 years), women (38.2%), BMI 27.8±5.4, diabetic 31.4% and hypertensive 44.9%. Coronary angioplasty was performed in 46.4% of patients. Procedural failure and crossover to alternative access site diminished from 5.7% in the first 2 years to 1.3% in the last 2 years ($p<0.0001$). Significant vascular complications were observed in 9 patients (0.1%): Forearm hematoma due to radial artery perforation 5 (0.6%) (1 developed compartment syndrome needed surgical intervention and blood transfusion), prolonged hand ischemia 2, radial artery bleeding needed surgical suture 1, distal embolization 1. Periprocedural Stroke/TIA 4 patients (0.05%). There were no death related to the procedure. Following the procedure 5 patients (0.07%) developed complex regional pain syndrome treated with anti-inflammatory drugs. Multivariate analysis revealed that early experience (OR 1.26, 95% CI 1.06-1.50, P=0.007), age>75 years (OR 1.23, 95% CI 1.05-1.44, P=0.009), female gender (OR 1.13, 95% CI 1.00-1.27, P=0.011), and diabetic (OR 1.04, 95% CI 0.97-1.11, =0.016) were independent predictors of complications.
Conclusion: Wrist arteries catheterization is associated with unique set of complications, and although infrequent, they present a challenge to catheterization laboratory staff to prevent and manage these issues as they appear.

**Renal Sympathetic Denervation for Resistant Hypertension. A Single Center Experience**

*Shauer, Ayelet; Danenberg, Haim; Lotan, Chaim*
*Hadassah Hebrew University, Cardiology, Jerusalem, Israel*

Introduction: Essential hypertension is the most prevalent disease in the western world. Wide and safe pharmacotherapies exist for the treatment of hypertension, however only 50% of patients achieve adequate blood pressure control, and many patients require multiple medications, often three or more, to adequately control their blood pressure. Catheter-based renal sympathetic denervation is emerging as a novel treatment for patients with resistant hypertension
Methods and results: Seven patients underwent the procedure between July and November 30 2011. Mean (±SD) office blood pressure was 188/80±25/13 mmHg and Mean ambulatory blood pressure was 149/75±12/5 mmHg. Number of antihypertensive medications was 4.1±1.6. Creatinine level was 94±25 micromol/l. The procedure was performed via the femoral artery under mild sedation. Between five to seven (two minutes each) low power radiofrequency ablations were applied along the length of each renal artery using the symplicity catheter (Medtronic). Overall 16 arteries were treated. Patients were hospitalized at the day of the procedure and stayed overnight for observation. There were no complications during or after the procedure. Creatinine level was not significantly changed. The three and six months clinical outcome of this cohort will be presented in the upcoming Israeli Heart Society Meeting.
Conclusions: Renal denervation is a novel and promising procedure for the treatment of resistant hypertension. In our preliminary experience no complications were recorded.