08:30 - 10:00 S12 - Complications and Outcome following Contemporary PCI Hall A

Chairs: **C. Lotan**
M. Mosseri

08:30 **Management and Outcomes of Coronary Artery Perforation During Percutaneous Coronary Intervention - Seven years of institutional experience**
A. Shimony, D. Zahger, R. Ilia, H. Gilutz, A. Shalev, C. Cafri
Beer Sheva

08:45 **The Risk of Cardiac Complications Following Noncardiac Surgery in Patients with Drug Eluting Stents Implanted at Least Six Months Prior to Surgery**
A. Assali, H. Vaknin-assa, E. Lev, I. Ben-dor, T. Ben-Tal, I. Teplitsky, D. Brosh, S. Fuchs, A. Battler, R. Kornowski
Petach Tikva

09:00 **Incidence of No-reflow Pheonomenon in Patients with Acute Myocardial Infarction Due to De Novo Plaque Rupture and Stent Thrombosis**
S. Schwartzenberg, D. Medvedofsky, A. Finkelstein, S. Bazan, A. Halkin, I. Herz, S. Banai, G. Keren, J. George
Tel Aviv

09:15 **Circulating Endothelial Progenitor Cells in Patients who Underwent Late Coronary Stent Thrombosis**
E. Lev, D. Leshem-Lev, N. Harel, D. Dvir, G. Greenberg, A. Assali, A. Battler, R. Kornowski
Petach Tikva

09:30 **A Propensity Score Matched Comparative Analysis of Major Clinical Outcomes Using Drug-Eluting Stents Versus Bare Metal Stents in a Large Single Center Clinical Setting**
T. Bental, A. Assali, S. Fuchs, H. Vaknin-Assa, E.I. Lev, D. Brosh, I. Teplitsky, R. Kornowski
Petach Tikva

09:45 **Ambulatory Discharge Following Transradial Coronary Intervention: Preliminary U.S. Single-center Experience (Same-day TransRadial Intervention and Discharge Evaluation, the STRIDE Study)**
R. Jabara [1,2], R. Gadesam [2], L. Pendyala [2], N. Chronos [2], L. Crisco [2], S. King [2], J. Chen [2]
[1] Jerusalem, [2] Atlanta, GA

Management and Outcomes of Coronary Artery Perforation During Percutaneous Coronary Intervention - Seven years of institutional experience

Avi Shimony, Doron Zahger, Reuben Ilia, Harel Gilutz, Arie Shalev, Carlos Cafri

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Background: Coronary perforation (CP) is a rare, sometimes lethal complication of percutaneous coronary intervention (PCI). We sought to define the incidence and outcome of CP in our institution given the advance in interventional techniques and devices.
Objectives: We analyzed a cohort of patients who had CP during PCI at our hospital over a 7-year period to examine incidence, management and outcomes.
Methods: All patients who had a CP as a complication of PCI between 1/01 – 12/07 were identified retrospectively from our computerized database. Demographic, clinical and procedural data and outcome variables were obtained. CPs were classified by an interventional cardiologist according to an accepted grading score. Type I perforations were defined by the development of an extraluminal crater without extravasation, type II by a pericardial or myocardial blush without contrast jet extravasation and type III by extravasation through a frank (1 mm) perforation or cavity spilling into an anatomic cavity chamber.
Results: 49 cases (Age 67.7±11.7 years) with CP (14.3%, 53% and 32.7% for grade I, II, III respectively) were identified among 8345 interventions performed during the study period (0.59%). The indications for PCI were STEMI, UA/NSTEMI or stable CAD (8.2%, 71.4%, 20.4% respectively). Perforated vessels were LAD (24.5%), LCX (24.5 %), RCA (43%), and SVG's (8%). Vessels were perforated by wires (49 %), balloons (28.6%) and stents (22.4%). Associated lesion characteristics were chronic total occlusion (53%), calcified lesions (40.8%), bifurcation lesion (34.7%), small diameter (≤2.5mm) (34.7%) and in-stent restenosis (4%). Three patients (6%) died in hospital, 9 (18.4%) had tamponade, 8 of whom (16.3%) required urgent pericardiocentesis and 3 (6%) required urgent surgery. Eleven patients (22.4%) were managed percutaneously with covered stents or balloon inflation. All severe complications occurred with grade III perforations (death 3/16; 19%, tamponade 9/16; 56%) but 31% (5/16) of grade III cases did not require any intervention. Most cases with grade I and II were followed conservatively.
Conclusions: Most patients with grade I and II perforations can be managed conservatively while patients with grade III perforations usually require a more aggressive approach. A sizeable minority of patients with grade III perforations can be managed without any intervention.

The Risk of Cardiac Complications Following Noncardiac Surgery in Patients with Drug Eluting Stents Implanted at Least Six Months Prior to Surgery

Abid Assali, Hana Vaknin-assa, Eli Lev, Itsik Ben-dor, Tamer Ben-Tal, Igal Teplitsky, David Brosh, Shmeul Fuchs, Alexander Battler, Ran Kornowski

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BACKGROUND: Non cardiac perioperative management of patients who recently underwent drug-eluting coronary stents (DESs) implantation may be challenging due to potential risk of stent thrombosis. These stents may inhibit re-endothelization of the treated vessel, making it vulnerable to platelet-mediated thrombosis.
OBJECTIVES: Given the anecdotal reports and case series suggesting that DESs may be still vulnerable to coronary thrombosis after six months, we sought to assess this risk.
METHODS: Linking the Rabin Medical Center interventional cardiology database with its non-cardiac surgical database, we have identified 78 patients who underwent DES placement and subsequently [after six months] had noncardiac surgery [15-vascular, 37- abdominal and genitourinary and 26-others, excluding ophthalmic surgery]. Outcome measures included 30-day rate of postoperative myocardial infarction (MI), DES-related thrombosis, and cardiac mortality
RESULTS: Major adverse cardiac events [death and non-fatal MI] occurred in 6 (7.7%) patients including 2 cardiac deaths (2.6%), 4 (5.1%) non-fatal myocardial infarctions (MIs). Two patients (2.6%) sustained stent thrombosis [one patient had 'definite' and one 'probable' stent thrombosis]. All MIs [including stent thrombosis] occurred in the vascular and abdominal surgery group. Two of the MIs events occurred while the patients were on dual antiplatelet agents
CONCLUSIONS: Non cardiac surgery after six months of DES deployment is associated with considerable risk of non-fatal MI and cardiac death. These cardiac complications remain a matter of diagnostic and therapeutic challenge and concern.

Incidence of No-reflow Pheonomenon in Patients with Acute Myocardial Infarction Due to De Novo Plaque Rupture and Stent Thrombosis

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Background: Coronary no-reflow is common in the setting of acute ST-elevation myocardial infarction and is widely recognized as a significant negative prognostic factor. The etiology is attributed to a combination of distal embolization and ischemia/reperfusion injury.

Objective: We sought to determine whether there is a difference between the incidence of no-reflow in acute myocardial infarction (AMI) in the usual setting of an eroded/thrombosed vulnerable plaque as opposed to occclusion of an existing stent by a thrombus.

Methods and results: We performed a retrospective analysis of all patients with AMI who underwent primary PCI during the past two years in our institution (Group A) and of all patients with AMI due to sub acute and late stent thrombosis in the past 8 years (Group B). We excluded patients with cardiogenic shock and renal failure. In Group B, we excluded patients with acute stent thrombosis. No-reflow was defined as TIMI flow score 0 or 1 after successful initial reperfusion (achievement of TIMI flow score 3 in the culprit artery).

Of the 157 patients in Group A, 7 (4.45%) had no-reflow versus only 1 patient (<1%) out of 104 patients in group B ($p < 0.05$).

Conclusion: Our study shows that there is a significantly lower incidence of no-reflow phenomenon in patients with AMI due to angiographically proven stent thrombosis than in patients with "de-novo" AMI. This finding can be explained by the different composition of the microembolic particles dislodged during PCI in the two groups and thus, no-reflow could be attributed to the presence of fragmented atheromatous plaques and not to thrombi.

Circulating Endothelial Progenitor Cells in Patients who Underwent Late Coronary Stent Thrombosis

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Background: An important factor that may contribute to the development of late stent thrombosis (ST) after drug eluting stent (DES) implantation is delayed arterial healing and poor endothelialization. Endothelial progenitor cells (EPCs) have been shown to play a prominent role in repair and re-endothelialization following vascular injury, such as balloon angioplasty. We, therefore, hypothesized that patients who develop late ST may have reduced levels and/or function of EPCs, as a factor contributing to their risk of ST.

Methods: Patients who developed late (>4 weeks following stenting) ST, within the past 3 years, were compared to a matched group of patients who underwent stenting and did not develop complications [matching according to gender, age, diabetes status, type of stent (DES vs. BMS), and current treatment with aspirin, clopidogrel and statins]. All patients had blood samples taken at least 3 months from the ST or index procedure. The percentage of peripheral mononuclear cells expressing VEGFR-2, CD133 and CD34 was evaluated by flow cytometry. EPC colony forming units (CFU) were grown from peripheral blood mononuclear cells, characterized, and counted following 7 days of culture on fibronectin-coated wells.

Results: The two groups (n=15 each) were well matched (93.3% men, mean age 60-62 years, 33.3% diabetes, 80% DES). The proportion of mononuclear cells co-expressing VEGFR-2 and CD133 or VEGFR-2 and CD34 was similar in both groups. However the mean number of CFU was lower among the patients who underwent late ST (Table).

Conclusions: In this preliminary study it appears that patients who had undergone late coronary ST have reduced levels of EPC CFUs, which reflects impaired EPC functional properties. These findings require validation by larger studies, but may contribute to the understanding of the pathogenesis of late ST.

	ST group (n=15)	Control group (n=15)
CD133+, VEGFR-2+ cells (%)	0.67±0.6	0.85±0.6
CD34+, VEGFR-2+ cells (%)	1.17±1.3	1.42±1.1
EPC CFUs (per 10^6 cells)	5.3±2*	11.2±5*

*P=0.002

A Propensity Score Matched Comparative Analysis of Major Clinical Outcomes Using Drug-Eluting Stents Versus Bare Metal Stents in a Large Single Center Clinical Setting

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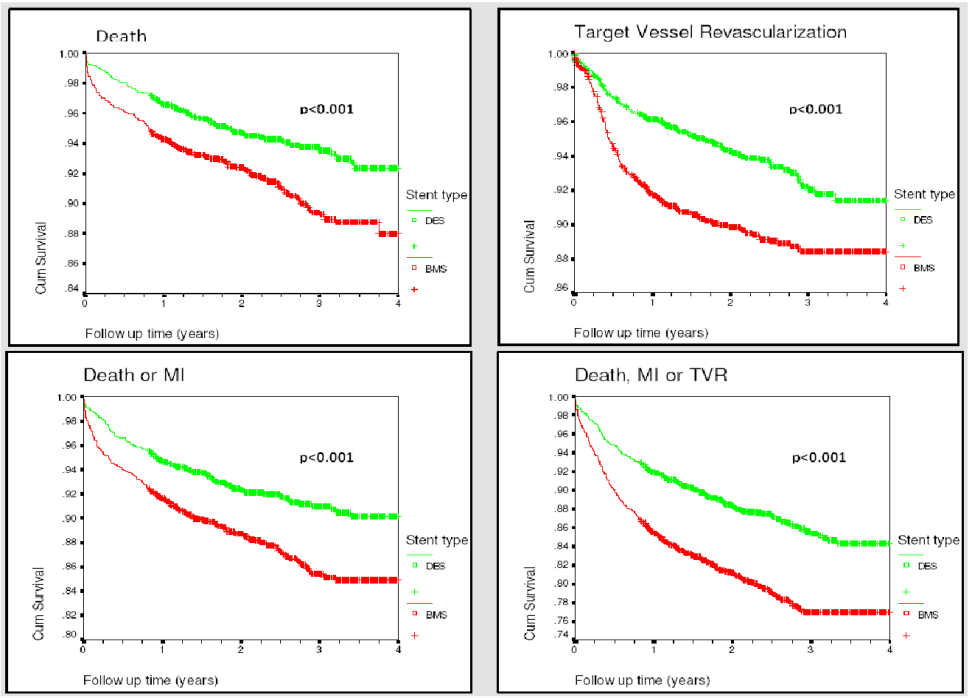
Background: Concerns have been raised about the long-term safety of drug eluting stents (DES) during routine clinical practice among large population cohorts.
Methods: We identified a consecutive cohort of 4700 patients undergoing PCI at our institution between 1/4/2004 and 30/6/2007. We compared total mortality, myocardial infarction (MI), repeat target vessel revascularization (TVR) rates and event-free survival in 3474 propensity score matched patients, of whom 1737 were treated using drug eluting stents (DES group) and 1737 were treated using bare metal stents (BMS group). Follow up time was 9 months to 4 years (mean and median 2.44 years). Propensity score matching balanced well all pre-PCI variables (age, gender, diabetes mellitus, hypertension, prior heart failure, known moderate to severe LV dysfunction, smoking, renal failure, prior CABG, PCI for ST elevation MI, PCI for MI or ACS, severe state, number of vessel disease).
Results: The salient features of the DES group were the use of longer or more stents, treatment of more lesions and of more proximal main vessels. The cumulative mortality was 7.66% in the DES group vs. 12.01% in the BMS group ($p<0.001$). Use of DES reduced the occurrence of MI (3.57% vs.5.2% $p=0.02$), of clinically driven TVR (8.58% vs. 11.58%, $p<0.001$) and of the composite endpoint of death/MI/TVR (15.66% vs. 23.08%; $p<0.001$), as shown in the figures.

Figures: Kaplan-Meier survival plots of the propensity score matched cohort



Conclusions: Our risk-adjusted, propensity score matched event-free survival analysis would indicate a *prognostic advantage* for DES utilization at our institution which sustains to 4 years following PCI.

Ambulatory Discharge Following Transradial Coronary Intervention: Preliminary U.S. Single-center Experience (Same-day TransRadial Intervention and Discharge Evaluation, the STRIDE Study)

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Background: Although the safety and cost-effectiveness of same-day discharge after uncomplicated transradial percutaneous coronary intervention (TR-PCI) is well-established in Europe and Asia, such data are not available for United States patients.
Methods: All patients who underwent TR-PCI at our high-volume, U.S. medical center between 2004 and 2007 were included in this study. The primary endpoint was in-hospital adverse clinical outcomes between 6 and 24 hours post-procedure.
Results: A total of 450 patients were included in this study (age 59±11 years). Of these, 13% were female; 27% were diabetic; 6% had peripheral vascular disease; and 5% had chronic kidney disease. Procedural indications included: stable angina (49%), unstable angina (31%), non-ST elevation myocardial infarction (non-STEMI, 17%), and STEMI (3%). All patients received an intra-arterial cocktail of heparin, verapamil, and nitroglycerin; and 13% of patients received glycoprotein IIb/IIIa inhibitors. Seven percent of patients had 3-vessel disease; 3% had bypass grafts stenoses; and 20% had Class B2/C lesions. Procedural success rate was 96%. A total of 24 (5.3%) post-procedural complications were observed; however, none occurred between hours 6 to 24, the time differential between same-day and next-day discharge. Thirteen patients (2.9%) experienced significant complications within the first 6 hours (MI, urgent repeat revascularization, and ventricular tachycardia). Eleven (2.4%) spontaneously-resolved minor access complications developed. There were 12 same-day discharges according to operators' discretion; none required re-admission.
Conclusions: Although a low incidence of complications did occur, none would have been impacted by same-day discharge. Those observed prior to 6 hours would have prevented early discharge; and those occurring after 24 hours would have been unaffected by routine, next-day discharge. This observational study demonstrated the safety and feasibility for a prospective evaluation of ambulatory TR-PCI in an American practice setting.