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Bypassing ER to Improve Outcomes of Patients with STEMI: Analysis of Data from 2004-2010 ACSIS

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Background: Rapid reperfusion of an infarct-related artery is crucial for the successful treatment of STEMI. In our previous analysis of data from 2004-2006 ACSIS we showed that bypassing the ER shortens door-to-balloon time and improves 30 day MACE.

Objectives: The main aim of our current analysis is to demonstrate whether bypassing ER causes any meaningful reduction of MACE and mortality in a larger cohort of STEMI patients.

Methods: We analyzed data of 1552 patients with STEMI treated by primary PCI from the 2004, 2006, 2008 and 2010 ACSIS registry. Thirty percent of patients (459 of 1552) arrived directly to the Intensive Cardiac Care Unit (ICCU) or Catheterization Laboratory and 70% (1093 of 1552) were assessed first in the ER. Our primary end points were door-to-balloon time, 30 day MACE and 30 day and 1 year mortality in the two study groups. Our secondary end points were pre discharge ejection fraction, in - hospital pulmonary edema and in- hospital cardiogenic shock.

Results: The study groups were well balanced according to basic demographic characteristics. There was no significant difference in Killip class on presentation, percentage of anterior STEMI or pain to door time between the groups. There was significant reduction in mean door to balloon time in the bypass ER group (59 vs 97, p=0.001). There was no difference in 30 day MACE, 30 day mortality or 1 year mortality between the two study groups. There was significantly less in-hospital pulmonary edema in the bypass ER group. We performed subgroup analysis of patients with anterior STEMI, women and patients arriving during weekends. There was no significant difference in frequency of primary end points in any of these subgroups.

Conclusions: In the analysis of 2004-2010 ACSIS data, we demonstrated that the bypass ER policy led to significant shortening of door- to - balloon time. However, we were unable to demonstrate any significant difference in 30 day MACE, 30 day and 1 year mortality.

One-Year Outcome Following Coronary Intervention in Elderly Patients with Non-ST Elevation ACS

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Background: Elderly patients with non-ST-segment elevation acute coronary syndromes (NSTE-ACS) may benefit from early coronary intervention. We aimed to evaluate the outcome of elderly patients with NSTE-ACS following coronary angiography in a real world setting.

Methods: The risk of 30-day and 1-year mortality by age and the time of coronary angiography (categorized as early [>48 h of admission] and late [>48 h of admission]) was assessed among 2,021 NSTE-ACS patients enrolled in the Acute Coronary Syndromes Israeli Survey (ACSIS) between 2004 and 2008.

Results: Elderly patients (>75 years) comprised 30% of the study population, and experienced a significantly higher rate of in-hospital complications. The risk of 1-year mortality was 2.6-fold ($p<0.001$) higher among elderly patients as compared with younger patients. Multivariate analysis showed that among patients aged >75 years, early and late interventions were associated with a lower risk of death at 30-day (HR=0.27 [$p=0.0008$] and HR 0.34 [$p=0.004$], respectively) and at 1-year (HR=0.41 [$p=0.0002$] and 0.52 [$p=0.003$], respectively) as compared with no intervention. In octogenarian patients (>80 years), early coronary angiography was associated with higher survival rates at 1-year (84%) as compared with both late coronary angiography (75%) or no intervention (61%; $p<0.001$ for both comparisons).

Conclusions: Our findings demonstrate that elderly patients comprise a high risk subset of the NSTE-ACS population, in whom coronary intervention is independently associated with a lower risk of mortality at 30 days and 1-year. Early intervention (within 48h) appears to be associated with a more favorable effect than late intervention in the octogenarian age-group.

Comparison of Outcome of Recurrent Versus First Non-ST-Elevation MI: Data from ACSIS 2000-2010

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Patients who sustain a recurrent acute MI are at an increased risk for complications and death. Objective: We compared the outcome of recurrent to first acute non-ST-elevation MI (NSTEMI) patients hospitalized in all CCUs during ACSIS 2000-2010.

Methods: We performed biennial prospective nationwide AMI/ACS surveys, collecting data prospectively from all patients hospitalized in all 26 CCUs in Israel

Results: Our cohort comprises of 3,596 NSTEMI patients. During the study period there was an increased usage of evidence based medications and interventions.

Year	2000	2002	2004	2006	2008	2010	All	P trend	P Recurrent vs. First
Recurrent NSTEMI (N)	110	188	224	273	231	266	1,292		
Age (yrs)	68	69	70	69	70	68	69	NS	0.0001
Coronary angiography (%)	54	60	56	63	73	78	65	0.0001	0.0001
Killip ≥ 2 (%)	42	31	28	34	18	25	29	0.0002	0.0001
Hospital mortality (%)	8.2	5.9	7.6	4.4	3.5	4.5	5.3	<0.05	0.004
1-year mortality (%)	20.9	15.4	21.3	15.0	14.9	N/A	17.2	NS	0.0001
First NSTEMI (N)	186	364	434	466	434	420	2,304		
Age (yrs)	65	65	65	65	63	64	65	NS	-
Coronary angiography (%)	58	62	65	79	83	86	74	0.0001	-
Killip ≥ 2 (%)	31	19	13	15	11	13	15	0.0001	-
Hospital mortality (%)	2.2	5.2	2.3	3.2	3.5	3.3	3.3	NS	-
1-year mortality (%)	10.8	12.6	11.4	8.6	7.0	N/A	9.9	0.009	-

Conclusions: Despite the improved therapeutic approach of NSTEMI patients in recent years, patients admitted for recurrent NSTEMI share a worse 1-year outcome as compared to first NSTEMI counterparts. An improved therapeutic approach is needed for these high risk patients.

Statins Loading before Percutaneous Coronary Intervention in Acute Coronary Syndrome
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Background: Early statin loading has been shown to reduce ischemic complications in patients undergoing PCI in the course of ACS and to improve indices of reperfusion in STEMI patients undergoing PPCI in small prospective randomized studies. The purpose of this study was to evaluate the effect of early statin loading in a nationwide registry of "real world" ACS patients.

Methods: ACSIS is a 2-month biannual nationwide ACS survey which documents all ACS patients admitted to each of the 26 cardiac departments in Israel. ACSIS 2010 comprised 1781 ACS patients. The study cohort consisted of the 1270 patients undergoing PCI during their in-hospital stay. Administration of statin loading and its timing were prespecified in the CRF.

Results: Statin loading was administered to 361 patients (28%) before the PCI who were compared with 909 patients (72%) who did not receive a statin before PCI. There were no differences in age (63 ± 13 vs. 62 ± 12 , $p=0.2$) or gender distribution (male: 79% vs. 81%, $p=0.6$) between groups. Pre-loaded patients were less likely to have dyslipidemia (69% vs. 78%, $p=0.01$) and to have been on chronic statin therapy prior to the index ACS (45% vs. 52%, $p=0.02$). Distribution of STEMI was similar between pre-loaded and non-pre-loaded groups (53% vs. 51%, $p=0.15$), however, among those who underwent PPCI statin loading prior to the PCI was associated with significantly higher incidence of early ST-resolution (80% vs. 66%, $p=0.003$). While statins were almost universally prescribed at discharge (98% vs. 97%, $p=0.9$), early statin loading was associated with significantly lower 30 days need for coronary re-intervention (2.8% vs. 7.9%, $p<0.001$).

Conclusions: In patients undergoing PCI for ACS, statin loading before the PCI is associated with markers of better myocardial reperfusion and less need for reintervention.

Thrombus Aspiration in STEMI Patients Undergoing Primary PCI - Insights from ACSIS 2010

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Background: Prior studies have suggested that thrombus aspiration prior to coronary stenting in patients with STEMI undergoing primary PCI (PPCI) improves clinical outcome.

Aim: To assess the impact of thrombus aspiration (TA) before stent implantation in STEMI pts undergoing PPCI on: (a) Infarct size: assessed by maximal CPK/troponin levels and LVEF; (b) MACE at 30 days (death, recurrent MI/ischemia, stent thrombosis, urgent revascularization, ischemic stroke). Methods: 517 STEMI patients who underwent PPCI and hospitalized in 26 CCUs during a 2-month national ACS Israeli Survey (ACIS) 2010 were included.

Results:

On multivariate regression analysis only TIMI 0-1 before PPCI was independently associated with use of TA (OR=3.47;2.28-5.28, p<0.0001). Use of TA was not associated with a better 30-day MACE (OR=0.93;0.48-1.81, p=0.84) after covariate adjustment for pertinent variables and the propensity score for TA use.

Conclusions: In "real-world" practice use of thrombus aspiration before stent implantation in STEMI pts undergoing PPCI was not associated with a better outcome at 30 days, and did not affect infarct size.

Radial Intervention in Patients with Acute Coronary Syndromes - Results from ACSIS PCI 2010

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Background: Bleeding following percutaneous coronary interventions (PCI) for acute coronary syndromes (ACS) is associated with increased morbidity and mortality. Trans-radial access (TRA) has been shown to reduce bleeding risk and in some studies was associated with better clinical outcomes. Based on the results of the ACSIS 2010 nationwide registry, we describe current uptake of the radial approach for ACS patients undergoing PCI in Israel, and compare outcomes of these patients to patients undergoing angiography using trans-femoral access (TFA). **Methods:** ACSIS is a 2-month biannual nationwide ACS survey which documents all ACS patients admitted to each of the 26 cardiac departments in Israel. Patient and procedural data were collected in the ACSIS-PCI 2010 registry for all patients undergoing PCI for acute coronary syndrome. Clinical characteristics, in-hospital and 30-day outcome were compared between TRA and TFA. All data handling was performed by the ACSIS registry team. **Results:** Of 2,193 ACS patients, 1815 ACS patients underwent coronary angiography, 515 (28%) of which were primary PCI for STEMI. Of the total cohort TRA was performed in 613 (34%) and TFA in 1189 (66%) cases. TFA patients were marginally older (63.4 ± 12 vs. 62 ± 12 years, $p=0.018$). Previous CABG patients were less likely to undergo TRA (5% vs 12% TFA, $p<0.001$). No other major differences were noted in baseline clinical or angiographic features. In the primary PCI cohort, TRA patients were younger (59 ± 11 vs. 61.7 ± 12 , $p=0.018$) and less likely to present with high risk STEMI (lower frequency of KILLIP class III-IV, initial TIMI 0-1 flow, and higher frequency of q-wave MI and low ejection fraction). Unadjusted 30 day outcomes are presented in the figure. **Conclusions:** The radial approach is used frequently but selectively in ACS patients undergoing coronary angiography/PCI in Israel. Reduced bleeding rates and improved clinical outcomes were observed in the TRA treated cohort.

Predictors of High-Risk Angiographic Findings in Patients with Non ST-Elevation ACS

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Background: In patients with non ST-elevation acute coronary syndrome (NSTE-ACS) the decision on early invasive strategy is stratified using risk calculation based on several clinical parameters and elevated cardiac biomarkers. We aimed to identify predictors of the angiographic extent and severity of coronary artery disease (CAD) in NSTE-ACS patients undergoing coronary angiography.

Methods: We evaluated 923 patients with NSTE-ACS included in the ACSIS and ACSIS PCI registry who underwent coronary angiography. High-risk coronary anatomy was defined as: left main disease >50%, proximal LAD lesion >70%, and 2-3 vessel disease involving the LAD. Clinical characteristics, in-hospital and 30-day outcome were compared between the high-risk (N=370) and the low-risk (N=553) group. Multivariable analysis was performed to identify independent predictors of high-risk anatomy.

Results: High-risk anatomy patients were significantly older, had a higher prevalence of renal failure, prior angina pectoris and heart failure, diabetes mellitus, peripheral vascular disease (PVD), and presented more often with Killip class >1 (15.4% vs. 5.4%, $p<0.0001$), ST-depression (33% vs. 24.8%, $p=0.0006$), and a lower ejection fraction (48.4% vs. 51.8%, $p=0.003$). The proportion of patients with abnormal biomarkers was similar between the groups; however, hyperglycemia was more frequent in the high-risk group which had higher rates of 30-day mortality (2.7% vs. 0.18%, $p=0.0006$), and combined mortality, myocardial infarction, and stroke (5.4% vs. 2.2%, $p=0.0014$). Independent predictors of high-risk anatomy included age (OR 1.36 95%CI 1.19-1.54), admission Killip class>I (OR 2.29 95%CI 1.28-4.07), PVD (OR 2.70 95%CI 1.42-5.09), and hyperglycemia (OR 1.03 95%CI 1.00-1.05).

Conclusions: In NSTE-ACS, extent and severity of CAD is predicted by clinical parameters but not by cardiac biomarker elevation. This finding should be included in the risk stratification of patients with NSTE-ACS.