

**Prognostic Factors in Pulmonary Hypertension: The Obesity Paradox**

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Background: Prognostic assessment in patients with pulmonary hypertension is important for clinical evaluation and therapeutical decision making.

Methods: A total of 105 consecutive patients with a diagnosis of pulmonary hypertension were evaluated by clinical characteristics, echocardiographic and right heart catheterization parameters. We assessed prognostic factors during a mean follow-up period of 19±13 months, by univariate and multivariate regression analysis for mortality.

Results: During follow-up period, 30 patients (29%) died. Death was associated in univariate analysis with higher pulmonary artery and right atrial pressures, enlarged right ventricular size and reduced function, preserved LV systolic function by echo, higher trans-pulmonary gradient and pulmonary vascular resistance, and inverse relation with body mass index (BMI). Lower cardiac output, elevated capillary wedge pressures and clinical heart failure, were not associated with higher mortality rates during follow-up. In multivariate analysis, obesity (BMI≥30kg/m<sup>2</sup>), was the only variable independently and significantly correlated with improved survival [H.R 0.2, 95% C.I 0.1-0.5; p=0.001], even after adjustment for baseline characteristics or heart failure measures. Obese (BMI≥30kg/m<sup>2</sup>) and very-obese (BMI≥35kg/m<sup>2</sup>) patients had significantly less mortality rates (15% and 8%, respectively) than normal/over-weight patients (35% and 40%, respectively) during follow-up (p=0.02).

Conclusions: In a cohort of pulmonary hypertension patients, obesity was significantly associated with lower mortality in multivariate analysis, compared to normal and over-weight patients. Similar to previous observations in other cardiovascular states, there may be an "obesity paradox" in patients with pulmonary hypertension, necessitating further research in larger cohorts of patients.

<IMAGE02>

## **Lipid Control in Patients with Coronary Heart Disease Treated in Primary Care or Cardiology Clinics**

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Background: Guidelines for lipid lowering therapy recommend LDL-cholesterol target of <70 mg/dl in patients with coronary heart disease. However, this LDL-cholesterol goal is not achieved in many of these high risk patients. We aimed to compare LDL-cholesterol control in patients with coronary disease treated only by a general care physician or by a cardiologist.

Methods: Included were patients with coronary heart disease who had full lipid profile available during 2010. The primary endpoints were the percentage of patients who achieved the LDL-C goals of <100mg/dl and <70mg/dl in the two groups.

Results: Of the 27,172 patients with coronary heart disease, 12,965 (47.7%) were followed-up only by a primary care physician and 14,207 (52.3%) were followed-up in a cardiology clinic. Overall, 18,366 (67.6%) patients achieved the LDL-C goal of <100mg/dl while only 6517 (24%) achieved the lower LDL-C goal of <70mg/dl. Patients who were followed-up by a cardiologist more frequently achieved the LDL-C goal of <100mg/dl (74.3% and 60.3%,  $p<0.0001$ , in patients treated by a cardiologist or by a primary care physician, respectively), as well as the lower LDL-C goal of <70mg/dl (27.2% and 20.4%,  $p<0.0001$ , in patients treated by a cardiologist or by a primary care physician, respectively). Differences in LDL-C control between the 2 groups remained highly statistically significant following a multivariate adjustment. Furthermore, patients followed up by a cardiologist were more commonly treated with highly potent statins and with non-statin cholesterol lowering drugs.

Conclusions: Among patients with coronary heart disease, those followed-up by a cardiologist receive a better anti-lipid treatment and more frequently achieve lipids goals. Nevertheless, the poor lipid control in both groups warrants an effort to improve lipid control in both primary care and cardiology clinics.

## **Smoking Reduction at Midlife and Lifetime Mortality Risk: A Follow-Up Study of Israeli Working Men**

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Previous studies failed to demonstrate survival advantage of smoking reduction. The authors assessed survival and life expectancy according to changes in smoking intensity in a cohort of Israeli working men. Baseline smokers recruited in 1963 were reassessed in 1965 (n = 4,633; mean age, 51 years) and followed-up prospectively for mortality through 2005. Smoking intensity at both time-points was self-reported and categorized as none, 1-10, 11-20, and greater than 20 cigarettes per day. Change between smoking categories was noted, and participants were classified as follows: increased (8%), maintained (65%), reduced (17%) or quit smoking (10%). During a median (Q1 - Q3) follow-up of 26 (16 - 35) years, 87% of participants died. Changes in intensity were associated with survival (Figure). In multivariable-adjusted models, the HRs (95% CIs) for mortality were 1.14 (0.99, 1.32) among increasers, 0.85 (0.77, 0.95) among reducers and 0.78 (0.69, 0.89) among quitters, compared with maintainers. Inversely, the adjusted ORs (95% CIs) of surviving to age 80 were 0.77 (0.60, 0.98), 1.22 (1.01, 1.47) and 1.33 (1.07, 1.66), respectively. The survival benefit associated with smoking reduction was mostly evident among heavy smokers and for cardiovascular disease mortality. These results suggest that decreasing smoking intensity should be considered as a risk-reduction strategy for heavy smokers who cannot quit abruptly.

<IMAGE03>

## **Air Pollution Exposure and Long-Term Outcomes after MI in Central Israel. A Follow-Up Study**

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**Objective:** In a community-based cohort of myocardial infarction (MI) survivors, we examined whether cumulative residential exposure to air pollutants constitutes a risk factor for adverse outcomes.

**Methods:** Patients aged  $\leq 65$  years ( $n=1,428$ ), admitted with first MI in 1992-1993 to the 8 hospitals serving the population of central Israel, were followed up through 2005. Extensive data were collected on socio-demographic, clinical, and environmental factors. Daily measures of nitrogen dioxide (NO<sub>2</sub>), nitric oxide (NO) and fine particles (PM<sub>2.5</sub>) recorded at air quality monitoring stations were summarized and cumulative exposure was estimated for each patient based on geo-coded residential location at study entry. Cox models were used to assess the hazard ratios (HRs) for all-cause death, cardiac death, recurrent MI, heart failure and stroke associated with a 10  $\mu\text{g}/\text{m}^3$  increase in pollutant exposure.

**Results:** Patients residing in more polluted areas had better socioeconomic status at both the individual and neighborhood levels. Exposure to pollutants was inversely associated with outcomes. However, these associations were either removed or reversed upon multivariable adjustment for socioeconomic and clinical variables (HRs [95% CIs] of PM<sub>2.5</sub> are reported in the Table).

**Conclusions:** In this unique setting and in contrast to other reports, better socioeconomic status was associated with higher exposure to pollution. In multivariable-models accounting for socioeconomic and clinical variables, we observed a weak positive association between PM<sub>2.5</sub> exposure and post-MI outcomes, consistent with findings in the general population. Considering exposure misclassification, the true association is likely stronger.

## Type-II MI - Demographics, Presentation, Management and Outcome, Results From ACSIS 2008-2010

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**Background:** Although almost five years have elapsed since a consensus document classified type-II myocardial infarction (MI) as MI secondary to ischemia due to either increased oxygen demand or decreased supply, knowledge is still scarce regarding epidemiology, causes, management and outcome of patients with type-II MI.

**Methods:** A comparative analysis was performed between patients with type-I and type-II MI who participated in two national Acute Coronary Syndrome Israeli Surveys (AC SIS) in the years 2008 and 2010.

**Results:** Of the total number of 2818 patients with acute MI who were included, 127 (4.5%) had type-II MI. The main causes for type-II MI were: Anemia (36%), sepsis (28%), arrhythmia (20%), post-surgical procedures (16%), hypoxia (16%) and heart failure (13%). In contrast to type-I MI, patients with type-II MI tended to be more frequently females (43.3% vs. 22.3%,  $p < 0.0001$ ), older (75.6±12 vs. 63.8±13,  $p < 0.0001$ ) and had more cardiovascular comorbidities ( $p < 0.0001$ ). Clinical presentation differed between groups (Table 1). Patients with type-II MI were less likely to undergo coronary angiography (36% vs. 88%,  $p < 0.0001$ ), and had substantially higher 30-day mortality rates (13.6% vs. 4.9%,  $p < 0.0001$ ).

**Conclusions:** We found significant differences in demographics, comorbidities and clinical presentation between patients with type-I and type-II MI. These differences may explain underutilization of coronary angiography, and higher mortality among patients with type-II MI.

Presenting symptom	TYPE II	TYPE I	p
Typical angina	54.3	84.5	<0.0001
Atypical chest pain	20.5	7.5	<0.0001
STEMI	20.0	55	<0.0001
Heart failure	59.1	25.5	<0.0001
Syncope	5.5	4.1	NS
Arrhythmia	14.2	4.7	<0.0001
Dyspnea	11.8	3.9	0.00002

## **Prevalence, Characteristics and Compliance to Treatment of Obstructive Sleep Apnea in CHD Patients**

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**Background:** Obstructive sleep apnea (OSA) is commonly associated with obesity, diabetes, hypertension, CHF and atrial fibrillation, conditions that are also related to coronary heart disease (CHD). It is unclear if and which patients with CHD should be routinely screened for OSA.

**Aim:** to evaluate the prevalence, characteristics and response to treatment recommendations of OSA in unselected patients with stable CHD presenting for routine followup in a cardiology clinic.

**Methods:** During a period of 6 months, all patients with stable CHD presenting for routine followup in pre-specified cardiology clinics were offered to participate in the study. Excluded were patients with chronic AF, a pacemaker, those that had undergone a sleep study previously and those that resided beyond 50 km of the hospital. Participants underwent a sleep history, sleep questionnaires, anthropometric measurements and an ambulatory partial sleep study. Clinical and laboratory data were extracted from the clinic computerized database.

**Results:** Of the 249 patients screened, 90 had exclusion criteria and 54 had previously undergone a sleep study. Amongst the 105 patients enrolled, the average age was  $67.4 \pm 8.8$  years and 89% were men. OSA was found in 42% of the patients, with 24% having moderate or severe OSA (RDI > 15). OSA prevalence was increased in patients with BMI  $\geq 30$  kg/m<sup>2</sup> (60%), but not amongst hypertensives and diabetics ((43% and 40% respectively). Of the 35 patients offered therapy only 24 agreed to meet with a sleep specialist, of which 3 improved after weight loss, 10 tried using CPAP but only 4 finally purchased the machine.

**Conclusion:** OSA is extremely common in patients with stable CHD. Screening should be considered in all such patients, but is especially justified in those with obesity. However, willingness to receive treatment is very low in these asymptomatic patients, and strategies to improve compliance should be explored.