Effect of Atrial Fibrillation on Mitral Incompetence Severity Established by Echocardiography

Adi Butnaru [1], Joseph Shaheen [1], Ofer Merin [2], Shuli Silberman [2], David Rosenmann [1], Dan Tzivoni [1]

[1] *Cardiology,* [2] *Cardio-Thoracic Surgery, Shaare Zedek Medical Center, Jerusalem, Israel*

Background: Presently there is no data on the effect of atrial fibrillation (AF) on the severity of mitral insufficiency.
We have observed that some patients with AF experience improvement of their mitral regurgitation (MR) upon return to sinus rhythm.
Objective: 1) to measure the influence of heart rhythm (sinus or atrial fibrillation) on severity of MR
2) to define clinical and echocardiographic parameters that influence the changes in MR severity in these patients
Methods: Between 1992-2006 we found 335 patients (51% males, mean age 62.27±16.07 years) with significant mitral insufficiency while in atrial fibrillation who underwent follow up echocardiography within 6 months, while in sinus rhythm. These patients were divided into 2 groups according to degree of MR improvement after returning to sinus rhythm: patients who improved by two grades or more (group 1) or by less than 2 grades (group 2).
Results: There were 98 patients (29.25%) in group 1 (55% males, mean age 66.1yrs). There was no difference between the groups in relation to hypertension, diabetes, stable or unstable coronary artery disease.
Left ventricular dimensions improved significantly (left ventricular end diastolic (LVEDD) from 5.13 cm to 4.98cm, p=0.0363, left ventricular end systolic (LVESD) from 3.62cm to 3.40cm, p=0.0314) compared to group 2 (LVEDD 5.18 cm to 5.25cm, p=0.3410, LVESD 3.69cm to 3.71cm, p=0.2995).
Patients in group 1 had a morphologically normal mitral valve in 32.6% vs only 23.6% in group 2 (p=0.087).
In addition, left atrial (LA) dimensions improved significantly (4.73cm to 4.31cm, p=0.0425) in group 1 compared to group 2 (4.71cm to 4.72 cm, p=0.4270) and pulmonary artery pressures improved marginally (from 44.41 mmHg to 37.48 mmHg, p=0.0587) in group 1, compared to group 2 (44.71mmHg to 41.57mmHg, p=0.1624).
Conclusions: In 30% of patients with paroxysmal AF, MR improves significantly after cardioversion to sinus rhythm. Clinical decisions should be based on echocardiographic data when the patient is in sinus rhythm.

The Natural History of Moderate Aortic Regurgitation

Daniel Weisenberg, Alex Omelchenko, Yaron Shapira, Mordehay Vaturi, Daniel Monakier, Alexander Battler, Alex Sagie

Cardiology Department, Echocardiography, Rabin Medical Center, Petach Tikva, Israel

Background: Whether to replace the aortic valve for moderate aortic regurgitation (AR) in patients refer for cardiac surgery primarily for CABG or MVR is still debatable. Therefore, we sought to study the rate of progression of moderate AR and the need for future surgical intervention.

Methods and Results: Two hundred and sixty-two consecutive patients (162 men,100 women; mean age 65 ± 15 year ,range 21 to 93) with moderate AR and no more than mild aortic stenosis, were followed for 42 ± 31 months. AR resulted from disease of the aortic leaflets in 145 patients (55%): 85-degenerative disease, 54-rheumatic and 6 infective endocarditis. In 70 patients (27%) the AR was secondary to dilatation of the aortic root and/or ascending aorta (average aortic diameter 48 ±6 mm).In the remaining 47 patients (18%) the cause of the AR could not be determined. Progression to severe AR occurred in 18 of the 262 patients (6.8%) , an average rate of progression of 5.1% per year. Progressors were evenly distributed between valvar disease and aortic root dilatation. Three of the patients with aortic dilatation underwent aortic valve replacement : one of them due to type A aortic dissection.

Conclusions: A small proportion of patients with moderate AR progress to severe disease in the mid-term. Etiology of the disease doesn´t seem to influence the rate of progression. A minority of patients needed aortic valve replacement during follow-up. Therefore, the indication of prophylactic valve replacement in patients with moderate AR who undergo coronary artery bypass or mitral valve surgery is questionable.

Comparison of Fast Instantaneous 3 D Echocardiography Analysis with Cardiac MR Imaging for the Evaluation of Left Ventricular and Left Atrial Volumes - A Pilot Analysis

Chaim Yosefy [1], Orly Gotyain [2], Eli Konen [2], Amos Katz [1]

[1] Cardiology Department, Barzilai Medical Center Campus, Ben-Gurion University, Ashkelon, [2] Department of Medical Imaging, Sheba Medical Center, Sheba Medical Center Heart Institute, Tel Aviv University, Tel Aviv, Israel

Introduction: Left ventricular (LV) ejection fraction (EF) and Left Atrial (LA) volume are an important predictors of morbidity and mortality in a wide range of patients and clinical scenarios. LV and LA volumes and EF measurements from two-dimensional echocardiographic (2DE) images are subjective, time-consuming, and relatively inaccurate. Real-time 3DE technique is a novel technique capable of instantaneous acquisition of volumetric images. The aim of this pilot analysis was to validate a new method for rapid, online measurement of LV and LA volumes from 3DE data using cardiac magnetic resonance (CMR) as the reference

Methods: CMR and 3DE data from 8 unselected patients (aged 15-61) that underwent cardiac evaluation for various reasons were obtained. The 3DE parameters: end systolic (ES) and end diastolic (ED) of LV and LA were analyzed using iE-33 machine designed to automatically detect the endocardial surface calculate ESV and EDV from voxel counts. 3DE-derived LV and LA volumes were compared with CMR volume measurements that were performed by the CMR physician corrected analysis (linear regression, Bland–Altman analysis).

Results: The analysis results, comparison and the correlations are presented in the table:

Parameter	CMR ml	3DE ml	r^2 (3DE vs. CMR)	Limits of agreement
LV EDV	108.6±26.9	105.9±27.1	0.81	SD: 11 ml, 9.3%
LV ESV	43.4±9.	41.2±8.1		
LA EDV	39.4±46.9	37.9±41.8	0.76	SD: 14 ml, 11.5%
LA ESV	64.4±44.0	59.8±39.1		

Conclusions: The 3DE have good correlation and close limits of agreement with CMR for calculating LV and LA volumes. The 3DE analysis offers a rapid, and accurate method for LV, LA volume and therefore LVEF calculation. This novel tool can mitigate the errors inherent to 2DE.

Is the Common Cut-Off Point for Prophylactic Surgery to Prevent Aortic Dissection Too High?

Ehud Kadmon[1], Asaf Fishelevitz[2], Yaron Shapira[1], Mordechay Vaturi[1], Daniel Weisenberg[1], Daniel Monakier[1], Alexander Sagie[1]

[1] *Cardiology, Echocardiography, Rabin Medical Center, Petach Tikva,* [2] *Medical School, Tel Aviv University, Tel Aviv, Israel*

Background: Aortic diameter ≥5.0 to 5.5cm is the cut-off point, under which it is recommended to perform elective surgery to prevent aortic dissection (AD), in non-Marfan patients with tri-leaflet valves.
We summarized the data of patients with AD, undergoing echocardiography in our hospital, with special focus on maximal ascending aortic diameter.
Methods: Computer records of all transesophageal echocardiograms (TEE) of acute type A AD by Stanford classification, performed in our hospital in the last 10 years were reviewed. Patients' characteristics and cardiograms were reviewed. TEE's were performed on presentation or intraoperatively.
Results: The study group included 47 patients, mean age 58±13 (range 27-79), 68% male. 70% had DeBakey type I dissection, and 30% had DeBakey type II dissection. The average aortic diameter was 5.2±1cm: It was >5.5 cm in 15 patients (32%), 5.0-5.5 cm in 12 patients (25%) and smaller than 5.0cm in 20 patients (43%). Thirty-day mortality was 23%, all with aortic diameter <5.5cm. Aortic diameter was <5.5 cm in 3/4 patients with Marfan syndrome, 2/2 patients with bicuspid aortic valve and 9/11 patients with atherosclerosis.
Hypertension was common (68%) and was evenly distributed among those with diameter <5.5cm and >5.5cm.
Conclusions: The majority (68%) of patients with AD had aortic diameter <5.5cm, i.e. below the threshold for prophylactic surgery, including non-Marfan patients with tri-leaflet valves. This calls for reconsideration of the cut-off values for prophylactic surgery.

Reproducibility of Visual Assessment of Segmental Wall Motion on Echocardiograms: A Multicenter Study by the Israeli Echocardiography Research Group

David S Blondheim [1], Ronen Beeri [2], Mordehay Vaturi [3], Yossi Tsadok [4], Sarah Shimoni [5], Alik Sagie [3], David Rosenmann [6], Marina Leitman [7], Rafael Kuperstein [8], Ilan Hay [8], Dan Gilon [2], Micha S Feinberg [8], Yoram Agmon [9], Volfgang Fehske [10], Noah Liel-Cohen [4]

[1] Hillel-Yaffe Medical Center, Hadera, [2] Hadassah University Hospital, Jerusalem, [3] Rabin Medical Center, Petach Tikva, [4] Soroka Ben Gurion University Medical Center, Beer Sheva, [5] Kaplan Medical Center, Rehovot, [6] Shaare Zedek Medical Center, Jerusalem, [7] Assaf Harofeh Medical Center, Zerifin, [8] Sheba Medical Center, Tel Aviv, [9] Rambam Medical Center, Haifa, Israel, [10] Department of Cardiology, Noninvasive Cardiology, St. Vinzenz Hospital, Cologne, Germany

Background: Quantification of wall motion abnormalities (WMA) is of paramount importance in interpretation of echocardiograms. Visual assessment of WMA is widely used but data are lacking on its accuracy. We determined this method's accuracy in expert hands using contemporary echo-technology.

Methods: Echo studies of 105 patients (28 healthy, 62 IHD, 15 DCM) were performed using Vivid 7 (GE) echo machines and analyzed blindedly by 10 experienced readers. Readers scored (1=normal to 4=dyskinetic) 18 segments from 3 apical views per-patient. A segmental "gold-standard" score (GSS) was constructed by the majority score.

Results: Of 1890 segments, 66% were normal by GSS, 30% abnormal and 4% unreadable. The overall readers' **inter-observer** variability when dichotomizing segments into normal (score 1) vs. abnormal (scores 2-4) had a Kappa of 0.65 ($p<0.0001$). For scoring WMA from 1 to 4, Kappa was 0.65, 0.28, 0.5 and 0.26 respectively, mean 0.5 ($p<0.0001$ for all) and Kendall's coefficient of concordance 0.73. **Intra-observer** variability was assessed in 10 patients: for dichotomizing segments (normal/abnormal) mean Kappa was 0.71 (individual reader's Kappas 0.5- 0.91). For scoring WMA from 1 to 4, Kappa was 0.71, 0.36, 0.55, 0.39, respectively, average 0.57 and Kendall's statistic 0.88. Compared to GSS scores: for dichotomizing segments (normal/abnormal) mean Kappa was 0.77 (individual Kappas 0.67-0.84). For scoring segments from1 to 4, Kappa was 0.77, 0.46, 0.65 and 0.37, respectively, mean was 0.64 and Kendall's statistic was 0.90.

Conclusion: Experienced readers had considerable inter- and intra-observer variability in quantifying WMA. Introduction of standardization methods or development of objective/ automated methods are necessary to assist visual WMA assessment.

Posterior Descending Coronary Artery Blood Velocities: Value and Feasibility of Non-invasive Sampling

Dawod Sharif [1], Amal Sharif-Rasslan [2], Camilia Shahla [1], Amin Khalil [1], Uri Rosenschein [1]

[1] Cardiology, Bnai Zion Medical Center, [2] Technology and Sceince, Technion, Haifa, Israel

Recent developments in echocardiography made transthoracic echocardiography (TTE)-Doppler sampling of coronary artery velocities possible. Left anterior descending coronary artery (LAD) velocities by TTE- Doppler is feasible almost in all subjects even without echo-contrast. Aim: Evaluation of feasibility of TTE-Doppler sampling of posterior descending coronary artery (PDA) velocities. Methods: Forty seven subjects, were studied, 27males, age 51.8±24.9 years, range 6-94 years, weight 74.6±16.7 kg. range 46-111 kg. Sampling of TTE-Doppler of the PDA were attempted from modified apical two-chamber views using 3.5 MHZ transducers. Results: Peak velocities in diastole 51.1±15.9 cm/sec were higher than in systole 23.2±6 cm/sec, $p<0.001$. Time velocity integral in diastole 15.9±5.4cm were higher than in systole 5.1±2.1 cm, $p<0.001$. Diastolic pressure half time averaged 178.3±65 msec and deceleration time 597±212.6 msec. Flow in the PDA in diastole 43.7±20.6 ml/min was higher than in systole 13.8±6.7 ml/min, $p<0.001$. Diastolic to systolic velocity ratio averaged 2.28±0.67, and was less than 1.5 in 3 subjects with severe PDA stenosis. Conclusions: Sampling of Doppler velocities of the PDA using TTE is feasible. Diastolic velocities, time velocity integrals and flows were higher than the systolic parameters. Sampling of PDA velocities may be used in the evaluation of subjects with coronary artery disease and can detect severe PDA stenosis.

Both Lean Hypertensive and Frankly Obese CHD Patients are at Increased Risk for Long-term Mortality

Uri Goldbourt [1,3], Nira Koren-Morag [3], David Tanne [2,3]

[1] Neufeld Cardiac Research Institute, Medical Faculty, Tel Aviv University, Tel Aviv, [2] Stroke Unit, Center for Brain Sciences Research, Sheba Medical Center, Tel Hashomer, Ramat Gan, [3] Epidemiology and Preventive Medicine, Medical Faculty, Tel Aviv University, Tel Aviv, Israel

Background. The issue of excess weight in apparently healthy men and women as a risk factor for disease and mortality has gained increasing interest. Less is know about the significance of weight in coronary heart disease (CHD) patients. This association may differ according to hypertension status.

Patients and Methods. We used data from a screening of 15,700 CHD patients, screened for eligibility to participate in the secondary prevention trial Bezafibrate Infarction prevention (BIP). Follow-up lasted from 1990/2 to 1999, over a mean period of 8 yrs. Mortality was obtained by matching with the National Population registry and incident stroke leading to hospitalization was assessed in a special project. Groups of relative weight were defined as **1** [lean patients] for body mass index (BMI) below 20 Kg/squared meter, **2** for 20-22.99, **3** for 23-24.99, **4** for 25-26.99, **5** for 27-29.99 and **6** for >30 Kg/SqM meters [obese patients]. Multivariate analysis using a proportional hazards model yielded hazard ratio (HR) estimates controlling for age, sex, diabetes, hypertension and MI history.

Results. Among 9520 patients who were normotensive at entry, crude mortality rates during follow-up were 19, 19, 16, 17, 17, and 19% in BMI groups 1 to 6, respectively. Among 4630 hypertensive patients the corresponding rates were 30, 23, 20, 16, 19 and 24%, respectively. These findings, indicating that the "desirable weight" as well as the "mildly overweight" CHD patients (25-27 Kg/SqM) do better were substantiated by a multivariate analysis which produced the following adjusted HRs: 0.87, 0.70, 0.71, 0.76 and 0.93 for groups 2 to 6, with the leanest patients as the reference. Specifically for women, the "mild overweight" group enjoyed the longest survival.

Comments. Lean and obese CHD patients fared worse than "desirable" and so-called "mildly overweight" counterparts over 8 years after being assessed for eligibility in a trial of stable CHD, and the combination of leanness and hypertension appeared particularly undesirable, adding to the accumulating doubts concerning a universal recommendation to maintain weights yielding BMI below 25 Kg/SqM. Dietary and lifestyle advice should be weighed against these and similar findings**.** Further research needs to be pursued examining how these associations interact with patients' ages and previous smoking habits.

Elevated C-Reactive Protein Levels Predict Poorer Cognitive Function Among Coronary Heart Disease Patients

Galit Weinstein [1,2], Uri Goldbourt [1,2], Roseline Schwartz [1], Tamar Phillips [1,2], David Tanne [1,2]

[1] *Department of Neurology, Neuroscience Center, Sheba Medical Center, Ramat Gan,*
[2] *Sackler Faculty of Medicine, Epidemiology and Preventive Medicine, Tel Aviv University, Tel Aviv, Israel*

Background- Chronic low-grade inflammation may be a risk factor for dementia in elderly persons. Our aim was to test the hypothesis that elevated concentrations of high sensitivity CRP (hsCRP) predict poorer cognitive function and in-particular executive function among patients with CHD.

Methods- A subgroup of CHD patients who previously participated in a trial of lipid modification (BIP trial) was assessed. CRP was measured by a high-sensitivity assay from thawed frozen (-70^{0}c) plasma samples collected at baseline. Cognitive scores were assessed more than 10 years later, using a validated set of computerized cognitive tests (Mindstreams Computerized Cognitive Battery; computing index scores summarizing performance in each cognitive domain and a global cognitive score). We compared means of cognitive scores normalized to age and education, between patients in the highest CRP tertile (CRP ≥3.6mg/L) and patients in the lower tertiles.

Results- Among 346 patients (mean age 72±6 yrs, 95% males, 19% diabetics) CRP levels at baseline were inversely correlated with both the global cognitive score (p=0.04) and with executive functions (p=0.02). The mean global and executive scores were lower among patients in the upper CRP tertile as compared to those in the lower two tertiles (91.6±11.3 vs. 95.4±11.3; p=0.004 and 93.3±11.5 vs. 97.9±12.4; p=0.001, respectively).

Conclusions- Increased CRP levels are associated with cognitive impairment and poorer executive functions among CHD patients. These results support the hypothesis that chronic low-grade inflammation may be involved in vascular cognitive impairment.

The Effect of Secondary Prevention on Recurrent MI; Results from the 2004 and 2006 ACSIS Survey

Leor Perl [1], Solomon Behar [3], Roseline Schwartz [3], Morris Mosseri [2]

[1] Internal Medicine B, [2] Cardiology Department, Meir General Hospital and the Sackler Faculty of Medicine, Kfar Saba, [3] The Neufeld Cardiac Research Institute, Sheba Medical Center, Tel Hashomer, Israel

Background:
The preventive effects of cardiovascular drugs after an acute myocardial infarction (AMI) are well established, but little is known concerning the effect of such secondary prevention on the characteristics of recurrent events. We therefore studied the characteristics of events and the patients who presented with recurrent MI (PMI - Previous MI group), in relation to their secondary prevention medications.

Methods:
Data was summed up from the 2004 and 2006 ACSIS. In the two surveys, there were 1207 PMI patients. This combined group was analyzed according to multiple variables.

Results:
65% of PMI patients were treated prior to admission with 3-4 secondary preventive drugs (platelet inhibitors, beta blockers, angiotensin enzyme inhibitors or statins), 28% with 1-2 drugs and 7% were not treated with any drug. Seven day mortality was 5% for patients with 3-4 drugs, 2% for 1-2 drugs and 0% for the 0 drugs group (P=NS). Thirty day mortality was 6%, 5% and 0%, respectively (P=NS). However, an analysis according to the TIMI score showed that in the high TIMI group, when adjusted for age, diabetes and ST elevations, there was a statistically non-significant opposite trend for lower mortality rates in the 3-4 drugs patients (OR= 0.88, confidence limits 0.49 to 1.61), whereas adjusting for sex, diabetes and ST elevations in the low TIMI group showed no difference in risk of death in patients treated with more or less drugs.

Conclusions:
PMI patients are under-treated with secondary preventive drugs prior to admission. Overall, there is a trend for higher mortality rates in those who are treated with more drugs. However, when adjusted for confounding factors, there is no change in mortality in the low TIMI score patients, and a non significant trend for a reduced death rate for the high TIMI score patients, when treated with more drugs. Thus, the higher risk found in PMI patients treated with more drugs is due to more co-morbidities and risk factors, and not the medical treatment itself.

Low Grade Inflammation in Asymptomatic Healthy Adults During Bouts of Respiratory Tract Infections in the Community: Potential Triggers for Cardiovascular Events

Arie Steinvil [1], Shlomo Berliner [1], Michal Bromberg [2], Varda Shalev [3], Itzhak Shapira [1], Ori Rogowski [1]

[1] Department of Internal Medicine 'D', Tel Aviv Souraski Medical Center, Tel Aviv, [2] Israel Center for Disease Control, Israel Ministry of Health, Jerusalem, [3] Medical Informatics Department, Maccabi Healthcare Services, Tel Aviv, Israel

Background: Cardiovascular morbidity and mortality demonstrate a well documented seasonal pattern. We explored the possibility that low grade inflammation is evident in asymptomatic adults during bouts of acute respiratory tract infection/inflammation in the community.

Methods: We examined the concentration of high-sensitivity C-reactive protein (hs-CRP) as well as quantitative fibrinogen in completely asymptomatic adults during a routine screening health program and correlated the results with weekly epidemiological data related to the appearance of acute respiratory tract infection/inflammation in the community (figure 1).

Results: Included were 5315 male and 2795 female at the mean (SD) of 45 (11) years. We demonstrated a statistically significant seasonal variation in the concentrations of hs-CRP and fibrinogen using the cosinor analysis. Following adjustment for a relatively large number of possible confounders, the weekly burden of acute respiratory infection/inflammation had a significant influence on the inflammation-sensitive biomarkers in the asymptomatic cohort. The magnitude of this influence could reach as much as 10% (2%-17%) in hs-CRP concentrations in women and 8.16 (5.44-10.88) mg/dl in fibrinogen concentrations in men.

Conclusion: Changes in the concentrations of two inflammation-sensitive biomarkers can be noted in completely asymptomatic adults at the time of increased burden of acute respiratory tract infection/inflammation in the community. The possibility exists that these inflammatory changes represent occult and asymptomatic infections that could by themselves trigger acute atherothrombotic events.

Respiratory illness rate curves in the community during the time period of the study.