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warm), C (wet and cold) or D (dry and cold). **Results:** Patients were 57 ± 13 years-old, 53% were male, EF = $30 \pm 9.7\%$ and predominantly non-ischemic. Eighty-nine clinical assessments were performed in 69 patients. Nurse classified patients into profiles B and C had significantly higher levels of NT-ProBNP than patients classified into profiles A and D (1862 ± 289 pg/ml vs 1144 ± 161 pg/ml; $P = 0.027$). Similar findings were encountered for cardiologist classified profiles B and C; and A and D respectively, (1607 ± 197 pg/ml vs 1018 ± 182 pg/ml; $P = 0.03$). Pearson correlation between nurse obtained CSC and cardiologist obtained CSC was $r = 0.87$; $P = 0.0001$. There was no statistically significant difference between levels of NT-ProBNP among groups classified by nurse or classified by cardiologist. **Conclusions:** HF patients clinical profile classification based on physical exam translate into groups of significantly different BNP levels. Nurses' performances in classifying patients into various clinical profiles and in detecting congestion based on physical exam were similar to cardiologists'.

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How Painful Is Advanced Heart Failure? Results from PAIN-HF

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While pain and/or physical discomfort has been reported in 40–70% of advanced heart failure (HF) patients in a variety of studies, we know little about the nature of pain in patients with HF, or the causes, location and consequences of their pain. PAIN-HF's purpose was to identify the prevalence of pain, its location, relation to other problems and possible causes in community-living patients with advanced HF. **Methods:** We surveyed 349 patients with advanced HF in outpatient clinics and hospice care settings regarding the presence, severity, nature, and location of pain. A multi-symptom assessment, depression screen, and clinical assessment were used to evaluate the presence of co-morbid conditions and symptoms at enrollment and 2 weeks later. **Results:** Subjects were 65.9 years old (SD 15.6), 64.2% males, and 78% White race. They reported a 53.9% prevalence of pain at baseline, and 51.0% at follow up. Of those reporting pain at baseline, 47.3% reported chest pain, but only 31.3% believed their pain was due to their HF condition. Among subjects with pain, the nature of moderate or severe pain was most commonly reported as tiring (62.7%), aching (57.7%), or sharp (51.1%). One in five subjects reported severe pain. Chi-square tests of association revealed strong and significant associations between those reporting pain and degenerative joint disease ($p < .001$), chronic back pain ($p < .001$), anxiety ($p = .001$), and depression ($p = .001$). Pain was moderately associated with fatigue ($p = .006$), shortness of breath ($p = .008$), and peripheral vascular disease ($p = .032$). **Conclusions:** Pain is prevalent among patients with advanced HF, and is associated with arthritis and other co-morbid conditions. This research is a first step to advance knowledge of etiology and outcomes of pain in persons with HF, and points to a need for strategies to assess and manage pain in patients with advanced HF.

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A Modified Course of Enhanced External Counterpulsation Improved Myocardial Perfusion and Function in Severe Ischemic Cardiomyopathy Patients

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Introduction: Enhanced external counterpulsation (EECP) has been shown to improve the exercise capacity, functional class and quality of life of patients with chronic heart failure after a full course of more than 30 hours treatment. This study examines the effects of a reduced course of 10 one-hour daily EECP treatments in patients with severe ischemic left ventricular dysfunction (LVD) who were no longer candidates for invasive revascularization procedures. **Methods:** 16 consecutive patients with severe LVD who were considered to be at high risk for coronary artery bypass graft (CABG) were treated with the reduced course of EECP. Their mean age was 55 ± 9 years. All the patients were subjected to pre and post rest myocardial perfusion study by I.V. injection of Tc^{99m} tetrofosmin. ECG-gated blood-pool SPECT with the inner myocardial wall for systole and diastole defined manually was used to calculate LV ejection fraction. Territorial score was used to analyze radionuclide perfusion data, and paired t-test was used to compare pre versus post EECP. **Results:** 56% of the 16 patients were hypertensive, 50% diabetic, 69% had history of prior MI, and 63% had triple vessel disease. There were no changes in both systolic (117 ± 15 versus 122 ± 16 mm Hg, $p = 0.5$), and diastolic blood pressure (79 ± 7 versus 83 ± 7 mm Hg, $p = 0.5$) pre and post EECP, but the heart rate decreased from 83 ± 16 to 76 ± 14 beats/min, $p < 0.03$. Gated LVEF increased from $26.6 \pm 9.0\%$ at baseline to $35.9 \pm 13.6\%$, $p < .003$. Post EECP, the radionuclide territorial score in the LAD region improved significantly from 44.1 ± 15.8 to

48.3 ± 16.1 , $p < 0.01$, as well as in the RCA region from 34.1 ± 7.3 to 39.0 ± 9.8 , $p < 0.02$, but not in the LCX region (45.3 ± 9.7 to 48.9 ± 8.3 , $p = 0.1$). After EECP 19% of the patients were considered revascularization candidates and underwent triple vessel CABG without complications. **Conclusion:** A 10 one-hour daily course of EECP significantly improved myocardial perfusion and gated LVEF in patients with severe left ventricular dysfunction. However, whether these beneficial effects can be sustained remains to be studied. Early experience has suggested that an initial short course of 10 hours of EECP followed with 1 or 2 hours of weekly treatment might sustain the benefit of EECP in heart failure patients.

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Self-Care Behaviors, Symptom Status, and Health-Related Quality of Life in Patients with Heart Failure

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Background: Symptomatic patients with heart failure (HF) report that health-related quality of life (HRQOL) is as important as survival. Most patients with HF experience physical symptoms such as dyspnea and fatigue, and HRQOL in patients with HF is poorer than that in patients with other chronic illness. Physical symptoms can limit patients' daily activities, and this limitation can be related to poor HRQOL. Both physical symptoms and HRQOL are related to comorbidity and mortality in HF. Poor self-care behaviors such as self-management, medication adherence, and dietary adherence may worsen physical symptoms and in turn worsen HRQOL. However, the impact of self-care behaviors on symptom status and HRQOL has not been examined fully. **Purpose:** To determine the relationship among self-care behaviors (self-management [maintenance, management, and confidence], medication adherence, and dietary adherence) and symptom status and HRQOL. **Methods:** One hundred ninety-nine patients (61 ± 12 years old, 67% male, 50% NYHA class III/IV) provided data on HRQOL (Minnesota Living with Heart Failure questionnaire), symptom status (Symptom Status questionnaire), self-management (Self-Care of Heart Failure Index), medication adherence (Medical Outcomes Study Specific Adherence Scale), dietary adherence (24-hour urine sodium), and demographic and clinical characteristics. Multiple regression analyses were used to examine the specific aims. **Results:** One self-management variable, lower confidence, was related independently to worse symptom status ($R^2 = .15$, $p < .001$). Lower confidence and dietary adherence were related independently to poorer HRQOL ($R^2 = .09$, $p < .001$). When symptom status was added, self-care was no longer a significant predictor of HRQOL. Worse symptom status was related to poorer HRQOL ($R^2 = .58$, $p < .001$). Medication adherence was not related to symptom status or HRQOL. **Conclusion:** Attention should be given to self-management and symptom status to improve symptom status and HRQOL. Further research is needed to determine the causal relationship among self-care behaviors, symptom status, and HRQOL.

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The Granov Factor — A New, Effective Impedance Algorithm for Non-Invasive Ambulatory Assessment of Preclinical Congestive Heart Failure

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Introduction: There are two synonymous clinical titles for the onset of left ventricular systolic dysfunction (LVSD), which is the first stage in the evolution of congestive heart failure (CHF). According to the ACC/AHA, the term is Stage B Heart Failure (HF), and it is defined as a "structural disorder of the heart, which has never developed symptoms of HF". The Framingham Study uses the term Asymptomatic Left Ventricular Systolic Dysfunction (ALVSD), and defines it as the phase of 40–45% > ejection fraction (EF) < 55%. The average prevalence of ALVSD in the adult population is approximately 5%. **Hypothesis:** Since the diagnosis and management of LVSD in its asymptomatic phase may halt its deterioration to the fateful CHF for years, we assume that the availability of a portable apparatus for diagnosing ALVSD in the community population will dramatically change the fate of CHF. **Methods:** A medical instrument which consists of an ordinary laptop computer in which the CD-ROM has been replaced by an impedance device called NICaS (Non-Invasive Cardiac System) has already been described elsewhere. Recently, a new algorithm, called the Granov Factor, which is based on the systolic time intervals (STI), was specifically developed for detection of ALVSD by the NICaS. One hundred patients underwent a Helsinki approved determination of EF < 55% by echocardiography and a study by the NICaS for determining GF < 10.0 within two-hour intervals, at the Wolfson Hospital, Israel. **Results:** EF < 55% was found by echo in 21 patients, and comparison of the NICaS versus Echo results revealed two false negative and one false positive NICaS findings. This is a sensitivity of 90.48%, specificity of 98.63%, and positive and negative predictive values of 95.0% and 97.5%, respectively. **Conclusions:** We introduce here an ideal portable diagnostic tool which can be used by any doctor anywhere, for the incidental diagnosis of ALVSD either during an ordinary physical examination, or through screening the community population.

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Background: Heart Failure (HF) is a leading cause for hospitalization within the Veterans Affairs (VA) medical system, and leads to excessive morbidity and mortality. We have implemented a telehealth HF disease management program for HF patients as a means by which to maximize HF medical therapies, provide close outpatient observation, and reduce HF hospitalizations. In addition to maximization of HF therapies, the program has also sought to follow serial echocardiograms in an effort to identify the impact of the program on cardiac remodeling. **Methods:** Pts enrolled in the VA telehealth program had symptomatic HF (New York Heart Association class II-IV) with new onset or difficult to manage symptoms and left ventricular ejection fraction (LVEF) < 40%. Pts were given an in-home telehealth message device (Health Buddy, Health Hero Inc., Mountain View CA) to monitor HF symptoms and vital signs daily. HF therapies were adjusted based on current HF treatment guidelines. Echocardiograms were obtained at the time of entry into the program and after maximization of HF therapies. **Results:** 165 pts had echocardiograms performed at baseline and after maximization of HF therapy (mean follow-up 27 months for all pts). Mean age was 69 ± 12, mean NYHA class was 2.8 ± 0.6, 99% were males and 11% were African American. The baseline nt-proBNP level was 3654 ± 5305 pg/ml. LVEF improved from 25.6 ± 7.6% at baseline to 33.8 ± 11.9% at follow-up (P < 0.001). LV end-diastolic dimension improved from 6.0 ± 0.8 cm at baseline to 5.8 ± 0.9 cm at follow-up (P < 0.001). LV end-systolic dimension improved from 4.9 ± 0.9 cm at baseline to 4.7 ± 1.1 cm at follow-up (P < 0.001). Left atrial size improved from 4.8 ± 0.7 cm to 4.6 ± 0.7 cm at follow-up (P < 0.001). **Conclusion:** HF disease management employing home telehealth technology improved adverse cardiac remodeling in a population of elderly male pts with chronic HF. Although quantitation of specific HF therapy use (such as medication and cardiac resynchronization therapy usage) was not the intent of this study, we would speculate that strict adherence to HF treatment guidelines as done by the HF home telehealth program contributed to the positive effect on cardiac chamber sizes.

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Thermal Vasodilation by Portable Device in Decompensated Severe Heart Failure with Inotropic Support

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Purpose: Thermal vasodilation using sauna bathing has been demonstrated hemodynamic useful in heart failure. However, in decompensated phase with intravenous inotropic support, patients are restricted at bed; consequently thermal vasodilation by sauna bathing is not appropriated. We studied hemodynamic effects of heating by portable thermal blanket in decompensated severe heart failure. **Methods:** We selected patients with severe heart failure hospitalized by decompensation, LVEF < 40%, in use of intravenous inotropic support. Patients were divided alternately in 2 groups (T and C). Group T was submitted to thermal vasodilation therapy by infrared blanket to achieve 50 °C of extra-corporal temperature. Hemodynamic measures, by thermodynamic method, were done at baseline and 1 h after. ANOVA by repeated measures was used with P < 0.05. **Results:** We studied 8 patients, with 59 years old, 75 % were men, and 50% had ischemic cardiomyopathy, 87.5 % used dobutamine, and BNP was 1,343 pg/ml. Baseline cardiac index was 2.38 l/min, and systemic vascular resistance was 1,917 dynes/sec.cm⁻⁵. Cardiac index increased 59.3 % in group T, and decreased 6.0 % in group C (p = 0.008). Systemic vascular resistance decreased 31.7 % in group T, and increased 18.3 % in group C (p = 0.006). **Conclusion:** Thermal vasodilation by portable device increased cardiac index and decreased systemic vascular resistance. This method is possibly useful in management of decompensated heart failure. Further studies are necessary to clarify this matter.

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Does Completion of Enhanced External Counterpulsation Treatment Course Improve Outcomes in Heart Failure Patients?

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Background: Enhanced External Counterpulsation (EECP) non-invasively improves quality of life and functional capacity in ischemic cardiomyopathy patients (pts). Whether completion of a 30 hour course of EECP has durable benefits in decreasing heart failure (HF) decompensation and MACE in ischemic HF pts is unknown. **Methods:** The IEPR2 is a prospective, sequential registry of 3,000 EECP treated pts. EECP dropouts, when immediate treatment events are excluded, provide a comparator group of durable effects. The demographics, immediate and 1 year outcomes of HF pts completing ≥ 30 hrs of EECP (C) were compared with pts receiving < 30 hrs (IC). Analysis was performed with Kaplan Meier, chi square, or unpaired t test as appropriate; significance at p < 0.05. **Results:** There were 481 C:116 IC pts with 94.5% 1 year follow-up. At baseline the C:IC cohorts were similar in: age (70 ± 11:69 ± 11 yrs), male gender (72%:68%), HBP (82%:85%), dyslipidemia

(both 89%), diabetes (54%:56%), CCS class III/IV angina (98%:97%), prior MI (84%:82%), PCI (72%:70%), CABG (76%:75%), multivessel CAD (93%:92%), EF (37.5 ± 15%:35.6 ± 15%), NYHA class, and DASI scores (8.4 ± 7.1:7.2 ± 7.3). There were C:IC differences in renal failure (21%:31%; p = 0.03), current smoking (7%:13%; p = 0.03), BB therapy (79%:66%; p = 0.02), ACEI (55%:44%; p = 0.04), statins (78%:69%; p < 0.05). During the usual 6–8 week of EECP C:IC groups differed significantly in heart failure exacerbation (3.9%:11.7%; p = 0.002), death (0.2%:4.7%; p < 0.001), MI (1.1%:5.8%; p = 0.003), ACS (2.5%:14.4%; p < 0.001). Post EECP there was significantly greater improvement (C:IC) in CCS class (89%:26%; p < 0.001) and DASI scores (14.1 ± 11.6:7 ± 7; p < 0.001). At 1 year C:IC pts improved in HF exacerbations (14.9%:27.9%; p = 0.001), Kaplan Meier mortality rate (9.5%:17.6%; p = 0.015), DASI score (13.8 ± 11.0:6 ± 10; p = 0.03), overall MACE (15.8%:25.4%; p = 0.018) and sustained improvement in CCS angina class (63%:23%; p < 0.001). **Conclusions:** Completion of >30 EECP hrs was associated with decreased morbidity and mortality during treatment and over 1 year follow-up. However, the high incidence of clinical events post EECP course in HF pts may warrant new EECP regimens (e.g. short initial course with weekly 1 or 2 hours maintenance EECP).

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Long Term Results of Levosimendan Therapy on Patients with Acute Coronary Syndrome and Cardiogenic Shock

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Calcium sensitizer levosimendan enhances myocardial contractility which could be advantageous in patients with myocardial ischemia requiring inotropic support. During three years 3852 patients with high risk acute coronary syndrome (ACS) underwent percutaneous coronary intervention (PCI) in our department. In 106 cases ACS was complicated with cardiogenic shock (mean age: 68.6 ± 1.2). The mean time interval between onset of chest pain and PCI was 7.5 ± 0.9 hours long. Short and long term effects of levosimendan on cardiac functions and survival of cardiogenic shock patients were analyzed. Levosimendan was administered in 39 of 106 cases as add-on therapy for patients with impaired left ventricular function, by extensive wall motion abnormality and by high blood cardiac enzyme concentration. Levosimendan therapy was started in most cases on the second or third day and applied 6 hours long as continuous infusion (0.1 microg/kg/min). During the time spent in the primary cardiac care center (mean in hospital time 6.0 ± 0.4 days) mortality was significantly lower in levosimendan treated patients (17% vs. 30%, p < 0.05). Most of these patients died because of circulatory failure. During the follow-up (mean time 204.6 ± 29.9 days) all cause mortality was also lower in the levosimendan treated patient group (54% vs. 68%, p = 0.06), however this difference seems to be on a lower level of significance. The time interval between the onset of infarction and PCI (6.6 ± 0.7 vs 9.7 ± 2.6 hours, p = NS) did not influence the effect of levosimendan on short and long term mortality. Levosimendan may improve cardiac function and decrease short term and even long term mortality in high risk patients with acute myocardial ischemia when cardiogenic shock developed independently of time interval of myocardial infarction. ±

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Stages of Hypertension as a Predictor for Cardiovascular Events in Heart Failure Patients

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Hypertension is an identified risk factor for cardiovascular disease and affects millions of Americans. Previous research supported a lower target blood pressure range of 130/80 mm Hg for the diabetic and renal patient. Within these previous studies, heart failure patients were excluded from the patient population. The purpose of this study was to examine the incidence and relationship of cardiovascular events within the stages of hypertension for patients with heart failure. A retrospective study was conducted on a convenience sample of patients 18–55 years old with documented heart failure. These patients were under the care of a cardiologist for at least one year, and did not have diabetes or renal disease. An electronic medical record system served as a tool for data collection. Blood pressure recordings were collected for each office visit. For each blood pressure recording, the New York Heart Classification, Stage of Heart Failure, and adverse events were entered into the data. If the ejection fraction and left atrial size were assessed, the findings were also entered. There were a total of 390 blood pressure recordings collected for the sample of 50 patients. The following are the identified adverse events and major coronary adverse events (MACE) identified in the chart review: hospitalization, dyspnea, chest pain, catheterization, fatigue, edema, percutaneous coronary angiography (PTCA), internal cardiac defibrillator/permanent pacemaker (ICD/PPM), coronary artery bypass graft (CABG), depression, syncope, ICD shock, expired, arrhythmia, ablation, palpitations, aortic valve replacement/mitral valve replacement (AVR/MVR), and transplant. Although there was no significance identified between MACE and stage of hypertension, $\chi^2(3, N = 116)3.368, p = .34$, a post-hoc analysis showed significance between dyspnea, $\chi^2(3, N = 97)7.68, p = .05$; catheterization, $\chi^2(3, N = 22)8.958, p = .03$; ICD shock, $\chi^2(3, N = 1)11.216$. The relationship between MACE and the NYHA class showed strong statistical significance, $\chi^2(4, N = 116)39.724$,