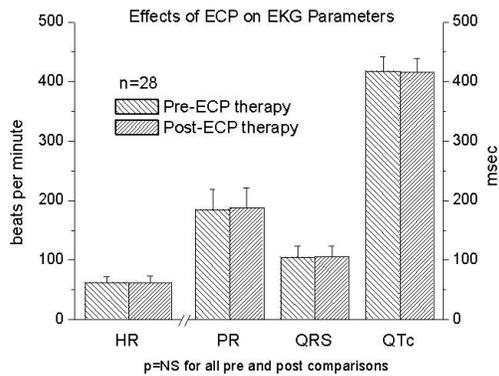


analyzed by response to ECP, ejection fraction, or history of revascularization, there were still no detectable changes in EKG parameters (all p=NS).

Conclusion: While ECP is an effective treatment for severe CAD, it does not prompt early electrical remodeling of the heart.



11:00 a.m.

891-3

Enhanced External Counterpulsation Improves Functional Capacity and Quality of Life in Women With Chronic Angina

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Background: Within the population of the United States, 36% of women aged 55-64 years are disabled by clinical manifestations of coronary heart disease, with disability rates of 55% for women over 75 years of age. We examined the therapeutic efficacy of EECP on functional status and quality of life in women with chronic angina as assessed by the Duke Activity Status Index (DASI), a standardized assessment that correlates well with peak oxygen uptake (Spearman correlation coefficient, 0.58).

Methods: Demographic and clinical outcome data were analyzed on all patients enrolled in the International EECP Patient Registry-2 who had baseline and post-treatment DASI scores (N=524). Linear regression model analyses were used to examine independent predictors of DASI scores.

Results: Baseline characteristics of the study group were: mean age- 68 years, female-27%, duration of CHD-12 years, prior myocardial infarction- 71%, history of diabetes-42%, and history of congestive heart failure (CHF)- 32%. Angina was classified as Canadian Cardiovascular Society class III or IV in 90% of patients. Patients experienced a mean of 11 episodes of angina/week despite optimum medical management and previous cardiac revascularization. Pre-treatment, the mean DASI score was 12 (of a possible 58.2); with females scoring 8.7 and males scoring 13.7 (p<0.001). Post-treatment, the mean DASI score was 17.9. Females scored 15.4 and males scored 18.8 (p<0.01). Linear regression analysis demonstrated that female gender, history of CHF, prior coronary artery bypass surgery, and class III/IV angina were independent predictors of low DASI scores pre-treatment. Age, diabetes and history of CHF were associated with a lower post-treatment score. Female gender was not independently associated with a lower score post-treatment.

Conclusion: This study demonstrates that, even with adjustment for comorbidities, there is more functional disability among female patients with chronic angina than with male patients. EECP improves functional capacity and quality of life as assessed by the DASI questionnaire with no gender disparity.

11:15 a.m.

891-4

The Effects of Enhanced External Counterpulsation on Myocardial Perfusion in Patients With Stable Angina: A Single-Blind Multicenter Pilot Study

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Introduction: Enhanced external counterpulsation (EECP) has been shown to reduce angina and improve exercise tolerance and quality of life (QOL) in patients with angina. However, the mechanism of these effects is unclear. We sought to determine whether EECP improves exercise-induced myocardial perfusion. **Methods:** Patients with class II-IV angina and exercise-induced reversible perfusion defects were enrolled from 5 US centers. QOL was assessed using SF-36 and Seattle Angina Questionnaires prior to and 1-month after 35-hours of EECP. Symptom-limited quantitative gated technetium-99m-sestamibi SPECT exercise perfusion imaging was performed prior to and 1-month post-EECP. Sestamibi was injected at the same heart rate in both stress tests. Exercise tests and SPECT images were read at core laboratories blind to the origin and time of the tests. Myocardial segments with partially or completely reversible perfusion defects on the pre-EECP study were flagged as target segments. **Results:** Of 37 patients enrolled, 34 completed pre- and post-EECP stress testing. The mean age was 61±10 years, 81% were male, 78% has prior revascularization, and 68% had 3-vessel disease. The mean

angina class decreased from 2.7±0.7 at baseline to 1.7±0.7 after EECP (p<0.0001). QOL by both the SF-36 and SAQ improved after EECP (p<0.001). Exercise duration increased from 9.1±3.7 min at baseline to 10.2±3.6 min post-EECP (p=0.03). The average percent tracer uptake of target segments pre- vs post-EECP following stress was 64.5±11.3 vs 63.3±13.2 (p=0.34) and at rest was 74.8±10.4 vs 72.7±9.9 (p=0.05). Reversibility (rest-stress) was 10.3±6.8 vs 9.4±8.1 (p=0.51). Average thickening fractions in target segments were 28.8±11.1 vs 26.9±13.3 (p=0.32). **Conclusions:** We confirm previous work that EECP reduces angina, improves exercise capacity, and improves QOL. A training effect with peripheral changes occurred after EECP. There were no significant changes in mean defect magnitude, amount of reversibility, and thickening fractions measured using myocardial quantitative SPECT imaging when compared at identical pre- and post-EECP heart rates. These data do not preclude balanced changes in global myocardial perfusion.

11:30 a.m.

891-5

Frequency and Results of Repeat Enhanced External Counterpulsation for Refractory Angina

William E. Lawson, Gregory Barsness, Ozlem Soran, Elizabeth D. Kennard, John C. Hui, SUNY Stony Brook, Stony Brook, NY, University of Pittsburgh, Pittsburgh, PA

Background: Enhanced external counterpulsation (EECP) relieves angina in most patients (pts). However, angina may not respond or may reoccur necessitating repeat EECP.

Purpose: To investigate EECP retreatment frequency, pt characteristics, retreatment course and response.

Methods: Sequential refractory angina pts, enrolled in the International EECP Pt Registry with 1 year follow-up post initial EECP therapy were examined. A Cox Proportional Hazards model was used to determine independent predictors of return for treatment within one year.

Results: Of 2,255 IEPR pts, 233 (10%) repeated EECP within 14 months. Mean age was 66.3 ± 10.9 years, 93.7% white, 73.4% male. By history, 68.8% had prior MI and 32.8% CHF. Risk factors included: DM 40.7%, HBP 70.7%, hyperlipidemia 82.3%, smoking 71.3%. The mean EF was 47.0 ± 14.4%; 18.5% had an EF < 35%. Only 14.8% were PCI or CABG candidates. At baseline, 85.9% had CCS class III/IV angina. Pts received 33.5 ± 9.5 hrs of EECP; 83.7% completed therapy. Post EECP 74% improved angina by 1 or more CCS classes; 28.7% remained CCS III/IV. Of the returning pts, 215 had full data available. Mean time to return was 168 ± 129 days. Retreatment reasons included: angina increase (27.8%), persistent angina (34.2%), completing an incomplete initial course (38.1%). At retreatment 78.3% had CCS class III/IV angina. Treatment averaged 26.4 ± 12.6 hrs; 77.1% completed therapy. Post retreatment angina was reduced by one or more classes in 71.4%; 30.8% had class III/IV angina. In pts completing their initial course, major retreatment predictors of were: prior CABG (RR 1.63; CI 1.07-2.49), prior PCI (RR 1.69; CI 1.13-2.52), HBP (RR 1.63; CI 1.08-2.46). In pts with an incomplete initial treatment, lack of anginal reduction predicted return (RR 2.19; CI 1.28-3.75).

Conclusions: Retreatment occurred in 6.2% of pts for persistent or worsening angina and in 3.8% for an incomplete initial course. EECP was similarly effective as initial and subsequent therapy. Return was predicted by prior revascularization and HBP in pts completing the initial course of EECP and by lack of angina reduction in pts with an incomplete initial course.

11:45 a.m.

891-6

Long-Term Improvement in Microvascular Angina Patients Treated With Enhanced External Counterpulsation

Kenneth D. Kronhaus, William E. Lawson, Lake Cardiology, Mount Dora, FL, SUNY Stony Brook, Stony Brook, NY

Background: Angina in patients without significant angiographic epicardial disease can be a medically refractory cause of chronic disability. For these microvascular angina patients Enhanced External Counterpulsation (EECP) may prove uniquely beneficial. Patent epicardial arteries facilitate transmission of the increased flow and pressure generated by EECP to the microcirculation and may promote angiogenesis, normalize endothelial function and improve myocardial perfusion and anginal symptoms. The benefit and durability of EECP therapy in these patients was studied.

Methods: Patients with typical angina refractory to medical therapy and evidence of microvascular angina (a pharmacologic or exercise stress test with radionuclide or echocardiographic imaging [ST] showing regional ischemia together with a cardiac angiogram demonstrating no significant coronary disease) were treated with EECP. Angina, assessed by the Canadian Cardiovascular Society class [CCS], and stress tests were evaluated at baseline and after completing EECP treatment. Major cardiovascular events (cardiac hospitalization, death, infarction) were tracked for the duration of follow-up. Statistical analysis was performed with the student t test; significance level p < 0.05.

Results: Twenty one pts, 14 women and 7 men with a mean age of 68.5 years, received an average of 36.4 hours of EECP. CCS improved in all patients; the average baseline class of 3.8 improved to an early CCS of 1.4 [p< 0.05] and 6.3 month CCS of 1.2 [p<0.05]. ST obtained a mean of 5.0 months post EECP showed complete resolution of defects in 16/17 cases [p<0.05]. There was a durable reduction in angina in 20/21 patients at a mean 12.9 months of follow-up. With up to 19 months of follow-up only 1 patient had an adverse event [heart failure requiring admission] and increasing angina [treated with EECP].

Conclusions: Microvascular angina is effectively treated with EECP. There is a reduction in angina and provokable ischemia. The effect is durable with a low incidence of recurrent angina one year post treatment and few adverse cardiovascular events.