

patients with systemic hypertension without OSA (Hyper) and 7 patients with systemic hypertension and moderate-to-severe OSA (Hyper+OSA). The three groups were matched for BMI and age. Hyper+OSA had shorter RR interval ( $749 \pm 28$  ms) compared with Hyper ( $836 \pm 29$  ms) and Controls ( $989 \pm 41$  ms;  $p < 0.001$  for both comparisons). In Hyper+OSA, total variance of RR was reduced ( $1082 \pm 117$  ms;  $p < 0.001$  for both comparisons) and spectral analysis of RR variability showed an increased low frequency normalized units ( $78 \pm 5$ ), index of sympathetic modulation (LF NU), a decreased high frequency normalized units ( $21 \pm 6$ ), index of vagal modulation (HF NU) compared with both Controls and Hyper ( $p = 0.001$ ) as well as an increased LF/HF ratio ( $2.43 \pm 1.09$ ). Systolic blood pressure (SBP) variance in Hyper+OSA ( $59 \pm 10$  mmHg) was greater than in Hyper ( $37 \pm 6$  mmHg), and twofold greater than in Controls ( $22 \pm 5$  mmHg) ( $p < 0.001$ ) as well as the LF component.  $\alpha$  index was significantly reduced in Hyper ( $5.2 \pm 1.5$  ms/mmHg) and Hyper+OSA ( $4.9 \pm 1.3$  ms/mmHg) compared with Controls ( $10 \pm 2.7$  ms/mmHg).

**Conclusions:** Hypertension associated with moderate-to-severe OSA is characterized by a greater increase in cardiac and vasomotor sympathetic drive than hypertension per se. This sympathetic overactivity may play an important role both in determining the high levels of arterial pressure in patients with OSA as well as in increasing their cardiovascular risk.

1009-170

### Accumulated Physical Activity Improves Arterial Compliance and Pressure Load Indices in Hypertensive African-American Women

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**Background:** Arterial elasticity and pressure load indices serve as early markers for vascular disease. The prevalence of hypertension and target organ injury is disproportionate among African-American women compared to Caucasians. Therefore, this ongoing study examines the effects of a prescribed exercise program on arterial elasticity and blood pressure indices in sedentary, untreated, mildly hypertensive African-American women aged 18-45.

**Methods:** This single-blinded, randomized, parallel-group design in which women ( $n = 5$  to date) were randomized to an 8-week intervention comprising a program of physical activity for 10 minutes, 3-times/day, 5-days/week at 50-60% heart rate reserve. Women in the control group ( $n = 7$  to date) continued with their usual activities. Large (C1) and small (C2) artery elasticity was measured noninvasively by radial waveform analysis using a modified 2-element Windkessel model. Pressure load (the percentage of daytime measurements  $>140/90$  mmHg and nighttime  $>120/80$  mmHg) was measured by 24-hour ambulatory blood pressure monitoring. Mean changes in arterial compliance and pressure load indices were compared using paired t-tests.

**Results:** Physical activity increased C1 by 8%, from  $11.3 \pm 3.3$  to  $12.2 \pm 2.9$  mL/mmHg  $\times 10$  ( $p = .038$ ) and C2 increased by 13.8%, from  $6.0 \pm 2.7$  to  $6.8 \pm 3.3$  mL/mmHg  $\times 100$ , although this did not reach statistical significance. Physical activity also produced greater reductions in pressure load indices, especially at night. Nighttime diastolic pressure load decreased by 39.8%, from  $65.7 \pm 15.7$  to  $39.5 \pm 14.1$  % ( $p = .021$ ). **Conclusions:** Moderate-intensity physical activity provided a beneficial effect on arterial elasticity and pressure load indices in this study. These findings suggest potential benefits from physical activity in hypertension-prone African-American women, particularly given their excess burden of pressure-related complications and the strong correlation between arterial stiffness, pressure load and target organ injury.

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1009-193

### Predictors of Diastolic Hypertension: The Framingham Heart Study

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**Background:** Diastolic hypertension (DH), defined as a diastolic blood pressure (DBP)  $\geq 90$  mmHg, occurs most often with systolic blood pressure (SBP)  $\geq 140$  mmHg (systolic-diastolic hypertension, SDH) and occasionally with SBP  $< 140$  mmHg (isolated-diastolic hypertension, IDH); however, factors in the development of DH are poorly understood.

**Methods:** Participants in the Framingham Heart Study were included in this investigation if they underwent 2 biennial examinations in 1953-1957 and were free of antihypertensive therapy and cardiovascular disease. Baseline blood pressure (BP) was the average of those recorded at both biennial examinations. The 10-year incidence of SDH and IDH in each BP category was examined.

**Results:** Sex and age-adjusted incidence rates of SDH were 8.5, 25.1, 56.9, 111.4 and 80.1 per 1000-person-years for persons in optimal, normal, high-normal BP, IDH and isolated-systolic hypertension (ISH) groups, respectively. Incidence rates for IDH were 6.8, 17.4, 24.9, 12.3, and 6.3, per 1000-person years for optimal, normal, and high-normal BP, SDH and ISH, respectively. Compared with optimal BP, hazard ratios (HR) and 95% CI for developing SDH, after adjusting for age, sex, and other risk factors, were 3.14 (2.44-4.043) for normal, 8.25 (6.42-10.61) for high-normal, 10.76 (8.03-14.43) for ISH, and 18.01 (13.20-24.56) for IDH. 68% of persons with IDH developed SDH during the 10-year follow up. Compared with optimal BP, HR for IDH were 2.45 (1.86-3.23) for normal, 3.52 (2.63-4.72) high-normal, 1.57 (1.06-2.31) for SDH, and 0.82 (0.45-1.50) for ISH. In addition to BP, predictors of SDH were high body mass index (BMI) at baseline and weight gain. In addition to BP, predictors of IDH were younger adult age, male sex, being a non-smoker, high BMI at baseline and weight gain.

**Conclusions:** Normal and High-normal BP (prehypertension) had the highest HR for new onset of IDH. In addition to prehypertension, ISH, and especially IDH had high HRs for the new onset of SDH, which carries increased risk for future cardiovascular disease. Identification of prehypertensive persons with lifestyle problems, particularly being overweight, is crucial in preventing the development of DH.

1009-194

### Comparison of Intra-Arterial and Noninvasive Oscillometric Blood Pressure in Lean, Overweight, and Obese Subjects

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**Background:** Controversy exists concerning the accuracy of non-invasive blood pressure (BP) measurements in obese persons. This study compares intra-arterial and non-invasive oscillometric BP in lean, overweight, class I and II obese and class III persons (World Health Organization classification).

**Methods:** Aortic-root (AR) and oscillometric (Dinamap XL) systolic and diastolic BP were obtained simultaneously in consecutive hemodynamically stable patients undergoing cardiac catheterization. Cuff sizes were selected in accordance with standard guidelines.

**Results:** There were 50 lean, 49 overweight, 61 class I/II obese and 28 class III obese patients. There were significant positive correlations between AR and oscillometric systolic BP's in lean ( $r = 0.902$ ,  $p < 0.0001$ ), overweight ( $r = 0.783$ ,  $p < 0.0001$ ), class I/II obese ( $r = 0.805$ ,  $p < 0.0001$ ) and class III obese ( $r = 0.656$ ,  $p < 0.0001$ ) subjects. There were significant positive correlations between AR and oscillometric diastolic BP's in lean ( $r = 0.920$ ,  $p < 0.001$ ) overweight ( $r = 0.356$ ,  $p < 0.015$ ), class I/II obese ( $r = 0.536$ ,  $p < 0.0005$ ) and class III obese ( $r = 0.721$ ,  $p < 0.0005$ ) subjects. Respective mean systolic AR and oscillometric BP's (mmHg) were  $152 \pm 34$  and  $145 \pm 30$  in lean patients,  $150 \pm 25$  and  $142 \pm 30$  in overweight patients,  $157 \pm 31$  and  $147 \pm 22$  in class I/II obese patients and  $159 \pm 25$  and  $150 \pm 24$  in class III obese patients. Respective mean diastolic AR and oscillometric BP's were  $76 \pm 13$  and  $85 \pm 15$  in lean subjects,  $76 \pm 13$  and  $86 \pm 12$  in overweight subjects,  $81 \pm 14$  and  $85 \pm 12$  in class I/II obese subjects and  $79 \pm 13$  and  $84 \pm 14$  in class III obese subjects. The differences between mean AR and oscillometric systolic and diastolic BP's were significant ( $p < 0.01$ ) in all weight groups.

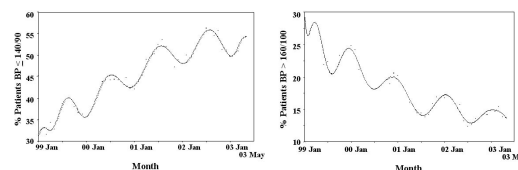
**Conclusions:** There is good correlation between AR and oscillometric BP's in lean, overweight and obese subjects. However, oscillometric BP measurement using a Dinamap XL underestimates systolic BP and overestimates diastolic BP to a similar extent in lean, overweight, class I/II obese and class III obese subjects.

1009-195

### The Effect of Seasonal Variation of Blood Pressure When Analyzing Improvement and Treating Large Groups of Hypertensives Patients

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**Background:** The VA Computerized Medical Record records all Blood Pressures (BP) measurements on both in and out patients. Hypertension was defined by at least 3 or more BP above 140/90 on 3 separate days in 10,476 patients. **Methods:** We measured % of hypertensives who became normal  $\leq 140/90$ , the % who remained severe  $\geq 160/100$ , and the number of hypertensive medication classes. This data was fed back to the individual provider. **Results:** In 4 years the % patients returning to normal increased from 33% to 56% ( $p < 0.0001$ ). Patients with BP  $\geq 160/100$  fell from 26% to 12% ( $p < 0.0001$ ). When monthly data is displayed (see graphs), a repetitive pattern is present where the % returning to normal is largest in the summer and reduced in the winter (7.7 ave % change)  $p < 0.0001$ . Patients  $\geq 160/100$  are smallest in the summer and largest in the winter ( $p < 0.0001$ ). Patients with severe elevations were on  $2.21 \pm 1.17$  classes of drugs while those with mild elevations were on  $1.86 \pm 1.16$  ( $p < 0.0001$ ). Diuretics were used by 42 % of the patients. **Conclusions:** Continuous improvement has occurred with data feed back to providers. Performance measured by patients  $\leq 140/90$  improves each summer and worsens each winter. True improvement should be determined by comparing data for the same time each year for groups and individuals. Further improvement may occur by the increased use of 3 classes of drugs especially diuretics. Increasing therapy in the winter months might also improve control both for groups and individual patients.



1009-196

### Acute Arterio-Venous Fistula Occlusion Reduces Sympathetic Nerve Traffic and Increases Baroreflex Sensitivity in Patients With Kidney Transplant

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**Background:** The acute bradycardia induced by the occlusion of an arteriovenous fistula (AVF), known as the Nicoladoni-Branham sign, is considerably larger than that which occurs during a carotid sinus massage. This suggests increased arterial baroreflex sensitivity during acute AVF occlusion. Moreover, the influence of acute AVF occlusion on muscle sympathetic nerve traffic (MSNA, by microneurography) is unknown. We therefore assessed the effects of acute AVF occlusion on baroreflex sensitivity and on MSNA in patients with stable functional kidney grafts and patent AVF.

**Design and Methods:** We measured blood pressure (BP), MSNA ( $n = 11$ ), heart rate (HR), cardiac output (CO) and arterial baroreflex sensitivity ( $n = 18$ ) at baseline and during acute, 30-second pneumatic AVF occlusions in 23 renal transplant recipients.

**Results:** During the first 5 seconds of the AVF occlusion, mean BP increased from  $98 \pm 4$