Marital Cohesion and Ambulatory Blood Pressure in Early Hypertension

Brian Baker, Karin Helmers, Brian O’Kelly, Ian Sakinofsky, Alan Abelsohn, and Sheldon Tobe

One hundred thirty-four men and seventy-one women, unmedicated mild hypertensives, underwent 24-h ambulatory blood pressure (BP) monitoring (ABP) and completed standardized questionnaires measuring marital and job stress. Of these, 44.8% had daytime diastolic BP < 90 mm Hg; 96.1% had left ventricular mass index in the normal range (N = 176). Lower marital cohesion (Cohesion, subscale of the Dyadic Adjustment Scale) was related to elevated nighttime ABP (P < .05) and 24-h diastolic BP (P < .05). With low Cohesion (N = 83), more reported spousal contact was associated with elevated nighttime ABP (P < .031). The 7.3% of subjects with very low Cohesion demonstrated approximately 6 mm Hg elevation of all ABP variables, controlling for other significant variables (P < .05, except for nighttime SBP). This study shows an association between marital cohesion and ABP and suggests that marital factors may have a role in sustaining BP in early hypertension. Am J Hypertens 1999;12:227–230 © 1999 American Journal of Hypertension, Ltd.

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Regularly occurring stress can be associated with blood pressure (BP) elevation and it is suggested that prolonged stress may affect the course of essential hypertension (EH). The impact of psychosocial factors on EH is likely strongest in the early phase before other mechanisms become established and treatment commenced. Direct evidence of the association of psychosocial factors and sustained hypertension, especially in men, is confined to the area of work-related stress. Marital dis-

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nighttime (11 PM to 7 AM). Daytime setting was every 15 min and hourly at night. Subjects were given standard instructions and proceeded through a normal working day. Left ventricular mass was measured by two-dimensional (2D)-guided M-mode echocardiography and indexed to body surface area (LVMI). Demographic data included educational level, marital status, children, employment history, income, ethnic background (white or not), cigarette smoking (current or not), alcohol consumption (abstinent, any consumption, or “regular drinker” (more than 2 drinks per day, 5 days per week), exercise (regular or not), relaxation techniques (regular practice or not), family hypertension history (hypertension present in first-degree relatives), and previous treatment for hypertension (antihypertensive medications taken more than 6 months previously). Marital adjustment was measured by the Dyadic Adjustment Scale (DAS), used in more than 1000 published studies, desire for marital change was assessed by the Areas of Change questionnaire (ACQ, completed by both spouses), and job strain, latitude, and demands were measured using the Job Content Questionnaire (JCQ). All instruments were well-validated and reliable.

**Statistical Analysis** Forward stepwise regression evaluated whether the independent variables (gender, age, body mass index [BMI], regular drinker, current smoker, education level, ethnic category, previous treatment for hypertension, family hypertension history, regular exercise, practice relaxation techniques) were associated with 24-h mean, daytime (7 AM–11 PM) and nighttime SBP and DBP. The marital variables were total ACQ (sum of Agree and Disagree subscales) and DAS subscales—Cohesion, Satisfaction, Consensus, and Affectional Expression). Further analyses used a 3 × 2 ANCOVA to determine the association between Cohesion (<9, “non-cohesive”; 9–14, >15 mean scores), gender, and ABP. Cutoffs for Cohesion were chosen because previous research demonstrates a mean of 8 for divorced couples and a mean of 13.4 for married couples. The mean in our sample was 14.7. Covariates were age, gender, BMI, smoker, drinker, family history of hypertension, and previous treatment for hypertension. χ² analyses evaluated BP and job strain (job demand > 25, decision latitude < 74). Subjects were classified hypertensive, high-risk, and white-coat (WCH) by daytime DBP (> 90, 85–89, < 85 mm Hg).

**RESULTS** There were 134 men (65.4%) and 71 women (34.6%); the mean age was 46.3 years, 75.7% were white, 70.1% had education beyond high school, 14.4% were current smokers, and 96% had LVMI in the normal range (N = 176). Gender differences were seen for BMI (men, 27.4; women, 25.9; P < .05), professionals (men, 49.6%; women, 32.8%; P < .05), regular drinker (men, 19.7%; women, 13.2%; P < .01) and all ABP variables (men > women, P < .05) except for nighttime SBP (P = .07). Women were more likely than men to be classified as WCH (P = .0035). Multiple regression analyses (Table 1) show the findings for ABP (N = 161). The main correlates for SBP and DBP were age and gender, respectively. Body mass index showed negative correlations with DBP, explained by outliers greater than 2 standard deviations; otherwise there were no associations. Psychosocial variables were alcohol, smoking, and Cohesion. Lower Cohesion was related to elevated nighttime SBP (P = .05) and increased 24-h and nighttime DBP (both P < .041).

Given the emergence of Cohesion, a regression was performed on those (N = 83) with Cohesion less than the mean. This showed a positive association between spousal contact and nighttime ABP (both P < .031). There were no Cohesion-by-gender effects. Effect size for Cohesion on ABP with respect to noncohesive subjects (N = 14, 7.3%) is shown in Table 1. There is a consistent increase for all ambulatory variables of approximately 6 mm Hg. The analysis controls for findings from main regression analysis. All findings are significant (P < .035) except for nighttime SBP (P = .107). A maximum likelihood factor analysis was conducted on the items for the Dyadic Adjustment Scale using a varimax rotation and the criteria to obtain four factors that were reproduced exactly, including Cohesion, as before by Spanier, except one item, moved from Satisfaction to Affectional Expression. Cronbach’s α using Spanier’s items were Cohesion = 0.82; other subscales = 0.74 to 0.87. Significant univariate correlations were seen with the other DAS subscales (all P < .0001) and negatively with the ACQ Disagree subscales (both P < .008), but not the Agree subscales (both P > .138, NS). Men with job strain (23%) were more likely to have hypertension than WCH (P < .03).

**DISCUSSION** Based on the high percentage of WCH and LVMI in the normal range, this group appears representative of those with early hypertension who may be most vulnerable to the effects of psychosocial factors before other factors such as peripheral resistance become established. Associations of regular alcohol consumption and smoking with elevated ABP, the preponderance of women in a WCH group, and job strain in the hypertensive group in men, have been reported previously. Marital cohesion emerges as a new factor in relation to ABP, especially seen in DBP and in nighttime ABP. Daytime results are less strong but ABP monitoring was performed on a working day. As home ABP was not delineated, it is not surprising that nighttime ABP was most closely related to marital
cohesion, as this is the time the couple is most likely to be together. When Cohesion is very low, as in 7.3% of our sample, there is about a 6-mm Hg effect on ABP, which is significant in all parameters except nighttime SBP. Early untreated hypertensives scoring in the “non-cohesive” range may represent a group vulnerable to the negative effects of a long-term live-in relationship. Cohesion relates to shared activities, which suggest a positive experience. There are five items; these are: engage in outside interests together, have a stimulating exchange of ideas, laugh together, calmly discuss something, and work together on a project. Low Cohesion appears necessary for sustainedpressor effects, whereas spousal contact only emerges in the presence of Cohesion less than the mean.

The validity of the DAS subscales has been debated. Cohesion in this sample is a valid and reliable subscale and this was demonstrated by high internal consistency and factor analysis. The difference in correlations between Cohesion and the Agree and Disagree subscales of the ACQ suggests that, although misperceiving one’s spouse’s desire for change is not cohesive, wanting change per se is not related to Cohesion. Cohesion items are largely descriptive and may be more quantifiable in comparison to other subscales and the ACQ. Given that, these findings may be regarded as an initial step in the development of a “marital strain” construct in relation to hypertension. More extensive evaluation of Cohesion, a self-report subscale, including objective assessment, is now required. Observational studies are limited in that they do not allow for the elucidation of cause and effect. Distinguishing work and home ABP would be helpful to delineate marital effects; however, this will likely depend on spousal contact. Finally, the presence of a comparative nonhypertensive group may prevent possible biased results from a preselected group.

**REFERENCES**

7. Burman B, Margolin G: Analysis of the association be-

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**TABLE 1. COHESION FINDINGS**

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<thead>
<tr>
<th></th>
<th>24-h SBP</th>
<th>SBP Day</th>
<th>SBP Night</th>
<th>24-h DBP</th>
<th>DBP Day</th>
<th>DBP Night</th>
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<td>0.28</td>
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<td>0.31</td>
<td>&lt; .0001</td>
<td>0.34</td>
<td>&lt; .0001</td>
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<td>.05</td>
<td>0.19</td>
<td>.008</td>
<td>0.16</td>
<td>.03</td>
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<td>Previous EH treatment</td>
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<td>.002</td>
<td>0.27</td>
<td>.0002</td>
<td>0.18</td>
<td>.01</td>
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<tr>
<td>Smoker</td>
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<td></td>
<td>0.18</td>
<td>.01</td>
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<tr>
<td>Cohesion</td>
<td></td>
<td></td>
<td>0.14</td>
<td>.05</td>
<td>0.15</td>
<td>.04</td>
</tr>
<tr>
<td>Cohesion less than mean</td>
<td>0.19</td>
<td>.008</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(N = 83)</td>
<td></td>
<td></td>
<td>0.19</td>
<td>.008</td>
<td></td>
<td></td>
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<td>Spousal contact</td>
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<td>0.27</td>
<td>.009</td>
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</tr>
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</table>

Effect size of noncohesive subjects

| mm Hg | 4.56 | 4.56 | 2.62 | 8.82 | 8.59 | 5.2 |
| F     | 0.034 | 0.032 | .107 | .003 | .004 | .024 |

* Effect size on ABP in mm Hg of Cohesion score < 9 (N = 14, v 177 [the remaining subjects]), controlling for age, gender, body mass index, regular alcohol consumption, previous treatment for hypertension, and smoking.

EH, essential hypertension; ABP, ambulatory blood pressure; SBP, systolic blood pressure; DBP, diastolic blood pressure; BP, blood pressure.


