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PROGNOSTIC IMPACT OF AMBULATORY BLOOD PRESSURE CONTROL IN TREATED HYPERTENSIVE PATIENTS
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Office blood pressure (BP) is not adequately controlled in many treated hypertensive patients. Prevalence and prognostic impact of ambulatory BP control are largely unknown.

In the setting of a prospective cohort study in hypertensive patients (PIUMA study), we evaluated the prognostic impact of office and ambulatory BP control in 759 patients with essential hypertension. Clinical data, including office and 24-hour ambulatory BP, were obtained before treatment and after an average of 3.6 years. Treatment was tailored to the single patient. At the follow-up visit, 27% of patients had adequate office BP control (<140/90 mmHg) and 39% had adequate 24-hour ambulatory BP control (<130/80 mmHg). During a follow-up period of up to 14 years, 55 patients experienced a first major cardiovascular event. Event rate did not differ significantly between patients with adequate or inadequate office BP control at the previous visit (0.97 vs 1.63 events x 100 patient-years; p = 0.24). In contrast, when BP control was assessed on the basis of 24-hour ambulatory BP, event rate was lower in well than in poorly controlled patients (0.90 vs 1.88 events x 100 patient-years; p = 0.02). After adjustment for age (p = 0.002), diabetes (p = 0.0003), and left ventricular hypertrophy (p = 0.007), 24-ambulatory BP control was associated with a 60% lesser risk for subsequent cardiovascular disease (95% confidence intervals: 19-81%; p = 0.011).

These findings indicate for the first time that ambulatory BP control is superior to office BP control for cardiovascular risk stratification in treated hypertensive patients.

Key Words: Ambulatory Blood Pressure, Prognosis, Left Ventricular Hypertrophy

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HOW WELL DOES A SPECIALIST CLINIC COMPARE TO MANAGED CARE ORGANIZATIONS FOR HYPERTENSION CONTROL?
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The control of hypertension has recently been added to the Health Plan Employer Data Information Set (HEDIS) Measures for 2000. The degree of blood pressure control for patients 46 - 85 years of age who have an established diagnosis of hypertension and have been enrolled in the plan for at least 12 months is estimated using the last recorded office blood pressure. For all patients, except those patients with end-stage renal disease, goal blood pressure is <140/90 mm Hg. A sitting blood pressure is used if available. If not, the supine value is used, with standing BP used only if no other values are available. We evaluated the percent of those who reached the HEDIS goal to estimate the prevalence of controlled hypertension in a tertiary care hypertension clinic. The Rush University Hypertension Service is comprised of 4 physicians, 3 of whom are certified Clinical Hypertension Specialists. Most of the patients were referred for refractory hypertension. No specific clinical pathway was used and no drug regimen was mandated.

All patients seen at the Rush University Hypertension Service from September, 1998 to February, 2000 were evaluated based on HEDIS criteria (N=588) of which 428 fulfilled the criteria and were evaluated for blood pressure control. Of the 160 patients excluded, 44% were excluded due to age, 12% lacked a diagnosis of hypertension and 36% had not been enrolled in the clinic for at least one year. Charts were unavailable for review in 8% of the patients.

The eligible cohort was 50% male; mean age was 64 ± 11 years. The mean systolic BP was 138 ± 14 mm Hg and mean diastolic BP was 79 ± 8 mmHg after at least one year in clinic.

Goal BP (<140/90 mm Hg) was achieved in 65% of these patients. An additional 27% reached only diastolic control below 90 mmHg with 8% having only SBP <140 mm Hg. Single drug therapy was used in 28%, with 34%, 21.3%, 11.6%, 4.4% requiring 2, 3, 4 or >5 medications respectively to achieve goal BP. The regimens included calcium antagonists in 59%, diuretics in 57%, angiotensin converting enzyme inhibitors in 39%, beta-blockers in 23%, alpha-blockers in 22%, and angiotensin receptor blocker in 15%.

These data compare favorably to the average BP control rate of 39 ± 10% seen in a survey of 257 Managed Care Organizations. Despite beginning with a cohort of patients referred for refractory hypertension, hypertension specialists were able to nearly double the proportion of patients reaching blood pressure goal. Multi-drug therapy was necessary in an overwhelming majority of the patients.


Key Words: Hypertension control, specialist clinic, Health Employer Data Information Set

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HEMODYNAMIC VERSUS SPECIALIST HYPERTENSION MANAGEMENT: RESULTS OF A RANDOMIZED TRIAL
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Resistant hypertension (RH) (>140/90 mm Hg despite multiple drugs) continues to pose a challenge despite improved drugs. To examine the role of non-invasive hemodynamic (HD) measurements (thoracic bioimpedance, we randomized 103 RH subjects to a 3-month trial of either HD directed drug Rx or clinical Rx by a hypertension specialist (SC) blinded to HD. Pre-randomization BP Rx averaged 3.6±0.1 drugs/patient, including diuretics (91%), ACE inhibitors/ARBs (81%) and CCBs (59%). HD measurements included cardiac index (CI), peripheral resistance (SVRI), and thoracic impedance reflecting central thoracic fluid volume (TBI). Protocol drugs were selected based upon HD values by pre-determined algorithm. Subjects returned monthly for drug and dose titration. Mean age was 66±1 yrs. Cardiovascular risk was high with multiple comorbidities (33% diabetic, 50% hyperlipidemic). Results were as follows:

<table>
<thead>
<tr>
<th></th>
<th>Hemodynamic Treatment</th>
<th>Specialist Care</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Entry</td>
<td>Final</td>
</tr>
<tr>
<td>Systolic BP (mm Hg)</td>
<td>169 ± 3</td>
<td>139 ± 3**#</td>
</tr>
<tr>
<td>Diastolic BP (mm Hg)</td>
<td>87 ± 2</td>
<td>72 ± 1**#</td>
</tr>
<tr>
<td>Serum creat (mg/dL)</td>
<td>1.3 ± 0.1</td>
<td>1.6 ± 0.1**</td>
</tr>
<tr>
<td>SVRI (d-sec-cm -5 -m -2 )</td>
<td>3309 ± 112</td>
<td>2794 ± 86**</td>
</tr>
<tr>
<td>Supine TBI (ohms)</td>
<td>33.4 ± 1.1</td>
<td>36.0 ± 1.0**</td>
</tr>
</tbody>
</table>

Mean±SEM
*p<0.05 vs entry, **p<0.01 vs entry, $#p<0.05 vs SC, #p<0.01 vs SC

HD protocol subjects reached goal BP (<140/90 mm Hg) more often (56% vs 34%, p<0.05). HD measurements demonstrated elevated SVRI and central fluid volume in RH, despite previous Rx. Final drug numbers were similar, but daily diuretic doses were higher in HD (3.3±0.4 vs 2.3±0.3 dose equivalents, p<0.05). Cardiac index remained stable with medication adjustments. SVRI was elevated at study entry, with greater reduction achieved in the HD patients correlating with lower BP readings. TBI rose with treatment as did serum creatinine reflecting reduction in central volume, independent of change in weight. These data indicate...