Adjustment of antihypertensive medication using home based, patient monitored blood pressure reduced both intensity of treatment and blood pressure control

Staessen JA, Den Hond E, Celis H, *et al* for the Treatment of Hypertension Based on Home or Office Blood Pressure (THOP) Trial Investigators. Antihypertensive treatment based on blood pressure measurement at home or in the physician's office: a randomized controlled trial. *JAMA* 2004;291:955–64.

Q Is home based, self measurement of blood pressure (BP) more effective than office based, physician measurement as a basis for initiating and titrating antihypertensive drug treatment?

METHODS

Design: randomised controlled trial.

Allocation: concealed.

Blinding: blinded (patients, physician making treatment decisions, outcome assessors, data analysts, and monitoring committee)*.

Follow up period: 1 year.

Setting: 56 primary care practices and 3 hospital based outpatient clinics in Leuven, Belgium and a specialised hypertension clinic in Dublin, Ireland.

Patients: 400 patients ≥ 18 years of age (mean age 53 y, 52% women) who had either untreated or treated hypertension (using ≤ 2 antihypertensive agents), and the last of 3 consecutive readings of diastolic BP (DBP) at 2 run-in visits averaged 95–114 mm Hg. Exclusion criteria: heart failure, unstable angina, stage 3 or 4 hypertensive retinopathy, myocardial infarction or stroke in the previous year, severe non-cardiovascular disease, serum creatinine concentrations $>177 \mu\text{mol/l}$, mental disorders, substance abuse, or employment involving night shifts.

Intervention: antihypertensive treatment based on self measured BP at home (home BP, $n = 203$) or physician measured BP at the office (office BP, $n = 197$). All patients measured their BP at home using validated, calibrated devices, had it measured in the physician's office, and had 24 hour ambulatory monitoring at 3 time points. Home BP comprised an average of all readings from 7 days before a follow up visit. Office BP comprised an average of 3 consecutive readings taken by the physician. Target BP was a DBP of 80–89 mm Hg. One blinded physician applied a standardised, 4 step, progressively intense drug regimen based on BP readings: treatment was intensified, unchanged, or reduced at each follow up point if DBP was >89 mm Hg, 80–89 mm Hg, or <80 mm Hg, respectively.

Outcomes: BP control based on 24 hour ambulatory monitoring.

Patient follow up: 347 patients (87%) completed the trial.

*Information provided by author.

MAIN RESULTS

More patients in the home BP group than in the office BP group stopped antihypertensive treatment because their DBP stabilised at or

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below target (table). The groups did not differ for progression to multiple drug treatment (39% *v* 45%, log rank $p = 0.14$). Change in 24 hour ambulatory DBP from randomisation to the end of follow up was lower in the home BP group than in the office BP group ($-7.1 \text{ v } -10.0$ mm Hg, mean difference 2.9, 95% CI 1.4 to 4.4, adjusted for baseline BP, sex, age, and body mass index).

CONCLUSION

In patients with hypertension, adjustment of antihypertensive medication based on blood pressure (BP) measured by patients at home led to less intensive drug treatment and lower BP control than adjustment based on BP measured in a physician's office.

Home based, self measured blood pressure (BP) *v* office based, physician measured BP for adjustment of antihypertensive treatment*

Outcomes at 1 year	Home	Office	RBI (95% CI)	NNT (CI)
Stopped antihypertensive treatment	26%	11%	127% (45 to 258)	7 (5 to 15)

*Abbreviations defined in glossary; RBI, NNT, and CI calculated from data in article.

Commentary

Research regarding identification of optimal BP targets is varied and difficult to apply in clinical practice. The study by Staessen *et al* focused on DBP goals of 80–89 mm Hg, whereas a previous study by the same authors identified isolated systolic hypertension as a predictor of cardiovascular (CV) risk in untreated elderly persons (≥ 60 y) using ambulatory blood pressure (ABP).¹ A recent meta-analysis of 29 prospective trials² found no significant difference among drug therapies for total major cardiovascular events, using both systolic and diastolic measurement. Lower BPs were associated with reduced events. Verdecchia reviewed available evidence on the prognostic value of ABP and found increased CV risk with even modest changes in systolic BP between 120–140 mm Hg.³

Limitations of the study by Staessen *et al* include no indication of race or mention of patients with diabetes. Follow up was limited to 1 year. Results focused on the higher intensity of drug treatment and better BP control with office based BP measurement. However, home BP measurement was helpful in identifying patients with “white coat” hypertension. This study allows nurses to appreciate important differences among office, home, and ABP measurement values and to consider the complementary ways in which all 3 measurement approaches can be used to enhance BP monitoring and control.

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1 Staessen JA, Thijs L, Fagard R, *et al*. *JAMA* 1999;282:539–46.

2 Turnbull F, Blood Pressure Lowering Treatment Trialists' Collaboration. *Lancet* 2003;362:1527–35.

3 Verdecchia P. *Hypertension* 2000;35:844–51.