

Comparison of conventional and automated blood pressure measurements: interim analysis of the THOP trial

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Background

Automated techniques of blood pressure (BP) measurement are increasingly being used to diagnose white-coat hypertension [1,2]. Compared to conventional blood pressure (CBP) measurement by the Korotkoff method, they are more reproducible and not subject to digit preference or observer bias. Self-measurement of the blood pressure at home (HBP) is less expensive than ambulatory blood pressure monitoring (ABP), but needs further clinical validation.

Objective

The main objective of the Treatment of Hypertension According to Home or Office Blood Pressure (THOP) trial is to test the hypothesis that antihypertensive drug treatment guided by self-measured BP may be more beneficial to the patient than treatment based on conventional BP measurement by the doctor [3]. In this progress report on the THOP trial, we compared the BP values at randomization obtained by CBP, HBP and ABP.

Methods

The protocol of the multicentre THOP trial was described in detail elsewhere [3]. For this progress report, BP measurements at baseline were available in 224 hypertensive patients. Sitting diastolic BP on-treatment or off-treatment was >95 mmHg on conventional measurement after a one-month run-in period. The doctor measured CBP with a standard sphygmomanometer. Twice, within a period of one month, three readings were obtained after the patient had rested for 5 min in the sitting position. The last two measurements of each visit were averaged.

Daytime BP (1000h–2000h) was calculated from 24-h ABP recordings. The patients measured their BP at home in the morning (0600h–1000h) and in the evening (1800h–2200h) with an automatic device (Omron HEM-705CP, Omron Corporation, Tokyo, Japan). Home blood pressure readings were performed over seven consecutive days. Each time the patient obtained three readings while seated. The BP thresholds to diagnose white-coat hypertension and sustained hypertension were 140/90 mmHg for CBP and 135/85 mmHg for ABP as well as HBP [4].

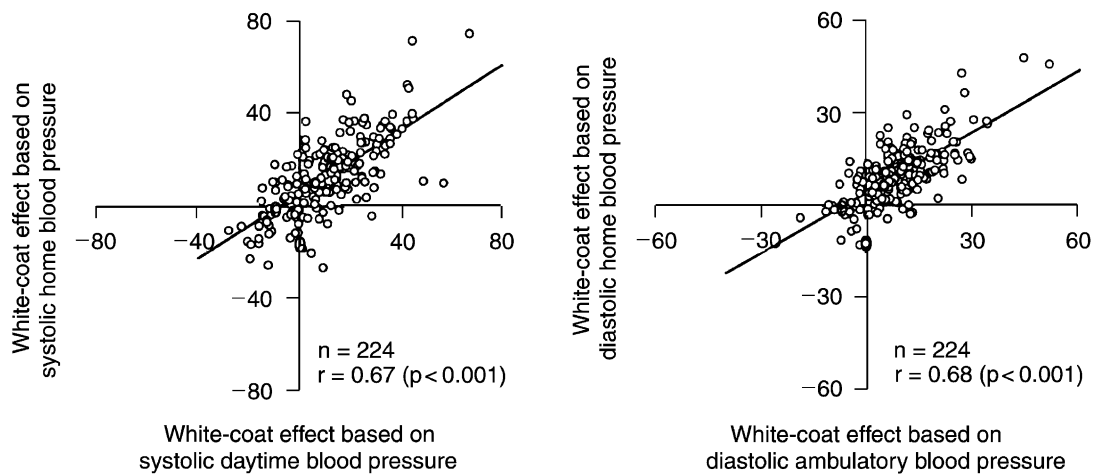
Results

The study group included 106 (47.3%) men. One hundred and twenty (46.4%) patients were currently taking anti-hypertensive drugs. Mean (SD) age and body-mass index were 54.9 (12.0) years and 28.2 (4.7) kg/m², respectively. Mean systolic/diastolic CBP, ABP and HBP were 160.5 (15.9)/101.2 (6.0) mmHg, 148.5 (15.9)/93.0 (10.3) mmHg and 146.4 (18.3)/91.3 (9.8) mmHg, respectively.

For systolic pressure, the mean difference between CBP and ABP was 12.0 (15.1) mmHg and that between CBP and HBP was 14.1 (15.5) mmHg. For diastolic pressure, the corresponding differences were 8.2 (9.4) mmHg and 9.9 (8.9) mmHg, respectively. The systolic white-coat effect was 2.1 mmHg ($p < 0.01$) larger for CBP compared with HBP than for CBP compared with ABP. A similar trend was observed for diastolic pressure (1.7 mmHg, $P < 0.001$). Nevertheless, the correlation coefficients between the white-coat effects based on HBP and ABP were 0.67 systolic and 0.68 diastolic ($P < 0.001$) (see Fig. 1).

Using ABP or HBP as criteria for the definition of hypertension, 189 (84.4%) patients were consistently classified as having sustained hypertension ($n = 173$) or white-coat hypertension ($n = 16$). Twenty-two (9.9%) patients had white-coat hypertension based on HBP but sustained hypertension according to ABP and 13 (5.8%) patients had white-coat hypertension based on ABP but sustained hypertension according to HBP. Using the diagnosis of white-coat hypertension by ABP as reference, the specificity, sensitivity and positive and negative

Fig. 1



White-coat effect based on HBP versus white-coat effect based on daytime ABP, for systolic (left panel) and diastolic (right panel) pressure.

predictive values of this diagnosis based on HBP were 88.7%, 55.2%, 42.1%, and 93.0%, respectively.

Conclusion

This progress report on the THOP trial demonstrates that under standardized conditions, the white-coat effects based on HBP and ABP are highly correlated. Nevertheless HBP and ABP identify different subsets of patients with white-coat hypertension. The implications of these findings in terms of cost-effectiveness and cardiovascular prognosis remain to be elucidated.

References

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