

COMMENTARY

Home blood pressure monitoring, even by the elderly, may save a kidney

Hiroyuki Terawaki

Hypertension Research (2009) 32, 1055; doi:10.1038/hr.2009.169; published online 16 October 2009

Accumulating evidence has shown that predialysis chronic kidney disease (CKD), or declined renal function, is an independent risk factor for death, cardiovascular events and stroke in the general population.^{1–3} Japan is rapidly becoming an aged society and the prevalence of CKD is high among the elderly.⁴ Accordingly, it is important to develop a therapeutic strategy for elderly patients with CKD.

As hypertension is a classical risk factor for CKD occurrence and progression, proper control of blood pressure (BP) could be regarded as a first-line therapeutic strategy. Unfortunately, the beneficial effect of strict BP control in the elderly is unclear. For example, very recently, the JATOS (the Japanese Trial to Assess Optimal Systolic Blood Pressure in Elderly Hypertensive Patients) study failed to show a beneficial (including renoprotective) effect of strict BP control (systolic BP <140 mm Hg).⁵

One possible hypothesis is that using home BP monitoring could be an effective strategy to determine the optimal BP level. Several reports have shown that BP measured at home has superior predictive value for mortality, cardiovascular events⁶ and stroke,^{7,8} and screening value for asymptomatic cerebral ischemia⁹ and CKD.¹⁰ In addition, a previous study showed that home-measured BP is better than clinic-measured BP at predicting the progression of disease in 'general' CKD patients.¹¹

In an article appearing in this issue, Okada *et al.*¹² used home BP monitoring, and assessed the prognostic value of home BP (morning and evening) and casual BP for

renal and cardiovascular outcome in elderly CKD patients (age ≥ 70 years). Using the Cox proportional hazards model, Okada *et al.* showed that home (both morning and evening), but not casual, systolic BP was significantly associated with an increased risk of renal end point. The authors suggest that home BP monitoring may be useful for the detection of renal prognosis in elderly CKD patients. Results were confirmed not only by performing multiple measurements of home BP (7 days), but also by performing the same number of measurements as the casual BP (twice). Therefore, it is suggested that the superior prognostic value of home BP is not due to the number of measurements; however, other contributing factors may include the lack of the white-coat effect or the timing of BP measurement (in early morning or late evening).

Although this study failed to elucidate the optimal target level of home BP (probably owing to the small cohort size; $n=104$), it succeeded in suggesting that home-based BP control could improve the renal prognosis of CKD even in the elderly. The optimal home-measured BP and the putative suppression of CKD in the elderly by therapeutic intervention remain issues that must be elucidated by future studies.

- Go AS, Chertow GM, Fan D, McCulloch CE, Hsu CY. Chronic kidney disease and the risks of death, cardiovascular events, and hospitalization. *N Engl J Med* 2004; **351**: 1296–1305.
- Ninomiya T, Kiyohara Y, Kubo M, Tanizaki Y, Doi Y, Okubo K, Hata J, Oishi Y, Shikata K, Yonemoto K, Hirakata H, Iida M. Chronic kidney disease and cardiovascular disease in a general Japanese population: the Hisayama Study. *Kidney Int* 2005; **68**: 228–236.

- Nakayama M, Metoki H, Terawaki H, Ohkubo T, Kikuya M, Nakayama K, Asayama K, Inoue R, Hashimoto J, Totsune K, Hoshi H, Ito S, Imai Y. Kidney dysfunction as a risk factor for first symptomatic stroke events in a general Japanese population—the Ohasama study. *Nephrol Dial Transplant* 2007; **22**: 1910–1915.
- Imai E, Horio M, Watanabe T, Iseki K, Yamagata K, Hara S, Ura N, Kiyohara Y, Moriyama T, Ando Y, Fujimoto S, Konta T, Yokoyama H, Makin H, Hishida A, Matsuo S. Prevalence of chronic kidney disease in the Japanese general population. *Clin Exp Nephrol* (e-pub ahead of print 11 June 2009; doi:10.1007/s10157-009-0199-x).
- JATOS Study Group. Principal results of the Japanese Trial to Assess Optimal Systolic Blood Pressure in Elderly Hypertensive Patients (JATOS). *Hypertens Res* 2008; **31**: 2115–2127.
- Bobrie G, Chatellier G, Genes N, Clerson P, Vaur L, Vaisse B, Menard J, Mallion JM. Cardiovascular prognosis of 'masked hypertension' detected by blood pressure self-measurement in elderly treated hypertensive patients. *JAMA* 2004; **291**: 1342–1349.
- Ohkubo T, Kikuya M, Metoki H, Asayama K, Obara T, Hashimoto J, Totsune K, Hoshi H, Satoh H, Imai Y. Prognosis of 'masked' hypertension and 'white-coat' hypertension detected by 24-h ambulatory blood pressure monitoring 10-year follow-up from the Ohasama study. *J Am Coll Cardiol* 2005; **46**: 508–515.
- Asayama K, Ohkubo T, Hara A, Hirose T, Yasui D, Obara T, Metoki H, Inoue R, Kikuya M, Totsune K, Hoshi H, Satoh H, Imai Y. Repeated evening home blood pressure measurement improves prognostic significance for stroke: a 12-year follow-up of the Ohasama study. *Blood Press Monit* 2009; **14**: 93–98.
- Hara A, Ohkubo T, Kondo T, Kikuya M, Aono Y, Hanawa S, Shioda K, Miyamoto S, Obara T, Metoki H, Inoue R, Asayama K, Hirose T, Totsune K, Hoshi H, Izumi S, Satoh H, Imai Y. Detection of silent cerebrovascular lesions in individuals with 'masked' and 'white-coat' hypertension by home blood pressure measurement: the Ohasama study. *J Hypertens* 2009; **27**: 1049–1055.
- Terawaki H, Metoki H, Nakayama M, Ohkubo T, Kikuya M, Asayama K, Inoue R, Hoshi H, Ito S, Imai Y. Masked hypertension determined by self-measured blood pressure at home and chronic kidney disease in the Japanese general population: the Ohasama study. *Hypertens Res* 2008; **31**: 2129–2135.
- Agarwal R, Andersen MJ. Prognostic importance of clinic and home blood pressure recordings in patients with chronic kidney disease. *Kidney Int* 2006; **69**: 406–411.
- Okada T, Nakao T, Matsumoto H, Nagaoka Y, Tomaru R, Iwasawa H, Wada T. Prognostic significance of home blood pressure on renal and cardiovascular outcomes in elderly patients with chronic kidney disease. *Hypertens Res* 2009; **32**: 1123–1129.