

indicated widespread damage and evidence of increased endothelial activity ranging from scarring through to nuclear atypia.

There are important lessons to be learned. Exposure of the thyroid gland to any irradiation requires lifelong supervision and introspection. This should include high-resolution ultrasound. The extent of thyroid exposure to radiation may be arcane and not recalled when the highlight of the history is focused on areas away from the gland. Most radiation oncology units in Australia have follow-up facilities, but the duration of follow-up is not uniform. Moreover, patients travel and disperse, so their supervision will be most likely carried out by doctors with less experience of such patients. In this regard the American Thyroid Association publishes an excellent information sheet for patients.<sup>4</sup>

The article concludes with a series of pertinent recommendations which emanate from the study. Although false positive results can occur, the risks demonstrated in this study indicate that the management regimen recommended by Somerville et al far outweighs a sanguine approach to the problem. Implicit in this is the importance of providing patients with information about the potential risks and the need for regular assessment.

Somerville et al observe that the Australian experience has disclosed a greater incidence of thyroid abnormality than seen in some other countries. This may derive from differing methods in the extent and depth of the studies, together with the sophistication of the ultrasound. The magnitude of the dose in the reported series did not seem to influence the

emergence of malignancy. Only time from the administration of the radiation therapy was important. It will be interesting to learn of the further evolving experience. In this regard, results of fluorodeoxyglucose positron emission tomography, in association with rising thyroglobulin levels, seem to give a clearer delineation of recurrent malignancy than can be obtained by other methods.<sup>5</sup>

There may come a time when it will be possible to protect patients from scatter irradiation involving the head, neck or upper-body region in the treatment of more generalised cancer such as leukaemia. However, such protection does not appear to be imminent and, even if attained, there will still be a group of potential thyroid cancer subjects as a legacy of the current therapeutic era.

**Alex Cohen AO**

Clinical Professor of Medicine  
University of Western Australia, Perth, WA

**Agatha van der Schaaf**

Head, Department of Nuclear Medicine  
Sir Charles Gairdner Hospital, Perth, WA

1. Gross MD, Shapiro B, Sisson JC. Radiation therapy of thyrotoxicosis. *Rays* 1999; 24: 334-347.
2. European Thyroid Association. <sup>131</sup>I Therapy for thyrotoxicosis towards 2000. *Eur J Nucl Med* 1996; 23: BP13-BP15.
3. Somerville HM, Steinbeck KS, Stevens G, et al. Thyroid neoplasia following irradiation in adolescent and young adult survivors of childhood cancer. *Med J Aust* 2002; 176: 584-587.
4. The American Thyroid Association. Childhood Head and Neck Irradiation. Leesburg Pike, Falls Church, VA: American Thyroid Association Inc, 2002.
5. Schluter B, Bohuslavizki WB, Beyer W, et al. Impact of FDG-PET on patients with differentiated thyroid cancer who present with elevated thyroglobulin and negative <sup>131</sup>I scan. *J Nucl Med* 2001; 42: 71-76. □

## Ambulatory blood pressure monitoring and "white coat" hypertension: saving costs

*Appropriate use of ambulatory blood pressure monitoring can be cost effective*

THE RATIONALE for the use of ambulatory blood pressure monitoring (ABPM) has been the subject of critical reviews and published guidelines.<sup>1-6</sup> Perhaps the most important and challenging finding to emerge from ambulatory blood pressure research has been the detection of "white coat" hypertension (also known as isolated clinic hypertension) in about 20% of subjects with repeatedly elevated casual blood pressure readings taken in the doctor's clinic.<sup>7,5</sup> The condition can only be detected by ABPM or self-monitoring, and there are no specific predisposing factors. For people with white coat hypertension and no evidence of cardiovascular disease or comorbidities such as diabetes or renal disease, most experts agree that the best policy is to monitor their clinic blood pressure regularly, with self-monitoring at home, and repeat ABPM at one- to two-yearly intervals.

The importance of continued monitoring is borne out by the evidence now emerging that white coat hypertension may not be an entirely innocent phenomenon.<sup>5,6</sup> The initial studies that examined the cost savings in the detection of

white coat hypertension by ABPM<sup>7,8</sup> did not consider the need for long-term surveillance and the conversion of patients with white coat hypertension to established hypertension; this might be as high as 75% over six years of follow-up.<sup>9</sup> The development of hypertension on ABPM criteria could not be predicted by changes in clinic blood pressures.

The cost-analysis study of ABPM in Australian general practice reported by Ewald and Perkarsky in this issue of the *Journal* (page 580)<sup>10</sup> is important for a number of reasons. The study confirms the high prevalence of white coat hypertension previously reported in the Australian community,<sup>11</sup> and reflects current general practice, because GPs decided on the basis of conventional clinic readings that drug treatment was indicated before ordering ABPM.

This cost analysis is the first such study based on Australian data, including best estimates of current pharmacological management of hypertension in Australia. It has also factored in a 10% per year conversion rate from white coat

hypertension to established hypertension. The sensitivity analysis showed that all monitoring strategies (ABPM at 1-, 2-, or 3-year intervals) were less expensive than no monitoring over a projected seven-year period.

The study almost certainly underestimated the average costs of investigations of hypertension, including standard investigations, documentation of target-organ effects and specific investigations in selected subjects to exclude secondary hypertension. The potential costs of adverse drug reactions were not considered. However, both of these would amplify the difference towards greater cost saving with the use of ABPM. Another important attributable cost is that of the perception of unwellness that accompanies inappropriate labelling as "hypertensive", which can lead to loss of productivity, sick leave, anxiety and the development of symptoms.

There are other groups of patients in whom ABPM might have cost-saving benefits. Staessen et al<sup>12</sup> reported on a study in 419 patients randomised to be treated according to their daytime ambulatory blood pressure or their clinic blood pressure, with the latter group receiving usual care. The mean follow-up was six months, and the two groups had similar mean left ventricular mass at the end of the study. The ambulatory blood pressure group had a 19% decrease in antihypertensive drug use and an 11% fall in doctors' fees. Some treated hypertensive patients exhibit a marked difference between ambulatory blood pressure and clinic blood pressure, and assessment of the effectiveness of antihypertensive therapy using clinic blood pressure readings tends to overestimate responses to drug therapy by including the "placebo" component of the reduction in blood pressure, which is minimal with ABPM. The results of the Syst-Eur study of systolic hypertension show that conventional clinic blood pressure measurements lead to an overestimate of the prevalence of isolated systolic hypertension among elderly patients.<sup>13</sup> This suggests the potential for excessive treatment and associated complications in a significant proportion of elderly patients. This white coat effect is reproducible.<sup>14</sup> The recognition of white coat hypertension in pregnancy, which may occur in as much as 30% of pregnancies,<sup>15</sup> has the potential to reduce anxiety, hospital admissions and drug use, with significant cost savings.

Some notes of caution are warranted. A major one is that we still await the results of definitive outcome studies in controlled trials comparing management of hypertension based on clinic blood pressure versus ambulatory blood pressure. The technique of ABPM is specialised, and service providers must use validated monitors and quality control measures. Current provision of ABPM is not regulated in Australia and is not recognised through the Medical Bene-

fits Scheme. Another cautionary note is that all available evidence suggests that hypertension in our community is more undertreated than overtreated.

The use of self-monitoring is also increasing, although there are more concerns with self-recording devices. In a recent analysis,<sup>16</sup> only five of 23 devices met acceptable criteria. A combination of the two has a lot to offer: ABPM may be better for the initial diagnosis of hypertension and for predicting prognosis, while self-monitoring may be of more value for the long-term follow-up of patients.

ABPM is an important diagnostic tool in the management of hypertension. The study by Ewald and Perkarsky indicates that appropriate use can be of cost benefit to the Australian community.

**Barry P McGrath**

Professor of Vascular Medicine and Professor of Medicine  
Monash University and Dandenong Hospital, Melbourne, VIC

- Pickering T. Recommendations for the use of home (self) and ambulatory blood pressure recording. American Society of Hypertension Ad Hoc Panel. *Am J Hypertens* 1996; 9: 1-11.
- Myers MG, Haynes RB, Rabkin SW. Canadian Hypertension Society guidelines for ambulatory blood pressure monitoring. *Am J Hypertens* 1999; 12: 1149-1157.
- O'Brien E, Coats A, Owens P, et al. Use and interpretation of ambulatory blood pressure monitoring: recommendations of the British Hypertension Society. *BMJ* 2000; 320: 1128-1134.
- Pickering T, James G, Boddie C, et al. How common is white coat hypertension? *JAMA* 1988; 259: 225-228.
- McGrath BP. Is white coat hypertension innocent? *Lancet* 1997; 348: 630.
- Palitini P, Mormino P, Santonastaso M, et al. Target-organ damage in stage I hypertensive subjects with white coat and sustained hypertension: results from the HARVEST study. *Hypertension* 1998; 31: 57-63.
- Yarrows SA, Houry S, Sowers JR. Cost effectiveness of 24-hour ambulatory blood pressure monitoring in evaluation and treatment of essential hypertension. *Am J Hypertens* 1994; 7: 464-468.
- Pierdomenico SD, Mezzetti A, Lapenna D, et al. "White-coat" hypertension in patients with newly diagnosed hypertension: evaluation of prevalence by ambulatory monitoring and impact on cost of health care. *Eur Heart J* 1995; 16: 692-697.
- Bidlingmeyer I, Burnier M, Bidlingmeyer M, et al. Isolated office hypertension: a prehypertensive state? *J Hypertens* 1996; 14: 327-332.
- Ewald B, Pekarsky B. Cost analysis of ambulatory blood pressure monitoring in initiating antihypertensive drug treatment in Australian general practice. *Med J Aust* 2002; 12: 580-583.
- Gourlay SG, McNeil JJ, Marriner T, et al. Discordance of mercury sphygmomanometer and ambulatory blood pressure measurements for the detection of untreated hypertension in a population study. *J Hum Hypertens* 1993; 7: 467-472.
- Staessen J, Byttebier G, Buntinx F, et al. Antihypertensive treatment based on conventional or ambulatory blood pressure measurement: a randomized controlled trial. Ambulatory Blood Pressure Monitoring and Treatment of Hypertension Investigators. *JAMA* 1997; 278: 1065-1072.
- Staessen J, Thijs L, Fagard R, et al. Predicting cardiovascular risk using conventional vs ambulatory blood pressure in older patients with systolic hypertension. *JAMA* 1999; 282: 539-546.
- Silagy C, McNeil J, Farish S, McGrath B. Comparison of repeated measures of ambulatory and clinic blood pressure readings in isolated systolic hypertension. *Clin Exp Hypertens* 1993; 15: 895-909.
- Bellomo G, Narducci PL, Rondoni F, et al. Prognostic value of 24-hour blood pressure in pregnancy. *JAMA* 1999; 282: 1447-1452.
- O'Brien E, Waeber B, Parati G, et al. Blood pressure measuring devices: recommendations of the European Society of Hypertension. *BMJ* 2001; 322: 531-536. □

[www.mja.com.au](http://www.mja.com.au)