Delaying Blood Pressure Control in Type 2 Diabetes: Illustrating Principles in the Practice of Medicine

Raj S. Padwal, MD, MSc[1,2] and Scott W. Klarenbach, MD, MSc[1]

[1]Department of Medicine, University of Alberta, Edmonton, AB, Canada; [2]2F1.26 Walter C. Mackenzie Health Sciences Centre, Edmonton, AB, Canada.

J Gen Intern Med 27(6):621–2
DOI: 10.1007/s11606-012-2034-4

> "It is much more important to know what sort of a patient has a disease than what sort of a disease a patient has."
>
> —Sir William Osler
> (1849–1919)

In this issue of JGIM, Laiteerapong and colleagues estimate the consequences of delaying systolic blood pressure (SBP) control in patients with newly diagnosed type 2 diabetes using a mathematical model.[1] In this model a hypothetical cohort, with the demographic and clinical baseline characteristics of 50-59-year-old adults in the population-representative 1999–2008 US National Health and Nutrition Examination Surveys (NHANES), are examined. They estimate that a 1-year delay in reducing SBP from 150 to 130 mm Hg is associated with a minimal increase in diabetes-related complication rates (14 events per 10,000 patients) and a very small decrease in quality-adjusted life expectancy (2 days). In contrast, a 10-year delay in achieving target SBP levels increased diabetes-related complication rates by 428 per 10,000 patients and reduced QALE by 145 days. A lifetime delay increased complication rates by 1855 events per 10,000 patients and lowered QALE by 332 days.

Explicit quantification of the consequences (or lack thereof) associated with delaying blood pressure control in patients with type 2 diabetes may help to optimize hypertension management in this patient population. Given the absence of RCT data and the challenges of conducting such a trial, the authors utilized risk equations from UKPDS to estimate outcomes. While a reasonable approach, limitations of the model and its assumptions should be considered when applying these results to patients. First, an important model assumption is that patients ultimately achieve target SBP levels, but, in reality, this holds true for only 30% of patients with type 2 diabetes in the US.[2] Second, the impact of delaying blood pressure control in higher risk subgroups (e.g. older patients or patients with additional cardiovascular risk factors) was not assessed. The absolute risks associated with uncontrolled blood pressure are higher in these subgroups and, therefore, the risks of delaying treatment are greater. Third, the model used a 130 mm Hg SBP treatment target assumption; however, this target is not directly supported by randomized controlled trial evidence and a higher target may be more appropriate unless individual stroke risk is high.[3] If a 140 mm Hg target threshold were used instead, one might expect even fewer complications to result from delaying antihypertensive drug initiation. Finally, 160 mm Hg was the highest baseline SBP modeled and results cannot be generalized to patients with greater SBP levels.

On the basis of their findings, the authors' contend that antihypertensive drug treatment can be safely delayed for longer than the three month period recommended by current guidelines,[4] enabling time to enact lifestyle modification measures. This is a reasonable conclusion provided the patient's global cardiovascular risk, estimated using a validated risk assessment tool, is low (i.e., less than 5–10%). In cases where the 10-year cardiovascular risk is estimated to be moderate or high, ACE-inhibitor or angiotensin receptor blocker therapy is recommended regardless of the blood pressure level and, thus, the question of whether or not antihypertensive drug initiation should be delayed becomes moot.[3,4] Concomitant with instituting lifestyle modification, major barriers to achieving target blood pressure levels (i.e., poor health care access, provider inertia, and patient non-adherence) need to be assessed and addressed, if possible. Otherwise, if drug therapy is eventually initiated, even further delays in achieving target BP control may occur. While the authors have made a compelling case that the short-term harms associated with delay in achieving treatment targets are minimal, it is not clear which strategy—delayed pharmacologic intervention with reassessment of impact of lifestyle intervention, or early pharmacologic therapy—will result in the greatest proportion of patients ultimately achieving target blood pressure. This is an important question to examine in future studies.

Excess adiposity, especially visceral, strongly predisposes towards the development of both type 2 diabetes and

Published online March 20, 2012

hypertension.[5] Accordingly weight reduction is arguably the most important lifestyle modification for hypertensive patients,[6] but what is the evidence of its efficacy and effectiveness? The 1-year results of the ongoing Look AHEAD (Action for Health in Diabetes) study provide some valuable insights. In this multicentre controlled trial, 5145 patients with type 2 diabetes were randomized to intensive lifestyle modification or a control arm consisting of diabetes education and support.[7] Intensive lifestyle modification in the first year consisted of 34 individual and group-based counseling sessions delivered by teams of dieticians, psychologists and exercise specialists and covering multiple topics including caloric restriction, exercise and behavioral modification. Conversely, subjects in the control arm received only three group-based educational sessions over the one-year period. Patients assigned to the intensive study arm lost 8.6% (standard deviation or SD 6.9%) of their body weight compared to 0.7% (SD 4.8%) in the control arm; corresponding SBP reductions were 6.8 mm Hg (SD 20 mm Hg) in the intensive arm and 2.8 mm Hg (SD 14.9 mm Hg) in the controls ($p<0.001$ for both between-group comparisons).

These results suggest that lifestyle modification can, in theory, be quite efficacious in reducing weight and SBP. Given that the baseline mean SBP of the trial participants was 129 mm Hg, mean blood pressure reductions may be even greater in a hypertensive population. However, subjects in Look AHEAD received counseling from trained trial personnel and were highly pre-selected for their ability to exercise. Furthermore, the intensity of the intervention used in the intensive treatment arm would be difficult to replicate in most primary care settings. Thus, the feasibility of achieving this degree of weight loss and blood pressure control in a clinical practice setting is likely to be much lower than in the Look AHEAD trial.

Nevertheless, attempting an extended trial of lifestyle modification may be worthwhile and should be considered for specific patients. The key phrase here is 'specific patients', which brings us to our final and most crucial point. Guidelines are intended to assist decision-making and not to replace clinical judgment; however, they are too often interpreted rigidly rather than in the spirit of their original intent. Thus, when making the decision to institute or delay initiation of antihypertensive drug therapy, the baseline cardiovascular risk, comorbidity profile, available resources to support lifestyle interventions, and values of the patient—including the degree of risk aversion and enthusiasm for lifestyle modification—all must be weighed. Ultimately, as was so eloquently expressed by Osler over a century ago, clinicians should bear in mind that therapeutic plans must be tailored to the needs of each individual patient if treatment is to be successfully optimized.

Disclosures: *None*

Corresponding Author: *Raj S. Padwal, MD, MSc; 2F1.26 Walter C. Mackenzie Health Sciences Centre, 8440-112th Street, Edmonton, AB T6G 2B7, Canada (e-mail: rpadwal@ualberta.ca).*

REFERENCES

1. **Laiteerapong N, John PM, Meltzer DO, Huang ES.** Impact of delaying blood pressure control in patients with type 2 diabetes: results of a decision analysis. JGIM. 2012; doi:10.1007/s11606-011-1951-y.
2. **Su DC, Kim CM, Choi IS, Plauschinat CA, Barone JA.** Trends in blood pressure control and treatment among type 2 diabetes with comorbid hypertension in the United States: 1988-2004. J Hypertens. 2009;27:1908–16.
3. **Rabi DM, Daskalopoulou SS, Padwal RS, Khan NA, Grover SA, Hackam DG, et al.** The 2011 Canadian Hypertension Education Program recommendations for the management of hypertension: blood pressure measurement, diagnosis, assessment of risk, and therapy. Can J Cardiol. 2011;27(4):415–33.
4. **American Diabetes Association.** Standards of Medical Care in Diabetes–2011. Diabetes Care. 2010;34:S11–61.
5. **Haslam D, James WPT.** Obesity. Lancet. 2005;366:1197–209.
6. **Padwal R.** Applying the 2005 Canadian Hypertension Education Program recommendations: 3. Lifestyle modifications to prevent and treat hypertension. CMAJ. 2005;173:749–51.
7. **Pi-Sunyer X, Blackburn G, Brancati FL, Bray GA, Bright R, Clark JM, Curtis JM, Espeland MA, Foreyt JP, Graves K, Haffner SM, Harrison B, Hill JO, Horton ES, Jakicic J, Jeffery RW, Johnson KC, Kahn S, Kelley DE, Kitabchi AE, Knowler WC, Lewis CE, Maschak-Carey BJ, Montgomery B, Nathan DM, Patricio J, Peters A, Redmon JB, Reeves RS, Ryan DH, Safford M, Van Dorsten B, Wadden TA, Wagenknecht L, Wesche-Thobaben J, Wing RR, Yanovski SZ.** Reduction in weight and cardiovascular disease risk factors in individuals with type 2 diabetes: one-year results of the look AHEAD trial. Diabetes Care. 2007;30:1374–83.