◣ Editorials

"Lending a Hand" to Patients with Type 2 Diabetes: A Simple Way to Communicate Treatment Goals

DEBORAH R. ERLICH, MD, MMedEd, *Tufts University School of Medicine, Boston, Massachusetts*

DAVID C. SLAWSON, MD, *University of Virginia School of Medicine, Charlottesville, Virginia*

ALLEN F. SHAUGHNESSY, PharmD, MMedEd, *Tufts University School of Medicine, Boston, Massachusetts*

Because sugar was historically the defining feature of diabetes mellitus (meaning "excess urination of honey"), treatment focused primarily on lowering blood glucose levels until recently. However, based on high-quality evidence from meta-analyses, glucose control should no longer be the main focus of treatment. A new approach to the care of adults with type 2 diabetes emphasizes proven interventions that improve duration and quality of life.

Bolstering data from the University Group Diabetes Program published in 1970,[1] four more recent studies have shown that intensive treatment aimed at lowering blood glucose levels neither affects mortality nor decreases complications of type 2 diabetes.[2-5] In contrast, interventions that are especially effective at extending life in these patients include smoking cessation,[6] blood pressure control, and reduction of lipid levels.[5] The United Kingdom Prospective Diabetes Study also showed that treatment with metformin (Glucophage) decreases mortality, regardless of its effect on blood glucose or A1C levels.[7] These findings are reflected in new guidelines from the American Diabetes Association and the European Association for the Study of Diabetes.[8]

An easy way to illustrate this new approach to patients is by "lending a hand" *(Figure 1)*.[4,5,7,9-14] From thumb to little finger, each digit on an open hand portrays one intervention in decreasing order of benefit: smoking cessation (thumb), blood pressure control (index finger), metformin therapy (middle finger), lipid reduction (ring finger), and glycemic control (little finger).[5,7,14-16]

Step 1 (Thumb): Smoking Cessation

Smoking poses a greater risk of morbidity and mortality than any other physiologic abnormality in patients with diabetes.[15]
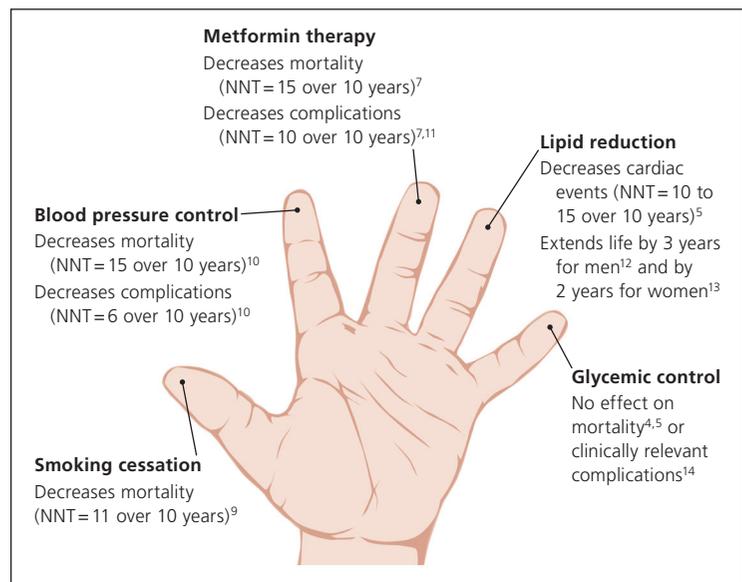
Addressing other issues without addressing smoking is like rearranging deck chairs on the Titanic. Smoking cessation is the primary goal except in patients with other risk factors that are so poorly controlled they will cause short-term effects (e.g., hypertensive crisis).

Step 2 (Index Finger): Blood Pressure Control

Blood pressure should be decreased to less than 140/80 mm Hg, based on evidence of fewer cardiovascular events and lower mortality in patients with type 2 diabetes.[2,10,16-18] Further reducing the systolic blood pressure to 120 mm Hg confers no additional benefit and may increase the risk of adverse effects, such as syncope, arrhythmia, and renal failure.[18] A thiazide diuretic or angiotensin-converting enzyme inhibitor should be the initial choice for pharmacotherapy.[16,19]

Step 3 (Middle Finger): Metformin Therapy

Metformin therapy delays premature mortality independent of its effect on glucose levels, and should be prescribed for overweight patients with type 2 diabetes unless contraindicated.[7,20] Lactic acidosis, once associated with phenformin use, is not a risk with metformin, and it is even safe in patients with moderate renal dysfunction (i.e., glomerular filtration rate of 30 to 59 mL per minute per 1.73 m²).[21] ▶

Metformin therapy
Decreases mortality
(NNT = 15 over 10 years)[7]
Decreases complications
(NNT = 10 over 10 years)[7,11]

Lipid reduction
Decreases cardiac events (NNT = 10 to 15 over 10 years)[5]
Extends life by 3 years for men[12] and by 2 years for women[13]

Blood pressure control
Decreases mortality
(NNT = 15 over 10 years)[10]
Decreases complications
(NNT = 6 over 10 years)[10]

Glycemic control
No effect on mortality[4,5] or clinically relevant complications[14]

Smoking cessation
Decreases mortality
(NNT = 11 over 10 years)[9]

Figure 1. Approach to management of type 2 diabetes mellitus. Each digit from thumb to little finger represents an intervention, in decreasing order of benefit. (NNT = number needed to treat.)

Information from references 4, 5, 7, and 9 through 14.

Step 4 (Ring Finger): Lipid Reduction

Lipid reduction decreases cardiovascular mortality in adults with type 2 diabetes.[13,22] Lowering cholesterol levels, preferably with statin therapy and lifestyle changes, extends life by 3.0 to 3.4 years in men[12] and by 1.6 to 2.4 years in women.[13]

Step 5 (Little Finger): Glycemic Control

Despite the current focus on A1C as an indicator of quality of care, lowering glucose levels to the nondiabetic normal range does not significantly affect mortality compared with conventional glycemic control,[4] and it does not reduce the risk of macrovascular complications from myocardial infarction or stroke.[3,14] Glycemic reduction increases the risk of hypoglycemia and its complications,[2] and can actually increase mortality if A1C is lowered consistently below 7.5%.[23]

Recently revised guidelines from the American Diabetes Association and the European Association for the Study of Diabetes propose less stringent goals (e.g., A1C less than 8%) for most patients with diabetes who have comorbidities.[8,20] A fasting blood glucose level of less than 200 mg per dL (11.1 mmol per L) is reasonable in these patients.[8,20] A management plan should center on controlling hyperglycemic symptoms in concert with individual patient preferences.

Physicians should not let well-intentioned but misguided concern for glucose levels distract them from attending to other interventions that more profoundly affect mortality: smoking cessation, blood pressure control, metformin therapy, and lipid reduction. This approach requires a shift in the thinking of patients and physicians. Patients with type 2 diabetes who currently focus first on glycemic control will need to "reverse the hand" to improve the duration and quality of life.

Address correspondence to Deborah R. Erlich, MD, MMedEd, at drerlich@gmail.com. Reprints are not available from the authors.

REFERENCES

1. Meinert CL, Knatterud GL, Prout TE, Klimt CR. A study of the effects of hypoglycemic agents on vascular complications in patients with adult-onset diabetes. II. Mortality results. *Diabetes.* 1970;19(suppl):789-830.
2. Patel A, MacMahon S, Chalmers J, et al.; ADVANCE Collaborative Group. Intensive blood glucose control and vascular outcomes in patients with type 2 diabetes. *N Engl J Med.* 2008;358(24):2560-2572.
3. Boussageon R, Bejan-Angoulvant T, Saadatian-Elahi M, et al. Effect of intensive glucose lowering treatment on all cause mortality, cardiovascular death, and microvascular events in type 2 diabetes: meta-analysis of randomised controlled trials. *BMJ.* 2011;343:d4169.
4. Hemmingsen B, Lund SS, Gluud C, et al. Targeting intensive glycaemic control versus targeting conventional glycaemic control for type 2 diabetes mellitus. *Cochrane Database Syst Rev.* 2011;(6):CD008143.
5. Huang ES, Meigs JB, Singer DE. The effect of interventions to prevent cardiovascular disease in patients with type 2 diabetes mellitus. *Am J Med.* 2001;111(8):633-642.
6. Yusuf S, Hawken S, Ounpuu S, et al.; INTERHEART Study Investigators. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet.* 2004;364(9438):937-952.
7. UK Prospective Diabetes Study Group. Effect of intensive blood-glucose control with metformin on complications in overweight patients with type 2 diabetes (UKPDS 34) [published correction appears in *Lancet.* 1998;352(9139):1558]. *Lancet.* 1998;352(9131):854-865.
8. Inzucchi SE, Bergenstal RM, Buse JB, et al. Management of hyperglycemia in type 2 diabetes: a patient-centered approach: position statement of the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD) [published correction appears in *Diabetes Care.* 2013;36(2):490]. *Diabetes Care.* 2012;35(6):1364-1379.
9. Hughes JR. A quantitative estimate of the clinical significance of treating tobacco dependence. *Am J Prev Med.* 2010;39(3):285-286.
10. UK Prospective Diabetes Study Group. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38 [published correction appears in *BMJ.* 1999;318(7175):29]. *BMJ.* 1998;317(7160):703-713.
11. Srinivasan B, Taub N, Khunti K, Davies M. Diabetes: glycaemic control in type 2. *Clin Evid (Online).* 2008. http://www.clinicalevidence.bmj.com/x/pdf/clinical-evidence/en-gb/systematic-review-archive/2008-03-0609.pdf (subscription required). Accessed September 11, 2013.
12. Grover SA, Coupal L, Zowall H, Weiss TW, Alexander CM. Evaluating the benefits of treating dyslipidemia: the importance of diabetes as a risk factor. *Am J Med.* 2003;115(2):122-128.
13. O'Connor NR. Diabetes mellitus (type 2). Essential Evidence Plus. http://www.essentialevidenceplus.com/content/eee/127 (subscription required). Accessed August 26, 2012.
14. UK Prospective Diabetes Study Group. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33) [published correction appears in *Lancet.* 1999;354(9178):602]. *Lancet.* 1998;352(9131):837-853.
15. Centers for Disease Control and Prevention. Adult cigarette smoking in the United States: current estimate. http://www.cdc.gov/tobacco/data_statistics/fact_sheets/adult_data/cig_smoking. Accessed August 26, 2012.
16. Vijan S, Hayward RA. Treatment of hypertension in type 2 diabetes mellitus: blood pressure goals, choice of agents, and setting priorities in diabetes care. *Ann Intern Med.* 2003;138(7):593-602.
17. Sibal L, Home PD. Management of type 2 diabetes: NICE guidelines. *Clin Med.* 2009;9(4):353-357.
18. Cushman WC, Evans GW, Byington RP, et al.; ACCORD Study Group. Effects of intensive blood-pressure control in type 2 diabetes mellitus. *N Engl J Med.* 2010;362(17):1575-1585.
19. Chobanian AV, Bakris GL, Black HR, et al.; Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure; National Heart, Lung, and Blood Institute; National High Blood Pressure Education Program Coordinating Committee. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertension.* 2003;42(6):1206-1252.
20. American Diabetes Association. Standards of medical care in diabetes—2012. *Diabetes Care.* 2012;35(suppl 1):S11-S63.
21. Salpeter SR, Greyber E, Pasternak GA, Salpeter EE. Risk of fatal and nonfatal lactic acidosis with metformin use in type 2 diabetes mellitus. *Cochrane Database Syst Rev.* 2010;(4):CD002967.
22. Ginsberg HN, Elam MB, Lovato LC, et al.; ACCORD Study Group. Effects of combination lipid therapy in type 2 diabetes mellitus [published correction appears in *N Engl J Med.* 2010;362(18):1748]. *N Engl J Med.* 2010;362(17):1563-1574.
23. Currie CJ, Peters JR, Tynan A, et al. Survival as a function of HbA(1c) in people with type 2 diabetes: a retrospective cohort study. *Lancet.* 2010;375(9713):481-489. ■