

Does Measuring Fructosamine Help Patients with Diabetes?

Petitti and colleagues¹ presented the results of a randomized trial and concluded that the addition of home fructosamine monitoring did not significantly improve glycemic control compared with glucose-only monitoring.

The experiences reported by these investigators are very different from trial results reported by myself and colleagues at the 60th Scientific Session of the American Diabetes Association, June 2000 (Table 1). We conducted a randomized trial in 25 patients to compare the effect of the hemoglobin A_{1c} (HbA_{1c}) reduction of weekly fructosamine monitoring in addition to daily glucose monitoring compared with only daily glucose testing over a 3-month period. Patients performing combined weekly fructosamine and daily glucose testing had a significantly greater reduction in HbA_{1c} of 1.2% ($P < 0.001$) compared with 0.3% (P value not significant) in the patients performing only daily glucose testing. In our study, fructosamine testing allowed patients to more easily and quickly assess their level of glycemic control and, if appropriate, contact the investigator when glycemic control was considered poor (fructosamine > 350 $\mu\text{mol/L}$). As a result of patient contact, the investigator was able to perform therapeutic interventions, including adjustment of dosage of the patient's current medication or addition of other pharmacologic agents.

On the basis of the authors' discussion regarding the limitations of their protocol, an important reason for our differing conclusions seems clear: In our study, the investigator was provided with results on fructosamine testing, allowing for the implementation of therapeutic interventions. Monitoring, whether it is performed by the patient or the health care professional, can only improve glycemic control if the test results are acted on as part of the disease management program. Because the fructosamine test evaluates glycemic control over the previous 2 to 3 weeks, the additional information provided by the fructosamine test may allow both patients and health care professionals to assess more recent changes in glycemic status and, as a result, take more timely and appropriate action. In our study, fructosamine testing allowed for timelier drug titration that would not have occurred with the current standard of care—standard glucose-only testing with at best quarterly HbA_{1c} measurements. Timelier titration resulted in greater HbA_{1c} reductions.

Petitti and colleagues discuss the potential value of fructosamine testing as a tool to help patients obtain better glycemic control. They point out that weekly fructosamine testing may offer an adherence advantage compared with daily glucose testing, but unfortunately the frequency of glucose testing was not documented. Given that the same reduction in HbA_{1c} was obtained in both study groups, it would be interesting to know if this

TABLE 1

Comparison of Results at 3 Months from Two Clinical Trials Studying Weekly Fructosamine Monitoring in Addition to Daily Glucose Testing*

	EDELMAN ET AL ($n = 25$)		PETITTI ET AL ($n = 140$)	
	FRUCTOSAMINE AND GLUCOSE	GLUCOSE ONLY	FRUCTOSAMINE AND GLUCOSE	GLUCOSE ONLY
Patient contacts, n	7	1	5†	5†
HbA _{1c} at baseline, %	9.2%	9.4%	9.1%	9.2%
HbA _{1c} at 3 months, %	8.0%	9.1%	8.6%	8.4%
Absolute improvement in HbA _{1c}	1.2% ($P < 0.001$)	0.3% (NS)	0.5% ($P < 0.05$)	0.8% ($P < 0.05$)
Percentage of patients obtaining goal of $< 8\%$ HbA _{1c} at 3 mo	55%	21%	34%	34%

*HbA_{1c} = hemoglobin A_{1c}; NS = not significant.

†Values are approximated.

result was obtained with less daily glucose testing in the study group with weekly fructosamine measurements.

Our results demonstrate greater HbA_{1c} reductions and suggest that fructosamine should be further studied as both a clinical decision tool for health care professionals and as a self-management tool for patients with diabetes.

Steven V. Edelman, MD

University of California, San Diego School of Medicine
San Diego, Calif

Reference

1. Petitti DB, Contreras R, Dudl J. Randomized Trial of Fructosamine Home Monitoring in Patients with Diabetes. *Eff Clin Pract.* 2001;4:18-23.

THE AUTHORS RESPOND

Both our intervention¹ and that of Edelman and colleagues involved the addition of weekly fructosamine self-testing to daily glucose self-testing. As we understand it, the study by Edelman and coworkers involved an instruction to patients in the dual-testing group to contact their physician for advice on further interventions when fructosamine level exceeded 350 $\mu\text{mol/L}$, whereas the glucose-only group was not encouraged to contact the physician for advice. Self-management is thus an incomplete description of the intervention in their study for the dual-testing group. The relative contributions of fructosamine self-testing and enhanced physician access on improvements in glycemic control are unknown.

Our study provided glucose testing strips at no cost to patients in both the dual-testing and glucose-only groups, and the numbers of strips remaining at the 3-month and 6-

month visits were recorded. To estimate the number of glucose tests done during the study for the dual-testing and glucose-only groups, we totaled the number of glucose strips provided by the study at baseline and at the 3-month visit and subtracted the number of strips remaining at the 3- and 6-month visits. For each patient, we divided this number by the number of days in the study. The estimated mean number of tests per day ($\pm\text{SD}$) was 1.7 ± 0.5 in the dual-testing group and 2.0 ± 0.7 in the glucose-only group ($P = 0.007$). Thus, the dual-testing group achieved the same level of glycemic control with fewer fingersticks. This might be perceived as an advantage to patients.

It is hard to argue with Edelman's call for further research. We believe that future research assessment of the independent contributions of testing and interventions that accompany testing is important.

Diana B. Petitti, MD

Richard Contreras, MS
Kaiser Permanente Southern California
Research and Evaluation
Pasadena, Calif

James Dudl, MD

Kaiser Permanente Southern California
Department of Medicine
San Diego, Calif

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1. Petitti DB, Contreras R, Dudl J. Randomized Trial of Fructosamine Home Monitoring in Patients with Diabetes. *Eff Clin Pract.* 2001;4:18-23.