RESEARCH LETTER

Impact of Point of Care Hemoglobin A1c Testing on Time to Therapeutic Intervention

Angela Goodhart, PharmD, Heather Johnson, PharmD, Erika Bodkins, MD, and Kelsey Samek, RN

Without compromising accuracy, point of care testing (POCT) provides immediate results at the time of in person patient consultation. The purpose of this study was to evaluate time until therapeutic intervention with POCT HbA1c versus venipuncture, where venipuncture was considered standard of care.

The primary outcome was time (hours) to implementation of a therapeutic intervention based on POCT HbA1c result, as compared with most recent venipuncture HbA1c before the study and its associated therapeutic intervention. A total of 94 POCT HbA1c tests were included in the primary analysis.

For the POCT HbA1c, the mean time to therapeutic intervention was 1.6 ± 3.14 hours. For the previous venipuncture HbA1c, the mean time to therapeutic intervention was 1376.66 ± 3356.6 hours ($P < .001$). Overall, this trial showed that POCT HbA1c results in a significantly faster time to therapeutic intervention than venipuncture in a primary care clinic that serves a rural population. (J Am Board Fam Med 2024;37:790–791.)

Keywords: **Diabetes Mellitus, Hb A1c, Patient Satisfaction, Point-of-Care Systems, Primary Health Care, Rural Population**

Introduction

Hemoglobin A1c (HbA1c) is one of the most common methods utilized for monitoring glucose control, and can occur via venipuncture or point-of-care testing (POCT). Previous studies have demonstrated accuracy of POCT measurements compared with venipuncture.[1] POCT can be performed in-office and resulted in under 5 minutes, whereas venipuncture processing requires a laboratory and several hours for a result. Patients may also not visit the laboratory location directly after an order is placed, causing a further delay.

Without compromising accuracy, POCT provides immediate results at the time of patient consultation enabling therapeutic decisions to be made at the earliest possible opportunity. Previous studies demonstrate cost-effectiveness and have shown improved HbA1c lowering, increased adherence to recommended monitoring schedules, and high patient satisfaction.[2–4]

Currently, no literature discusses change in time to therapeutic intervention following implementation of HbA1c POCT. The primary purpose of this study was to evaluate time until therapeutic intervention with POCT HbA1c versus venipuncture, where venipuncture was considered standard of care.

Methods

Patients who were indicated for a HbA1c based on current American Diabetes Association recommendations received a POCT HbA1c from an Afinion™ HbA1c device. On receiving their result, a patient satisfaction survey was administered.

The primary outcome was time (hours) to implementation of a therapeutic intervention based on HbA1c result, as compared with most recent

This article was externally peer reviewed.

Submitted 22 November 2023; revised 12 December 2023; accepted 15 April 2024.

From the West Virginia University School of Pharmacy (AG); West Virginia University School of Pharmacy (HJ); West Virginia University School of Medicine (EB, KS).

Funding: An internal department grant in the amount of $5000 from the West Virginia University Department of Family Medicine supported the project. No additional external funding was received.

Conflict of interest: The authors have no conflicts of interest to disclose.

Corresponding author: Angela Goodhart, PharmD, Clinical Assistant Professor, West Virginia University School of Pharmacy, PO Box 9520 64 Medical Center Dr Morgantown, WV 26506-9520 (E-mail: angela.goodhart@hsc.wvu.edu).

venipuncture HbA1c. For both the POCT intervention and venipuncture control, start time was the result time and end time was the time of an order being placed or time of result review if no changes implemented.

Significant differences in time to therapeutic change for venipuncture versus POCT testing was assessed using paired *t* test. Significance was set at P value less than 0.05. Paired t test were calculated using the GraphPad QuickCalcs Web site: https://www.graphpad.com/quickcalcs/ttest2/ (accessed May 2023). This project was acknowledged by the West Virginia University Institutional Review Board.

Results

A total of 94 POCT HbA1c tests were included in the primary analysis. The average POCT HbA1c result was 8.2% and the average previous venipuncture HbA1c result was 8.5%.

For the POCT HbA1c, the mean time to therapeutic intervention was 1.6 ± 3.14 hours. For the previous venipuncture HbA1c, the mean time to therapeutic intervention was 1376.66 ± 3356.6 hours (P < .001). Mean time to therapeutic intervention for POCT and venipuncture is shown in Table 1. More than 90% survey of responses indicated agreement or strong agreement with POCT HbA1c being more convenient than going to a laboratory, having immediate feedback being important to their understanding of their diabetes control, and having a face-to-face discussion about changes based on the result being preferable to waiting for a phone call or message another day.

Table 1. Time to Therapeutic Intervention (n = 94)

	Mean (Hours)
POCT	1.6 + 3.14
Venipuncture	1376.66 + 3356.6

Abbreviation: POCT, point of care testing.

Discussion

This study shows POCT HbA1c is associated with changes being implemented significantly faster than with traditional venipuncture. This could explain why implementing POCT has led to improved HbA1c control in previous studies.[2,4] The satisfaction survey showed that most patients preferred POCT to venipuncture and that it seemed to improve their understanding of diabetes control.

It is clear that having a result quickly helps providers to react efficiently and helps patients to implement realistic changes quickly. This study had limitations, including being conducted at a single center and manual entry of results, which could have led to human error. In addition, because patients served as their own controls, the HbA1c results occurred during different times throughout the year, which could have led to changes in workload that affected providers' ability to review results.

Overall, this trial showed that POCT HbA1c results in a significantly faster time to therapeutic intervention than venipuncture and patients generally preferred this method to traditional venipuncture.

To see this article online, please go to: http://jabfm.org/content/37/4/790.full.

References

1. Chadee A, Blackhouse G, Goeree R. Point-of-care hemoglobin A1c testing: a budget impact analysis. Ont Health Technol Assess Ser 2014;14:1–23. 204.
2. Pillay S, Aldous CM, Singh D, Pillay D. Validation and effect on diabetes control of glycated haemoglobin (HbA1c) point-of-care testing. S Afr Med J 2019;109:112–5.
3. Crocker JB, Lynch SH, Guarino AJ, Lewandrowski K. The impact of point-of-care hemoglobin A1c testing on population health-based onsite testing adherence: a primary-care quality improvement study. J Diabetes Sci Technol 2021;15:561–7.
4. Al Hayek AA, Al-Saeed AH, Alzahrani WM, Al Dawish MA. Assessment of patient satisfaction with on-site point-of-care hemoglobin A1c testing: an observational study. Diabetes Ther 2021;12:2531–44.