Copyright © Athens Medical Society
www.mednet.gr/archives
ARCHIVES OF HELLENIC MEDICINE: ISSN 11-05-3992

ORIGINAL PAPER
ΕΡΕΥΝΗΤΙΚΗ ΕΡΓΑΣΙΑ

Comparison of costs of hemoglobin A1c determination by point-of-care testing (POCT) and standard hemoglobin A1c analyzer

ARCHIVES OF HELLENIC MEDICINE 2010, 27(6):953–955
ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2010, 27(6):953–955

V. Wiwanitkit

Thai Diabetic POCT Forum Coordinator, Thailand

Σύγκριση κόστους μεταξύ της συσκευής POCT και του κλασικού αναλυτή αυτής για τον προσδιορισμό της αιμοσφαιρίνης A1c

Περίληψη στο τέλος του άρθρου

OBJECTIVE **The use of the levels of hemoglobin A1c for the monitoring of glycemic control in patients with diabetes mellitus (DM) is an accepted method of clinical usefulness. A study was performed to assess the relative costs of hemoglobin A1c determination by diagnostic testing at or near the site of patient care (point-of-care testing, POCT) and using the standard hemoglobin A1c analyzer.** METHOD **A cost identification study was performed. The model of DCA (POCT) versus D10 (standard hospital method) in the Thai context was used.** RESULTS **The direct cost of the DCA is higher than that of the D10, but the indirect cost of the DCA is lower than that of the D10. The total cost of the DCA is lower than that of D10.** CONCLUSIONS **The total cost of hemoglobin A1c determination by the POCT format (DCA) is lower, which implies that the use of this approach is more economically appropriate.**

Key words

Analyzer
Cost
Hemoglobin A1c
POCT

Submitted 9.11.2009
Accepted 26.11.2009

At the present time, the determination of the level of hemoglobin A1c is a widely used test in the management of diabetes mellitus (DM). The use of hemoglobin A1c level for monitoring of glycemic control in patients with DM has been accepted for its clinical usefulness and is the hematoendocrinology test of widest use.[1] Basically, the determination of hemoglobin A1c is based on the principles of clinical biochemistry, and in the hospital setting, the standard clinical chemistry analyzer is the equipment mainly used for analysis. Recently, due to the blooming of the new technology of diagnostic testing at or near the site of patient care (point-of-care testing, POCT), POCT analyzers have been successfully developed and effectively used in clinical practice.[2,3]

The POCT analyzer has the advantage of shortening the turnaround time of laboratory analysis. This means that patients with DM can get the appropriate treatment from their physician in charge in a shorter period of time. However, there is another important consideration in the use of the POCT analyzer, which is the cost of the system. This is a study performed to assess the relative costs of hemoglobin A1c determination by POCT and the standard hemoglobin A1c analyzer. The models of DCA (POCT) and the D10, the standard analyzer in the Thai context, were used.

MATERIAL AND METHOD

The study was a descriptive medical economics study. The models compared were the DCA (representative of POCT hemoglobin A1c analysis)[4] and the D10 (representative of standard hemoglobin A1c analysis).[5] The scenario of Thailand was used for economical modeling, and the cost identification method was employed. The direct and indirect costs of each system were determined and compared, following which the total cost, which is the summation of the direct and indirect costs of each system, were determined and compared.

RESULTS

The direct costs for use of DCA and D10 were identified. The details of the cost identification study are shown in table 1. It can be seen that the direct cost of the DCA analysis (7.51 US$) is higher than that of the D10 (5.32 US$).

Conflict of interest: The author is the medical consultant of and coordinator to the Thai diabetic POCT forum which is supported by Connect Diagnostics Thailand.

Table 1. Direct cost identification:* Comparison between POCT [point-to-care testing] (DCA) and standard (D10) methods of hemoglobin A1c determination.

Item	DCA**	D10**
Preanalytical issues		
EDTA tube	0.00	0.09
Needle	0.09	0.09
Syringe	0.00	0.09
Analytical issues		
Reagent cost	7.35	4.27
Calibrator	0.00	0.02
Quality control materials	0.07	0.76

*Cost is presented in US$, ** The cost is calculated per test

DISCUSSION

There is no doubt that the determination of hemoglobin A1c is useful in diabetic care.[1,2] The prediction of complications can be derived by application of the hemoglobin A1c test. Originally, the determination of hemoglobin A1c had to be performed in the hospital using the standard clinical chemistry analyzer. The patient had to wait for the laboratory result before getting the appropriate medical treatment from the physician in charge. Recently, however, POCT technology has become available for hemoglobin A1c determination and this has helped to reduce the waiting period.[6]

Under the conditions of the present economic crisis, an important consideration in the use of any new technology in clinical practice is its cost. Here a standard cost identification study was performed to assess the relative costs of use of the POCT (DCA) and the standard (D10) hospital-based practice. Both analyzers, DCA and D10, have been scientifically approved for their efficacy for hemoglobin A1c analysis.[4,5]

From the initial findings it can be seen that the direct cost of the POCT approach is higher than that of standard approach. This can mislead the general practitioner into concluding that the POCT approach is not appropriate due to its high cost. However, there are also the frequently forgotten indirect costs to be taken into consideration. As seen in table 2, it can be shown that the probable indirect costs incurred the procedure of DCA should be lower than those of the standard hospital-based approach, and that the resulting overall cost of the POCT should also be lower than that of standard approach. Specifically, the reduction of the unnecessary travelling and waiting is the main reason for the lower total cost of the POCT approach.

In conclusion, it can be shown that the total cost of hemoglobin A1c determination by DCA (POCT format) is lower, which implies that the use of this approach is economically appropriate.

Table 2. Indirect, added, costs: Comparison between POCT [point-to-care testing] (DCA) and standard (D10) methods of hemoglobin A1c determination.

Item	DCA	D10
Patient issues		
Travelling expense	Yes/No*	Yes
Laboratory/hospital issues		
Sample transportation cost	No	Yes
Labor cost	1 medical person	Many medical personnel

*No travelling expense is incurred when POCT is used as active field service to the patient

ΠΕΡΙΛΗΨΗ

Σύγκριση κόστους μεταξύ της συσκευής POCT και του κλασικού αναλυτή αυτής για τον προσδιορισμό της αιμοσφαιρίνης A1c

V. WIWANITKIT

Thai Diabetic POCT Forum Coordinator, Thailand

Αρχεία Ελληνικής Ιατρικής 2010, 27(6):953–955

ΣΚΟΠΟΣ Τα επίπεδα της αιμοσφαιρίνης A1c είναι χρήσιμα για τον έλεγχο των επιπέδων σακχάρου στους διαβητικούς ασθενείς. Μελετάται το κόστος προσδιορισμού της αιμοσφαιρίνης A1c με τη συσκευή παρά την κλίνη του ασθενούς (POCT) και με τον κλασικό αναλυτή για τον προσδιορισμό της. **ΥΛΙΚΟ-ΜΕΘΟΔΟΣ** Έγινε υπολογισμός του κόστους του μοντέλου DCA σε σχέση με το D10, που χρησιμοποιείται στην Ταϊλάνδη. **ΑΠΟΤΕΛΕΣΜΑΤΑ** Φαίνεται ότι το άμεσο κόστος του DCA είναι υψηλότερο σε σχέση με αυτό του D10, ενώ το έμμεσο κόστος του DCA είναι χαμηλότερο σε

σχέση με εκείνο του D10. Το συνολικό κόστος του DCA είναι χαμηλότερο από αυτό του D10. **ΣΥΜΠΕΡΑΣΜΑΤΑ** Το συνολικό κόστος για τον προσδιορισμό της αιμοσφαιρίνης A1c με τη μέθοδο POCT (DCA) είναι χαμηλότερο και η χρήση της εν λόγω μεθόδου είναι οικονομικά συμφέρουσα.

Λέξεις ευρετηρίου: Αιμοσφαιρίνη A1c, Αναλυτής, Κόστος, POCT

References

1. GAREL MC, BLOUQUIT Y, MOLKO F, ROSA J. HbA1c: A review on its structure, biosynthesis, clinical significance and methods of assay. *Biomedicine* 1979, 30:234–240
2. GREAVES RF, NORTHFIELD JA, CAMERON FJ. Haemoglobin A1c: Evaluation of three point of care analysers for use in a paediatric diabetes clinic. *Ann Clin Biochem* 2005, 42:124–129
3. SHEPHARD M, WHITING M. Assessment of the practicability and analytical performance of a point-of-care affinity chromatography haemoglobin A1c analyser for use in the non-laboratory setting. *Ann Clin Biochem* 2006, 43:513–515
4. SZYMEZAK J, LEROY N, LAVALARD E, GILLERY P. Evaluation of the DCA Vantage analyzer for HbA1c assay. *Clin Chem Lab Med* 2008, 46:1195–1198
5. MARZULLO C, MINERY M. Evaluation of D10 hemoglobin testing system for hemoglobin A1c assay. *Ann Biol Clin (Paris)* 2008, 66:95–99
6. HICKS JM, HAECKEL R, PRICE CP, LEWANDROWSKI K, WU AH. Recommendations and opinions for the use of point-of-care testing for hospitals and primary care: Summary of a 1999 symposium. *Clin Chim Acta* 2001, 303:1–17

Corresponding author:

V. Wiwanitkit, Thai POCT Forum Coordinator, Thailand
e-mail: wviroj@yahoo.com