IS EARLY MEASUREMENT OF A1c USEFUL FOR THE PREDICTION OF TREATMENT RESPONSE IN TYPE 2 DIABETES?

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AIM OF THE STUDY

Can early measurement of A1c and Glycated Albumin at 15-30 days predict 3-month A1c variation?

INTRODUCTION

A timely assessment of response to treatment in type 2 diabetic (T2DM) patients initiating a pharmacological treatment could be useful for avoiding longer-term use of ineffective drugs.

A1c, which is correlated with average glucose of the previous 3 months [1], is currently considered the gold standard for monitoring glucose control. Effects of variations of treatment are usually assessed through A1c determination after 3 or more months.

GA has been proposed as an indicator of shorter-term (2-week) glucose control [2], although standardization of measurement methods has not been achieved yet [3].

STUDY DESIGN

27 metformin-treated patients with type 2 diabetes initiating a pharmacological treatment other than insulin (16M:11F, aged 64.7±10.1 years; diabetes duration 8.6±8.5 years)

The prescribed treatment was maintained throughout the 3-month follow-up. A1c and GA were measured at baseline, and every 15 (±3) days for 3 months.

GLYCATED HEMOGLOBIN A1c (mmol/mol): HPLC method on fresh total blood with Variant-II-turbo (Bio-Rad)

GLYCATED ALBUMIN GA (% glycated on total albumin): colorimetric LUCICA-GA-L™ kit (Asahi Kasei Pharma, Tokyo, Japan) with Dimension Vista 1500 (Siemens Healthcare) instrument on frozen sera (4)

	HbA1c (mmol/mol) and GA (%)	P
A1c baseline	59.0±12.0	-
GA baseline	31.9±11.3	-
A1c 15 days	56.0±7.8	<0.01
GA 15 days	28.8±10.8	0.03
A1c 30 days	53.0±7.0	<0.001
GA 30 days	27.7±9.8	<0.001
A1c 90 days	50.0±7.2	<0.001
GA 90 days	25.5±9.8	0.004

Tab.1: Mean±SD values of A1c and GA at baseline, 15, 30 and 90 days. P values for A1c and GA vs. respective baseline values after paired Student's t test

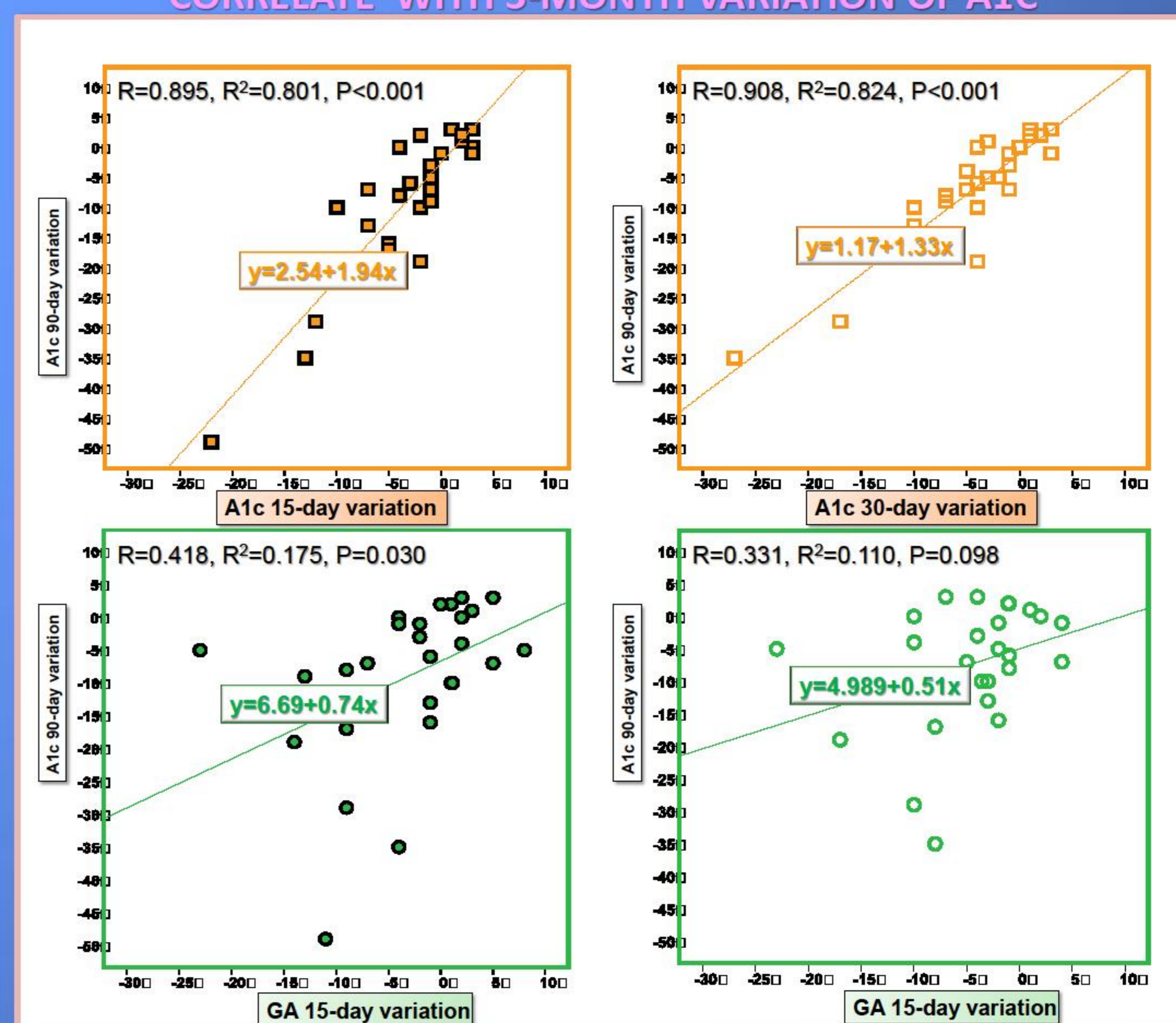### EARLY VARIATIONS AT 15 DAYS OF A1c BETTER THAN GA STRONGLY CORRELATE WITH 3-MONTH VARIATION OF A1c

Fig. 1: Correlation of 15- and 30-day variation of A1c and GA with 90-day A1c variation. R, R2, P and regression equations are indicated.

Delta vs baseline	Total n=27	P	Non Responder n=7	P	Responder n=20	P
dA1c 15 days	-4.47±7.45	0.01	0.71±2.69	ns	-4.75±5.81	0.003
dA1c 30 days	-7.17±9.10	0.001	0.00±2.58	ns	-6.47±6.69	0.001
dA1c 90 days	-12.9±15.55	0.001	1.57±1.27	ns	-12.7±12.3	<0.001
dGA 15 days	-3.11±6.91	0.03	1.29±2.81	ns	-4.58±7.38	0.012
dGA 30 days	-4.83±6.16	0.001	-2.87±4.36	ns	-5.57±6.61	0.002
dGA 90 days	-6.28±9.54	0.004	-4.80±10.39	ns	-6.83±10.0	0.008

Tab.2: Mean±SD variations of A1c and GA from baseline. Responders (74%) and nonresponders to the therapy have been defined by variation of A1c at 90 days <0 or ≥ 0, respectively. P values for A1c and GA variations after paired Student's t test

DISCUSSION

Variations of A1c measured as early as 15 days from the start of treatment can accurately predict 3-month results. Conversely, GA does not appear to be similarly effective in particular at 30-days. This could be partly due to the lack of standardization of laboratory methods for GA, which has been only recently expressed as fraction of glycated over total albumin [2,3]; in addition, transient fluctuations of glucose control could have a greater impact on GA, affecting its predictive potential. Our data suggests that variation of A1c may represent a more stable short-time predictor of therapeutic response than GA.

REFERENCES

1. Rohlfing CL et al. Diab Care 2002
2. Koga M. Adv Clin Chem 2011
3. Tahara Y & Shima K. Diab Care 1995

TAKE HOME MESSAGE

THIS PILOT STUDY SUGGESTS THAT AN EARLY (15-DAY) DETERMINATION OF A1c CAN BE OF HELP FOR THE RAPID ASSESSMENT OF TREATMENT RESPONSE IN T2DM