

VALIDITY OF URINE SUGAR MONITORING FOR CONTROL OF DIABETES

Hariharan, R.S. and Seshiah, V.*

Urine glucose testing has traditionally been relied upon by both physicians and diabetic patients to monitor the control of Diabetes. Repeated observations in diabetics on the correlation between blood glucose concentration and simultaneously determined urine glucose concentration bring out the limitations of this approach. It has been observed that diabetics often have altered renal threshold for glucose on introduction of therapy rendering urine glucose testing fallible in estimating the prevailing blood glucose level.

In a study aimed at determining the validity of urine glucose monitoring in assessing control of Diabetes, 161 diabetics underwent a blood glucose test by the Dextrostix. Eytone system and a simultaneous urine glucose test with Diastix on a double-voided urine specimen. Table-1 shows the corresponding Blood Glucose levels for the various grades of glucosuria.

Table 1
Corresponding Blood Glucose levels for the various grades of glucosuria

S. No.	No. of samples tested	Urine Glucose in gm%	Corresponding Blood Glucose in mgm%	
			Mean	Range
1.	158	Nil.	116.47 ± 39.36	45 – 260
2.	22	0.1	157.91 ± 39.46	95 – 250
3.	23	0.25	156.56 ± 44.43	90 – 260
4.	21	0.5	201.19 ± 36.85	100 – 280
5.	36	1	231.61 ± 61.56	100 – 356
6.	37	2	273.86 ± 70.88	150 – 400

While the mean blood glucose levels in column 4 for the various degrees of glucosuria are within the commonly anticipated ranges, the range through which BG level can exist for each of these glucosuric levels as seen in column 5 of the table is interesting. Thus, in aglucosuric subjects, the BG can be as low as 45mg% or as high as 260mg%, in those with 0.1 G% glucosuria it can vary from 95 - 250mg % , in those with 0.25 % glucosuria it varied from 90-260 mg% etc. Not only were the BG levels for each degree of glucosuria unpredictable and variable from patient to patient, but also were they variable in the same patient from day to day and even within the same day on different occasions.

*Dept. of Diabetology, Madras Medical College and Govt. General Hospital, Madras-600003.

That an alteration in renal threshold for glucose in diabetics is common after initiation of therapy needs a special mention.

An illustrative case is presented below :

Mr. S. 46, M.

GTT on 10.1.'85	F	½	1	1½	2
BS (mg%)	220	360	420	410	280
US (Urine Sugar)	Nil	+			
9.2.'85	BS	US			
10.3.'85	210	Trace			
10.4.'85	146	+			
	112	+			

Thus these studies bring out that

- (i) urine glucose and blood glucose do not always correlate
- (ii) not only do they differ from person to person, but also in the same person on different occasions
- (iii) a lowering of renal threshold for glucose is common and needs to be recognised.

This makes the traditionally relied upon method, urine glucose testing for monitoring control of Diabetes less reliable. Hence the applicability of urine glucose testing in assessing diabetes control needs to be reconsidered.