

The influence of a soiled finger in capillary blood glucose monitoring

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Dear Editor,

There are several aspects concerning self-monitoring of blood glucose (SMBG) which can influence the outcome of the measurement.¹ For example, there is no general agreement regarding the use of the first or second drop of blood for glucose monitoring. Our aim was to investigate the influence of wiping a drop of blood on glucose concentrations measured by SMBG when having a finger soiled with different sugar-containing products, and the effects of cleaning a soiled finger with chlorhexidine. Twenty-five non-diabetic adults participated. After they had washed their hands, their fingers were soiled with various sugar-containing products. The products used were dextrose, fruit, jam, honey, and chocolate paste. Glucose concentrations were determined in the first, second and third drop of capillary blood (intervention 1). Furthermore, measurements were done in one drop before and in two drops of blood after cleaning a soiled finger with chlorhexidine (intervention 2). All results were compared with a control measurement from a clean and dry finger.

Glucose levels were determined with the Accu-Check Inform II (Roche, Almere, the Netherlands). The general linear model (GLM) with repeated measures (multivariate testing) was used to test for overall changes in glucose concentrations. Furthermore, using the 'simple' contrast, each concentration was compared with the control.

Table 1 shows glucose concentrations in sequential drops of blood in different circumstances. In both interventions the highest glucose concentrations were found in the first drop of blood, with a significant decrease in sequential blood glucose concentrations from the first drop of blood to control ($p=0.013$ and $p<0.0005$ respectively). In 53% of the cases in intervention 1 and in 34% of the cases in intervention 2, the blood glucose concentration in the third drop of blood was still more than 10% higher than the control measurement. In the literature only one study describes the difference between glucose concentrations in the first and the second drop of blood.² This study showed no differences between the readings. The study was conducted in volunteers

Table 1. Glucose concentrations in different sequential drops of blood

	Intervention 1			Measurement before cleaning	Intervention 2		Control
	1st drop	2nd drop	3rd drop		1st drop	2nd drop	
Median, ranges	10.7 (4.8-33.3)	6.2 (4.5-24.1)	5.8 (4.3-15.3)	8.4 (5.4-33.3)	5.9 (4.3-33.3)	5.4 (4.4-6.9)	5.1 (4.3-7.3)
Absolute difference vs control; median	5.2 (0.0-28.6)	0.9 (-1.0-19.0)	0.6 (-0.9-10.0)	3.2 (-0.5-28.6)	0.8 (-0.3-28.2)	0.2 (-1.1-1.6)	--
> 10% higher vs control	89%	63%	53%	87%	63%	34 %	--

n=25; glucose in mmol/l; median (interquartile ranges).

without soiled fingers, however. Soiled fingers can have a great effect on blood glucose readings. Our study shows that it is difficult to clean the fingers properly. A new study has to be performed to investigate aspects concerning SMBG in people with diabetes. In the meantime, the results of our study emphasise the potential inaccuracy of SMBG, even when measuring in the second or third drop of blood, and even after cleaning the finger with chlorhexidine.

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