An evaluation / comparison of Medi-test glucose sticks and Diabur-Test 5000 urine sticks for measuring diabetic control

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Introduction

Many patients with diabetes choose to monitor their urine as a way of checking their diabetic control. There are a variety of reasons for this which include less pain than testing capillary blood with a finger prick test. It is also easier and quicker than blood testing: in randomised controlled trials there is no difference between urine and blood testing in type 2 diabetes and in some studies type 1 for achieved HbA1c and frequency of hypoglycaemia.

Health professionals encourage the use of self monitoring with either blood or urine as a means of achieving normal or acceptable glycated haemaglobin results (HbA1c). We advocate for newly diagnosed people with diabetes who may need to concentrate on therapeutic education urine monitoring initially as it can be less technically demanding. If patients would prefer to do blood glucose monitoring or they do not achieve their HbA1c targets then home blood glucose monitoring is offered.

Background

At present we use Diabur Test 5000 urine strips (Boehringer Mannheim). These tests take at least 2 minutes to perform. The cost of one packet of Diabur Test Strips is £2.33p for a pack of 50 (1). There are other alternative urine testing sticks available which may offer a cost effective alternative. We decided to test a new set of urine strips called the Medi-Test Glucose from BHR Pharmaceuticals Ltd. These strips cost £2.03p per pack of 50 (1) and can be read after 60 seconds.

Objectives

To test for quality assurance these strips were tested in our centre against BM test 5L and Diabur-Test 5000 for reliability in detecting glucose. There was no significant difference between these 3 strips, therefore it was ethical for us to use this new strips with patients.

The main objective of the research was to evaluate the method of urine testing that patients preferred and to examine the costs, comparing the Diabur-Test 5000 and the Medi-Test Glucose test strips.

The other research questions were:

1. Which strips did patients find the easiest to use?

2. Which strips did patients find more reliable?

3. Which strips did patients find more convenient?

4. What problems did patients experience with either of the test strips?

Methods

The first method of analysis was a laboratory analysis to test the precision of glycaemia of the MediTest strips against the Diabur-Test 5000 and the BM Test 5L.

The second and main part to this research was a patient evaluation exercise. Patients were identified by health professionals as suitable for the evaluation through out patients, diabetes research clinics and Diabetes Specialist Nurse (DSN) clinics. The sample size was 30.

Patients were included in the survey if they had been using the Diabur-Test 5000 urine strips for one month previously.

The test strips were evaluated using an evaluation questionnaire. Half of the questions were designed on a five point 'Likert' scale with the remainder taking a yes/no format. Questions were asked about ease of use, quickness and convenience. These sections of the questionnaire were analysed separately but also together to provide an overall usage score. The same questionnaire was used to analyse views on both strips.

Patients were firstly asked to complete the questionnaire on their perceptions of the Diabur-Test 5000 urine strips. Medi-test Glucose strips were then dispensed and patients were taught how to use them by a nursing assistant. The nursing assistant demonstrated technique and provided an information sheet.

Patients were asked to use the Meditest Glucose strips for between 4 and 6 weeks. Patients were given a urine monitoring book and asked to record their daily test results. This book provided a column for patients to comment on any difficulties they had with their test. Patients were asked to test their urine once daily at different times of the day. This was before

breakfast, before lunch, before dinner/tea and before bed on consecutive days.

Patients returned to the Diabetes Care unit after using the test strips for between 4 and 6 weeks. At this appointment they were asked to complete the same evaluation questionnaire and were given the opportunity to use the resources of the diabetes education material available and talk to staff. Patients were also provided with a pack of their original Diabur-Test 5000 they were previously using. The Medi-test Glucose strips were provided free of charge from the manufacturing drug company for the purpose of this evaluation.

The results of the study were analysed using the Microsoft Unistat statistical package. A two tailed Wilcoxon matched pairs signed ranks test was used to compare the Meditest Glucose urine sticks against the Diabur-test 5000. Questions were asked about ease of use, quickness and convenience. These parts of the questionnaire were analysed individually. An average score of these three areas was given to give an overall usage score.

Results

Patients found the Meditest strip easier to use ($p=0.05$). Quickness scores were very significantly in favour of Meditest ($p=0.00016$) as well as in convenience ($p=0.01$). The overall usage score was highly significant in supporting the Meditest strip ($p=0.00028$) (see Table 1). Patients were asked if they found the urine sticks reliable. 70% (=21) found the Diabur sticks reliable compared with 86.6% (N=26) when asked about the Meditest sticks (see Table 2).

The main problems reported by patients with the Diabur sticks were the difficulties in holding them, differentiating between colours and strips sticking together. Only 4 out of the 30 sample reported these problems. 5 people reported problems with the Meditest strip. These problems were all related to the colour on the strip being difficult to match to the bottle.

After completing the second questionnaire patients were asked which strip they preferred to use. 80% (N=24) of patients preferred to use the Meditest Strip.

Discussion

It is clear from the results that patients significantly preferred to use the Meditest urine stick. Particularly in the areas of speed and convenience, the MediTest strips were favoured. This may be due to the time the test takes to perform. A result is available from the Meditest by 60 seconds compared with 2 minutes for the Diabur.

The Meditest strip also has the advantage of detecting glucose at a lower level than the Diabur strip. 1.1mmols/L compared to 5.5mmols/L respectively. Hospital wide use of this stick would allow the diabetes team to detect smaller amounts of glucose enabling them to make finer adjustments to treatments. This would work towards even tighter control of diabetes which has been shown to have beneficial effects in both type 1 and Type 2 diabetes (2,3) in relation to both microvascular and macrovascular complications.

As well as beneficial effects to the patient, the Meditest strip also has a cost advantage, being a cheaper alternative to the Diabur strip. Taking Leicestershire as an example, with a total population of 926,710, there are an estimated 20,047 number of people with diabetes as estimated bythe 1991 census. Of these we estimate that there are at least 16% using urine testing, mostly using the Diabur stick. For a switch to using Meditest this would offer a minimum cost saving of 7696.8 pounds per annum over the county.

Although this evidence favours Meditest, the authors suggest it may be difficult to incorporate theory into practice. Resistance to change may result in an effort to alter current practice. Many of the diabetes team rely on urine testing results to make alterations in treatment. A change in urine stick would mean the diabetes team would need re educating on the values of the Meditest strip and how they compare with other testing methods. This can be overcome by the use of teaching sessions and wall charts highlighting differences.

If a new urine stick was introduced, at the time of change there would be 2 types of urine sticks in use. The diabetes teams would need to be able to interchange between different strips according to patient preference and GP prescribing. Confusion may occur in patients who record test results in

colours rather than figures. This method is sometimes used in our non literate patient group.

Conclusion

This study has highlighted a more sensitive and cheaper alternative to urine testing for people with diabetes. The Meditest strip is clearly favoured by patients for time and convenience and is equally as effective at detecting glucose as the BM test 5L and the Diabur test 5000 strips. A change to Meditest would provide significant cost savings for our unit, however implementing this change would mean re-education of members of the diabetes team.

References

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Table 1 Average Scores

	Diabur	Meditest	Significance
Ease of use	1.4	1.1	P=0.05
Speed	2.4	1.13	P=0.00016
Convenience	1.8	1.13	P=0.01
Overall usage score	2.1	1.1	P=0.00028

Table 2 Reliability, recommendations, preference

		Diabur	Meditest
Reliability	**Yes**	21	26
	No	8	2
	Don't Know	1	2
Recommend to others	**Yes**	25	27
	No	5	2
	Don't Know	0	1
Preference		5	24