MICROALBUMINURIA ESTIMATION BY A NEW DIP STICK METHOD
—COMPARISON WITH RADIOIMMUNOASSAY

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SUMMARY
The usefulness of a dipstick method for estimation of microalbuminuria (MA), the Micral
test (Boehringer Mannheim, West Germany) was evaluated by comparing the results with
those obtained by a radioimmunoassay (RIA). The sensitivity of Micral test was 89% and
its specificity was 99%. The test is performed in about 6 minutes and the test principle is
immunochemical in nature. It is a reliable and rapid procedure for semiquantitative
estimation of microalbuminuria.

INTRODUCTION
Presence of microalbuminuria (MA) defined as an albumin excretion ≥ 20 to 200 mg/l (or
30 to 300 mg/day) is a strong predictor of clinical nephropathy1. Detection of microal-
buminuria is important because at this stage therapeutic intervention may help to reverse.
Detection of MA in any form of diabetes is therefore of great significance. At present
quantitative estimation of MA is possible either by nephelometry or by radioimmunoassay
(RIA), both of which require special laboratory facilities and personnel and the results may
not be available immediately in the out patient clinic. The Micral test is a new rapid semi-
quantiative dip stick test introduced by Boehringer Mannheim (West Germany). This study was
designed to test the usefulness of the Micral test in comparison with a standard RIA proce-
dure.

MATERIAL AND METHODS
Random urine samples collected from consecutive diabetic patients with ≥ 5 year dura-
tion of diabetes were tested. If the proteinuria exceeded ≥ 150 mg/l by the sulphosalicylic
acid test, the samples were excluded. A total of 120 samples were tested both by the Micral
and the RIA for albumin. The Micral test was carried out at the room temperature with
30 minutes of the sample collection. An aliquot of urine was kept frozen at −20°C for the RIA
procedure. The microalbuminuria kit of Pharmacia, Uppsala was used. The sensitivity of
the kit was 0.4 ng/ml and the measuring range was 0.6 to 8 ng/ml. Intra and inter assay co-
efficients of variations were < 5% and < 7% respectively. Urine sample was diluted 1:2
when the albumin excretion was above 80
mg/l.

Test principle of Micral test
Human albumin is semiquantitatively es-
timated by an immunochemical procedure2,3.
The test strip is dipped into the urine just below
the zone, coloured blue, for 5 sec. without
touching the sides of the container. The strip
is withdrawn and kept flat on a non-absorbant
surface. After exactly 5 minutes the colour on
the reaction zone is matched with the scale
provided on the container. Five colour zones
corresponding to 9, 10, 20, 50, 100 mg/l of
albuminuria are shown on the scale.

JOUR. DIAB. ASSOC. INDIA; VOL. 32, NO. 1
The absorbed urine enters a zone on the strip containing soluble antibody-enzyme conjugate which specifically binds to albumin. Excess conjugate is retained in a separate zone containing immobilised human albumin so that only the conjugated immune complex from the sample reaches the reaction zone. Here the enzyme B-galactosidase reacts with the substrate, producing a red dye, the intensity of which after exactly 5 minutes is directly related to the albumin content of the urine.

RESULTS

Microalbuminuria (albumin excretion of ≥ 20 mg/l) was present in 28 patients (23.3%). Figure 1 shows the relation between the semiquantitative estimate and the albuminuria estimated by the RIA. The 4 blocks represent the semiquantitative range. The overall sensitivity of the Micral test was 89% as it detected 25/28 positive cases in the study. The specificity of the test was 99% as one normal value was shown in the abnormal range. In comparison with the RIA values, 95%, 83%, and 78% of the values in < 20 mg/l, > 20 to 50 mg/l and > 50 to 100 mg/l zones were within the range.

CONCLUSIONS

The Micral test is found to be a rapid and reliable procedure for semiquantitative estimation of microalbuminuria. It provides a simple procedure for screening for MA and is a sensitive and specific test. In addition to providing a quick assessment of the albuminuria, it also helps to select the positive samples where exact quantification is necessary.

REFERENCES


JOUR. DIAB. ASSOC. INDIA; VOL 32, NO 1