Screening for chronic kidney disease in type 2 diabetes: Does an abnormal urine albumin to creatinine ratio need to be repeated?

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Abstract

Context: Microalbuminuria is the earliest clinically detectable stage of diabetic nephropathy. Canadian Diabetes Association guidelines recommend screening for chronic kidney disease with a urine albumin to creatinine ratio (ACR) and then repeating an abnormal test twice over a 3-month period. Two out of three positive results confirm microalbuminuria. Recent studies looking at first void samples have suggested that multiple samples may not be necessary at the screening stage for diagnosing microalbuminuria.

Objectives: To determine the positive predictive value of a single random abnormal urine ACR compared to repeat samples in a patient with type 2 diabetes to diagnose microalbuminuria.

Design: Retrospective longitudinal secondary data analysis using Calgary Lab Services data.

Participants: Patients with newly diagnosed diabetes who are over the age of 21 in the study period from January 2008 to December 2013 and who have the first abnormal urine ACR followed by another measurement completed within 120 days were included in the study.

Outcome measures: Positive predictive value of an abnormal urine ACR result to diagnose microalbuminuria was calculated.

Results: 1243 cases were identified with inclusion criteria. Exclusions included 296 results with macroalbuminuria in the first screening and 465 results with inadequate follow up of the abnormal result to confirm or refute microalbuminuria. Of 591 remaining cases, 23 were identified as false positive and 509 as true positive resulting in a positive predictive value of the first abnormal urine ACR to diagnose microalbuminuria calculated at 96.2%.

Conclusions: The first abnormal value of a random urine ACR has good positive predictive value for the diagnosis of microalbuminuria in patients with Type 2 diabetes. Further studies are required to evaluate the reproducibility of these results. A major limitation of the study is that there was no reference value available for a number of results within the study time frame which may over-estimate the true positive results. As a next step, the data will be further assessed to examine patients who were started on or had a dose adjustment of an ACE/ARB medication around the time of ACR measurement to focus results on screening and not treatment response.

Methodology

Inclusion criteria

• Age ≥ 21 (≥ 18 in the pre-screen 3 year period)
• HbA1C 2.6-6.5 or individuals with ≥ 2 abnormal fasting plasma glucose tests in a 6 month (December fasting glucose ≥ 7)

Exclusion criteria

• Any patient with prior elevated ≥ 5 gestational diabetes screen (to exclude gestational diabetes)
• Prior elevated HbA1C ≥ 7 in the past 3 years
• Prior elevated fasting glucose (≥ 6.5) in the past 3 years (greater than 1 month prior to HbA1C)

Results

Number of cases identified: 1243
Excluded from the final analysis: 199 results with macroalbuminuria in the first screening and 465 results with inadequate follow up of the abnormal result to confirm or refute microalbuminuria.

Included in final analysis: 591

22 were identified as false positive and 569 were identified as true positive resulting in a positive predictive value of the first abnormal urine ACR to diagnose microalbuminuria calculated at 96.2%.

Conclusions

Key Points

• There is a gap between recommended practice guidelines and actual clinical practice in screening for chronic kidney disease in diabetes.

• Multiple random urine ACR samples might not be necessary to categorize the patients as having microalbuminuria. However, further studies are required.

• A simpler diagnostic model for diagnosing renal disease would improve patient compliance, efficiency of testing and implementing health interventions. As well there would be an economic advantage from a health care utilization perspective.

Limitations of the study: A limitation of the study is that there was no third value available for a number of results within the study time frame which may over-estimate the true positive results.

Further analysis planned: As a next step the data will be further assessed to exclude patients who were started on or had a dose adjustment of an ACE/ARB medication around the time of ACR measurement to focus results on screening and not treatment response.

REFERENCES

[5] Multiple random urine ACR samples might not be necessary to categorize the patients as having microalbuminuria. However, further studies are required.
[6] A simpler diagnostic model for diagnosing renal disease would improve patient compliance, efficiency of testing and implementing health interventions. As well there would be an economic advantage from a health care utilization perspective.

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More information can be found in the full text of the article.