Does microalbuminuria screening in diabetes prevent complications?

EVIDENCE-BASED ANSWER

Screening diabetic patients for microalbuminuria identifies those who may benefit from treatments that delay progression to renal failure (strength of recommendation: **B**, based on extrapolation from Level 1 treatment studies of patients with microalbuminuria).

No research has determined the best method for screening for microalbuminuria, or whether screening in primary care populations will produce better long-term outcomes. No studies have examined the role of microalbuminuria screening after angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs) have been instituted for other indications.

EVIDENCE SUMMARY

Patients with diabetes mellitus have a 20% to 40% lifetime risk for development of nephropathy, and microalbuminuria is the earliest easily detectable marker of renal damage.[1] Improved control of blood sugar[2,3] and blood pressure[4] decreases but does not completely prevent development of microalbuminuria and progression to overt kidney failure. ACE inhibitors and ARBs have been shown to diminish this progression even in the absence of hypertension (the latter in type 2 diabetes only) (**Table**).

No prospective randomized trials of screening have been reported. There is uncertainty about what method of screening is most effective and practical in primary care settings.[10] Expert opinion recommends diagnosing microalbuminuria after 2 positive test results,[1] but whether repeated tests improve diagnostic accuracy is still controversial.[10]

A large randomized controlled trial showing better long-term renal and vascular disease outcomes would be needed to give screening for microalbuminuria a strength of recommendation of **A**. Recruiting patients for such a study, and interpreting its results, would be difficult: many subjects would have other indications, such as hypertension or congestive heart failure, warranting use of potentially renoprotective medications.

RECOMMENDATIONS FROM OTHERS

The American Diabetes Association recommends annual screening for microalbuminuria—after 5 years of established type 1 disease, and at time of diagnosis for type 2 diabetes without macroalbuminuria. Initial screening can use 1 of 3 methods: measurement of the albumin-to-creatinine ratio in a random, spot collection; 24-hour collection with creatinine, allowing the simultaneous measurement of creatinine clearance; timed (eg, 4-hour or overnight)

CONTINUED

What is a Clinical Inquiry?

Clinical Inquiries answer real questions that family physicians submit to the Family Practice Inquiries Network (FPIN), a national, not-for-profit consortium of family practice departments, residency programs, academic health sciences libraries, primary care practice-based research networks, and individuals with particular expertise.

Questions chosen for Clinical Inquiries are those considered most important, according to results of web-based voting by family physicians across the U.S.

Answers are developed by a specific method:

- First, extensive literature searches are conducted by medical librarians.
- Clinicians then review the evidence and write the answers, which are then peer reviewed.
- Finally, a practicing family physician writes a commentary.

TABLE

Reno- and cardioprotective efficacy of treatments for diabetic patients with microalbuminuria

DM type	Medication	NNT	Time (years)	To prevent endpoint
1	ACE inhibitor (Captopril)	7.9*	2	Clinical proteinuria[5]
2	ACE inhibitor (Enalapril)	6.3*	5	Macroalbuminuria[6]
2	ACE inhibitor (Enalapril)	2.4*	7	Significant proteinuria[7]
2	ARB (Losartan)	3.6	3.4	End-stage renal disease[8]
2	ACE inhibitor (Ramipril)	4	4.5	Cardiovascular disease[9]†

*Normotensive subjects

†Myocardial infarction, revascularization procedure, stroke, cardiovascular death, congestive heart failure requiring hospitalization, overt nephropathy, renal dialysis, or laser treatment for retinopathy

DM, diabetes mellitus; NNT, number needed to treat; ACE, angiotensin-converting enzyme; ARB, angiotensin receptor blocker

collection. At least 2 of 3 tests measured within a 6-month period should show elevated levels before a patient is said to have microalbuminuria.[1]

Wayne A. Hale, MD, MS, *Moses Cone Health System Family Practice Residency, Greensboro, NC;*

Joan Nashelsky, MLS, *Family Practice Inquiries Network, East Lansing, Mich*

CLINICAL COMMENTARY

Blood pressure control and ACE inhibition improve mortality and morbidity for patients with diabetes mellitus type 2. Therefore, maximize ACE inhibitor or ARB doses, as tolerated, and aim for a blood pressure of 110–120/70–80 mm Hg (130/85 mm Hg is the maximum).

Using this plan, I do not routinely screen for microalbuminuria—which is, at best, a surrogate marker for nephropathy and poor blood pressure control—unless I believe it will work as an educational and motivational tool for patients who are less committed to self-care.

If serum creatinine becomes elevated, a 24-hour urine collection to examine volume, creatinine clearance, and protein can be used to help develop a negotiated care plan with the patient, which may or may not include referral. Until there is different evidence about screening and treatment options for microalbuminuria, I see no need to screen when the above plan is in effect.

Stephen A. Wilson, MD, *University of Pittsburgh Medical Center, St. Margaret Family Practice Residency, Pittsburgh, Pa*

REFERENCES

1. Standards of medical care for patients with diabetes mellitus. *Diabetes Care* 2002; 25;S33–S49.
2. Effect of intensive therapy on the development and progression of diabetic nephropathy in the Diabetes Control and Complications Trial. The Diabetes Control and Complications Trial (DCCT) Research Group. *Kidney Int* 1995; 47:1703–1720.
3. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). UK Prospective Diabetes Study Group. *Lancet* 1998; 352:837–853.
4. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes:

UKPDS 38. UK Prospective Diabetes Study Group. *BMJ* 1998; 317:703–713.
5. Laffel LM, McGill JB, Gans DJ. The beneficial effect of angiotensin-converting enzyme inhibition with captopril on diabetic nephropathy in normotensive IDDM patients with microalbuminuria. North American Microalbuminuria Study Group. *Am J Med* 1995; 99:497–504.
6. Ahmad J, Siddiqui MA, Ahmad H. Effective postponement of diabetic nephropathy with enalapril in normotensive type 2 diabetic patients with microalbuminuria. *Diabetes Care* 1997; 20:1576–1581.
7. Ravid M, Lang R, Rachmani R, Lishner M. Long-term renoprotective effect of angiotensin-converting enzyme inhibition in non-insulin-dependent diabetes mellitus. A 7-year follow-up study. *Arch Intern Med* 1996; 156:286–289.
8. Brenner BM, Cooper ME, de Zeeuw D, et al. Effects of losartan on renal and cardiovascular outcomes in patients with type 2 diabetes and nephropathy. *N Engl J Med* 2001; 345:861–869.
9. Effects of ramipril on cardiovascular and microvascular outcomes in people with diabetes mellitus: results of the HOPE study and MICRO-HOPE study. Heart Outcomes Prevention Evaluation (HOPE) Study Investigators. *Lancet* 2000; 355:253–259.
10. Scheid DC, McCarthy LH, Lawler FH, Hamm RM, Reilly KEH. Screening for microalbuminuria to prevent nephropathy in patients with diabetes. A systematic review of the evidence. *J Fam Pract* 2001; 50:661–668.

Is MRI useful for evaluation of acute low back pain?

EVIDENCE-BASED ANSWER

Magnetic resonance imaging (MRI) is rarely helpful in the evaluation of acute low back pain. Limited evidence suggests that MRI may be useful in further assessing "red flags" in the history or physical exam.

MRI has a high sensitivity and specificity in the detection of cancer or infection, but it is not particularly specific when evaluating lumbar radiculopathy. Poor specificity can lead to finding clinically irrelevant abnormalities.[1] The overall evidence for the appropriate use of MRI in low back pain is limited and weak[2,3] (strength of recommendation: **C,** based on limited randomized controlled trials).

EVIDENCE SUMMARY

Radiologic imaging of any kind is seldom needed in the evaluation of acute low back pain unless there are "red flags" suggestive of cancer, infection, or fracture (**Table**). Conduct a thorough history and review of systems to risk-stratify patients that may benefit from imaging.

TABLE

Red flags for underlying causes of low back pain

Condition	Red flags
Cancer	Age >50 History of cancer Unexplained weight loss Failure to improve after 4 to 6 weeks of conservative low back pain therapy
Spinal infection	Fever >38°C History of intravenous drug abuse Urinary tract infection
Neurologic emergencies or urgencies	Cauda equina symptoms Progressive neurologic deficit Suspicion of ankylosing spondylitis Unrelenting night pain or pain at rest Pain with distal numbness or leg weakness
Fracture	History of osteoporosis Chronic oral steroid use Serious accident or injury

Adapted from Institute for Clinical Systems Improvement[10]

One study of patients with low back pain identified risk factors for cancer, including age >50 years, prior cancer, unexplained weight loss, pain lasting >1 month, and no relief with bed rest.[4] An elevated erythrocyte sedimentation rate of >50 mm/hr in the setting of these risk factors should prompt the clinician to order an MRI or bone scan.[5]

An analysis of systematic reviews and original articles by Jarvik and Deyo reported sensitivities for MRI (83% to 93%) and for radionucleotide scanning (74% to 98%) in detecting cancer.[6] MRI exhibits the best sensitivity (96%) and specificity