What is the initial work-up in the diagnosis of hypertension?

Brett V. Daniel, MD, Gary Kelsberg, MD
Valley Family Medicine Residency, Renton, Wash
Terry Ann Jankowski, MLS
University of Washington, Seattle

Evidence summary

There are currently no large outcome studies evaluating the initial work-up of hypertension; however, 4 international expert panels have published recommendations. These panels advise 3 initial objectives: 1) assess lifestyle and identify other cardiovascular risk factors or concomitant disorders that may affect prognosis and guide treatment; 2) search for treatable causes of high blood pressure; and 3) assess for the presence of target organ damage that would change the management of the patient (such as chronic kidney disease or heart disease).

In addition to a thorough history and physical, the following studies are recommended for patients with newly diagnosed hypertension:

- Serum potassium and creatinine. All 4 panels recommend measuring serum potassium and creatinine in order to: 1) monitor the effects of diuretics and angiotensin-converting enzyme (ACE) inhibitors used in hypertension therapy, 2) screen for unexplained hypokalemia that may indicate a low-renin form of hypertension, 3) calculate baseline creatinine clearance, and 4) screen for chronic kidney disease.

- Fasting blood glucose. All 4 panels recommend measuring a fasting glucose level to screen for diabetes. An abnormal glucose level may also reveal glucose intolerance, one of the diagnostic criteria of metabolic syndrome. Up to 60% of patients with diabetes also have hypertension.

- Fasting lipid panel. All 4 expert panels

Evidence-based answer

Not all recommendations for working-up hypertensive patients are cost-effective

There is obvious enthusiasm among the expert panels for a detailed workup of patients with hypertension. But are the recommendations cost-effective? Annual urine dipstick testing beginning at age 30 for hypertensive patients is highly cost-effective. Identification of proteinuria and treatment with an ACE inhibitor or angiotensin receptor blocker prevents the progression of renal disease at a quality-adjusted life-year cost of $15,484 to $26,320, depending on the age group.

Unfortunately, evaluation for secondary causes of hypertension, screening for LVH, and ruling out comorbidities have not been explicitly evaluated for cost-effectiveness.

Brian Crownover, MD, FAAFP
96th Medical Group, Family Medicine Residency, Eglin Air Force Base, Eglin, Fla

Clinical commentary

Testing for microalbuminuria is optional in the work-up for a patient without diabetes (SOR: C, expert consensus). Some expert panels list limited echocardiography as another option.
LVH detected by ECG better predicts CV complications than LVH detected by echocardiography

Echocardiography. Two panels\(^3,4\) and an online text\(^10\) recommend echocardiography, preferably limited echo, as an optional study. A systematic review of studies comparing the sensitivities and specificities of ECG and echo found that each was highly specific for the detection of LVH (specificity 98.8%; positive likelihood ratio=5.3; negative likelihood ratio=0.94).\(^4\)

Hematocrit. All 4 panels recommend a hematocrit to screen for anemia, which may be due to chronic kidney disease.

Urinalysis. All 4 panels recommend a urinalysis to screen for renal disease.

Electrocardiogram (ECG). All 4 panels recommend an ECG to screen for findings associated with hypertension, including left ventricular hypertrophy (LVH), myocardial infarction, and rhythm abnormalities. A cohort study followed 2363 patients for 14 years who had untreated hypertension and were without pre-existing cardiovascular disease. After controlling for age, sex, diabetes, and mean blood pressure, LVH by ECG conferred a significant increased risk for cerebrovascular events (relative risk=1.79; 95% confidence interval [CI], 1.17–2.76).\(^4\) However, in a cohort of 4684 subjects from the Framingham Heart Study, ECG had a sensitivity of only 6.9% for the detection of LVH (specificity 98.8%; positive likelihood ratio=5.3; negative likelihood ratio=0.94).\(^4\)

Echocardiography may help assess disease duration and guide management, both panels recommend it for patients with severe or refractory hypertension but without other target organ damage.

Microalbuminuria. All panels listed microalbuminuria testing as an optional study for patients without diabetes because of its association with an increased incidence of cerebrovascular disease.\(^12\) It is unclear whether microalbuminuria results from the increased intraglomerular pressure in hypertension or if it represents glomerular damage.\(^13\)

Sodium, calcium, uric acid. There is no consensus on the routine inclusion of several studies: serum sodium (recommended by 2 panels and an online text\(^4,5,10\)), serum calcium (recommended by 1 panel and the text\(^1\)), and uric acid (1 panel recommends it while the text\(^10\) lists it as optional).

**Recommendations from others**
Recommendations from major organizations are included in Evidence Summary, above.

**REFERENCES**


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Faculty

- **Goutham Rao**, MD, Roundtable Chair
  Assistant Editor, *The Journal of Family Practice*
  Associate Professor, Pediatrics
  University of Pittsburgh School of Medicine
  Clinical Director, Weight Management & Wellness Center
  Children’s Hospital of Pittsburgh
  Director, Medical Informatics
  UPMC St. Margaret Family Medicine Residency
  Pittsburgh, Pennsylvania

- **Richard H. Davis, Jr**, PA-C
  Senior Physician Assistant
  Division of Gastroenterology
  University of Florida
  Gainesville, Florida

- **David A. Peura**, MD
  Professor of Medicine
  Associate Chief, Division of Gastroenterology
  University of Virginia Health Sciences Center
  Charlottesville, Virginia

- **Wendy L. Wright**, MS, RN, ARNP, FNP
  Adjunct Faculty
  Fay W. Whitney School of Nursing
  University of Wyoming
  Laramie, Wyoming
  Family Nurse Practitioner
  Bedford, New Hampshire

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- **Acknowledgments**

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