When More Isn't Better: Visits for Hypertension

Answers to the September 2016 Journal Club Questions

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Editor's Note: *You are reading the 53rd installment of* Annals of Emergency Medicine *Journal Club. This Journal Club refers to the article by Masood*[1] *published in the September 2016 edition of* Annals. *Information about Journal Club can be found at http://www.annemergmed.com/content/journalclub. Readers should recognize that these are suggested answers. We hope they are accurate; we know that they are not comprehensive. There are many other points that could be made about these questions or about the article in general. Questions are rated "novice" (NOV), "intermediate" (INT), and "advanced" (ADV) so that individuals planning a journal club can assign the right question to the right student. The "novice" rating does not imply that a novice should be able to spontaneously answer the question. "Novice" means we expect that someone with little background should be able to do a bit of reading, formulate an answer, and teach the material to others. Intermediate and advanced questions also will likely require some reading and research, and that reading will be sufficiently difficult that some background in clinical epidemiology will be helpful in understanding the reading and concepts. We are interested in receiving feedback about this feature. Please e-mail journalclub@acep.org with your comments.*

DISCUSSION POINTS

Masood et al[1] stated that the study goal was to "understand the epidemiology, patient characteristics, and short- and long-term outcomes of emergency department (ED) patients with a primary diagnosis of hypertension." They conducted a cohort study using administrative data from the National Ambulatory Care Reporting System, which contains deidentified information from all ED visits within the province of Ontario, Canada, beginning in 2002.

1. ED visits for hypertension between April 1, 2002, and March 31, 2012, among adult patients with a valid Ontario health care number were included in the study.

NOV A. How did this study define ED visits for hypertension?

INT B. What was this definition's positive predictive value for identifying hypertension-related ED visits according to manual review of medical records? With the information provided in the methods, can you calculate the negative predictive value, sensitivity, or specificity? If not, what information do you need to compute these?

NOV C. Diagnosis codes in Canada do not influence reimbursement for ED visits. Name 2 alternative explanations for why an ED visit might erroneously have hypertension listed as the primary, final diagnosis.

2. These authors report that ED visits for hypertension are increasing yet the "feared complications of hypertension are extremely infrequent."[1]

NOV A. According to this study, emergency physicians should anticipate increasing visits for hypertension. Summarize and discuss the international guideline recommendations about which patients should receive immediate blood pressure reduction in the ED and the evaluation, treatment, and follow-up recommendations for those who do not require immediate blood pressure reduction.

INT B. Discuss your clinical practice when treating a patient with hypertension who is not currently receiving antihypertensive medications. Do you prescribe a blood pressure–decreasing medication at discharge? If yes, what patient characteristics (age, sex, race, comorbidities, chief complaint, existing antihypertensive prescription, etc) do you consider when you make this decision? If no, explain your rationale for not starting or titrating antihypertensive medications.

INT C. Recent work by Patel et al[2] has raised questions about the role of the ED in evaluation or treatment of patients with severely elevated blood pressure ($\geq$180/110 mm Hg) or hypertensive urgency. During 7 years across the Cleveland Clinic health care system, less than 1% of patients with a clinic blood pressure greater than or equal to 180/100 mm Hg were referred to the ED. Among patients who were sent to the ED, only (2%) had pulmonary edema, acute kidney injury, or elevated cardiac biomarker levels, and 80% were discharged home. Discuss the findings of these 2 articles together. How is the role of the ED within the larger health care system evolving in the United States and Canada? What role can the ED play for patients with

asymptomatic elevated blood pressure? Is "hypertensive urgency" a useful term?

3. ED visits for hypertension increased from 15,793 in 2002 to 25,950 in 2012. The results included the raw number of visits, crude rate of visits, and the age- and sex-standardized ED visit rates from 2002 to 2012.

(INT) A. What is one reason to report age- and sex-standardized ED visit rates for hypertension, in addition to the raw number and crude rates?

(NOV) B. What reference population did the authors use for the standardized ED visit rates?

4. (NOV) A. Discuss the difference between statistically significant differences and clinically important differences. In a study with a sample size of 206,147 ED visits, how might these 2 concepts influence interpretation of results?

(NOV) B. Figure 4 in the article by Masood[1] presents the proportion of subsequent hospitalizations for patients who were admitted versus discharged from the ED, according to categories of hypertension complications (stroke, heart failure, acute myocardial infarction, atrial fibrillation, renal failure, aortic dissection, or encephalopathy). The proportions are higher overall for patients who were admitted from the ED. Does this mean that being admitted increases the risk of being hospitalized in the future for complications of hypertension? If not, why not?

ANSWER 1

Masood[1] stated that the study goal was to "understand the epidemiology, patient characteristics, and short- and long-term outcomes of emergency department (ED) patients with a primary diagnosis of hypertension." They conducted a cohort study using administrative data from the National Ambulatory Care Reporting System, which contains deidentified information from all ED visits within the province of Ontario, Canada, since 2002.

Q1. ED visits for hypertension between April 1, 2002, and March 31, 2012, among adult patients with a valid Ontario health card number were included in the study.

Q1.a How did this study define ED visits for hypertension?

ED visits for hypertension were defined as adult ED visits in the province of Ontario in which the patient had a final, primary ED diagnosis of hypertension as defined by any of the following *International Classification of Diseases, 10th Revision* (*ICD-10*) codes: I10, I11, I12, I13, and R030. Patients had to have a valid Ontario health card number to be included in the provincial health administrative database (the Canadian Institutes of Health Information National Ambulatory Care Reporting System). In Ontario, all ED visits have been reported to this database since 2002.

It is not entirely clear whether hospital diagnosis codes were also considered for patients who were hospitalized from the ED.

Q1.b What was the definition's positive predictive value for identifying hypertension-related ED visits according to manual review of medical records? With the information provided in the methods, can you calculate the negative predictive value, sensitivity, or specificity? If not, what information do you need to compute these?

The positive predictive value (PPV) of using *ICD-10* codes I10, I11, I12, and I13 for a primary diagnosis of an ED visit for hypertension was 95.7% (95% confidence interval 94.6% to 96.7%). To obtain the PPV, the investigators divided the number of cases identified by both the *ICD-10* definition and chart review (the "reference standard") by the total number of ED visits for hypertension that were identified by their *ICD-10* definition. The PPV is sometimes called the "true positive proportion" or, stated otherwise, the proportion of test positives (*ICD-10* diagnosis) that are true positives (chart-review-confirmed cases of hypertension). If we round PPV to 96%, this means that of 100 ED visits identified as being for hypertension by the *ICD-10* definition, 4 would have been found on chart review to not actually have been for hypertension (Figure). The reported PPV is derived from a small subset (approximately 0.8%) of all ED visits for hypertension abstracted from the National Ambulatory Care Reporting System and thus "predicts" the relative accuracy of coding in the database, not the clinical diagnosis itself.

To calculate the negative predictive value, we would need to know the number of ED visits in which an *ICD-10* code other than I10, I11, I12, or I13 was used for patients with and without a true diagnosis of hypertension. However, the latter cannot be derived from the existing study database because it includes only individuals with

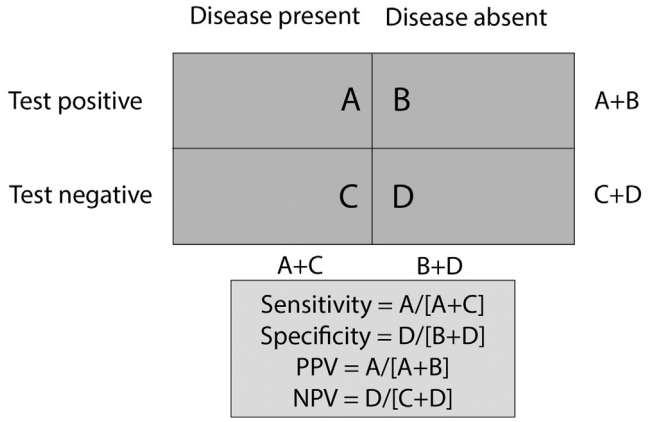

Figure. 2×2 Table for calculating hypertension-related ED visits.