



A Population-Based Analysis of Outcomes in Patients With a Primary Diagnosis of Hypertension in the Emergency Department

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Study objective: Patients treated primarily for hypertension are common in the emergency department (ED). The outcomes of these patients who were given a primary ED diagnosis of hypertension have not been described at a population level. In this study, we describe the characteristics and outcomes of these patients, as well as changes over time.

Methods: This retrospective cohort study used linked health databases from the province of Ontario, Canada, to assess ED visits made between April 1, 2002, and March 31, 2012, with a primary diagnosis of hypertension. We determined the annual number of visits, as well as the age- and sex-standardized rates. We examined visit disposition and assessed mortality outcomes and potential hypertensive complications at 7, 30, 90, and 365 days and at 2 years subsequent to the ED visit.

Results: There were 206,147 qualifying ED visits from 180 sites. Visits increased by 64% between 2002 and 2012, from 15,793 to 25,950 annual visits, respectively. The age- and sex-standardized rate increased from 170 per 100,000 persons to 228 per 100,000 persons during the same period, a 34% increase. Eight percent of visits ended in hospitalization, but this proportion decreased from 9.9% to 7.1% during the study period. Mortality was very low: less than 1% within 90 days, 2.5% within 1 year, and 4.1% within 2 years. Among subsequent hospitalizations for potential hypertensive complications, stroke was the most frequent admitting diagnosis, but the frequency was still less than 1% at 1 year. Together hospitalizations for stroke, heart failure, acute myocardial infarction, atrial fibrillation, renal failure, hypertensive encephalopathy, and dissection were less than 1% at 30 days.

Conclusion: The number of visits made primarily for hypertension has increased significantly during the last decade. Although some of the increase is due to aging of the population, other forces are contributing to it as well. Subsequent mortality and complication rates are low and have declined. With current practice patterns, the feared complications of hypertension are extremely infrequent. [Ann Emerg Med. 2016;68:258-267.]

Please see page 259 for the Editor's Capsule Summary of this article.

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INTRODUCTION

Background

Hypertension is a highly prevalent condition that is associated with significant morbidity and mortality.¹ Recent studies estimate that 30% of Americans, 25% of Canadians, and 1 billion persons globally are affected by this condition.^{2,3} As a consequence, hypertension is one of the most frequent health care issues treated by health care providers.

Importance

Although the long-term outcomes and treatment of hypertension have been well studied in the nonurgent, ambulatory care setting,¹ there is very little evidence to

guide the management of hypertension in the emergency setting, particularly without evidence of end-organ damage.^{4,5} This is the result of a dearth of studies on the short- and long-term outcomes of emergency department (ED) patients whose main health care issue is hypertension; this shortfall may explain the wide practice variation in the management of these patients in the ED.⁶ A study published in 1967 is one of the few that has examined short- and long-term outcomes: it reported that among 143 male patients with severely elevated diastolic blood pressures (115 to 129 mm Hg) who were randomized to antihypertensive medication or placebo, there were 21 hypertensive complications or deaths in the placebo group

Editor's Capsule Summary*What is already known on this topic*

There are few studies reporting short- and long-term outcomes of patients presenting to the emergency department (ED) with primary discharge diagnosis of hypertension.

What question this study addressed

What are the mortality and complication rates in patients who have a final primary ED diagnosis of hypertension?

What this study adds to our knowledge

In this population-based retrospective cohort study of greater than 200,000 patients during 10 years, mortality was low (<1% at 90 days, 4% at 2 years), as were short- and long-term complication rates.

How this is relevant to clinical practice

Although retrospective, this study supports the concept that the majority of patients do not require hospitalization and referral to primary care is sufficient.

versus none in the treatment group.⁷ In contrast, a recent study assessed 1,016 ED patients with a primary diagnosis of hypertension who had no signs of end-organ damage and found that only 0.2% had died 30 days later and less than 2% a year later.⁸ However, the study was conducted at a single ED, which serves a predominantly black population (94% of the study cohort). The short- and long-term outcomes in a current cohort of these patients at the population level are unknown.

Goals of This Investigation

A better understanding of ED hypertension at the population level would provide a foundation on which to build future evidence-based guidelines that can standardize the management of this common presentation. The goal of this study was to understand the epidemiology, patient characteristics, and short- and long-term outcomes of ED patients with a primary diagnosis of hypertension.

MATERIALS AND METHODS**Study Design**

We conducted a retrospective cohort study of patients with a primary ED diagnosis of hypertension. Research ethics board approval was obtained from Sunnybrook Health Sciences Centre.

Data Collection and Processing and Selection of Participants

Patients were identified from the Canadian Institutes of Health Information National Ambulatory Care Reporting System, a database that contains abstracted, anonymized data on all ED visits made in the province of Ontario, Canada.⁹ Ontario is Canada's most populous province, with an ethnically diverse population of 13 million. Hospital reporting to the National Ambulatory Care Reporting System became mandatory in Ontario in 2002.

We identified ED visits with a final, primary ED diagnosis of hypertension that were made between April 1, 2002, and March 31, 2012, by patients aged 18 to 105 years, who had a valid Ontario Health Card Number. For Ontario residents with a valid number, all medically necessary services are provided free (ie, universal health care coverage); thus, provincial health administrative databases include the large majority of health care visits and billings in the province. Diagnosis codes for hypertension included the *International Classification of Diseases, 10th Revision* codes I10, I11, I12, I13, and R030. We validated codes I10 to I13 in the National Ambulatory Care Reporting System with ED charts pulled from 5 tertiary and community EDs in Ontario (1,580 charts): positive predictive value 95.7% (95% confidence interval [CI] 94.6% to 96.7%). The median presenting (triage) blood pressure at those 5 sites was 181/97 (interquartile range 164 to 200/85 to 109). Diagnosis codes for complications of hypertension are shown in [Table E1](#) (available online at <http://www.annemergmed.com>). In the Canadian health care system, the diagnosis codes selected do not affect claims reimbursement, nor do they alter the size of the reimbursement; therefore, the ED diagnosis is not influenced by these external factors.

The patient's chief complaint was collected in the National Ambulatory Care Reporting System between April 1, 2006, and March 31, 2011; we report the most frequent chief complaint on the subportion of visits made during that period. With the unique encrypted health card number, patients in the National Ambulatory Care Reporting System were linked to other provincial databases at the Institute for Clinical Evaluative Sciences to determine comorbidities, index hospitalizations, subsequent hospitalizations, and mortality. The Registered Persons Database contains demographic and mortality data (including out-of-hospital deaths) for all Ontario residents,¹⁰ the Canadian Institutes of Health Information Discharge Abstract Database contains documentation on all Ontario hospitalizations (including up to 25 diagnoses and comorbidities), and the Ontario Health Insurance Plan contains all billings for inpatient and outpatient physician visits and procedures.¹¹

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