Short-Term Implications of Anti-Hypertensive Treatment in the Emergency Department

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Introduction

- **ACEP Level C**: No strong recommendation for starting antihypertensives in the ED for elevated BP without target-organ damage.[1]
- **Return Risk**: ~11% of hypertensive ED patients return within 30 days.[2]
- **Treatment Trends**: ED physicians more likely to treat patients with prior HTN or very high BP.[2]
- **Evidence Summary**: No proven benefit to acutely lowering hypertension without target-organ damage; no clear evidence of harm either.[3]

Aims and Objectives

Aim I: Assess the effects of ED administration of anti-hypertensives on the short-term rates (2 and 7 days) of severe adverse events (AEs) for discharged ED patients with elevated BP.

Aim II: Assess the effects of ED administration of anti-hypertensives on the short-term rates (2 and 7 days) of revisit rates (RR) for discharged ED patients with elevated BP.

Methods

- **Study design**: Retrospective cohort study in the ED
- **Objective**: Compare 2- and 7-day risk of adverse events (AEs) and revisit rates in hypertensive patients treated *with* vs *without* antihypertensives
- **AEs defined as**: MI, HF, hypertensive encephalopathy, aortic catastrophe, stroke, or death
- **Inclusion**: Adults (≥18) discharged from ED with a primary/secondary diagnosis of hypertension
- **Exclusion criteria**: Pregnancy, missing data, BP <140/90, prior HTN treatment in past 18 months, current antihypertensive use
- **Statistics**:
  - Descriptive stats by treatment group
  - Kruskal–Wallis for continuous variables
  - Chi-square for categorical variables
  - Logistic regression adjusted for age, sex, race, HTN stage, Elixhauser score, recent HF
- **Outcomes** reported as aOR with 95% CI and p-value

Results

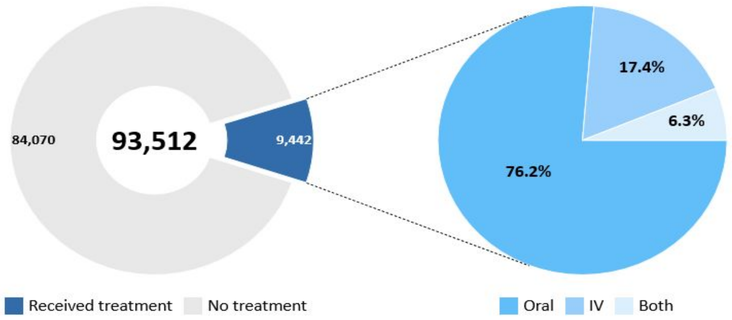

Figure 1. Population Breakdown of Treatment Type

Table 1. Patient Characteristics

	No Med (n=84,070)	Med (n=9,442)	p-value	Oral (n=7,180)	IV (n=1,643)	Both (n=597)	p-value
Mean Age (Years, SD)	59 (17)	58 (16)	<0.001	58 (16)	59 (17)	55 (16)	<0.001
Sex			0.029				0.065
Female (%)	48,264 (57)	5,310 (56)		4,018 (56)	962 (59)	320 (54)	
Male (%)	35,806 (43)	4,132 (44)		3,162 (44)	681 (41)	277 (46)	
Race			<0.001				<0.001
White (%)	50,228 (60)	4,812 (51)		3,721 (52)	829 (51)	250 (42)	
Black (%)	30,132 (36)	4,147 (44)		3,057 (43)	752 (46)	329 (55)	
Other (%)	3,710 (4)	483 (5)		402 (6)	62 (4)	18 (3)	
Blood Pressure			<0.001				<0.001
Mean SBP (mmHg, SD)	159 (18)	183 (26)		180 (25)	190 (28)	202 (25)	
Mean DBP (mmHg, SD)	88 (13)	102 (16)		100 (15)	105 (18)	114 (17)	
Elixhauser (SD)	0.2 (3.5)	-0.1 (2.8)	<0.001	-0.1 (2.8)	0.1 (3.2)	-0.2 (2.5)	0.008
Heart Failure History (%)	340 (0.4)	24 (0.3)	0.026	14 (0.2)	9 (0.5)	1 (0.2)	0.034

Table 2: Treatment Group Outcomes

Outcome	Day	aOR	p-value	95% CI
Adverse Events (AEs)	2	—	< 0.05	Not enough data for OR
	7	2.69	< 0.05	[1.65 - 4.26]
Revisit Rates (RR)	2	1.27	< 0.05	[1.11 - 1.43]
	7	1.1	0.05	[1.00 - 1.20]

Table 3: Route of Administration Outcomes

Outcome	Route	Day	aOR	p-value	95% CI
Adverse Events (AEs)	Oral	2	—	> 0.05	Not significant
	Oral	7	2.2	< 0.05	[1.20 - 3.77]
	IV	2	—	< 0.05	Not enough data for OR
	IV	7	5.37	< 0.05	[2.48 - 10.51]
Revisit Rates (RR)	Oral	2	1.17	< 0.05	[1.02 - 1.35]
	Oral	7	1.04	> 0.05	Not significant
	IV	2	1.67	< 0.05	[1.30 - 2.12]
	IV	7	1.32	< 0.05	[1.09 - 1.59]
RR Oral vs IV	—	2	1.3	0.05	[0.99 - 1.68]

Conclusions

- **Increased** odds of 2- and 7-day revisits in the treated group, with **IV treatment** associated with an increased risk.
- The odds of a revisit at **2 days** were significantly higher compared to 7 days for both treatment groups, highlighting a potential vulnerability in short-term post-treatment management.
- **IV antihypertensives** conferred the highest **7-day AE risk**, highlighting the need for caution with aggressive BP management. Patients receiving IV treatment are often more critically ill, meaning they inherently carry a higher risk for complications[4].
- Patients with a history of heart failure were more likely to experience an AE at 7 days (Oral aOR=19.4; IV aOR = 21.4; p<0.00001). This is consistent with other studies that have shown acute treatment of elevated BP in the ED in patients with a history of chronic heart failure was associated with higher odds of an ED revisit[3].

In this retrospective analysis, ED antihypertensive treatment of elevated BP was associated with increased short-term rates of AEs and revisits, especially with IV treatment.

Limitations

- Retrospective so no causality can be established.
- Single health care system.

Future Directions

- Multicenter prospective studies are needed to confirm our results. Larger studies are needed to assess 2-day AEs and determine clinical significance.

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