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Variability in Blood Pressure Medications Prescribed to Stroke Patients at Hospital Discharge

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Presenter Disclosure Information

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Objectives

- Highlight literature on blood pressure (BP) control in stroke patients
- Present retrospective analysis of BP medications prescribed at hospital discharge
- Discuss future directions



Background

- 25% of strokes annually are recurrent events
- 50% of stroke survivors have uncontrolled blood pressure, a major risk factor for recurrent stroke
- A 10 mm Hg decrease in systolic blood pressure (BP) is associated with a 41% stroke risk reduction



Background



- Up to **80%** of vascular events after stroke may be prevented by risk factor modification
- AHA/ASA guidelines suggest **diuretics** and **ACE inhibitors** *may be preferred for BP control* in stroke survivors

The available data indicate that diuretics or the combination of diuretics and an angiotensin-converting enzyme inhibitor is useful (*Class I; Level of Evidence A*).



Literature Highlights

- HOPE (2000)
 - Heart Outcomes Prevention Evaluation Trial
- PROGRESS (2001)
 - Perindopril Protection Against Recurrent Stroke Study
- ALLHAT (2002)
 - The Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial
- PRoFESS (2008)
 - Telmisartan to Prevent Recurrent Stroke and Cardiovascular Events



Hypothesis

There is a wide variation in the classes of blood pressure medications prescribed to ischemic stroke patients at hospital discharge.



Methods

- 483 consecutive adult ischemic stroke patients
- Admitted to our academic medical center
- January 2015 to April 2017
- BP medications categorized by type
- Hypertension: history of hypertension on admit
- Exploratory and descriptive analyses were performed



Methods

- Data Source:
 - Get with the Guidelines (GWTG) database
- Exclusions:
 - Intracerebral Hemorrhage (ICH)
 - Subarachnoid Hemorrhage (SAH)
 - Transient Ischemic Attack (TIA)
 - Expired during hospitalization



Results

Baseline Characteristics	
Age mean (SD)	65 (14)
Gender count (percent)	
• Female	227 (50%)
• Male	225 (50%)
Race count (percent)	
• Black or African-American	240 (53%)
• White	178 (40%)
• Unknown	26 (6%)
• Asian	7(2%)
• Native Hawaiian/Pacific Islander	1 (0%)



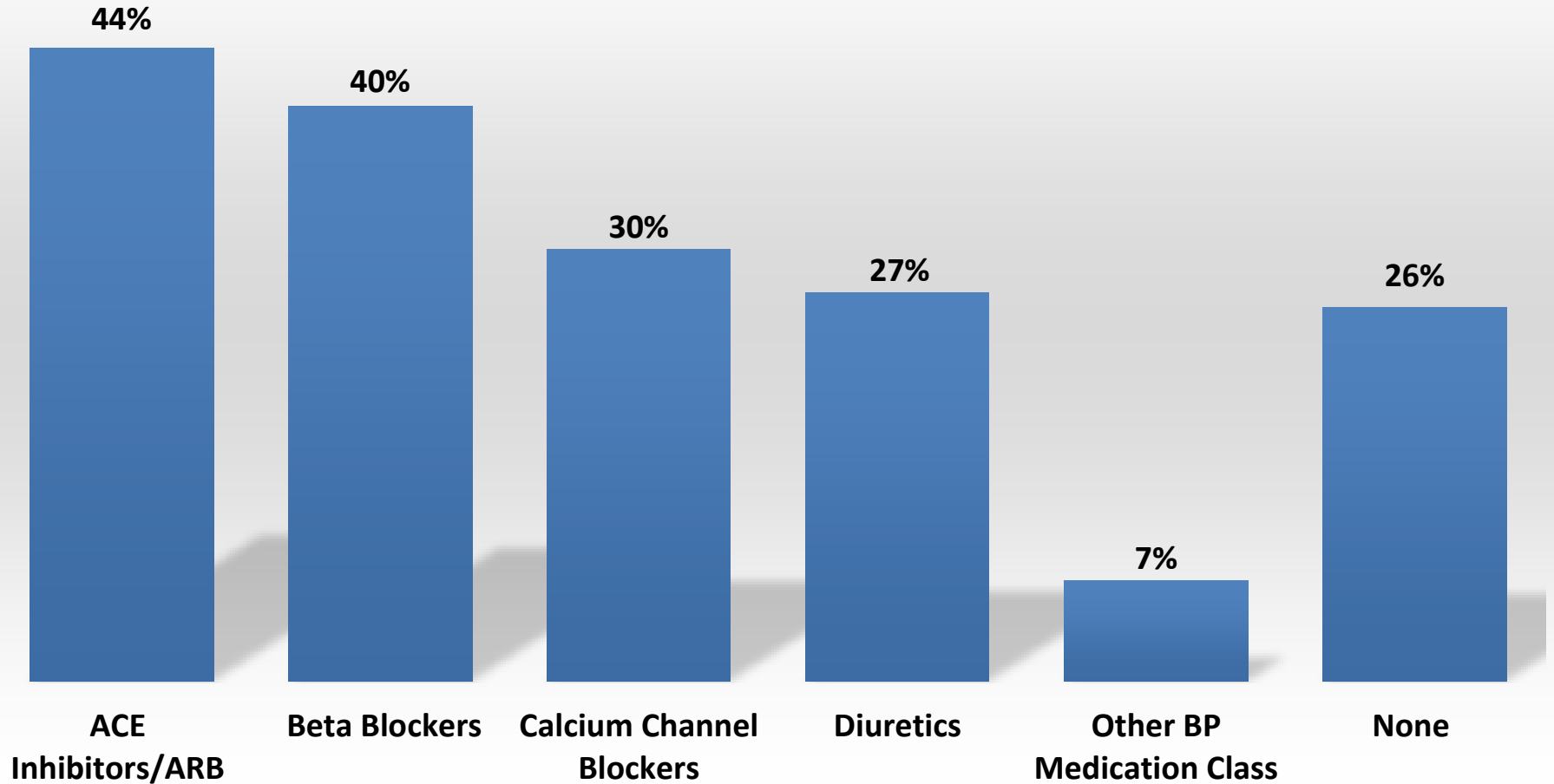
Results

Of the 483 AIS patients:

- **373** patients (77%) history of hypertension
- **335** patients (90%) prescribed BP medications at discharge



BP Medications Prescribed by Category



BP Medication Class by Age

	ACE Inhibitors / ARB (n=198)	Ca Channel Blockers (n=134)	Beta Blockers (n=182)	Diuretics (n=121)	Other BP Medication Class (n=33)	None (n=116)
Age <i>Mean (SD)</i>	66 (12)	66 (14)	68(13)	65(12)	67 (13)	60 (17)

Patients who were prescribed no blood pressure medications tended to be younger ($p < 0.01$)



BP Medication Class and Gender

	ACE Inhibitors/ ARB (n=198)	Ca Channel Blockers (n=134)	Beta Blockers (n=182)	Diuretics (n=121)	Other BP Medication Class (n=33)	None (n=116)
Female	96 (48%)	67 (50%)	89 (49%)	65 (54%)	13 (39%)	62 (53%)
Male	102 (52%)	67 (50%)	93 (51%)	56 (46%)	20 (61%)	54 (47%)
<i>Count (percent)</i>						

Patients were no more likely to be prescribed one BP medication class over another based on gender. (p= 0.70)



BP Medication Class and Race

	ACE Inhibitors/ ARB (n=198)	Ca Channel Blockers (n=134)	Beta Blockers (n= 82)	Diuretics (n=121)	Other BP Medication (n=33)	None (n=116)
Asian	4 (2%)	2 (2%)	2 (1%)	2 (2%)	0 (0%)	1(1%)
Black or AA	114 (58%)	93 (69%)	99 (54%)	73 (60%)	26 (79%)	51(44%)
Native Islander	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)
Race Unknown	12 (6%)	8 (6%)	9 (5%)	6 (5%)	1 (3%)	7(6%)
White	68 (34%)	31 (23%)	72 (40%)	40 (33%)	6 (18%)	56 (48%)

Black or African-American patients were more likely be to prescribed Calcium Channel Blockers or Other BP Medication than patients of other races (p= 0.03334)



BP Medication Class and Discharge Disposition

	ACE Inhibitors/ ARB (n=198)	Ca Channel Blockers (n=134)	Beta Blockers (n=182)	Diuretics (n=121)	Other BP Medication (n=33)	None (n=116)
Home	78 (40%)	50 (37%)	60 (33%)	49 (41%)	7 (21%)	57 (49%)
Hospice	1 (0%)	0 (0%)	3 (2%)	2 (2%)	0 (0%)	12 (10%)
Another Hospital	1 (0%)	0 (0%)	1 (1%)	1 (1%)	1 (3%)	6 (5%)
SAR, AR, or LTAC	118 (60%)	84 (63%)	117 (64%)	68 (56%)	25 (76%)	39 (34%)
Left AMA	0 (0%)	0 (0%)	1 (1%)	1 (1%)	0 (0%)	2 (2%)

Patients discharged to a rehab facility were more likely to be prescribed a medication from the 'other BP medication' category ($p = <0.00001$)



Conclusion

- 44% of stroke pts were prescribed **ACE/ARB**
- 27% of stroke pts were prescribed **diuretics**
- Stroke pts prescribed other BP medication type were younger
- African-American patients were more likely to be prescribed Calcium Channel Blockers or another BP medication type
- Stroke pts prescribed another BP medication type were more likely to be discharged to a rehabilitation facility (SAR/AR/LTAC)



Future Directions

- Multi-site analysis of the national GWTG dataset
- Future prospective cohort study to differentiate if there are preferred medications according patients' backgrounds for the prevention of recurrent stroke



Questions??



Selected References

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