PRN Antihypertensive Medications in Hospitalized Patients: Doing More Harm than Good?
By Priyanka Athavale and Charlie M. Wray

Titrating blood pressure (BP) medications in the outpatient setting is one of the most fundamental practices in medicine. Unfortunately, managing hypertension in the inpatient setting may not be as evidence based or as straightforward as we think. For decades, our response to elevated BP in hospitalized patients has been to give intravenous or oral medications pro re nata (PRN). Although this intervention does a harm, remains an important one.

A recent study in the journal *Hypertension* examined data from over 4000 propensity-matched hospitalized patients who, in addition to their scheduled antihypertensives, also received PRN antihypertensives and compared adverse outcomes to those who only received scheduled antihypertensives. The authors found that patients who received PRN antihypertensives were more likely to experience immediate lowering of systolic BP acute kidney injury, ischemic events, and longer hospital stays (1). Although these findings may be new to many, the literature around this topic has been growing in recent years.

A similar analysis published in the *Journal of the American Medical Association Internal Medicine* examined inpatient antihypertensive use in over 20,000 patients admitted for non-cardiac reasons and similarly found that individuals treated with PRN antihypertensives had higher rates of acute kidney injury and myocardial ischemia compared to a matched cohort (2). So the answer is to increase the patient’s daily regimen, right? Not quite, as there is little evidence that intensifying antihypertensives at discharge is associated with improved BP control or reduced cardiac events. For example, a recent study by Anderson et al. (3) found that an antihypertensive regimen that was intensified during hospitalization led to increased readmission rates and more serious adverse events within 30 days of discharge.

Despite the widespread practice of treating asymptomatic hypertension in the hospital, there is growing evidence to support that this may have unintended side effects. Although institutions often use standardized order-sets to treat hypertension in the inpatient setting, these studies show that such practices should be reexamined and potentially modified. Instead of reflexively treating elevated BPs, careful consideration of the underlying cause of hypertension should be the initial treatment (4). Additionally, instead of making such decisions on their own, inpatient providers should look to other resources to help guide their decision-making process. For instance, the use of electronic health records of outpatient medications and BP trends and clinical pharmacists are resources that can be leveraged to support optimal treatment of inpatient hypertension.

All told, this growing body of literature may be ushering in a paradigm shift in how we think about hypertension management in the hospitalized patient. Simply put, PRN antihypertensives and aggressive uptitration of antihypertensives in the inpatient setting may, in fact, do more harm than good.

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References

**Association between PRN Use of Antihypertensive Medications and Adverse Outcomes in Hospitalized Patients**

<table>
<thead>
<tr>
<th>RETROSPECTIVE</th>
<th>1:1 Propensity matching</th>
<th>Abrupt SBP lowering</th>
<th>Acute kidney injury (AKI)</th>
<th>Ischemic stroke</th>
<th>In-hospital mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Florida Health Hospital January 2012 to April 2016</td>
<td>n=4,219</td>
<td>p=0.001</td>
<td>p=0.002</td>
<td>p=0.001</td>
<td>p=0.001</td>
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<tr>
<td>Hospital admissions that received BP meds n=42,380</td>
<td>PRN BP meds + scheduled BP meds N = 4,219</td>
<td>2.05</td>
<td>1.24</td>
<td>8.5</td>
<td>2.36</td>
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<tr>
<td><em>OR (95% CI)</em></td>
<td>(1.56–2.71)</td>
<td>(1.09–1.42)</td>
<td>(1.96–3.76)</td>
<td>(1.26–4.41)</td>
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**Conclusion** The use of as needed antihypertensive medication is associated with an abrupt drop in BPs, increased risk of ischemic events, in-hospital mortality, and longer length of stay.