ARB We Choosing the Correct Antihypertensive? The Effect of Angiotensin II on Cognitive Impairment

**Activity Title:**

Camryn Vecera, PharmD

PGY-2 Geriatric Pharmacy Resident

UPMC Presbyterian/Shadyside

**Speaker:**

**Objectives:**

* Describe the relationship between hypertension, the renin-angiotensin system, and cognitive impairment in older adults
* Discuss evidence comparing angiotensin receptor blockers (ARBs) versus angiotensin-converting inhibitors (ACE inhibitors) effect on cognitive impairment
* Recognize how the evidence comparing the antihypertensives would apply to clinical practice

**Presentation Abstract:**

Hypertension has been studied extensively showing a correlation in the decline of cognitive function and is known to be a modifiable risk factor. However, it is still unknown if the benefit of controlling hypertension in regard to cognitive impairment is due to the reduction of blood pressure or through alternative mechanisms of the renin-angiotensin system, specifically angiotensin II. Antihypertensive medications work on the renin-angiotensin system in various ways, and it is hypothesized that certain medications have more protective properties than others. The clinical significance of the selection between antihypertensive medications and their effect on cognitive impairment and dementia remains in question. This presentation will discuss recent evidence exploring if angiotensin receptor blockers (ARBs) compared to angiotensin-converting inhibitors (ACE-inhibitors) provide a better protection in people who do or not have pre-existing cognitive impairment.

**Format:**

Live

Home study

Live and Home study

Webinar (Live)

November 16, 2022

**Date of Live Activity:**

**Activity length (hr. or CEU): 1 hour**

Topic Designators – activities are related to:

If a CPE activity’s target audience is exclusively for pharmacists, the designation “P” will be used as follows:

01-P Disease State Management/Drug therapy

02-P AIDS therapy

03-P Law (related to pharmacy practice)

04-P General Pharmacy

05-P Patient Safety

06-P Immunizations

07-P Compounding

08-P Pain Management/Opioid

**Questions**

**1. All the following are ways the renin-angiotensin system may be protective towards cognitive impairment, except:**

**- Vasodilation**

**- Protect against ischemia**

**- Increase acetylcholine**

**- Preserve memory**

**2. True or False: Based on the article "Candesartan vs Lisinopril for Neurocognitive Function in Older Adults With Mild Cognitive Impairment", the authors have shown candesartan has superior protection for older adults with cognitive impairment compared to lisinopril.**

**-True**

**3. After reviewing the literature, what would be a practical change in the medication regimen in the provided case?**

**-Continue with the antihypertensive medication the patient is on**

**-Switch antihypertensive medication to an angiotensin receptor blocker**

**-Switch antihypertensive medication to a dihydropyridine calcium channel blocker**

**-The evidence does not support any change to medication regimen**

**References:**

1. Deng Z., Jiang J., Wang J., et al. Angiotensin Receptor Blockers Are Associated With a Lower Risk of Progression From Mild Cognitive Impairment to Dementia. *Hypertension.* 2022;79:2159-2169. DOI: 10.1161/hypertensinaha.122.19378.
2. William van Dalen J., Marcum Z., Gray S., et al. Association of Angiotensin II-Stimulating Antihypertensive Use and Dementia Risk: Post Hoc Analysis of the PreDIVA Trial. *Neurology.* 2021; 96:e67-e80. Doi: 10.1212/WNL.0000000000010996.
3. Marcum Z., Cohen J., Zhang C., et al. Association of Antihypertensives That Stimulate vs Inhibit Types 2 and 4 Angiotensin II Receptors With Cognitive Impairment. *JAMA Network Open.* 2022;5(1):e2145319. Doi:10.1001/jamanetworkopen.2021.45319.
4. Hajjar I., Okafor M., McDaniel D., et al. Effects of Candesartan vs Lisinopril on Neurocognitive Function in Older Adults With Executive Middle Cognitive Impairment: A Randomized Clinical Trial. *JAMA Network Open.* 2020;3(8):e2012252. Doi:10.1001/jamanetworkopen.2020.12252.
5. Cohen J., Marcum Z., Zhang C., et al. Risk of Mild Cognitive Impairment or Probable Dementia in New Users of Angiotensin II Receptor Blockers and Angiotensin-Converting Enzyme Inhibitors: A Secondary Analysis of Data From the Systolic Blood Pressure Intervention Trial (SPRINT). *JAMA Network Open.* 2022;5(7):e2220680. Doi: 10.1001/jamanetworkopen.2022.20680
6. Kuan Y., Huang K., Yen D., et al. Angiotensin-converting enzyme inhibitors and angiotensin II receptor blockers reduced dementia risk in patients with diabetes mellitus and hypertension. *International Journal of Cardiology*. 2016;220:462-466.
7. Kehoe P. The Coming of Age of the Angiotensin Hypothesis in Alzheimer’s Disease: Progress Toward Disease Prevention and Treatment? *Journal of Alzheimer’s Disease.* 2018:62(3)1443-1466. Doi:10.3233/JAD-171119
8. Petek B., Villa-Lopez R., Loera-Valencia G., et al. Connecting the brain cholesterol and renin-angiotensin systems: potential role of statins and RAS-modifying medications is dementia. *Journal of Internal Medicine.* 2018, 284:620-642. Doi:10.1111/joim.12838.
9. Hughes D., Judge C., Murphy R., et al. Association of Blood Pressure Lowering With Incident Dementia or Cognitive Impairment: A Systematic Review and Meta-analysis. *JAMA.* 2020;323(19):1934-1944. Doi:10.101001/jama.2020.4249.
10. Kaschina E., Namsolleck P., Unger T. AT2 Receptors in cardiovascular and renal diseases. *Pharmacologic Research.* 2017;125:39-47.
11. Livingston G., Huntley J., Sommerlad A., et al. Dementia prevention, intervention and care: 2020 report of the *Lancet* Commission. *Lancet.* 2020;396(10248):413-446. Doi:10.1016/S0140-6736(2)30367-6.
12. Levi Marpillat N., Macquin-Mavier I., Tropeano A-I., et al. Antihypertensive classes, cognitive decline and incidence of dementia: a network meta-analysis. *Journal of Hypertension.* 2013;31(6):1073-1082. Doi:10.1097/HJH.0b013e3283603f53