The Relationship Between Oral Antihypertensive Medications and Intraocular Pressure

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Introduction

Research has demonstrated a positive correlation between blood pressure (BP) and intraocular pressure (IOP), although the mechanism of this relationship remains largely unknown (1). Medications used to reduce IOP generally do so by either decreasing aqueous humor production or by increasing aqueous humor outflow (2). Although there is overlap in many of the medications used to treat elevated BP and elevated IOP, the route of administration differs. Topical agents are most often used to reduce IOP, as the blood-ocular barrier limits therapeutic concentrations from being achieved in the eye with systemic administration. This study tested the relationship between oral antihypertensive agents and IOP in non-glaucomatous, non-ocular hypertensive (OHT) eyes.

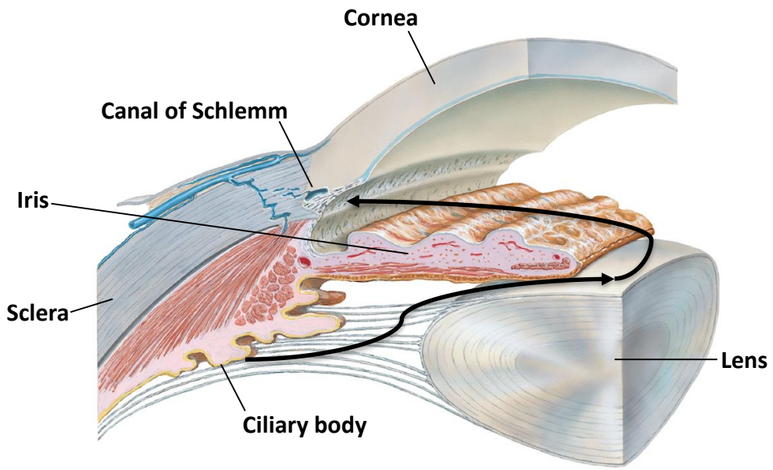


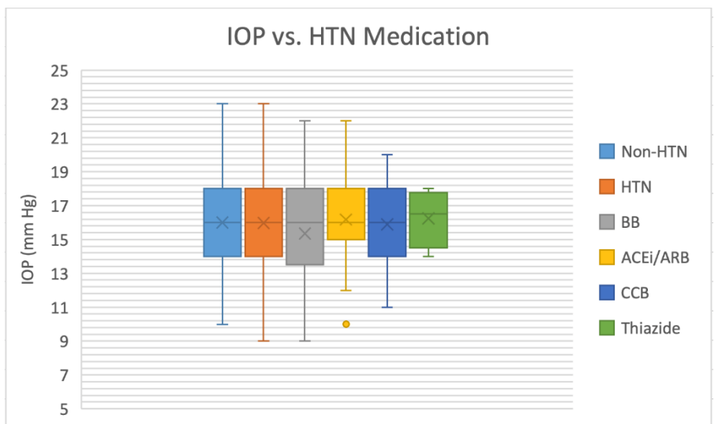
Figure 1 modified image from Netter (3): Illustration of aqueous humor production in ciliary body and pathway to reabsorption by the Canal of Schlemm

Methods

We analyzed data collected at a clinic in Portland, OR between 1/1/2016-6/1/2018 (N=288). Patients over the age of 60 with no history of glaucoma, OHT, eye trauma, or use of IOP-lowering eye drops were included. Subjects taking a beta blocker (BB), angiotensin-converting enzyme inhibitor (ACEi) or angiotensinogen II receptor blocker (ARB), calcium channel blocker (CCB), or thiazide diuretic were identified and categorized by pharmacotherapy. IOP was analyzed using a one-sided analysis of variance based on medication regimen.

Results

There was no significant difference in IOP between HTN subjects and non-hypertensive subjects (p=0.9614). There was no significant difference in IOP amongst any of the four analyzed categories of antihypertensive agents (BB, ACEi or ARB, CCB, and thiazide diuretic) when compared to each other or compared to non-hypertensive subjects (p>0.95).



Conclusions

Our results indicate that the use of commonly prescribed oral antihypertensive medications does not have a significant effect on IOP. This supports previous data which suggests that systemic administration of these medications does not reduce IOP, likely due to the blood-ocular barrier hindering adequate concentrations in the eye. Further stratification based on sex could be considered, as IOP is known to vary between males and females (4). Additionally, future studies should consider the dosage of these medications and BP when determining the overall effect on IOP.

References

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