



# Relationship between Increased Intraocular Pressure in Glaucoma Patients with Hypertension

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## Abstract

**Background:** Glaucoma is one of the biggest causes of blindness in the world. According to World Health Organization (WHO), there are approximately 39 million people with blindness in the world and around 12 million people are in Southeast Asia. Glaucoma is a chronic optic neuropathy characterized by decreased visual field and cupping of the optic disc. In glaucoma patients, there is usually an increased intraocular pressure which can be caused by several risk factors such as hypertension.

**Objectives:** This study attempts to determine the relationship between increased intraocular pressure in glaucoma patients and hypertension at Haji Adam Malik Hospital in 2018.

**Material and Methods:** This study is an analytic study which is done by collecting intraocular pressure and blood pressure of all glaucoma patients at 2018 from medical records at Haji Adam Malik Hospital. The data was analyzed using chi-square test.

**Results:** Sixty four glaucoma patients' data were collected from Haji Adam Malik Hospital, there were 39 patients with both hypertension and increased intraocular pressure.

**Conclusion:** The results obtained show that hypertension is a risk factor towards increasing intraocular pressure in glaucoma.

**Keywords:** Glaucoma; Intraocular pressure; Hypertension

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## Introduction

Glaucoma is one of the biggest causes of blindness in the world. According to World Health Organization (WHO), there are approximately 39 million people with blindness in the world and around 12 million people are in Southeast Asia [1]. Glaucoma is the second leading cause of blindness in the world after cataract. Glaucoma is a chronic optic neuropathy characterized by decreased visual field and cupping of the optic disc. In glaucoma patients, there is usually an increased intraocular pressure which can be caused by several risk factors [2].

In the anterior segment of the eye, there is a clear liquid called as aqueous humor that fills anterior and posterior camera. It is produced by the ciliary body and has a composition similar to plasma [3]. The aqueous humor can be drained to the blood vessels through the trabecular meshwork or iris. Usually, the increased production of aqueous humor or the decreased drainage can lead to ocular hypertension. The increased pressure can damage the optic nerve of the eye and cause decreased vision [4].

The exact cause of glaucoma is unknown but there have been several risk factors that contribute to the development of glaucoma, one of the risk factors is hypertension [5]. Hypertension is the term for high blood pressure which means that the blood pumped by the heart is applying a much stronger force to the blood vessels. This can damage the blood vessels and cause several complications [6].

## Objectives

In this study, it is proposed that increased intraocular pressure in glaucoma can be caused by hypertension.

## Materials and Methods

### Place and year of work

The present study was carried out from July to October 2019. The medical records data was

**Table 1:** The analysis of the relationship of increased intraocular pressure with hypertension in 64 glaucoma patients using the Chi-square test.

		Increased intraocular pressure		p-value
		+	-	
Hypertension	+	39	8	0.044*
	-	10	7	

\*significance at P<0.05

collected in the Department of Medical Record, Haji Adam Malik Hospital.

**Ethical considerations**

This study has received permission from Health Research Ethical Committee of Faculty of Medicine, University of Northern Sumatra.

**Results**

The observation results of the medical records of glaucoma patients are presented in Table 1. The results show that there are more glaucoma patients with increased intraocular pressure and hypertension compared to other normal intraocular pressure and blood pressure.

**Discussion**

The results of this study aligns with another study done by Ringgo Alfarizi, in which there is a significant p-value (0.044) which shows that hypertension is a risk factor towards the development of increased intraocular pressure for glaucoma [7]. Plasma that flows to the ciliary body goes through a few processes including active transport, ultrafiltration and diffusion which produce the aqueous humor that fills the camera [8]. The amount of aqueous humor production are usually elevated or the drainage system is blocked which can cause an increase in pressure, these alterations have no exact cause but there are several risk factors that has been linked to cause these changes and hypertension is seen as one of them [5].

Blood pressure has a direct influence on ocular perfusion and intraocular pressure. High blood pressure persisting in a person can cause damage towards its blood vessels which can disrupt blood flow to the eyes [9]. Also, elevated blood pressure causes vasoconstriction and decreases blood flow. As the blood vessels carry important substances such as oxygen, chronic vasoconstriction and low blood flow can cause nutritional deficit to the eye and therefore can damage the optic nerve [10,11].

**Conclusion**

From the result of this study, it is revealed that hypertension is a risk factor towards the development of increased intraocular pressure in glaucoma. Nevertheless, these two variables need to be investigated further together to identify the definitive therapy for both of these diseases and to prevent more people from catching these diseases.

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