

Introducing the shape of globe as a predisposing factor for glaucoma

Mehdizadeh, A., Hoseinzadeh, A., Fazelzadeh, A.

School of Medicine, Mashad University of Medical Sciences, Mashad, Iran

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Abstract

Glaucoma is a common blinding disease worldwide with a number of risk factors such as intraocular pressure, myopia, gender, race and hyperopia. Here we introduce eyeball's shape as a predisposing factor for glaucoma. If the eyeball is a sphere, the stress distribution is homogenous. We assume the eyeball as a non sphere. Then, the distribution of stress will not be homogenous. Different individuals have different eyeball's shapes and different patterns of stress distribution in their eyes. So based on the eyeball's shape deviation from a sphere they will have different risks for glaucoma. The eyeball is routinely considered as a sphere, but some evidences show that the globe is not a sphere. Two empirical observations are consistent with the hypothesis. The first is that ethnicity and sex are established risk factors for glaucoma. On the other hand there are several morphological differences in the body structure among individuals. According to these anatomical differences, eye's shape is different among different races and between two sexes. Secondly, there are some conditions such as myopia and hyperopia in them the shape of the globe has been changed. These conditions are risk factors for glaucoma too. Glaucoma screening program for early detection of high risk individuals is very important. Current diagnostic procedures of glaucoma do not take the shape of eyeball into account. We suggest using eyeball's shape for early glaucoma detection. There are three other factors in addition to eyeball's shape, including thickness of the globe's wall, intraocular pressure, and inner radius that should be measured together for each individual and stress load should be calculated in different points of the globe. Then eyes with more stress load in site of injury are more prone for glaucoma. More accurate measurements of the factors which are contributing in stress value for each case, lead us toward better glaucoma screening. © 2008 Elsevier Ltd. All rights reserved.

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