

Descriptive Study of an Urban Glaucoma
Screening and Analysis of Screening Variables

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Submitted
April 1, 1992

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Abstract

Objective- To analyze the data from an urban glaucoma screening. Variables looked at are Race, Age, Sex, Family history of glaucoma, IOP, and Cup/Disk ratios. A secondary objective will be to determine the prevalence of primary open angle glaucoma in our screening population.

Design and Setting- The population was a non-probability convenience sampling consisting primarily of Comprehensive Health Services' (CHS) members, although it was open admission for anyone over 18 years of age. The screening took place at three locations of CHS (an HMO serving the Detroit community). Intraocular pressures with non-contact tonometers (Goldmann was used if readings were high), and C/D ratios with direct ophthalmoscopy were measured. Glaucoma suspects were referred for complete eye exams. The prevalence of glaucoma was estimated for those screened that were CHS members.

Main Results/ Conclusions

- The population consisted primarily of blacks as expected, but only 20% were males. For unknown reasons black men were outnumbered by women five to one. This suggests Detroit black men may not be seeking health care as often as black women. This relationship may not be race dependent.
- The average population age was 35.6 (+/- 13.8 years). Total N=396.
- Only 49% of the screening "fails" had sought eye care three months following the screening even though patients were counseled at the screening and letters were sent urging compliance. Future screenings must aggressively address this problem to be successful.
- About 72% of those referred had glaucoma ruled out. Our "fail" criteria may have been too strict for this population.
- Family history of glaucoma did not correlate with high pressure or large cups.
- Gender did not seem to correlate with IOP, C/D ratio, or with the diagnosis of glaucoma.
- Using linear regression analysis a relationship between age and IOP existed. This infers the elderly are at a higher risk for glaucoma but direct conclusions cannot be made.
- Although IOP and C/D ratios were low, a high percentage of glaucoma was found. With the prevalence of glaucoma and the relationships of age with IOP, our study supports targeting American blacks for screenings and education about glaucoma. This is especially true for those middle aged or older.

Introduction

Recently in "The Baltimore Eye Survey" it was shown that the risk of primary open angle glaucoma (POAG) is four to five times greater for blacks. Specifically it was found 1.23% of blacks aged 40-49 had POAG, while only .92% of whites did. In addition, blacks 80 years or older were diagnosed with POAG 11.26% of the time, while whites only 2.16% of the time. (1) Others have said race may be one of the most critical predisposing factors for developing glaucoma. (2) "The Baltimore Eye Survey" concluded blacks are at higher risk for POAG, and suggested screenings should be targeted for this high risk group. (1) The purpose of this paper is to analyze the data from one screening primarily of blacks and examine the relationships between Race, Age, Sex, IOP, and C/D ratios. As a secondary goal we will estimate the prevalence of POAG in our screening population.

Description

The screening took place at three health centers in the Detroit area. The screening, although open admission, consisted primarily of members of CHS (an HMO serving the Detroit community). The population included over 95% blacks, so conclusions were aimed at this group. The only admission requirement was an age of 18, although no one was turned away. The information collected included the person's name, address, phone number, CHS identification if applicable, age, sex, race, length of time since last eye exam, a glaucoma specified case history, intraocular pressure with a non-contact tonometer and an internal exam with direct ophthalmoscopy evaluating the C/D ratio; horizontal and vertical. A Goldmann tonometer was used for those pressures that were inconsistent or high. The horizontal and vertical C/D ratios were averaged for statistical calculations. All internals were performed by one of three Doctors of Optometry or two Senior Optometry Interns. The students frequently compared estimates of C/D ratios with staff to provide consistency. Referrals for a complete eye exam were made if any one or more of the following were found:

- IOP of 21 or greater in either eye
- a difference in IOP between the two eye of 5mmHg or more
- C/D of .5 or greater (horizontal and vertical)
- C/D difference between the two eyes of .2 or greater
- C/D difference of .2 or greater between horizontal and vertical in the same eye
- Notching of the optic nerve rim tissue

These criteria were set up in advance; however, referrals were not made in a few instances where pressures were only slightly elevated and the internal was deemed normal. In these few cases clinical judgement overrode the fail criteria and the subject

passed the screening. They were informed of their increased risk for glaucoma and the necessity of a complete eye exam.

Following a complete eye exam, CHS charts were reviewed to determine the diagnosis. These were separated into the following groups: 1. Diagnosis of POAG 2. POAG suspect 3. POAG not present. An attempt was made to contact all screening fails to ensure proper eye care was available and had been sought.

Data from the screening was entered into a computer statistical program and is available through the Ferris State University Optometry library. A descriptive statistical analysis of the continuous variables age, IOP, and C/D were made, as well as the discrete variables sex, race, and positive history of glaucoma in the family. Linear regression analysis was used to determine relationships between the screening variables. The prevalence of glaucoma was estimated for the screening population by looking at those CHS members who were found to have POAG.

Results

The population consisted of 95.7% black, 3.3% white, and 1.0% other. There were 88 male participants (22.2%) and 309 female (77.8%). The average age was 35.6 (+/- 13.8 years).

The average IOP for the right eye (OD) was 14.7 (+/-3.9mmHg), while the average for the left eye (OS) was 14.8 (+/-3.8mmHg).

The average for the C/D ratios were .26 (+/- .14) for both eyes.

Out of the 393 people who responded to the written question "Has anyone in your family had glaucoma or high eye pressure?", 14.3% gave a "Yes" response.

Using multiple linear regression analysis with IOP of the right eye as the dependent variable and age and C/D ratio of the right eye as independent variables, the p values were .01 and .001, respectively. The values for the left eye were not as direct with the age p value= .003 and the C/D ratio p value= .076.

Multiple linear regression using IOP as the dependent variable, but including Age, C/D ratio, Sex, and Family history of glaucoma showed that sex and history had no correlation with IOP, while the other variables showed similar correlation as before.

The total number of screening fails was 47 (or almost 12%). Of these, 37 were CHS members and by February 3rd, 1992, 49% (18/37) had complied with the recommended follow-up examination, while the rest had not. Of those who did comply, 17% (3/18) had a diagnosis of POAG confirmed and treatment was initiated. Eleven percent are being followed as glaucoma suspects, and 72% had a

diagnosis of glaucoma ruled out. If these percentages can be generalized to the total number of "fails", then eight people of the total population would have been confirmed with glaucoma (2.0%), and five would be glaucoma suspects (1.3%).

Of those referred, 24.3% were men which is similar to their overall percentage in the screening (22.2%). Final diagnosis of glaucoma also did not correspond to gender; however, small sample size limits this generalization.

Considering reasons for referral, 10.6% (5/37) were referred because both the IOP and C/D ratio were high, 27.7% (13/47) were referred on tonometry alone, while 59.6% were referred on C/D ratio alone.

Conclusions/Comments

The population consisted almost exclusively of blacks with over 75% females. The total enrollment percentages at CHS confirm a much larger percentage of females. For unknown reasons black males do not seek medical care as readily as black females at CHS, and even across the country. In a recent Medicare study of heart bypasses, it was shown black men receive fewer bypasses than black women, and it was suggested black men may be more reluctant to seek medical care than their female counterparts. (3) This relationship may not be related to race and instead may be typical of all men. Further investigation is warranted to find if men are more reluctant to seek medical care.

Assuming all CHS members who failed the screening would seek eye care at CHS, it is alarming that only 49% of the screening "fails" sought eye care over the three months following the screening. This is especially true since counseling was attempted at the screening and letters were sent to remind patients. It is conceivable they received eye care elsewhere, but unlikely considering further services were free of cost. In this manner, either the screening failed to inform glaucoma suspects of the hazards and urgency of this disease, or the people themselves were negligent. In either case, counseling for screening "fails" needs to be thorough and immediate. Scheduling eye exams immediately or performing them on-sight would be optimal. Ideally, at least Goldmann tonometry and visual fields could be performed on sight.

The estimate of the prevalence of glaucoma in our study corresponds to the Baltimore Eye Survey data. (1.23% of blacks 40-49 years of age, 4.05% to 5.51% for those 50-69). (1) Our estimate of 2% includes a population average age of 36, but with a large standard deviation and many people over 50. Similarly, the Framingham Eye Study shows prevalence rates of glaucoma ranging from 1.2% to 2.1%. (4) The trend in the Baltimore study

shows an increasing risk of glaucoma with increasing age, as well as with race.

Although our study has difficulty showing a direct relationship between age and glaucoma, it does suggest increasing IOP is associated with increasing age (people with glaucoma were not isolated from this data which increases the correlation). The data also suggests IOP's increase with increasing C/D ratios, which is also expected with the glaucoma patients included in the population. In all, the elderly seem to be prone to higher IOP and larger CD ratios, which are assumed predicting factors for glaucoma.

With the prevalence of glaucoma, and the relationships of age and C/D ratios with IOP, our study supports targeting American blacks for screenings and education about glaucoma. This is especially true for those middle aged or older.

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