

学位論文の要旨

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学位論文名 Epidemiological Study of Glaucoma in Residents of a Rural Community: Analysis of Data Obtained From Resident Health Screenings in the Town of Sakurae in Shimane Prefecture, Japan

発表雑誌名 International Medical Journal
(巻, 初頁～終頁, 年) (in press)

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論文内容の要旨

INTRODUCTION

Glaucoma is one of the major causes of blindness, early detection of glaucoma and prevention of disease progression are important in preventing blindness. But its prevalence varies with respect to gender, age and ethnicity. While the increased intraocular pressure of glaucoma damages the optic nerve and creates vision defects, recent studies have also begun to examine “normal” tension glaucoma.

The current study analyzed the data gathered in glaucoma screenings, and determined the prevalence of glaucoma for various age and gender groups. At the same time, we assessed the relationship between intraocular pressure and fundus test findings in order to clarify the severity of optic nerve damage in individuals with normal intraocular pressure. We also think that we carry out this research during the long period as baseline about these data.

MATERIALS AND METHODS

Sakurae is a town surrounded by mountains, and has a large elderly population (currently contained in Gotsu city). Over a 5-year period from 1989 to 1993, the town of Sakurae, in collaboration with the Shimane Medical University (currently, the Faculty of Medicine, Shimane University) and local doctors, conducted a resident health survey (resident health screenings).

Glaucoma screenings were performed on examinees who underwent the resident health screenings over a 2-year period, from 1990 to 1991. These screenings consisted of a medical history, tonometry and fundus test. The medical history interview covered past history of glaucoma, and symptoms such as visual field defects, eye pain, severe headaches and stiff shoulders. Intraocular pressure was measured in both eyes. Initially, intraocular pressure was

measured using a non-contact tonometer (NCT). If NCT pressure was 18 mmHg or higher, or if subjective symptoms associated with glaucoma were noted, an ophthalmologist used a hand-held Perkins applanation tonometer (PER pressure). Residents were diagnosed with increased intraocular pressure when PER pressure was 21 mmHg or higher.

For the fundus test, a funduscope and a nonmydriasis camera were used in both eyes. Residents were diagnosed as having glaucomatous changes when one or more of the following findings were seen: 1) cup:disc ratio (c/d ratio) of 0.6 or larger, or a left-right difference of 0.2 or larger; 2) notching; 3) retinal nerve fiber layer defect; and 4) papillary splinter hemorrhage.

With increased intraocular pressure or glaucomatous changes, residents were classified as belonging to a positive screening group. In addition to this group, residents with NCT pressure of 18 mmHg or higher, but with PER pressure of less than 21 mmHg, were recommended to undergo thorough examinations. Thorough examinations consisted of slit-lamp exams, gonioscopy, and perimetry. Ophthalmologists made diagnoses based the results of these tests. Thorough examinations were conducted from 1990 to 1993.

The prevalence of glaucoma was calculated for different age and gender groups by dividing the number of residents who underwent screening by the number of residents diagnosed with glaucoma, based on the results of thorough examinations plus the number of residents with a past history of glaucoma. In statistical analyses, the χ^2 test, Fisher's direct probability approach, and the Mantel-Haenszel method were used. The 95% confidence interval of prevalence was estimated based on Poisson distribution.

In the present study, we handled epidemiological data in the same manner as civil servants to ensure privacy and access to the data was limited to those involved in the study.

The study protocol was approved by the Ethics Committee of Shimane University and written informed consent was obtained from all subjects.

RESULTS AND DISCUSSION

3,244 residents of Sakurae were aged 20 years or older. Of these, 1,899 residents (58.5%) underwent resident health screenings. As a result of 13 refuse to the glaucoma screening, a total of 1,886 residents underwent the glaucoma screenings. Twelve residents (three men and nine women) had a past history of glaucoma, and thus tonometry and/or fundus test was performed in the remaining 1,874 residents (770 men, 1,104 women).

The proportion of increased PER pressure in residents who underwent glaucoma screenings was 3.2%: 4.0% for men, and 2.6% for women. There was no significant difference between increased PER pressure and gender. The proportion of glaucomatous fundus change for residents who underwent glaucoma screenings was 10.5%, and ranged from 1.6% in those aged 20–29 years to over 15% in those 70 years or older. In both men and women, the higher the age,

the higher the prevalence of glaucomatous change (trend, $p < 0.001$ men; $p < 0.01$ women). Of residents who underwent glaucoma screenings, the ratio of individuals with increased PER pressure or glaucomatous change was 12.9%.

There were 241 residents in the positive screening group. Of these, 126 saw a specialist for a thorough examination. In addition, of 389 residents with PER pressure of less than 21 mmHg but NCT pressure of 18 mmHg or higher, 10 saw a specialist. A total of 251 residents met the criteria to undergo thorough examinations, and 136 residents underwent these exams.

Sixty-eight residents were diagnosed with glaucoma. Therefore, of 1,886 residents, a total of 80 residents had glaucoma, and prevalence was 4.2% (95% confidence interval: 3.4-5.3%). The prevalence of glaucoma among men was 4.5% (95% confidence interval: 3.2-6.3%) and among women was 4.0% (2.9-5.4%). There were no significant gender differences, and no residents in their 20s were diagnosed with glaucoma. Higher ages were associated with significantly higher glaucoma prevalence (trend, $p < 0.001$). Moreover, this trend was observed for both men and women (trend, $p < 0.001$). Similarly in many studies both of Japan and the other countries, prevalence of glaucoma tended to increase with age. In the present study, while 58.5% of total Sakurae residents underwent health screenings, only 32.3% of residents over the age of 80 years underwent these screenings. Therefore, the prevalence of glaucoma observed in the present study may be somewhat lower than the actual figure.

Both tonometry and funduscopy were performed in 3,555 eyes. The proportion of glaucomatous fundus change for high-pressure eyes was significantly higher than lower intraocular pressure eyes at 11.2% ($p < 0.001$). Nevertheless, the incidence of glaucomatous change for lower intraocular pressure eyes, with NCT pressure of less than 18 mmHg or PER pressure of less than 21 mmHg, was 7.8% (221/2841). The results of the interventional study of glaucoma patients in USA suggested that untreated intraocular pressure could exacerbate glaucoma in patients with normal intraocular pressure. In brief, it seems important to consider the intraocular pressures in diagnosis and therapy of glaucoma.

CONCLUSION

The prevalence of glaucoma increases significantly with age, but no significant gender differences were observed in the present study.

In the future, it will be necessary for epidemiological studies on glaucoma to clarify the correlation between intraocular pressure and glaucoma.