Original Article

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The Study of the Frequency of Hypertensive Retinopathy in the Elderly at Amirkola Town During 2011-2012

S.A. Rasoulinejad (MD)*[1], E. Mekaniki (MD)[1], S.R. Hosseini (MD)[2], R. Zaboli [3], S.E. Rasoulinejad (MSc)[3]

1.Department of Ophthalmology, Ayatollah Roohani Hospital, Babol University of Medical Sciences, Babol, I.R.Iran
2.Social Determinants of Health Research Centre, Babol University of Medical Sciences, Babol, I.R.Iran
3.Babol University of Medical Sciences, Babol, I.R.Iran

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ABSTRACT

BACKGROUND AND OBJECTIVE: The risk of high blood pressure increases to a great extend with increasing age which, in turn, raises the risk of retinopathy. Given the high prevalence of ophthalmic complications in the advanced ages, there is a growing need for public health and medical services. This study aims to determine the frequency of hypertensive retinopathy in the elderly, in *Amirkola* town.

METHODS: This cross-sectional study was performed on all patients aged 60 or above, residing in *Amirkola town*, Iran. All the patients were referred to the eye clinic of Ayatollah Rouhani Hospital during 2011-2012. Comprehensive ophthalmic examinations were performed by an ophthalmologist. Based on the obtained definitive evidence and photographic findings, various degrees of hypertensive retinopathy in one or both eyes were detected and assessed.

FINDINGS: Among the 505 studied patients, 65 patients (12.9%) were suffering from hypertensive retinopathy. About 10 (15.4%) patients were suffering from high blood pressure for more than ten years. Moreover, 55 patients (84.6%) had hypertension for less than 10 years ($p<0.0001$). A total of 18 patients (27.7%) had history of hyperlipidemia, while 47 patients (72.3%) had no history of it ($p=0.005$).

CONCLUSION: The obtained results of our study indicated that the frequency of hypertensive retinopathy in the elderly patients was high. Therefore, monitoring blood pressure and serum lipids on a regular basis in the elderly is highly recommended.

KEY WORDS: Elderly, Hypertension, Retinopathy.

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Introduction

Considering the increase in the average life expectancy and declining fertility rates all over the world, the population of people aged 60 or more has grown more than the other age groups (1). Similarly in Iran, the elderly population is increasing due to having good access to health care

*Corresponding Author: S.A. Rasoulinejad (MD)
Address: Department of Ophthalmology, Ayatollah Roohani Hospital, Babol, I.R.Iran
Tel: +98 11 32338301
Email: rasolisa2@gmail.com

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and the low birth rates. The ratio of elderly to young people in 2005 was approximately 3.7% in Iran. It is expected to increase by 11.6% in 2025, and by 30.8% in 2050 (2). Chronic diseases such as hypertension can disproportionately affect the elderly population and lead to disability, reduced quality of life, high health care costs and the need for long-term care (3). Hypertension can be asymptomatic for a long time and present itself in a time when its complications have become serious and irreversible (4,5).

Hypertension is a risk factor for cardiovascular, ophthalmic and renal diseases and stroke (5,6). Arteriolar spasm, retinal hemorrhage, edema and exudates are the most common ocular involvements arising from hypertension, which can increase the risk of retinopathy (7,8). It has been suggested that the eyes are the target organs in hypertension. Acute and severe hypertension has a huge impact on the structure and function of the eyes. Additionally, small vessels of the retina might get involved as a result of hypertension (6).

Several studies in different parts of the world indicate that the prevalence of retinopathy in patients with hypertension, aged 40 years and above, ranged between 5.4% and 25.6%. The rate of retinopathy in patients with hypertension was significantly less in the patients using the anti-hypertensive medications than those who were not treated with these medications (9). The risk of retinopathy has increased greatly with advancing age and long duration of hypertension. Considering the high prevalence of eye complications in the elderly, there is a growing need for medical and social services and public health system. This study aims to determine the frequency of hypertensive retinopathy in the elderly, in Amirkola town during 2011-2012.

Methods

This cross-sectional study was a part of Amirkola Health and Aging Project (AHAP) (grant No 892917) (10). This study was performed on 505 patients, aged 60 years and above, who were residing in Amirkola town, located in north of Iran. After approval of the Ethics Committee of the Babol University of Medical Sciences and obtaining an informed consent, all the patients referring to the eye clinic of Ayatollah Rouhani Hospital for the routine eye examinations, with no ocular morbidity, during 2011-2012 were enrolled in the study. The patients whose medical past histories (about blood pressure) were not available for any reason, were excluded from this study; moreover, the patients for whom detailed examination of the retina was not possible and the patients who had ocular comorbidities were excluded from this study.

In our study, hypertension was diagnosed by means of measuring blood pressure using sphygmomanometer (Omron M3, Intellisense). Blood pressure was evaluated both in supine and standing positions. In our study, hypertension was defined as systolic blood pressure greater than 140 mmHg, and diastolic blood pressure greater than 90 mmHg, or using antihypertensive medications by the patients. Comprehensive ocular examinations were performed on all the patients by an ophthalmologist.

Based on the obtained definitive evidence and findings of photography, there were various degrees of hypertensive retinopathy in one or both eyes, which were accurately assessed. Eye examinations included visual acuity with Snellen chart, slit-lamp biomicroscopy, intra-ocular pressure (IOP), iris examination, ophthalmoscopy with non-contact lens (78 in diameter) after dilation of the pupil (using tropicamide 1%) and ophthalmoscopy based on the presence or absence of complications such as arteriolar narrowing, microaneurysms, hemorrhages, exudates, exudative (or serous) retinal detachment, optic disc edema and macular edema. Retinopathy was graded based on Scheie scheme (11).

The grades of the system has been described as follows: grade zero: no changes in the retinal vessels, grade 1: slight narrowing of the retinal arteriolar, grade 2: obvious narrowing of the retinal arteriol with focal irregularities, grade 3: grade 2 together with retinal hemorrhage, exudates and edema, and grade 4: grade 3, as well as optic disc edema. The other information concerning age, gender, level of literacy, smoking and the underlying diseases such as hypertension and hyperlipidemia were recorded in a checklist.

Finally, the data were analyzed using SPSS, version 22 and performing t-test and Chi-square tests. Data were considered statistically significant ($p<0.05$).

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Results

In this study, 505 elderly patients residing in Amirkola town were investigated. According to the obtained results, the mean age of the patients was 71.55±5.90 years ranging between 60 and 90 years. The mean age of patients with and without retinopathy was 72.57±5.76 and 71.40±5.91, respectively. There were no significant differences in the age of the patients. Among all, 440 patients (87.1%) had no hypertensive retinopathy and 65 patients (12.9%) had hypertensive retinopathy. The mean duration of hypertension was 1.79±3.8 years (table 1).

The study of the grades of retinopathy in our study showed that the highest and lowest frequencies were observed in grades zero and four, respectively (fig 1). The comparisons between retinopathy and the other variables demonstrated that there were significant differences among hypertension, its duration (p<0.001), hyperlipidemia (p=0.005) and retinopathy (table 2).

Table 1. Demographic information of the elderly in Amirkola town

Variables	N(%)
Gender (male)	290(57.4)
Education level(less than highschool)	409(80.1)
Smoking (yes)	148(29.3)
Hyperlipidemia history (yes)	76(15)
Hypertension History	159(31.5)

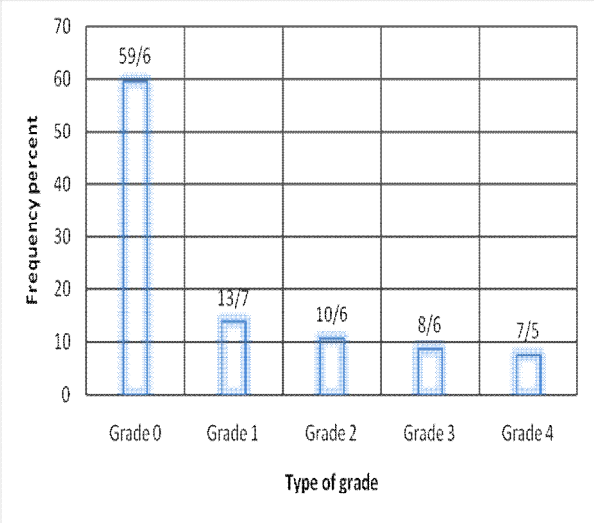

Figure 1. The frequency of retinopathy in the elderly in Amirkola town

Table 2. The relationship between retinopathy and the other variables in the elderly in Amirkola town

Variables		Hypertensive retinopathy Yes N(%)	Hypertensive retinopathy No N(%)	p-value
Gender	Male	37(56.9)	253(57.5)	0.99
	Female	28(43.1)	187(42.5)	
Smoking	Yes	22(33.8)	126(28.6)	0.38
	No	43(66.2)	314(71.4)	
Hyperlipidemia History	Yes	18(27.7)	58(13.2)	0.005
	No	47(72.3)	382(86.8)	
Hypertension History	Yes	63(96.9)	96(21.8)	<0.0001
	No	2(3.1)	344(78.2)	
Duration of Hypertension	No	0(0)	344(78.2)	<0.0001
	>10years	55(84.6)	89(20.2)	
	<10years	10(15.10)	7(1.6)	

Discussion

According to our study, the prevalence of hypertensive retinopathy was 12.9%. Moreover, grade zero hypertensive retinopathy was more common in the studied population. In addition to hypertension, duration of hypertension plays a key role in the hypertensive retinopathy, and hyperlipidemia is another risk factor for hypertensive retinopathy. The prevalence of hypertensive retinopathy was 5.4% in Akhter et al. study (12). This was reported 9.8% in Yu et al. study (13) and 21% in Klein et al. study (4). According to a study conducted by Wang et al., in China, the prevalence of hypertensive retinopathy was 25.6% (14). Also, it was 39.9% in Besharaty et al. study (15).

Ladipo et al. reported a 70% hypertensive retinopathy in Nigeria (16), and hypertensive retinopathy was reported to range between 67 and 74% in Abdollahi et al. study (17). The difference in the prevalence of the hypertensive retinopathy in various studies can be due to several factors such as age, disease management and underlying diseases. Rate of retinopathy is four times higher in the patients with uncontrolled hypertension as compared to those with controlled disease (13). What's more, duration of hypertension as an influential factor in retinopathy, plays a critical role in the occurrence of hypertensive retinopathy. Severity of hypertension, family history of hypertension, the quality of care in a health system

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and care services, comorbidities, age and the sample size are the factors affecting the reported rate of retinopathy in various studies.

In this study, there was a significant association between hypertensive retinopathy and hypertension. This was in line with the obtained results of Besharaty et al. study. According to that study, the prevalence of hypertensive retinopathy significantly increases with growing the severity of hypertension from mild to severe (15). According to a study performed by Klein et al., the prevalence of retinopathy and arteriolar narrowing were higher in patients with uncontrolled hypertension besides medication than those with controlled disease (18). Similar to Klein et al. study, there was a significant direct correlation between hypertension and retinopathy in Mazarei et al. (19) and Williams et al. (20) studies. The obtained results of our study were confirmed by all the aforementioned studies. Retinopathy is a result of increased retinal blood flow response to hypertension.

Increased blood pressure leads to the breakdown of the blood-retinal barrier causing retinal hemorrhage, edema and exudates. Moreover, the optic nerve fibers are damaged due to ischemia (8). Based on our results, the risk of retinopathy was higher in the patients suffering from hypertension for more than ten years than those with hypertension for less than ten years, which was confirmed by Besharaty study. According to Besharaty study, the risk of retinopathy increases as the duration of hypertension gets longer (15). Thus, longer duration of hypertension is associated with more optic nerve and retinal vessels damage. The results of our study also demonstrated that hyperlipidemia is a risk factor for hypertensive retinopathy. This was confirmed by Akhter et al. study. According to that study, there was a significant relationship among hyperlipidemia, total cholesterol and triglyceride levels and the incidence of hypertensive retinopathy (12). Hyperlipidemia plays a significant role in hypertensive retinopathy both directly and indirectly, via affecting the other risk factors. However, these findings require further investigation. In our study, not accounting for underlying diseases such as cardiovascular and renal diseases affecting hypertensive retinopathy was the main limitation. Further prospective studies are recommended to investigate hypertension in people aged more than 45 years. According to the obtained results of our study, the risk of hypertensive retinopathy can be significantly reduced through screening and early diagnosis and treatment of hypertension in the elderly, as well as controlling the risk factors for hypertension. Given the high prevalence of hypertensive retinopathy in the elderly, monitoring blood pressure and serum lipids on a regular basis is recommended

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