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Pattern of retinal diseases in hilly terrain of Himachal Pradesh, India

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视网膜血管疾病在印度喜马偕尔邦丘陵地带的患病模式的研究

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摘要

目的:研究视网膜血管疾病在印度喜马偕尔邦丘陵地带(海拔 500~4500m)的患病模式/分布。

方法:对西姆拉三级医院眼科自 2008-08/2013-04 期间的视网膜疾病患者进行回顾/前瞻性研究。选取 5600 位中的 4323 名患者作为研究对象。该数据均来自于医院记录,随后根据患者的年龄,性别分布情况和诊断结果进行分析。所有患者都进行了视力,屈光,裂隙灯和眼底检查。以眼底临床记录和眼底照相记录来确定诊断。应用眼底照像机(Kowa Fundus Camera VX-10)进行照相,必要时进行眼底荧光素血管造影。

结果:在 4323 例患者中,男性视网膜疾病患者有 2563 例(59. 29%),多于女性 1760 例(40. 71%)。在 525 例(12. 14%)糖尿病视网膜病变患者中,轻度非增殖性糖尿病视网膜病变 133 例(3. 08%),中度 156 例(3. 60%),重度 120 例(2. 78%),增殖性糖尿病视网膜病变 116 例(2. 68%)。在 393 例(9. 10%)高血压性视网膜病变患者中,I 级高血压性视网膜病变患者 130 例(3. 01%),II 级 111 例(2. 57%),III 级 131 例(3. 03%),IV 级 21 例(0. 49%)。在 660 例(15. 27%)其他视网膜血管疾病中,视网膜分支静脉阻塞 229 例(5. 30%),视网膜中央静脉阻塞 55 例(1. 27%),半视网膜中央静脉阻塞 8 例(0. 19%),视网膜中央动脉阻塞 20 例(0. 46%),视网膜分支动脉阻塞 4 例(0. 09%),眼部缺血综合征 1 例(0. 02%),早产儿视网膜病变 9 例(0. 21%),视网膜大动脉瘤 5 例(0. 12%),近中心凹毛细血管扩张 6 例(0. 14%),贫血性视网膜病变 16 例(0. 37%),白血病视网膜病变 10 例(0. 23%),视网膜前出血 52 例(1. 20%),Coats 病 8 例(0. 19%),睫状视网膜动脉阻塞 1 例(0. 02%)例,Eales 病 10 例(0. 23%),血管炎 17 例(0. 39%)以及有临床意义的黄斑水肿 209 例(4. 83%)。

结论:糖尿病视网膜病变是最常见的视网膜血管疾病。视网膜疾病已经成为印度一个主要公共卫生问题。此研究将有利于对喜马偕尔邦丘陵地带视网膜血管疾病的控制管理从而减少该眼病的发病率。

关键词:喜马偕尔邦;回顾/前瞻性的;糖尿病视网膜病变

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Abstract

• AIM: To study the pattern/distribution of retinal vascular diseases in the hilly terrain of Himachal Pradesh (altitude ranging from 500-4500m above sea level).

• METHODS: It is a retro/prospective study of patients with retinal diseases attending the general ophthalmology clinic of a tertiary care facility at Shimla from August 2008 to April 2013. Out of 5600 subjects, 4323 were taken as a sample. The data were taken from the hospital records and thereafter analyzed to determine their age, sex distribution and diagnosis. All patients underwent visual acuity, refraction, slit lamp examination and fundus evaluation. The diagnosis was confirmed from fundus clinic records and evaluation of fundus photographic records retro/prospectively. The photographs were taken on the fundus camera (Kowa Fundus Camera VX-10) and fundus fluorescein angiography done where ever indicated.

• RESULTS: Out of the 4323 patients, there were more males 2563 (59. 29%) than females 1760 (40. 71%) with retinal diseases. Out of the 525 (12. 14%) diabetic retinopathy (DR) subjects, mild non-proliferative diabetic retinopathy was present in 133 (3. 08%), moderate non-proliferative diabetic retinopathy in 156 (3. 60%), severe non-proliferative diabetic retinopathy in 120 (2. 78%) and proliferative diabetic retinopathy in 116 (2. 68%) subjects. Amongst the 393 (9. 10%) subjects of hypertensive retinopathy, hypertensive retinopathy - grade 1 (was present in 130 (3. 01%), hypertensive retinopathy - grade 2 in 111 (2. 57%), hypertensive retinopathy - grade 3 in 131 (3. 03%) and hypertensive retinopathy - grade 4 in 21 (0. 49%) subjects. Of all the 660 (15. 27%) subjects of other retinal vascular disorders, branch retinal vein occlusion (BRVO) was present in 229 (5. 30%), central retinal vein occlusion (CRVO) in 55 (1. 27%), hemi central vein occlusion in 8 (0. 19%), central retinal artery occlusion (CRAO) in 20 (0. 46%), branch retinal artery occlusion in 4 (0. 09%), ocular ischaemic syndrome in 1 (0. 02%), retinopathy of prematurity in 9 (0. 21%), retinal artery macroaneurysm in 5 (0. 12%), juxtafoveal telangiectasia in 6 (0. 14%), anaemic retinopathy in 16 (0. 37%), leukemic retinopathy in 10 (0. 23%), preretinal haemorrhage in 52 (1. 20%), Coats disease in 8 (0. 19%), cilioretinal artery occlusion in

1 (0.02%), Eales disease in 10 (0.23%), vasculitis in 17 (0.39%) and clinically significant macular edema in 209 (4.83%) subjects.

• CONCLUSION: DR was the most common retinal vascular disorder. Retinal disorders appear to be a major public health problem in India. The present study shall help us in planning the management of such disorders in the hilly state of Himachal Pradesh to reduce the visual morbidity arising out of such disorders.

• KEYWORDS: Himachal Pradesh; retro/prospective; diabetic retinopathy

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INTRODUCTION

Vitreo-retinal diseases as a group are one of the more common ocular morbidities leading to blindness in the adult population, while being the most common cause of blindness worldwide in children. Population based studies reported an overall prevalence of vitreo-retinal disorders of 8.56%, with a range between 10.4% and 21.02% for the 40y and over age group. Diabetic retinopathy (DR) is the fifth leading cause of visual impairment and blindness globally, and is the most common cause of new cases of blindness among working aged adults in the developed world. In the developing world, which harbours almost 90% of the world's blind population, retinal diseases are among the leading cause of blindness after cataract. In Asia, vitreo-retinal diseases are becoming an increasing problem, with expectations that more than half of the world's diabetic patients will live in Asian countries by the year 2030[1].

Retinal disease has had a low priority in prevention of blindness programmes in developing countries mainly because retinal diseases were considered an uncommon cause of blindness in the developing world. Population-based surveys reported vitreoretinal disorders to be responsible for 8.56% and 12.7% in Iran and India respectively. According to the Pakistan National Survey for blindness and visual impairment done in year 2002-2003, posterior segment diseases accounted for 3.4% of total blindness and visual impairment[2].

Recently, there has been a significant increase in the burden of vitreoretinal disorders globally. In Nigeria, vitreo-retinal disorders constitute a significant cause of ocular morbidity and vision loss with reported hospital prevalence rates ranging from 4.5% to 13.0%. Elsewhere in Ethiopia, a 12.5% hospital prevalence of vitreoretinal disorders was reported whereas a population-based survey in Iran documented a prevalence of 8.56%[3].

The 1981 Nepal Blindness Survey estimated that there were 117 623 blind people in Nepal. The retinal diseases were found to be an important cause accounting for 3.3% of blindness. After the 1981 survey there have been several population based studies in Nepal that have reported the prevalence of blindness from retinal diseases within a range of 1% to 10.8%. Based on these studies, it has been reported that age related macular degeneration (AMD) and retinal detachment are the major causes of visual impairment[4].

Diabetes mellitus (DM) is one of the most common non-communicable disease with an increasing incidence worldwide. Recent estimates indicate that there were 171 million people throughout the world living with diabetes in the year 2000, and this number is projected to increase to 366 million by 2030, with the most significant increase occurring in developing countries. While most individuals affected with DM in developed countries are elderly, the majority of subjects in developing countries are younger (46-64 years of age), which intensifies the consequences of DM in these societies. DR is increasingly becoming a major cause of blindness throughout the world[5].

Nearly 80% of the considerable burden of blindness in India is attributed to curable causes, such as cataracts and refractive errors. A recent study found that retinal disorders are an important cause of blindness in India. It is estimated that there will be 244 million people (14.9% of the population) 65y and older by 2050 compared with 42 million (4.5% of the population) in 1995. This shift in demographics is likely to be accompanied by a shift in the prevalence of retinal diseases as major causes of blindness in India[6].

DR is a priority blinding disease and is now included in the disease control strategy of VISION 2020 initative. The estimated 57 million persons with diabetes in India by 2025 has implications for the National Programme for Control of Blindness in India. There is a high potential for vision loss in persons with diabetes, with approximately two thirds of persons having had vision loss after 35y of diabetes. Current treatment modalities are effective in preventing as much as 98% of vision loss and blindness due to severe retinopathy, if treatment is provided at the appropriate time[7]. A high rate of legal blindness among diabetics has been reported in the literature. One study estimates legal blindness is 50-80 times higher in people with diabetes. Among the 37 million blind people worldwide, 4.8% (1.3 million) suffer from DR[8]. The prevalence of diabetes and DR in developed and developing countries are high enough to become public health concerns[9].

Over the past 20y, eight population-based studies have been conducted in western countries using photographic evidence of DR. Their results have consistently suggested that the prevalence of DR is close to 28.7%[10]. The World Health Organization (WHO) has recommended its member countries to integrate a program approach for DR within their prevention of blindness programs. In industrialized countries, the magnitude of DR is high and it is the leading cause of blindness[11]. DR is a cause of visual disability although diabetic patients are not exempted from blindness from other eye diseases such as cataract and glaucoma[12].

DR is the most common complication of diabetes and the leading cause of blindness among working-age populations in the Western world. Screening and prompt treatment of DR are not top priorities in many regions of the world, because the

impacts of other causes of preventable blindness remain an issue. Ethnicity is a complex, independent risk factor for DR. Observations from white populations cannot be extrapolated fully to other ethnic groups. The prevalence of DR, sight-threatening DR, and clinically significant macular edema are higher in people of South Asian, African, Latin American, and indigenous tribal descent compared to the white population[13].

The aim of eliminating avoidable blindness due to diabetes in the eastern mediterranean region is also possible if care providers and patients work together and countries proactively apply a public health approach to DR[9]. The challenge posed to the eye care programme in India is underscored when one considers that approximately one fifth to one third of all persons with diabetes will have retinopathy - there may be approximately 11 - 20 million persons with DR by 2025 in India, including approximately 5.7 million people with severe retinopathy who require either laser or surgical intervention to preserve vision[7]. In this retro/prospective study of retinal diseases at a tertiary care facility of Shimla hills, we determined the pattern of retinal vascular disorders among the patients who reported for photographic evaluation.

SUBJECTS AND METHODS

Subject The present study was conducted in the Department of Ophthalmology, Indira Gandhi Medical College, Shimla. Shimla is the capital of Himachal Pradesh (HP) which has 12 districts. A total of 5600 subjects from all districts of HP visiting the fundus clinic of a tertiary care institute were evaluated during a period from August 2008 to April 2013. From these 5600 patients, 4323 subjects were taken as a sample. It is a retrospective and prospective study. We confirm adherence to the guidelines of the Declaration of Helsinki as well as Indira Gandhi Medical College Hospital ethics committee approval.

Methods In brief the present study involved 4323 subjects residing in HP (altitude ranging from 500-4500m above sea level). HP is a hilly terrain and has a very distinct population that is composed of ethnolinguistic groups of tribals and socials. Most of the natives belong to Aryan origin while the people of Lahaul and Spiti district are essentially descendants of Mongols. Patients coming from all districts of HP underwent visual acuity, refraction, slit lamp examination and pupil dilatation for detailed fundus evaluation. The diagnosis was confirmed from hospital records, fundus clinic records and evaluation of fundus photographic records retro-prospectively. Inclusion criteria included proper and complete records of the patient with clear fundus photographs and fluorescence fundus angiography (FFA) where as exclusion criteria included fundus photographs/FFA taken on fundus camera not clearly visible for making a diagnosis and patients presenting with opaque ocular media.

In all the subjects, ophthalmological examination was performed. Visual acuity was measured by using Snellen's chart, slit lamp biomicroscopy was done to assess the ocular adenexa and the anterior segment of eye using a slit lamp biomicroscope (Haag Striet-900), fundus examination was done by using the direct and indirect ophthalmoscope.

Fundus photographs were taken on the fundus camera (Kowa Fundus Camera VX-10, KOWA Company Ltd, 4-14, Nihonbashi-honcho 3-chome, Chuo-ku, Tokyo 103-8433 Japan). The subject was instructed to be seated in front of the fundus camera. Height of the optical bench was adjusted to let the chin on the chin rest and forehead on the forehead rest in a natural posture. The examined eyes were set at the eye level mark. Fundus camera was positioned such that the luminous spots for alignment can come in the centre and the luminous spot is smallest and sharpest. Then by pressing the shutter button for photographing, the images taken were displayed on the monitor.

Fluorescein angiography was performed by injecting a 6s bolus injection of 2-5 cc of sodium fluorescein into a vein in the arm or hand. A series of black-and-white or digital photographs were taken of the retina before and after the fluorescein reaches the retinal circulation (approximately 10s after injection). Photos were taken approximately once every second for about 20s, then less often. A delayed image was obtained at 5 and 10min. A filter was placed in the camera so only the fluorescent, yellow-green light (530 nm) was recorded.

Statistical Analysis Data collected was managed on an excel spreadsheet. Significance was determined by using percentage.

RESULTS

During the period fromAugust 2008 to April 2013, 5600 patients visiting the fundus clinic of the tertiary care institution were evaluated. From these 5600 patients, 4323 subjects were taken as a sample for the study. Since the study was aimed to find out the pattern of retinal vascular disorders, other retinal disorders were not included. Table 1 shows that of the total 4323 cases studied, there were more males 2563 (59.29%) than females 1760 (40.71%) with fundus diseases.

Table 2 depicts that out of the 525 (12.14%) DR subjects, mild non-proliferative diabetic retinopathy (M. NPDR) was present in 133 (3.08%), moderate non-proliferative diabetic retinopathy (MOD. NPDR) in 156 (3.60%), severe non-proliferative diabetic retinopathy (S. NPDR) in 120 (2.78%) and proliferative diabetic retinopathy (PDR) in 116 (2.68%) subjects.

Table 3 reveals that amongst the 393 (9.10%) subjects ofhypertensive retinopathy, hypertensive retinopathy-grade 1 (HRG 1) was present in 130 (3.01%), hypertensive retinopathy-grade 2 (HRG 2) in 111 (2.57%), hypertensive retinopathy-grade 3 (HRG 3) in 131 (3.03%) and hypertensive retinopathy-grade 4 (HRG 4) in 21 (0.49%) subjects.

It is to be noted that age, diabetes mellitus (DM), hypertension *etc*. are itself a risk factor for a number of retinal vascular disorders. Retinal vascular disorders like DR, hypertensive retinopathy, Arterial and veno-occlusive disorders were predominant in older age groups whereas Coats disease, vasculitis, retinopathy of prematurity (ROP) were encountered in the first decade of life. Table 4 shows that of all the 660 (15.27%) subjects of other retinal vascular disorders, branch retinal vein occlusion (BRVO) was present in 229 (5.30%), central retinal artery occlusion (CRAO)

Table 1 Gender distribution of cases

Gender	Total	Percentage (%)
M	2563	59.29
F	1760	40.71
Total	4323	100

Table 2 Diabetic retinopathy

Disease	Total	Percentage (%)
M. NPDR	133	3.08
MOD. NPDR	156	3.60
S. NPDR	120	2.78
PDR	116	2.68
Total diabetic retinopathy	525	12.14

Table 3 Hypertensive retinopathy

Disease	Total	Percentage (%)
HRG 1	130	3.01
HRG 2	111	2.57
HRG 3	131	3.03
HRG 4	21	0.49
Total hypertensive retinopathy	393	9.10

Table 4 Other retinal vascular disorders

Disease	Total	Percentage (%)
BRVO	229	5.30
CRAO	20	0.46
CRVO	55	1.27
BRAO	4	0.09
HCVO	8	0.19
OIS	1	0.02
ROP	9	0.21
RAM	5	0.12
JFT	6	0.14
AR	16	0.37
LR	10	0.23
PRH	52	1.20
Coats disease	8	0.19
CAO	1	0.02
Eale's diease	10	0.23
Vasculitis	17	0.39
CSME	209	4.83
Total other retinal vascular disorders	660	15.27

in 20 (0.46%), central retinal vein occlusion (CRVO) in 55 (1.27%), branch retinal artery occlusion (BRAO) in 4 (0.09%), HCVO in 8 (0.19%), ocular ischaemic syndrome (OIS) in 1 (0.02%), ROP in 9 (0.21%), retinal artery macroaneurysm (RAM) in 5 (0.12%), juxtafoveal telengectasia (JFT) in 6 (0.14%), anaemic retinopathy (AR) in 16 (0.37%), leukemic retinopathy (LR) in 10 (0.23%), preretinal haemorrhage (PRH) in 52 (1.20%), Coats disease in 8 (0.19%), cilioretinal artery occlusion (CAO) in 1 (0.02%), Eales disease in 10 (0.23%), vasculitis in 17 (0.39%) and clinically significant macular edema (CSME) in 209 (4.83%) subjects.

DISCUSSION

Though HP is a hilly terrain consisting of different districts, the different districts having different types of geographic and socioeconomic conditions. Most of the people depend upon agriculture as a source of income. There are many rural and backward areas. There is a diversity of culture, language, customs, food habits and way of life. Yet our study represents the patients residing in HP. This is the first fundus photograph based study to report the prevalence of vitreo-retinal disorders in HP. In the present study more number of male patients with fundus diseases was seen as compared to females. These results are similar to the studies carried out by[3,4,14,15].

The severity of DR was positively associated with patients age, years since DM diagnosis and HbA1c levels[16]. The difference in the previous study and our study may be due to size of the sample, methodology and age factor. MOD. NPDR was most common and PDR the least common among DR. DR was the most common retinal disease found in our study. These finding are consistent with a previous report[4] but differ with respect to bilateral visual impairement documented in a study[14]. The findings of our study are similar to those identified by[15,17]. The prevalence of DR in our study was 12.14% which is lower than that reported in China (43.1%)[18]. This difference may be due to size of the sample. The prevalence of DR was 18% in an urban population with diabetes mellitus in India. The duration of diabetes is the strongest predictor for DR[19]. Prevalence of DR was 6.3% among persons with diabetes who were screened for the first time; it was 9.3% among those rescreened. Patients with DR had a higher risk of blindness (vision less than 6/60) compared to those without DR[20].

The prevalence of DR was 17.6% among the self-reported rural population with diabetes[21]. The odd ratios (ORs) of DR among diabetic residing in an urban area was significantly higher than diabetics residing in rural areas. DR was associated to the duration of diabetes[8]. The rate of DR among patients with DM in capital of Yemen was 54.9%. The duration of diabetes was positively associated with the presence of DR[11]. The substantial differences in the reported prevalence of DR in previous studies and our study may be attributed to the differences in the study methodologies, population, or the differences in the mean age of the study cohort. For example, case selection, DR grading, detection methods may differ between studies. The variation in disease prevalence among these studies could be due to differences in the characteristics of subjects. The rate of M. NPDR, MOD. NPDR, S. NPDR and PDR in our study was 3.08%, 3.60%, 2.78%, 2.68% respectively and was lower than that (13.6%, 8%, 8.1%, 6.4%) reported in Saudi Arabia[22]. In our study, PDR was 2.68% which is lower than that reported in Yemen[11].

HRG 3 was the most common among hypertensive retinopathy. In our study, HRG retinopathy was common among the fundus disorders. The discrepancy between two other studies could be due to the size of the sample[4] and age range respectively[17].

Both the studies had similar findings in respect of hypertensive retinopathy[3]. In Chinese persons, while controlling for other systemic parameters, hypertension was associated with increased intraocular pressure, retinal microvascular abnormalities, and prevalence of retinal vein occlusion and DR[23]. In our study, association of hypertension with other retinal vascular disorders was not evaluated.

We found that prevalence of CRVO was lower than BRVO, which is consistent with previous findings[24,25]. On the basis of these data, an estimated 16.4 million adults are affected by retinal vein occlusion (RVO), with 2.5 million affected by CRVO and 13.9 million affected by BRVO[24]. The difference with another study was due to particular age group being not evaluated[4].

Across all the studies, the median (interquartile range) prevalence of any DR in known diabetes was 27.9% (22%–37%) and 10.5% (6%–16%) in newly diagnosed diabetes. Prevalence of DR was higher in developing countries[26]. The results of this study gave an insight into the pattern of retinal eye diseases. There is a tremendous impact of increasing retinal blindness secondary to retinal diseases especially DR in India. This entails the necessity for accessible comprehensive eye care services, establishment of human resources, screening and awareness of the disease and affordable eye health policy. It appears that in spite of proliferation of various levels of posterior segment service facilities within the country the number of attendance in retina clinic is on rise. The present study shall help us in planning the management of such disorders in the hilly state of HP to reduce the visual morbidity arising out of such disorders.

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