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The spectrum and burden of Vitreo-retinal diseases among ophthalmic out-patients in a tertiary care hospital: A retrospective study

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Abstract
Objective: To evaluate the spectrum and frequency of patients presenting with vitreo-retinal diseases at a tertiary care hospital in Gujarat.
Material and Methods: A total of 92922 patients were seen on OPD basis at the Department of Ophthalmology, GMERS Medical College, Gandhi Nagar, from 01 January 2018 to 31 December 2020. Their data was obtained from the OPD register. Demographic details, evaluation of vision with refraction, anterior segment slit lamp examination, dilated posterior segment slit lamp examination with 90 D lens, indirect ophthalmoscopy with 20 D lens were done. When needed ultrasound (B Scan), Fundus Fluorescein angiography and OCT examination were also done. Data was analysed for simple frequency and inter group differences were performed using the Chi-Square test.
Results: Out of the total OPD patients, 4952 patients had vitreo-retinal diseases. Diabetic retinopathy was the most common vitreo-retinal disease. Vision threatening DR was found in 884 patients having DR. Age related macular degeneration (ARMD) and Retinal Vascular occlusive diseases were the next common vitreo retinal diseases causing vision impairment. Co-existent DM and Hypertension were the most common associated systemic diseases. Hematological tests, OCT were the most commonly done investigations.
Conclusion: Diabetes is major factor contributing to blindness due to vitreo retinal diseases in the form of Diabetic Retinopathy and its association with retinal vessel occlusive disease. With the changing demographic in the coming years, this problem is going to increase. The time has now come to rise up to the situation and plan the establishment of human resources, early screening, timely management and awareness of the disease and to make it affordable and easily accessible to the community.

Keywords: Age related macular degeneration, diabetes, diabetic retinopathy, fundus fluorescein angiography

Introduction

As per the recent Rapid Assessment of Avoidable Blindness (RAAB) survey, 2014-2019 done by AIIMS in co-ordination with NPCB, the prevalence of blindness in India was 0.36%, of which 5.9% (age group >=50 yrs) were due to posterior segment complications-Diabetes, ARMD etc [1]. Of the causes of significant visual impairment in Indian, 3.7% population (age group >=50 yrs) had posterior segment complications. The prevalence of type 2 diabetes is increasing alarmingly worldwide [2]. As we all know India is known as the Diabetic capital of the world. Estimated about 69.2 million population was suffering with DM in 2015 in India, which is expected to increase to 123.5 million by 2025 [3]. Increasing duration of diabetes is the most important risk factor for the development of diabetic retinopathy (DR) [4]. DR related vision impairment can be prevented in 98% of cases, if screened early and treatment is started at appropriate time [5].
R.P. Centre for Ophthalmic Sciences, New Delhi conducted the National Diabetic Retinopathy Rapid Assessment of Avoidable Blindness (RAAB) Survey 2015–2019, recently, under the aegis of the Ministry of Health and Family Welfare, Government of India. It was found that the prevalence of Diabetes in India was 11.8% and among them, DR was present in 16.9%, which is a significantly high ratio [6]. There is a lack of an integrated DR screening and management program in India [7]. Currently, only opportunistic screening of DR in a high-risk population in India is relied upon by the National Program for Control of Blindness (NPCB) [8]. Paucity of knowledge among physicians about DR, lack of adequate infrastructure for DR screening, poor knowledge about

DR in the patients themselves and poor cross-referral to ophthalmologists are the major challenges that need adequate attention to ensure effective DR management in India as a whole [9, 10].

ARMD and retinal vessel occlusion are the other two retinal diseases causing visual impairment. The prevalence of ARMD in India as measured in the INDEYE study was -late ARMD 1.2%; early ARMD: grade 1 - 39.3%; grade 2 - 6.7% and grade 3 - 0.2% [11]. A study in Central India found the prevalence of early ARMD to be 6.1 to 8.3% and late ARMD to be around 0.2 to 0.6% depending upon age [12]. Prevalence of branch retinal vein occlusions was 0.66% ± 0.12% per subject and of central retinal vein occlusions was 0.11% ± 0.05% per subject in the Central India Eye and Medical study [13].

With increased life expectancy and better cataract services, retinal diseases such as ARMD and DR are coming up as important causes of blindness and will do so in the years to come. Similar studies done in Bhutan [14], Pakistan [15], Iran [16] and Korea [17] also highlight the same.

Materials and methods

Study design: This was a retrospective cross sectional case series study. Approved by the Ethics Committee at GMERS Medical College, Gandhi Nagar, Gujarat, and adhered to the principle of Declaration of Helsinki. Patient privacy was maintained by excluding names and hospital numbers from data analysis and manuscript preparation.

Setting: GMERS Medical College and General Hospital, Gandhi Nagar, Gujarat provides tertiary level care to Gandhi Nagar and surrounding regions as well as rural population of Ahmedabad, Mehsana, Sabarkantha, Aravalli and Kheda districts. All services are provided free of charge. In addition to cataract, speciality services like retina, glaucoma, cornea etc. are provided at the hospital.

Participants, clinical examination and data collection: A total number of 92922 patients visited the OPD at the Department of Ophthalmology from 01 January 2018 to 31 December 2020 as shown by the ophthalmic out-patient attendance register. The patients' demographic data were taken, including presenting complaints and their duration, Visual acuity as per Snellens' chart or tumbling E chart, medical or surgical treatments received before presenting to the hospital and associated systemic diseases with their duration.

Intraocular pressure was measured by Goldman applanation tonometry and anterior and posterior segments were examined under slit lamp bio-microscopy and 90 D double aspheric lens. Fundus findings were confirmed by Binocular Indirect Ophthalmoscopy using a 20 D double aspheric lens. In patients where it was necessary, OCT, fundus photography and/or FFA (Fundus Fluorescein Angiography) were performed.

Diabetic retinopathy (DR) was classified as per the modified Airlie House or Abbreviated ETDRS classification [18, 19]. Clinically significant macular edema (CSME) was defined as: 1) retinal oedema at or within 500 µm of the centre of the macula; 2) hard exudates at or within 500 µm of the centre of the macula if associated with retinal thickening (including outside 500 µm); 3) retinal thickening of one disc diameter (1500 µm) or larger, any part of which is within one disc diameter of the centre of the macula [20]. Age-related macular degeneration (AMD) was classified by the clinical Classification of Age-related Macular Degeneration method [21]. Hypertensive retinopathy (HTR) was graded using the Keith-Wagener-Barker classification system [18].

Data was entered and analysed for simple frequency using SPSS version 16.0. Tests for significant inter group differences were performed using the chi square test with a $p<0.001$ considered statistically significant.

Result

A total of 92922 new patients visited GMERS Medical College, Gandhi Nagar, from 01 January 2018 to 31 December 2020, of which 4952 (5.33%) were registered in the retina clinic. Out of these 4952 patients of the retina clinic, 3120 (63%) were males while 1832 (37%) were females. Out of 4952 patients 1931 (39%) had monocular involvement while rest of the 3021 (61%) patients had bilateral involvement. 1047 patients had more than 1 retinal disease?

Distribution of different diseases that led to registration in the retina clinic is shown in (Table 1).Diabetic retinopathy (DR) was the most common retinal disease.2218 (44.8%) patients registered in the retina clinic were having DR. Out of 2218 (44.8%) patients having diabetic retinopathy, 754 (34% of total DR) patients had clinically significant macular edema (CSME) and 130 (5.9%) patients had advanced diabetic eye disease (ADED). Table 2 gives the relative frequency of different types of diabetic retinopathy. Of the total 754 patients with CSME, 322 (14.5%) patients had bilateral clinically significant edema while 432 (19.5%) had unilateral clinically significant edema.

Table 1: Frequency of different types of retinal diseases

Retinal Disease	No. of patients	Unilateral	Bilateral
Diabetic Retinopathy	2218	531	1687
ARMD	957	119	838
High Myopia	579	42	537
BRVO	541	532	9
CRVO	353	341	12
Hypertensive Retinopathy	296	0	296
Cystoid Macular Edema	197	181	16
ERM / VMT	143	57	86
Retinal Dystrophies	142	0	142
Dislocated/Subluxated cataract or IOL	115	96	19
Vitreous Haemorrhage	94	88	6
Vasculitis	87	48	39
Macular Hole	73	61	12
Retinal Detachment (RRD)	71	67	4
Central serous chorio-retinopathy	49	46	3
Retinitis Pigmentosa	31	0	31
Branch/central retinal artery occlusion	19	19	0
Endophthalmitis	8	8	0
Others	69	69	0

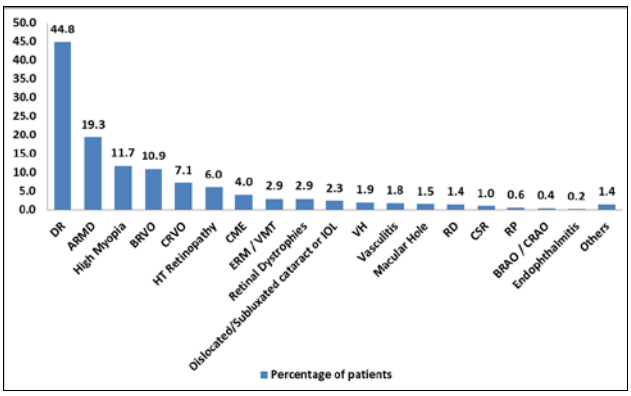

Fig 1: Shows in percentage of patients

Table 2: Frequency of different types of Diabetic retinopathy

Type of Retinopathy	No of patients	Percentage (among DR)
Unilateral NPDR	531	23.9%
Bilateral NPDR	1036	46.7%
NPDR + PDR	248	11.2%
Bilateral PDR	273	12.3%
NPDR + ADED	63	2.8%
PDR + ADED	56	2.5%
Bilateral ADED	11	0.5%

Table 3: Frequency of CSME among patients having Diabetic retinopathy

Type of macula involvement	No of patients	Percentage (among DR)
Bilateral CSME	322	14.5%
Unilateral CSME	432	19.5%
No CSME	1464	66%

Table 4: Frequency of different types of ARMD

Type of ARMD	No of eyes
Early	1542
Intermediate	152
Late	101
Total	1795

Discussion

The retinal disease pattern noted at GMERS Medical College, Gandhinagar is comparable to those noted at other institutions of the developing world. With improvement in cataract surgical outcomes, vitreo-retinal diseases have become emerging causes of blindness in recent years, along with Glaucoma.

Table 5: Comparing prevalence of vitreo-retinal disease in OPD in various studies:

Region	Prevalence of Vitreo retinal disease in OPD
Gandhinagar, Gujarat	5.33
South-Eastern Nigeria(22)	3.9
Addis Abbaba, Ethiopia(23)	12.5
Ile Ife, Nigeria(24)	13
Kuala Lumpur, Malaysia(25)	12
Karachi, Pakistan(15)	13.4

One of the factors affecting our Study may be that the Retina Unit became fully functional only in Mid-2018. With the passing of years, gradually the number of retina patients being seen at the department has increased.

Diabetic retinopathy was the most common cause for visiting the retina clinic. Of the total number of retina patients, 44.7% has some form of diabetic retinopathy. Out of 2218 total patients having Diabetic Retinopathy, 198 cases were not knowing that they were suffering from Diabetes, i.e., they were first time diagnosed cases. The rest 2200 patients were known cases of Diabetes. Even among the known cases of Diabetes, 867 patients did not have a single screening for DR. Vision threatening DR was found in 884 patients. There is a lack of awareness of the effects of Diabetic retinopathy and how early detection can prevent visual disability in the medical system. The patients and even sometimes the treating general practitioners / physicians do not give adequate importance to DR screening, and thus when the patient finally arrives after having visual deterioration, it is sometimes too late to prevent visual disability.

One of the factors for patient apathy may be the time-consuming and labourious nature of retinal examination-starting from time required for dilatation of pupils, slit lamp bio-microscopy, indirect ophthalmoscopy, OCT and FFA when required. Also there is need of an attendant with the patient, thus causing loss of productive time to both the patients and attendants. New emerging technologies for undiluted fundus examination with rapid Artificial intelligence guided diagnosis will surely help in this regard.

Just as an estimate- with the total population of Gandhi Nagar district being nearly 15,00,000 as per 2020/2021 estimate and the estimated prevalence of DM in India ranging from 5% to 17%, at least 1,50,000 persons need to be screened once a year for DR. That is equivalent to screening 400 persons in a day. Screening at this level would be only possible if there is adequate manpower, infrastructure and advanced instruments to serve the purpose.

Our findings are similar to Nepal eye hospital study where diabetic related conditions were most common cause for visiting the retina OPD. In Malaysia and Nigeria diabetic retinopathy accounted for 9.7% and 9.6% retinal diseases respectively.

Age Related Macular Degeneration (ARMD) was the second most common retinal pathology in the presenting patients. Large scale estimation of the prevalence of ARMD has not been done in India. As per a South India study, the prevalence of any type of ARMD was found to be between6.1% and 9%. With availability of OCT to diagnose cases early and prompt treatment with Anti-VEGF agents, significant visual disability due to wet ARMD can be prevented. In our study, ARMD was present in 957 patients (19.3%) presenting to the Retina Clinic. Of these 957 patients, 101 patients presented with Late ARMD. ARMD accounted for 9.3% of retinal diseases in Karachi [15]. The prevalence of ARMS in Ethiopia as per a study was 2.7%. The age adjusted prevalence of ARMD was 4.72% in Sri Lanka [26]. Thus there is an increased prevalence of ARMD as seen in our study as compared to the studies of other countries.

71 patients presenting to the retina clinic has Rhegmatogenous Retinal detachment in this study, which accounts for 1.43% of the total 4952 patients. Compared to our study, RRD was presenting feature in7% of patients in Nepal and 12% of patients in Malaysia [24, 25]. In Ethiopia retinal detachment accounted for the second largest group (24.5%) of diseases.[23] In Karachi, 20.6% of patients presenting at a tertiary eye care facility had RRD [15]. Retinal detachment surgeries with restoration of useful vision are successful. Improvements in the capacity to detect and effectively manage retinal detachment will prevent blindness in these economically viable age groups.

Prevention of avoidable blindness due to posterior segment diseases has many aspects – general awareness of DR and ARMD, screening, early diagnosis and treatment, availability of Anti Vegf injections, Laser therapy and vitreo-retinal surgeries. With cataract surgery rates improving, posterior segment diseases and glaucoma are set to be two important factors for prevention of avoidable blindness. Adequate planning and work needs to be done in this regard.

The results of this study gave an insight into the pattern of retinal eye diseases seen in a tertiary centre in Gandhinagar. However in order to generalize the results it is necessary to conduct a larger multi-centre study or a population based study.

Conclusion

With improvement in cataract surgical rates, proportion of

blindness secondary to retinal diseases, especially DR is set to increase inIndia. In our study, Diabetic retinopathy was the most common vitreo-retinal disease. Out of 2218 total patients having Diabetic Retinopathy, 198 cases were first time diagnosed cases. Among the known cases of Diabetes, 867 patients did not have a single screening for DR. Vision threatening DR (presence of proliferative diabetic retinopathy and/or CSME) was found in 884 patients. Effective infrastructure and man-power needs to be established to efficiently handle all aspects of patient care-awareness drives, screening, early diagnosis and proper management. Age related macular degeneration (ARMD) and Retinal Vascular occlusive diseases were the next common vitreo-retinal diseases causing vision impairment. The treatment of retinal diseases on a whole is costly and is difficult for the average person to afford. This entails the necessity of an affordable eye health policy which will be of benefit to the community at large.

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