To Evaluate the Demographic Profile And Subtypes of Glaucoma of Patients In a Tertiary Hospital in North India.

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Abstract: *Purpose: To evaluate the demographic profile and subtypes of glaucoma*
Material Andmethods: *A prospective study of randomly selected 250 patients with a suspicion of glaucoma were taken up for the study. Their demographic data and clinical findings were tabulated and analyzed.* ***Observations:*** *Out of 250 patients, 128 (51.2%) were males and 122 (48.8%) females. PACG (34.80%) was the most common followed by Glaucoma Suspects (24 %), POAG (22 %) secondary glaucoma(15.60%), CG/DG (2%), JOAG(1.2%) and NTG(0.4%) In the POAG group, M:F was 1.39:1 whereas in PACG it was 0.93:1. POAG suspects ,Congenital glaucoma, JOAG and secondary glaucoma had male predominance but latent ACG had female dominance. The mean age at presentation was 56.908±8.934 and 60.8±9.105 years for PACG and POAG respectively. 60.8% of the patients were from urban populace whereas 39.2% from the rural areas.The most common causes of secondary glaucomas were lens-induced (23.07%), pseudoexfoliation (17.94%) (PXE) and uveitic glaucomas (15.38%). CONCLUSION: Out of primary glaucomas,the most common subtype was PACG, CACG being the most dominant followed by Glaucoma suspects and POAG. Glaucoma being a silent killer of vision, it's routine screening is highly recommended for early detection and timely management to decrease the worldwide burden of preventable blindness.*
Keywords: *Glaucoma, subtypes, narrow angle glaucoma, open angle glaucoma,*

I. Introduction

Glaucoma ,a multifactorial optic neuropathy is a leading cause of irreversible global blindness with approximately half of them in Asia . The worldwide burden is expected to increase from 16.5 million in 2010 to 79.6 million by 2020,of which 74% will have open angle glaucoma(OAG) . 55% of OAG and 70% of angle[1] closure glaucoma (ACG) are expected to be females. India has over 1 billion population and has massive bur-[2] den of visual impairment. Prevalence of glaucoma varies with age,sex,geographical location and racial differ-[3-6] ences.   Studies from USA,Europe,Korea have shown higher prevalence rates of primary open angle glaucoma[6,7] (POAG) than primary angle closure glaucoma(PACG).   However various population based studies from India[2,8-10] and China have found PACG more prevalent than POAG. .   Higher prevalence of POAG and PACG has[2,10-13,19-21] been reported in urban population than rural in studies conducted in South India.   The purpose of the present study was to determine the clinical profile of glaucoma patients attending regional institute of Ophthalmology ,Amritsar and to differentiate them into various subtypes of the disease

II. Material And Methods

A prospective study of randomly selected 250 patients of all ages and both sexes with a suspicion of glaucoma attending the Outpatient Department of Ophthalmology, Government Medical College, Amritsar were taken up for the study. After obtaining an informed consent,detailed history was taken and each selected case was subjected to a comprehensive eye examination, Goldmann applanation, tonometry, direct ophthalmoscopy, slit-lamp biomicroscopy with 90 D lens, gonioscopy with a three mirror goniolens and perimetry on the Humphrey visual Field analyser. Patients with occludable angle, Intraocular pressure > 21 mm of Hg on two or more

separate occasions and/or optic disc changes suggestive of glaucoma and/or visual field changes were included in the study. Patients already registered and on treatment were excluded from the study. All participants were classified into the following groups: congenital glaucoma(CG),juvenile glaucoma(JG), POAG , PACG, ocular hypertension (OHT), normotensive glaucoma(NTG), Glaucoma suspect and secondary glaucoma . The data was compiled and statistically analyzed.

Observations

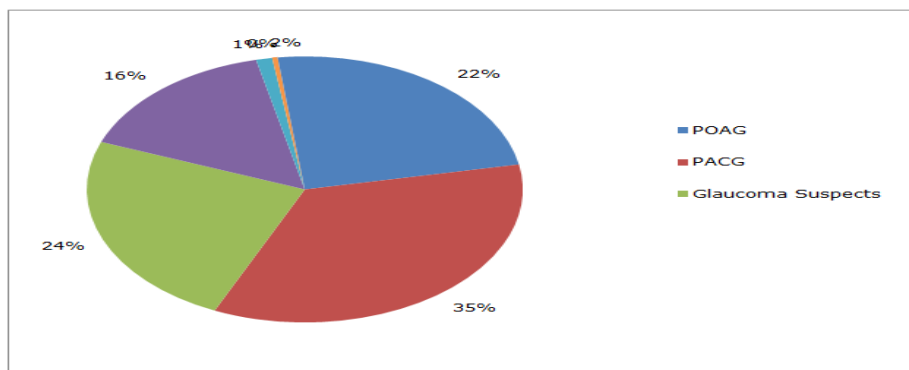| TABLE 1. DISTRIBUTION AND SUBTYPES OF GLAUCOMA (N=250 PATIENTS)		
Primary Angle Closure Glaucoma	87	34.80 percent
Primary Open Angle Glaucoma	55	22.00 percent
Juvenile Open Angle Glaucoma	3	1.20 percent
Developmental/Childhood Glaucomas	5	2.00 percent
Normal Tension Glaucoma	1	0.40 percent
Secondary Glaucomas	39	15.60 percent
Glaucoma Suspects/at risk patients (includes Ocular hypertensives, POAG suspects, JOAG suspects, latent ACG etc.)	60	24 percent

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FIG 1 : Distribution of subtypes of Glaucoma in %

TABLE 2. Age Distribution Of Glaucoma In The Study								
AGE (yrs)	POAG	PACG	SECONDARY GLAUCOMA	DEVELOPMENTAL GLAUCOMA	JOAG	GLAUCOMA SUSPECTS	NTG	TOTAL
< 10	-	-	-	2	-	-	-	2
11-20	-	-	-	2	1	-	-	3
21-30	-	-	2	1	1	2	-	6
31-40	-	1	2	-	1	9	-	13
41-50	10	21	9	-	-	23	-	63
51-60	18	28	12	-	-	20	-	78
> 60	27	37	14	-	-	6	1	85

TABLE 3 DEMOGRAPHIC DISTRIBUTION OF PATIENTS		
	MALE	FEMALE
PRIMARY ANGLE CLOSURE GLAUCOMA	42	45
PRIMARY OPEN ANGLE GLAUCOMA	32	23
JUVENILE OPEN ANGLE GLAUCOMA	03	00

DEVELOPMENTAL/CHILDHOOD GLAUCOMA	04	01
NORMAL TENSION GLAUCOMA	01	00
SECONDARY GLAUCOMAS	21	18
GLAUCOMA SUSPECTS	25	35
TOTAL	128	122

TABLE 4 DEMOGRAPHIC DISTRIBUTION OF PATIENTS

	RURAL	URBAN
PRIMARY ANGLE CLOSURE GLAUCOMA	34	53
PRIMARY OPEN ANGLE GLAUCOMA	20	35
JUVENILE OPEN ANGLE GLAUCOMA	02	01
DEVELOPMEN-TAL/CHILDHOOD GLAUCO-MAS	04	01
NORMAL TENSION GLAUCO-MA	01	00
SECONDARY GLAUCOMAS	17	22
GLAUCOMA SUSPECTS	20	40
TOTAL	98	152

TABLE 5. DISTRIBUTION OF PRIMARY ANGLE CLOSURE SUBTYPES

	MALE	FEMALE	TOTAL
Acute ACG	7	12	19
Intermittent ACG	5	5	10
Chronic ACG	30	28	58
TOTAL	42	45	87

TABLE 6. GENDER WISE DISTRIBUTION OF POAG AND PACG

	MALE	FEMALE	M:F RATIO
POAG	32	23	1.39:1
PACG	42	45	0.93:1

TABLE 7. DISTRIBUTION OF SECONDARY GLAUCOMAS

	MALE	FEMALE	TOTAL
Aphakic/Pseudophakic Glauco-ma	2	0	2
Adherent Leucoma	1	1	2

Pseudoexfoliation Glaucoma	3	4	7
Pigmentary Glaucoma	2	0	2
Uveitic Glaucoma	3	3	6
Trauma	2	1	3
Neovascular Glaucoma	2	1	3
Steroid Induced	1	3	4
Lens Induced	5	4	9
Keratoplasty	1	0	1
TOTAL	22	17	39

TABLE 8 SUBTYPES OF GLAUCOMA SUSPECTS IN THE STUDY	
PRIMARY OPEN ANGLE GLAUCOMA SUSPECT	29
JUVENILE OPEN ANGLE GLAUCOMA SUSPECT	08
LATENT ANGLE CLOSURE SUSPECT	22
OCULAR HYPERTENSION	1
TOTAL	60
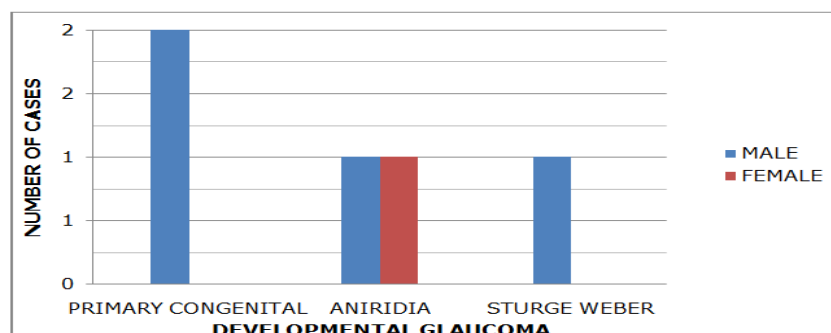
III. Discussion

Glaucoma is a major public health problem and the second leading cause of blindness in the world. The worldwide burden is expected to increase to 79.6 billion by 2020.[1]The regional burden of glaucoma in India was reported to be 23.5% of the global blindness with an estimated 5.8 million people affected.[2] The study of clinical profile and subtypes of the various glaucomasaims to help in the screening and early detection of the disease . In our study, out of a total of 250 patients, 128 (51.2%) were malesand 122 (48.8%) females. PACG (34.80%) was the most common subtype of the disease, followed by Glaucoma Suspects (24 %), POAG (22 %) secondary glaucoma(15.60%), CG/DG (2%), JOAG(1.2%) and the least common was NTG(0.4%) In the POAG group, M:F was 1.39:1 where as in PACG it was 0.93:1. POAG suspects also showed male dominance (M:F 1.42:1) butlatent ACG had a female dominance with double the number of cases in comparison to the male gender. Congenital glaucoma, Juvenile Open Angle Glaucoma (JOAG)and secondary glaucoma also had male predominance. The lone ocular hypertensive patient was a female. Das found male predominance in chronic angle closure glaucoma (CACG) and POAG (M:F as 1.35:1) whereas females showed predominance in the acute and intermittent subtypes of ACG.[15] Results matched our study where CACG had a male predominance , intermittent ACG had an equal gender distribution and acute PACG showed a female dominance (12 cases, 63.15%). Meta analysis conducted on twenty-nine population -based studies in adult Asians also found M:F in PACG prevalence as 1:1.5.[16] S.A. Al Obeidan et al in 2011 observed female predominance in PACG and male dominance in POAG in their study in Saudi Arabia.[17]In a study conducted by Martin, the average age of presentation of POAG in Caucasians was 69.1 years.[18]whereas in the present study, the mean age in years at presentation was 56.908±8.934 years for PACG and for POAG) was 60.8±9.105 years. This could indicate that glaucoma proba-

bly occurs almost a decade earlier in Indians as compared to Caucasians. In a study in north India, Das observed a mean age of presentation for POAG (60.54 years) and for PACG (55.13 years) similar to our study.[15] In other prevalence studies namely the Andhra Pradesh Eye Diseases Study (APEDS) rare.[19], the Chennai Glaucoma Study (CGS) rare.[20] the Aravind Comprehensive Eye Survey (ACES).[21], the Vellore Eye Study (VES).[11] the West Bengal Glaucoma Study (WBGS),and The Central India Eye and Medical Study.[13] increasing age and higher IOP was a consistent risk factor for glaucoma.

60.8% of the patients in our study were from urbanpopulace and 39.2% from the rural areas. Similar results were found by Lingam Vijaya et al (2008),APEDS by Chandrasekhar et al (2010) and Francis AW et al in 2014.[19,20,22]

A study conducted by Congdon reported that in Caucasian races, POAG accounted for 75-95% of the primary glaucomas.[23] Quigley also corroborated that POAG was the most common form of glaucoma in many countries and accounted for 60-70% of the cases in the United States.[8] In contrast to the studies in the western world in our study, PACG(34.80%) was the most common subtype of the disease, followed by Glaucoma Suspects (24 %) and POAG (22 %). The POAG to PACG ratio was 39:61 in our study. Our study was supported byDas who reported Glaucoma suspects (after PACG) as being the second most predominant category of glaucomas (29.94%) with POAG suspects forming the major subtype[15].Gupta (1975) and Sihota(1998) also reported a significantly high incidence of angle closure glaucoma (ACG) in India (almost half of all adult primary glaucomas seen.)[24,25]Jacob et al in Vellore found that prevalence of PACG, ocular hypertension and POAG was 43.2 (30.14-56.3), 30.8 (19.8-41.9) and 4.1 (0.08- 8.1), per 1,000, respectively.[11]whereas various studies in Singapore on different Asian populations found POAG to be the dominant glaucoma.[26-28] . In contrary to our study Ramakrishnan R et al in 2004in South India and Nangia V et al in 2013 in central India also concluded that ratio of POAG to PACG was 3.4:1 and 7.7:1 respectively[12,13]

Our study was supported by Obeidan SA et al in Saudi Arabia who found that PACG was the most common type (46.6%) followed by (PAC) (17.2%), secondary glaucoma (13%) and (POAG) (12.8%) ,NTG (5.9%),CG(2.6%), and JOAG (1.9%).[17] In Pakistan Mahar PS et al found that POAG was the commonest glaucoma followed by CACG where asRizvi et al and Barbar et al found CACG more common than POAG Barber et al[29-31]In our study, out of 87 cases (35%) of the most prevalent PACG group ,majority had CACG (58) followed by acute ACG(19) and then intermittent ACG(10). Sihota reported that PACGconstituted 45.9% of total primary adult Glaucomas in his study and CACG was the most common sub type(44%),31,2% had intermittent and 24.8% had acute PACG.[25]

Quigley estimated that 6 million people in the world have secondary glaucoma compared to 67 million with the primary glaucomas.[1] In the present study, secondary glaucomas accounted for 15.6 % of the total number of cases. The three most common secondary glaucomas were lens-induced (23.07%), pseudoexfoliation (17.94%) (PXE) and uveitic glaucomas (15.38%). In a study by Das et al in North India secondary glaucomas accounted for 6.72% and the three common causes were glaucoma secondary to adherent leucoma, aphakia or pseudophakia and trauma.[15] Rashid in his study in Kashmir reported Pseudoexfoliation (40.25%) as the most important cause of secondary glaucoma followed by steroid-induced (3.25%), traumatic (2%), neovascular (1.5%) and phacomorphic glaucoma (1%)[32]The population-based Aravind comprehensive eye survey from south India reported incidence of secondary glaucomas in 0.7% cases, S.A. Al Obeidan et al in 13%，Mahar PS et al in 22,8% Barbar et al in 36.1% and pseudo exfoliation was the dominant cause in all .[17,21,29,31]

CG/DG constituted 2% (5 cases) with primary congenital glaucoma (PCG) being the predominant. It is difficult to form an opinion on the incidence of congenital glaucomas on the basis of such a low number of cases. One child each had Aniridia and Sturge Weber syndrome The British Infantile and Childhood Glaucoma (BIG) Eye Study reported primary congenital glaucoma to be the major subtype of congenital glaucoma (45.45%) with South Asian children at major risk.[33] The incidence was 1 in 3300 in Andhra Pradesh andaccounts for 4.2% of all childhood blindness.[34]In our study, Juvenile Open Angle Glaucoma accounted for 1.2% of all cases with all three cases being males and a mean age at presentation of 28.33±8.50 years. Das described a male predominance and a mean age at presentation of 29.16.[15] OH and NTG both contributed one patient each to our study (0.4%). Das also reported NTG to be relatively rare.[15] But higher prevalence was reported in 2011 in Saudi Arabia by Obeidan SA et al.(5.9%)[17] and in Korea by Ji Hyun Kim in 2011(94.4% of POAG) and Lee et al in 1993.[7,35] The Tajima Study, in Japan, described a greater prevalence of NTG (3.9%) in Japan as compared to other Asian and Caucasian societies.[36]

IV. Conclusions

Primary glaucomas were the most prevalent type of glaucomas in our study and commonest amongst them was PACG followed closely by Glaucoma suspects and POAG. Age and raised IOP were the established risk factors. PACG was seen more common in females whereas POAG and CACG more in males . Urban population had higher prevalence of all types of glaucoma than rural . Early detection and management is the key to decrease the global burden of blindness from preventable cause of glaucoma.

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