EPIDEMIOLOGY AND CAUSES OF OPTIC ATROPHY IN GENERAL OUTPATIENT DEPARTMENT OF LUMBINI EYE INSTITUTE

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ABSTRACT

INTRODUCTION: Optic atrophy is usually applied to the condition of the disc following degeneration of the optic nerve. The present study was done to explore the epidemiology and causes of optic atrophy.

MATERIAL AND METHODS: A cross-sectional study of 100 cases of optic atrophy patients with convenience sampling was conducted from 1 July 2012 to 23 September 2012. Clinical history was taken including demography. Visual acuity was taken, pupillary reaction tested and posterior segment examined. Optic atrophy was diagnosed by optic disc examination with slit lamp bio-microscopy with aid of 90D lens. Disc pallor with diminution of vision was used as parameter to diagnose optic atrophy.

RESULTS: Out of 100 patients, male were 54%. It was bilateral in 26%. The mean age was 53.6 years (+/-18.11 yrs SD). The highest occurrence was seen in 61-70 yrs age range. Glaucoma was the most common cause of optic atrophy involving 58%. Out of 42% non-glaucomatous optic atrophy, 55% manifested primary optic atrophy, 38% secondary optic atrophy and 7% consecutive optic atrophy. The non-glaucomatous causes were trauma, optic neuritis, central retinal vein occlusion, intracranial space occupying lesions, papilloedema and in nine cases cause was unknown. Socially blind patients comprised of 37%.

CONCLUSION: Optic atrophy was nearly equal in occurrence in both male and female and common above 4th decade of life. Glaucoma was commonest cause. Non-glaucomatous optic atrophy was also not uncommon and several causal factors should be considered.

KEYWORDS: Blindness; Causes; Optic atrophy

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INTRODUCTION

Optic atrophy is usually applied to the condition of the disc following degeneration of the optic nerve. Optic atrophy is the end result of various lesions of the visual pathways from ganglion cell layer to the lateral geniculate body.[1] Optic atrophy can be congenital and acquired type. Among acquired causes, there can be different underlying pathology. The treatment of optic atrophy is not effective of any cause and the prognosis depends on the possibility of early control of the causal factor.
The objective of this study is to review cases presenting with optic atrophy with a view to identify epidemiology and causes.

MATERIAL AND METHODS

A cross-sectional study was done in general OPD of Lumbini Eye Institute, from 1 July 2012 to 23 September 2012. During this period, 100 patients with optic atrophy were documented by convenience sampling method. Ethical approval was obtained from institutional academic committee. Informed consent was taken from each patient.
The exclusion criteria was optic atrophy of congenital causes and inclusion criteria was all other optic atrophy patients presenting in general ophthalmology OPD. Optic atrophy related with glaucoma was also included as in general OPD both glaucoma and non-glaucoma related cases presented.
Non-glaucomatous optic atrophy was classified according to the disc picture as;

1. *Primary optic atrophy:* These patients had disc pallor involving the entire disc extending up to the disc margin with well defined borders of the optic disc. The lamina cribrosa were seen more clearly.

2. *Secondary optic atrophy:* These patients had pallor of the disc with evidence of past or present exudation, including obstruction of the physiological cup, irregularity and distortion of the neuro-retinal rim, no clear picture of the lamina cribrosa.

3. *Consecutive optic atrophy:* These patients had waxy disc pallor with evidence of inflammatory and degenerative changes in the chorio-retinal tissues.

Specially designed proforma was filled for each patient. History was taken including demography, positive and relevant negative history related to our study. The history of risk factors leading to optic atrophy were documented; the history of trauma (head and eye), glaucoma, optic neuritis, use of drugs like anti-tubercular drugs, any neurological problems (intracranial space occupying lesions) or head surgery, history of systemic diseases like hypertension, diabetes mellitus and thyroid eye disease, ocular posterior segment diseses like central retinal vein occlusion, hypertensive retinopathy, history of cerebro-vascular accident, history of pregnancy induced hypertension.

Visual acuity was taken first unaided and then with refraction. Anterior segment examination was done with Haag Streit slit lamp. Pupillary reaction was tested by swinging flash light test. Posterior segment examination was done with the help of 90 D lens. Intraocular pressure and blood pressure were recorded. Color vision and contrast sensitivity tests were performed in visually possible patients. Fundus photo of different types of optic atrophy were taken for documentation. Whenever required and possible, patients were investigated with magnetic resonance imaging in order to rule out intracranial space occupying lesion (ICSOL).
Disc pallor with diminution of vision was used as parameter to diagnose optic atrophy. Data were entered in Statistical Package for Social Sciences (SPSS) version 16. Results were interpreted in frequency and percentages.

RESULTS

In present study, out of 100 patients, 54% (54) were males and 46% (46) females. The disease was bilateral in 26% (26) patients whereas 74% (74) patients presented with unilateral manifestations. In unilateral cases, right and left eyes were involved in 39% and 35% respectively.

The mean age was 53.6 yr (+/-18.11 yrs SD) with minimum age of 14 yrs and maximum of 90 yrs. Above 40 yrs of age, there were 74% (74) patients. The highest occurrence was seen in 61-70 yrs age range followed by 51-60 yrs (Table 1).

Table 1: Age and sex distribution of patients with optic atrophy

Age range	Sex		Total
	Male	Female	
11-20	5	0	5
21-30	6	7	13
31-40	4	4	8
41-50	5	10	15
51-60	14	8	22
61-70	12	13	25
71-80	6	4	10
>80	2	0	2
Total	**54**	**46**	**100**

In 91% cases some etiological factors were present and in 9% of the cases no cause could be found. Glaucoma was the most common cause of optic atrophy involving 58% (58) cases. Out of these 58 cases 93.1% were above 40 years of age. The non-glaucomatous cause of optic atrophy comprised of 42 cases (42%). Ocular trauma and head injury comprised 13% (13) cases. Optic neuritis was cause in 3% (3) cases, 5% (5) cases were due to central retinal vein occlusion. ICSOL (acoustic neuroma, pituitary macroadenoma) was cause in 4% (4) cases. Chronic Papilloedema related cases were 4% (4), and one case was of the chronic alcoholic patient. Myopia, age related macular degeneration and retinitis pigmentosa was associated with one case each comprising 3% (3) in total (Table 2).

Table 2: Cause of optic atrophy

Cause	Frequency	Percent (%)
GOA	58	58
Trauma	13	13
Unknown	9	9
Vascular	5	5
ICSOL	4	4
Papilloedema	4	4
Optic neuritis	3	3
Others	3	3
Alcohol	1	1
Total	**100**	**100**

GOA=glaucomatous optic atrophy, ICSOL=intracranial space occupying lesion
Unknown=where no cause could be found
Vascular=old central retinal vein occlusion
Others=myopia, age related macular degeneration and retinitis pigmentosa

The non-glaucomatous cause of optic atrophy comprised of 42 cases (42%). The disease manifested as primary optic atrophy in 23 patients (55%) which included trauma, retrobulbar neuritis, unknown and alcoholic patients. Secondary optic atrophy in 16 patients (38%) included vascular diseases, ICSOL, papilloedema, unknown and paillitis. Consecutive optic atrophy in 3 cases (7%) which included myopia, ARMD and RP (Figure 1).

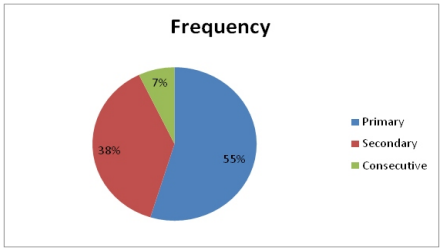

Figure 1: Optic atrophy

Table 3: Visual acuity of right eye with optic atrophy

Best corrected visual acuity	Frequency	Percent (%)
6/6-6/18	1	1.53
<6/18-6/60	6	9.23
<6/60-3/60	7	10.76
<3/60-1/60	20	30.76
HM	10	15.38
PL	9	13.84
NPL	12	18.46
Total	**65**	**100**

HM=hand movement, PL=perception of light, NPL=no perception of light

Table 4: Visual acuity of left eye with optic atrophy

Best corrected visual acuity	Frequency	Percent (%)
6/6-6/18	0	0
<6/18-6/60	3	4.91
<6/60-3/60	3	4.91
<3/60-1/60	15	24.59
HM	13	21.31
PL	19	31.14
NPL	8	13.11
Total	**61**	**100**

Best corrected visual acuity for right eye was <3/60 in 78.48% (Table 3) and for left eye in 90.18% (Table 4). The result showed 37% patients had best corrected visual acuity in better eye <3/60 and were socially blind.

DISCUSSION

In our study 54% were male and 46% female. It was similar to the study done in Nigeria [2] where 52.5% male and 47.5% female was found. But in one study done in Singapore [3] there was 75% male and 25% female. In the study done in India[1,] 66% were male and 34% female. In the study done by Oluleye et al. [4] male:female ratio was 2:1. Our study showed optic atrophy does not have sex predisposition.

The involvement of right eye was in 39%, left eye 35% and bilateral in 26%. It was similar to the study done by Chinyere et al.[2] 22.2% bilateral and 87.8% unilateral but dissimilar to the study done by Chaddah et al.[1] in which 72% bilateral, 14% right eye and 14% left eye involvement. The optic atrophy was bilateral in 80% and unilateral in 20% in study done by Oluleye T.S et al.[4] Our study showed optic atrophy had no predisposition of any eyes but unilateral involvement is common.

The highest frequency of optic atrophy was seen in 61-70 years group (25%), followed by 51-60 years group (22%).

Above 40 years it comprised of 74% of the patients. In the study done in Singapore [3] the highest incidence was in 5th decade 25%, followed by 6th decade 18.75%, and above 40 years it was 56.8%.

The mean age of optic atrophy in our study was 53.6 yrs (+/-18.11 yrs SD). The mean age was 40 yrs (+/-18.7 yrs SD) in study done by Chinyere et al.[2] As age increases optic atrophy was common remarkably above 40 years old. The various etiological factors in optic atrophy were found. In 91% cases some etiological factors were present and in 9% of the cases no cause could be found. There was no cause found in 27% cases in the study done by Chaddah et al [1] and 15% in Loh R.C.K. [3]

As our study was done in general OPD, it was obvious that patients with glaucomatous and non glaucomatous cases were going to be presented. Glaucoma was cause in 58% cases. Most cases were related with primary open angle glaucoma, two cases were of chronic angle closure glaucoma and one case pseudoexfoliation glaucoma. Out of these 58 cases 93.1% were above 40 years of age. Glaucoma is silent killer of vision. Most of the patients were not aware of glaucoma before they lost complete vision. The lack of knowledge and timely management of glaucoma might be the main factor to have many patients with optic atrophy. In 13% of our cases, optic atrophy was due to trauma. Chaddah MR et al [1] found trauma comprised 7% of optic atrophy and Oluleye T.S et al [4] found 8%. But in the study done in Singapore [3] it was responsible for 16.2%.

Optic neuritis was cause in 3% cases and 5% cases were due to central retinal vein occlusion. Intracranial space occupying lesion (ICSOL), acoustic neuroma and pituitary macro-adenoma related in 4% cases. Loh R.C.K[3] found 17.5% vascular cause and 20.6% due to ICSOL. Oluleye T.S et al.[4] found 8% due to ICSOL.

Chronic papilloedema was causative factor in 4% cases. The chronic alcoholic patient accounted one case. Myopia, age related macular degeneration and reitinitis pigmentosa (RP) were associated with one case each. Oluleye T.S et al[4] found 3% association with RP.

When we considered non-glaucomatous optic atrophy only in our study we found 55% primary optic atrophy, 38% secondary optic atrophy and 7% consecutive atrophy. The disease manifested as primary optic atrophy in 48 patients, as secondary optic atrophy in 31 cases and 11 cases had consecutive optic atrophy in study done by Chaddah MR et al.[1] WHO definition of blindness is best corrected visual acuity (BCVA) in better eye <3/60[7]. In Nepal it is categorized as social blindness[5]. In our study 37% of optic atrophy cases had BCVA <3/60 in better eye and were socially blind. The prevalence of social blindness (VA <3/60 in the better eye) in the recent surveys in Nepal was 2.5%.[5] Optic neuropathy was cause of 3.94% blindness in the study[6]. Though cataract is the leading cause of curable blindness in Nepal, optic atrophy is also one of the causes contributing to irreversible blindness in patients more than 40 years.

CONCLUSION

Optic atrophy was one of the ocular conditions with nearly equal occurrence in both male and female. It is common above 4th decade of life. Glaucomatous optic atrophy was commonest presentation at general OPD. It might be due to lack of awareness of glaucoma and its management in early course of disease. Non-glaucomatous optic atrophy resulting in optic atrophy is not uncommon in our community and several risk factors may be implicated. Optic atrophy is one of the causes of irreversible blindness. As the treatment is not effective early diagnosis and timely management of underlying cause is the key factor to prevent optic atrophy.

REFERENCES

1. *Chaddah MR, Khanna KK, Chawla GD. Optic atrophy (Review of 100 cases). Indian J of Ophthalmol 1971; 19(4): 172-76. PMid:15745415*

2. *Chinyere Nnenne, Pedro-Egbe CN, Cookey SAH, Awoyesuku EA, Ani N. Nonglaucomatous optic neuropathies in Port Harcourt. Clin Ophthalmol 2011; 5:1447-50*

3. *Loh R.C.K. Acquired optic atrophy in Singapore, a study. Singapore Med J 1968; 9(2): 73-75. PMid:5678590*

4. *Oluleye T.S, Ajaiyeoba A.I, Fafowora O.F, Olusanya B.A. The aetiology of optic atrophy in Nigerians- a general hospital clinic study. Int J Clin Practice 2005; 59(8): 95052. http://dx.doi.org /10.1111/j. 1742-1241.2005.00541.x PMid:16033618*

5. *Sapkota YD. The Epidemiology of Blindness in Nepal: 2012, ed. Publisher - Nepal Netra Jyoti Sangh, Nepal 2012; 1- 9.*

6 *Sharma R, Marasini S, Nepal BP. Pattern of blindness in a community based hospital of Nepal. Nepal J Ophthalmol 2013;5(9): 50-56http://dx.doi.org/10.3126/nepjoph.v5i1.7822*

7. *The national research and training center on blindness and low vision. Definition of blindness and low vision. Mississippi state university, USA, 2013 (Last modified on 05-21-2013). Available at www.blind.msstate.edu/tta/referral/dbtv (accessed on 10/08/2013)*