Original Article

Stargardt's Disease: Clinical Presentation and Fundus Fluorescein Angiographic Findings

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ABSTRACT

OBJECTIVE: To document the clinical presentation and fundus fluorescein angiographic findings in Stargardt's disease.

METHODOLOGY: This descriptive study was conducted at the Department of Ophthalmology Unit-I Civil Hospital Karachi and Unit III Lyari General Hospital Karachi of Dow University of Health Sciences from June 2004 to May 2008. Patients were selected from the out patient department of Sindh Govt. Lyari General Hospital and Civil Hospital Karachi fulfilling the inclusion criteria. Sociodemographic data and family history were obtained and patients subjected to complete ophthalmic examination of anterior and posterior segment and Fundus Fluorescein Angiography.

RESULTS: Thirty patient were found to have Stargardt's disease. Mean age was 18.4±6.9 years. Twenty two (73.4%) patients were found to be 20 years of age or below. Males [18 (60%)] outnumbered the females [12(40%)]. Visual acuity at presentation revealed a symmetric loss of vision in right and left eyes (P=0.410 at 99% CI). Macula showed atrophic lesion in 12 cases (40%), beaten bronze in 13 (43.3%) cases and varnished appearance in 5 (16.7%) cases. Retinal flecks were found in 18 (60%) patients only. Fundus fluorescein angiography revealed dark choroids and elliptical hyperfluorescent lesion at the macula in all the patients. Tiny hyperfluorescent areas not corresponding to the area of flecks were found only in 18 (60%) patients.

CONCLUSION: We conclude that Stargardt's disease has varied presentation and there is a familial and genetic predilection.

KEY WORDS: Stargardt's, Autosomal recessive, hyperfluorescence, Macular Dystrophy.

INTRODUCTION

Originally described by Stargardt[1], a German ophthalmologist, in 1909, Stargardt's disease is the commonest retinal dystrophy that affects the retinal pigment epithelium (RPE) and photoreceptor layer of the retina[2]. Prevalence of Stargardt's disease is reported to be1:10,000 [3]. Apart from their ophthalmologic appearance, there is no clear distinction between fundus flavimaculatus and Stargardt's disease.[4] The general course of Stargardt's disease is a slow loss of central vision, resulting from central atrophy of the retinal elements. Stargardt's disease is autosomal recessively condition that is bilaterally symmetrical and causes macular degeneration in childhood and it has been estimated to account for 7% of all retinal conditions in this age group.[5] The first genetic locus for recessive Stargardt's disease was mapped to the short arm of chromosome 1 (1p21-p13). Mutations in ABCA4 have been associated with autosomal recessive Stargardt's disease.[6] In addition to typical clinical features, fundus fluorescein angiography is a valuable tool for the diagnosis of Stargardt's disease in which we find elliptical hyperfluorescent lesion at the macula and dark choroids in almost all the patients[7]. There is no satisfactory treatment; however this disorder can be prevented by taking appropriate measures at appropriate time. The aim of management of this disorder is[8]:

1. Provision of prognosis, i.e. "you will never be completely bling".
2. Specific treatment for low vision like low vision aids.
3. Genetic counseling.
4. Prenatal diagnosis and selective abortion.
5. Referral to patient self help groups.

By following these steps, we can improve the quality of life of the affected individuals and minimize the prevalence of this disorder in the society by restricting intermarriages.

The purpose of this study is to document the clinical presentation and fundus fluorescein angiographic findings in patients of Stargardt's disease in our population and compare this to the available published data.

PATIENTS AND METHODS

From June 2004 to May 2008, 30 patients with a diagnosis of Stargardt's disease were included in the study. Patients were selected from the Out Patient Eye Departments of Sindh Govt Lyari General Hospital and Civil Hospital Karachi. Diagnosis criteria included:

1. Decreased visual acuity.
2. Bilaterally symmetrical maculopathy with or with-

out flecks.

3. Autosomal recessive mode of inheritance i.e. by history of consanguineous marriage (cousin marriage), skip generation (mother and father of the affected individual are free of disease), and grand parents are affected.
4. Typical fundus fluorescein angiographic appearance e.g. elliptical hyperflourescent macular lesion with or without other Hyperflourescent Lesions and dark choroid.

The age, sex, the area of residence, family history and history of consanguineous marriages were obtained from the selected patients who were further subjected to complete ophthalmic and systemic examination. The ophthalmic examination included assessment of visual acuity, refractive error, color vision, examination of visual fields, applanation tonometery and slit lamp biomicroscopy of both anterior and posterior segments. Fundus examination was done with direct and indirect ophthalmoscope, Goldmann triple mirror and +90 D lens. Coloured fundus photography and FFA was performed in all cases. The electrophysiological tests could not be carried out because of non-availability of the facility.

To determine the mode of inheritance, a note was made regarding interfamily marriages and an effort was made to examine the family members and close relatives. The refractive error was corrected and low vision aids were advised where required. Patients were followed up at monthly interval for 2 months and then every 6 months. Each follow up visit included further assessment of the visual status, measurement of intraocular pressure, and changes in the refractive status.

Statistical analysis was performed by entering and analyzing data on SPSS version 15.00 for Windows.

RESULTS

Thirty patients were found to have Stargardt's disease with a mean age of 18.4±6.9 years with a minimum of 9 and a maximum of 36 years. Twenty-two (73.4%) patients were found to be 20 years of age or below **(Table I)**. Males [18 (60%)] outnumbered the females [12 (40%)]. Visual acuity at presentation revealed a symmetric loss of vision in right and left eye (P=0.410 at 99% CI). Seven (23.3%) patients had visual acuity between 6/6 and 6/18, 16 (53.3%) patients between 6/24 and 6/60, 5 (16.7%) patients between 6/60 and 3/60 and only 2 (6.7%) patients had visual acuity less than 3/60 in better eye with best possible correction of refractive errors **(Table II)**. Refractive status of our population was found to be emmetropia in 19 (73.3%) patients, myopia in 8 (26.7%) patients and astigmatism more than one diopter in 3 (10%) patients **(Table III)**. Intraocular pressure was found to be normal in all these patients. State of the macula showed atrophic macular lesion in 12 (40%) cases, beaten bronze in 13 (43.3%) cases and varnished appearance in 5 (16.7%) cases **(Table III)**. Retinal flecks at the posterior pole and mid periphery were found in 18 (60%) patients. Fundus fluorescein angiography revaealed dark choroids and elliptical hyperflorescent lesion at the macula in all the patients. Hyperfluorescence corresponding to the area of flecks was found only in 18 (60%) patients. Family history of same disease was positive in 8 (26.7%) cases while it was negative in 22 (73.3%) patients. All the patients included in the study had an autosomal recessive mode of inheritance.

TABLE I: AGE DISTRIBUTION (n=30)

Age Categories (in years)	Frequency	Percent
Under 10	2	6.7
10-20	20	66.7
20-30	5	16.7
Above 30	3	10.0

TABLE II: CATEGORIZATION OF VISION IN BETTER EYE WITH BEST CORRECTION (n=30)

Categories of Vision	Frequency	Percent
Better than 6/18*	7	23.3
6/24-6/60 **	16	53.3
6/60-3/60 ***	5	16.7
Less than 3/60****	2	6.7

* Normal or near normal vision
** Mild to moderate visual impairment
*** Severe visual impairment
**** Blind by WHO Definition

TABLE III: DISTRIBUTION OF REFRACTIVE ERRORS AND MACULAR LESION (n=30)

Types of refractive errors	Frequency	Percent
Astigmatism	3	10.0
Emmetropia	19	63.3
Myopia	8	26.7
Appearance of Macula		
Atrophic	12	40.0
Beaten bronze	13	43.3
Varnished appearance	5	16.7

DISCUSSION

Stargardt's disease has been found to be the commonest macular dystrophy in our population[9]

Mean age of presentation is significantly higher (18.4 years) than reported by Aaberg (12 years).[10] This might be due to lack of awareness and medical facilities, available to this population. There is a symmetric loss of vision in both eyes which is a hallmark of this disease[3,11]. Higher male incidence in this study might be due to social and cultural background of the study population. In this study only two (6.6%) patients had a visual acuity 3/60 in the better eye with best available correction, indicating a low incidence of blindness. In a large series of 361 patients Rotenstreich[12] and associates reported an incidence of 4% of vision of 3/60 or less in better eye with best possible correction. The patients with Stargardt's disease could be assured that they would not become blind as the disease progresses. Refractive errors found in this series are not different from other studies[13, 14]. We found atrophic and beaten bronze macular appearance of elliptical shape in majority of patients. This finding was due to late presentation of the patient to eye department in our series. Macular lesion in Stargardt's disease evolves through different stages with the progression of the disease[15-17]. Retinal flecks were identified only in 60% cases on ophthalmologic examination and fundus photography showed that absence of this finding does not exclude the diagnosis of Stargardt's disease. Many observers have described only macular lesion without Flecks.[18] Fundus fluorescein angiography demonstrated dark choroid and elliptical hyperfluorescent lesions in all of our patients and tiny hyperfluorescent lesions not corresponding to the flecks in 60% of patients. Weber and associates[19] found dark choroids in all patients they studied for genetic analysis. Dark choroids and elliptical hyperfluorescent lesions are pathognomonic angiographic signs in Stargardt's diesease[20]. Although autosomal dominant mode of inheritance of this disease has been described by some authors[21, 22] we only found the cases with autosomal recessive mode of inheritance in our study. This limitation could have been due to small number of cases in the study, and we also lack facilities for electrodiagnonosis (ERG, EOG) and genetic analysis in our setup. Other findings in our series are identical to those from reported in the literature[19, 20].

CONCLUSION

Stargardt's disease is not uncommon in our population but in majority of cases it does not cause complete blindness. Fundus fluorescein angiography in addition to clinical findings is a valuable tool for its diagnosis. Patient could be made productive for society by providing them about their prognostic information, early diagnosis and subsequent provision of Low Vision Aids.

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