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BREAKING THROUGH AN ARBORIZING NETWORK OF PERSISTENT PUPILLARY MEMBRANE: A CASE SERIES.

Ophthalmology

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ABSTRACT

Persistent Pupillary membrane (PPM) from various age groups and different presenting features attended outpatient department of a tertiary care centre. PPM was associated with cataract in two cases and superadded with features of chronic uveitis in one. One patient had developed amblyopia. Two cases were managed conservatively and one managed surgically by membranectomy with cataract extraction giving good postoperative result in terms of visual acuity and pupillary appearance. Cataract extraction in such patient posed risk of excessive postoperative inflammation, hyphema, pigment release from iris, transillumination defects and eventually glaucoma. All patients were followed up over a period of 15 months.

KEYWORDS

Persistent Pupillary Membrane, Amblyopia, Congenital Anomaly, Embryonic Vasculature, Iris Collarette.

INTRODUCTION:

Persistent pupillary membrane is a condition with incomplete resorption[1,2] of anterior lenticular fetal vascular arcade, a mesodermal tissue derived from primary annulus vessels, tunica vasculosa lentis[3]. The vasculature developing on anterior lens surface communicates with the hyloid vasculature on posterior surface of lens and contributes to formation of tunica vasculosa lentis. Regression of this tunica vasculosa lentis begins in 6th month of intrauterine life so that visual axis is optically clear. It gets completed by 8 months of gestation[4]. When there is aberration in this physiological involutional development, few fine, tenacious strands are left behind in the visual axis. Such strands account for persistent pupillary membrane. It may range from freely floating thin fibrillary strands to thick ones, arising from iris stroma at the level of the collarette and getting attached to anterior lens surface or more commonly to the strands of iris on other side. If these strands are large enough, they can interrupt the visual axis; if present over prolonged period, they can lead to stimulus deprivation amblyopia and anisometric amblyopia[5] depending on the symmetry of PPM in both eyes.

LITERATURE SURVEY:

Most of the studies done in this topic have reported a single case, majority in the pediatric age group. Association of PPM with cataract and its further management has not been reported much. Variability in development of amblyopia and also association with chronic uveitis in our patients has led to this study.

MATERIALS AND METHOD:

Three patients belonging to different age spectrum, presented to the outpatient department (OPD) of a tertiary care centre with a range of symptoms. They were systematically evaluated and managed for their respective presentations.

RESULTS

Out of the 3 patients, one was a child aged 14 years and two were adults (aged 47 and 64 years).

CASE 1

A 14 year old girl was referred for ophthalmological evaluation in view of headache since one year. She did not have any ocular complaints at the time of presentation. Patient did not have any known systemic medical or surgical illness with no significant family history. Her uncorrected visual acuity (UCVA) on Snellen's chart was 6/5 in both eyes with normal near vision without any convergence insufficiency. Cover uncover test was normal. Intraocular pressure (IOP) was within normal limits. On further dilated slit lamp evaluation, OD had rider opacities and normal iris pattern; whereas OS showed presence of persistent pupillary membrane arising from iris at 4 o'clock to 8 o'clock and getting attached to anterior lens capsule in the centre of pupillary axis with underlying anterior subcapsular cataract formation. Few strands of PPM were seen broken at 4-5 o'clock not reaching beyond pupillary margin. Posterior segment evaluation was normal.

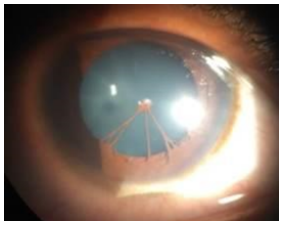

Fig 1: PPM with anterior subcapsular cataract (Case 1)

Case 2

64 year old male presented to our OPD with gradual, painless, progressive diminution of vision in OU (OS more than OD) along with recurrent redness since one year. There was no history of systemic illness.

On examination, OU best corrected visual activity (BCVA) was 6/18 on Snellen's chart. IOP was 14mm Hg in OU. Cover uncover test was normal. On anterior segment examination, OD had nuclear sclerosis grade 2-3 along with anterior subcapsular cataract and cortical cataract while OS had nuclear sclerosis grade 2-3 with cortical cataract. Dilated Slit-lamp examination also revealed posterior synechie, 1+ flare in anterior chamber, and strands of pupillary membrane in both eyes without any keratic precipitates or nodules. Posterior segment examination was normal. Clinical picture was suggestive of chronic iridocyclitis. Routine investigations such as complete blood count, renal function test, investigations to rule out secondary causes of uveitis like serum complement levels, anti-nuclear antibody, HLA B27, ESR and C-reactive protein level were performed. Rheumatology opinion for this patient was sought. Since all the investigations were normal, a diagnosis of idiopathic uveitis was made. Patient was operated for OD cataract by clear corneal phacoemulsification. During the surgery 50% of pupillary membrane strands spontaneously lysed with viscomydriasis using cohesive Ophthalmic viscoelastic device. Remaining pupillary membranes were excised with micro scissors with minimum intraoperative

bleeding followed by unevenful phacoemulsification and PCIOL implantation. Post operatively BCVA was 6/6 on Snellen's chart with an IOP of 12mmHg and quiet anterior segment. One year later, the patient is 6/6 plano in OD. The repeat rheumatological work up also showed nil activity. OS was managed conservatively for chronic iridocyclitis and is currently awaiting cataract surgery.

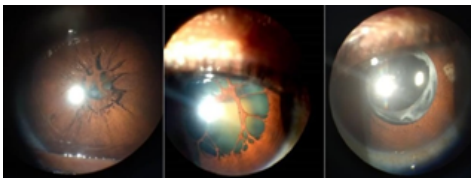

Fig 2: PPM with immature senile cataract in undilated pupil, dilated pupil, postoperative picture (from left to right) (Case 2)

Case3

47 years old male presented to our OPD with diminution of vision in OU since childhood with no other ocular complaints and no systemic illness. On examination patient's BCVA was 6/9 in OU along with bilateral dense PPM; rest of the ocular examination was within normal limits. Patient did not have squint or any cataractous changes and had normal fundus in both eyes. This picture was suggestive of stimulus deprivation amblyopia due to dense PPM. Patient was explained about management and advised regular follow up.

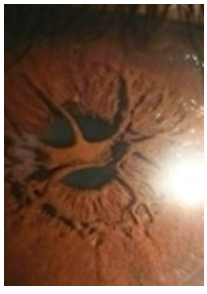

Fig 3: Dense PPM. (Case 3)

DISCUSSION

PPM is a common congenital anomaly, occuring in various degrees. However, the dense exuberant or hyperplastic variety is relatively rare. This may or may not affect vision due to the fact that 1.5 mm of pupillary diameter is necessary for normal retinal image formation. In our series, Case 3 had the most relatively dense membrane with central position, and hence had decreased vision. As this was uncorrected in childhood, patient became amblyopic.

Amblyopia, anterior polar cataract, coloboma, strabismus and anterior segment abnormalities are common associations found in these patients. Case 1 had associated cataract but no amblyopia. In view of good vision, conservative management was done which included meticulous cycloplegic refraction and close follow up for the same, keeping a watch for development of amblyopia. Smaller membranes do not require treatment as they generally spontaneously involute. Till then mydriatic therapy usually suffice.

Case 2 had no evidence of amblyopia. This appears to be due to the possibility of the thick strands producing a pin hole (1.5 mm) effect, hence not interfering with vision during initial years of life. However the possibility was explained pre operatively and case was successfully managed surgically with use of microscissors and ocular viscoelastic device.

Attachment of PPM anteriorly can lead to corneal opacity but both our cases didn't have any such attachment. However, posterior attachment was noticed in the child's case and was associated with cataract. This was not found in the adult patients.

In a case report by Norris H.et al, a 10 year old male child with OU PPM and 6/9 visual acuity was reported. Authors did not consider any active medical or surgical management necessary then. We had a similar approach for case 1. However they discussed various treatment modalities such as mydriatic therapy, Nd:YAG laser application, and surgical excision[1]. Another case report by Ramappa M et al stated a 7 year old male child with bilateral PPM with exotropia who was managed surgically without any complications, resulting in improvement in the final visual acuity[2]. Jacob M et al emphasised on early management of PPM till 6 weeks of life, preferably surgically rather than with Nd:YAG, keeping in mind the risk of development of cataract due to undue contact with crystalline lens[5]. Ahmad SS reported one case of PPM with senile cataract similar to our case 2. This study supported management of such patient in two stages to avoid intraoperative bleeding. Argon laser pupillotomy followed by conventional cataract surgery after 5 days was advocated in this study.[6]

CONCLUSION

Thick membranes have the risk of development of amblyopia; hence each case should undergo thorough and meticulous cycloplegic refraction with subsequent correction and patching if required, along with regular follow up.

Surgical removal appears to be safe if indicated. Option of LASER membranectomy is also available.

Management is tailor made for each patient depending on age and presence of associated features.

FUTURE SCOPE:

Though this study included more than one patient unlike most other studies; we would like to study more patients with longer follow up.

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