Original Research Paper

Volume - 13 | Issue - 07 | July - 2023 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Ophthalmology

RISK FACTORS OF MACULAR HOLE FORMATION

Dr. Jitendra Kumar	M.S. Ophthalmology, Professor and Head of the Department, Department of Ophthalmology, M.L.B. Medical College, Jhansi (U.P.)
Dr. Ruby Bala	Junior Resident, Department of Ophthalmology, M.L.B. Medical College, Jhansi (U.P.)
Dr. Nistha Singh	Junior Resident, Department of Ophthalmology, M.L.B. Medical College, Jhansi (U.P.)

ABSTRACT **Purpose-** To study the risk factors of macular hole. **Method-** This was a retrospective observational study that involved 80 eyes of 40 patients with complaining of diminution of central vision. Complete ophthalmic examination was done in diffuse light followed by indirect ophthalmoscopic examination. **Results-** A total of 40 patients were examined out of which 23 (57.5%) were female and 17(42.5%) were male .Maximum number of patients were in the age group of 60-70 years 14(35%), followed by age group of 50-60 years 12(30%),followed by age group of 70-80 years 08(20%) and least number of patients were present in 40-50 year 06(15%). Most common risk factor was the females 23(57.5%) out of which post menopausal females were at more risk. 2nd most common risk factor was the diabetes mellitus 10(25%) in which diabetic males 06(15%) were at more risk as compare to the diabetic females 04(10%). Myopia was the 3rd common risk factor 09(22.5%) in which female was at more risk 05(12.5%) as compare to male 04(10%). Trauma was the least common risk factor 04(10%) out of which males were more prone as compare to the females.

KEYWORDS : macular hole, central vision, metamorphopsia, menopausal female.

INTRODUCTION-

Macular hole (MH) is a vitreoretinal interface disease characterized by a partial or full-thickness neurosensory retinal defect in the center of the macula. The diagnosis and treatment plan has been dramatically changed in the last two decades. A new classification system based on morphology and vitreoretinal interface pathology has convincingly revealed the pathways related to the formation of a macular hole.[1] The diagnosis and follow-up after treatment, clinically as well as by optical coherence tomography (OCT), has become definitive nowadays.[2] Due to central foveal involvement, metamorphopsia and visual deprivation are the common presenting symptoms that may be reversible after successful anatomical closure following surgery. A macular hole is mostly idiopathic or related to vitreomacular traction syndrome. The macular hole may be associated with various forms of macular pathology including: After laser treatment[3],Intraocular surgical intervention[4], Epiretinal membrane, Polypoidal choroidal vasculopathy (PCV)[5], Hypertensive retinopathy (HTNR), Diabetic retinopathy (DR), Vitelliform dystrophy[6], Ruptured retinal arterial macroaneurysm (RAM)[7].

Other rare associations are: Central retinal artery occlusion (CRAO)[8],Retinitis pigmentosa(RP)[9],Alport syndrome [10], Valsalva retinopathy[11],Stargardt disease[12],Syphilis.

Apart from this, ocular pathology, which may predispose the eye to develop a macular hole, is myopia with or without posterior staphyloma.[13] Retinal detachment from the macular hole is not very uncommon, and in these cases, different techniques of hole closure are now being tried.[13][14] Trauma is another important cause, specifically in the young age group.[15] A traumatic macular hole may close spontaneously and, if not, may require surgery.[16] If it is not associated with any other predisposing condition, it is called a primary macular hole. Those associated with predisposing conditions designated as secondary macular holes.

MATERIAL AND METHOD

This was a retrospective study that involve 80 eyes of 40 patients of macular hole complaining of metamorphopsia and central visual deprivation . Patients were recruited from the OPD of MLB Medical College Jhansi, Uttar Pradesh and followed from 1st April 2022 to31st December 2022 . It was performed under the Helsinki Declaration of 1975 , as revised in 2000.The necessary from the Ethical and Research Committee was obtained for the study.

Inclusion Criteria

All patients who presented to the OPD of MLB Medical College Jhansi with the complaint of metamorphopsia and central visual deprivation were included.

Exclusion Criteria

1. Patients with ocular systemic diseases that could affect the
2. Patients with other retinal disorders.
3. Patients with recent intraocular surgery.
4. Patients with the history of trauma.

All patients were subjected to a detailed history taking, refraction using Topcon Autorefractometer and best corrected visual acuity (VA) measurement. All patients had complete ophthalmic examination including Biomicroscopic slit lamp examination, Fundus examination with 90D lens and Fundus photography and Spectral Domain Optical Coherence Tomography.

RESULT

A total of 80 eyes of 40 patients were studied. We included eyes with complain of metamorphopsia and central visual deprivation were included.

Table- Age distribution and risk factor distribution among 40 patients of macular hole.

YEARS	Total	Idiopathic		Diabetic		Mellitus		High Myopia		Trauma	
		FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE
40-50	06	01	00	00	00	01	02	00	02		
51-60	12	04	01	01	01	02	01	01	01		
61-70	14	05	02	02	03	01	01	00	00		
71-80	08	03	01	01	02	01	00	00	00		
Total	40	13	04	04	06	05	04	01	03		

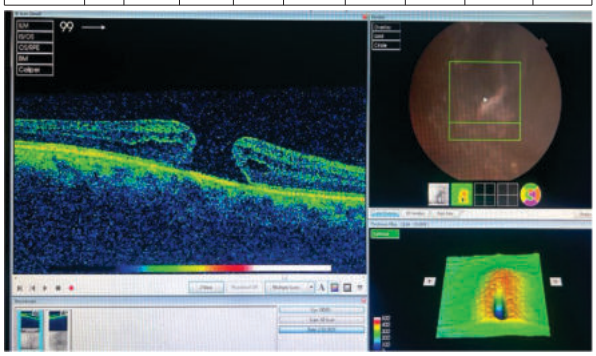

Image: Showing Full Thickness Macular Hole Of Left Eye In 68 Years Old Female.

DISCUSSION-

Stage 1 MH:

It can be observed as chances of spontaneous resolution is near 50%.

Surgical intervention has a negligible role in prevention in macular hole formation and it has its own complications whereas it has a high anatomical success rate if done in stage 2. In the case of significantly reduced visual acuity, the patient is symptomatic in stage 1 and persists for a long duration, surgery is usually advised.

Stage 2/3 MH:

Spontaneous closure of FTMH may take place in 4 to 11.5% of cases.[17] Usually, local anesthesia is preferred for surgery unless contraindicated otherwise. Pars-plana vitrectomy (PPV) is the mainstay of surgery following which the subsequent steps are performed. A standard 20/23/25/27-gauge core vitrectomy is performed initially. The posterior cortical vitreous is separated from the optic disc by using suction mode disabling cutter or by an extrusion cannula or bent needle which is a very important step. As posterior cortical vitreous is seen only after elevating it from the underlying retina triamcinolone acetonide assistance may be needed. Ocriplasmin, a serine protease, can also be used to separate vitreoretinal adhesion or to induce posterior vitreous detachment (PVD).[18] Induction and completion of PVD either surgically or by the pharmacologic agent are mandatory to remove all vitreoretinal interactions which can complicate the postoperative outcomes. After completing the vitrectomy of the cortical vitreous up to the equator, the peripheral vitreous is trimmed. The majority of MH cases no longer have any vertical vitreomacular traction because the posterior cortical vitreous is already separated from the macula. Specifically, vitreous around the ports should be removed meticulously to prevent traction from the insertion of the instruments and resulting retinal break or dialysis. Peeling of the internal liming membrane (ILM) is an important step, which has improved the rates of closure of macular holes.[19]

However, the induction of PVD remains the most crucial step in the management of stage 2 or 3 macular holes. Only pharmacologic separation of vitreous from the retina by ocriplasmin intravitreal injection in a dose of 0.125 mg in 0.1 ml, is another way of treatment for a macular hole with a success rate of 40.6 - 67%.[20][21] Phakic eyes of less than 65-year-old patients with no ocular comorbidity, less than 250-micron diameter holes, vitreomacular adhesion of less than 1500 micron are most suitable for pharmacologic vitreolysis.[22]

Stage 4 MH:

Apart from the induction of PVD all the steps are the same because in stage 4 MH PVD has already taken place.

RESULTS-

Most common risk factor for macular hole formation is female itself of age group of 60-70 years followed by age group of 50-60 years, followed by age group of 70-80 years, least common by age group of 40-50 years. In male diabetes mellitus and trauma was the most common risk factor for macular hole formation . High Myopia was also associated with macular hole formation in male and female both.

REFERENCES-

1. Gattoussi S, Buitendijk GHS, Peto T, Leung I, Schmitz-Valckenberg S, Oishi A, Wolf S, Deák G, Delcourt C, Klaver CCW, Korobelnik JF., European Eye Epidemiology (E3) consortium. The European Eye Epidemiology spectral-domain optical coherence tomography classification of macular diseases for epidemiological studies. Acta Ophthalmol. 2019 Jun;97(4):364-371. [PubMed]
2. Azzolini C. Macular Hole: From Diagnosis to Therapy. J Ophthalmol. 2020; 2020: 1473763. [PMC free article] [PubMed]
3. Stein GE, Jung JJ, Bodine S, Trokel SL, Chang S. Vitrectomy for macular hole following Nd:YAG laser injury. Taiwan J Ophthalmol. 2016 Oct-Dec;6(4):195-198. [PMC free article] [PubMed]
4. Pillai GS, Varkey R, Unnikrishnan UG, Radhakrishnan N. Incidence and risk factors for intraocular pressure rise after transconjunctival vitrectomy. Indian J Ophthalmol. 2020 May;68(5):812-817. [PMC free article] [PubMed]
5. Chino M, Yoshikawa Y, Kanno J, Nagashima T, Sakaki Y, Katsumoto T, Shibuya M, Shoji T, Makita J, Shinoda K. Development and spontaneous closure of a secondary macular hole associated with submacular hemorrhage due to polypoidal choroidal vasculopathy: a case report. BMC Ophthalmol. 2020 Mar 17;20(1):108. [PMC free article] [PubMed]
6. Peart S, Ramsay A, Khan QA, Leong T, Gordon-Bennett P. Large, Spontaneous Macular Hole with Posterior Pole Detachment in a Patient with Best Vitelliform Macular Dystrophy. Case Rep Ophthalmol. 2019 May-Aug;10(2):221-226. [PMC free article] [PubMed]
7. Tsuiki E, Kusano M, Kitaoka T. Complication associated with intravitreal injection of tissue plasminogen activator for treatment of submacular hemorrhage due to rupture of retinal arterial macroaneurysm. Am J Ophthalmol Case Rep. 2019 Dec;16:100556. [PMC free article] [PubMed]
8. Levison AL, Schachat AP. Macular hole from a central retinal artery occlusion. JAMA Ophthalmol. 2014 Dec;132(12):1493. [PubMed]
9. Fragiotta S, Rossi T, Carnevale C, Cutini A, Tricarico S, Casillo L, Scuderi G, Vingolo EM. Vitreo-macular interface disorders in retinitis pigmentosa. Graefes Arch Clin Exp Ophthalmol. 2019 Oct;257(10):2137-2146. [PubMed]
10. Raimundo M, Fonseca C, Silva R, Figueira J. Bilateral giant macular holes: A rare manifestation of Alport syndrome. Eur J Ophthalmol. 2019 Jan;29(1):NP13-NP16. [PubMed]
11. Xie ZG, Yu SQ, Chen X, Zhu J, Chen F. Macular hole secondary to Valsalva retinopathy after doing push-up exercise. BMC Ophthalmol. 2014 Aug 12;14:98. [PMC free article] [PubMed]
12. Rizzo S, Mucciolo DP, Bacherini D, Murro V, Vannozzi L, Virgili G, Bani D, Sodi A. Macular hole in Stargardt disease: Clinical and ultra-structural observation. Ophthalmic Genet. 2017 Sep-Oct;38(5):486-489. [PubMed]
13. Li Y, Li Z, Xu C, Liu Y, Kang X, Wu J. Autologous neurosensory retinal transplantation for recurrent macular hole retinal detachment in highly myopic eyes. Acta Ophthalmol. 2020 Dec;98(8):e983-e990. [PubMed]
14. Liao DY, Liu JH, Zheng YP, Shiu HW, Wang JM, Chao HM. OCT proves that vitreomacular adhesion is significantly more likely to develop vision-threatening retinal complications than vitreomacular separation. BMC Ophthalmol. 2020 Apr 22;20(1):163. [PMC free article] [PubMed]
15. Gao M, Liu K, Lin Q, Liu H. Management Modalities for Traumatic Macular Hole: A Systematic Review and Single-Arm Meta-Analysis. Curr Eye Res. 2017 Feb;42(2):287-296. [PubMed]
16. Chen HJ, Jin Y, Shen LJ, Wang Y, Li ZY, Fang XY, Wang ZL, Huang XD, Wang ZJ, Ma ZZ. Traumatic macular hole study: a multicenter comparative study between immediate vitrectomy and six-month observation for spontaneous closure. Ann Transl Med. 2019 Dec;7(23):726. [PMC free article] [PubMed]
17. Liang X, Liu W. Characteristics and Risk Factors for Spontaneous Closure of Idiopathic Full-Thickness Macular Hole. J Ophthalmol. 2019;2019:4793764. [PMC free article] [PubMed]
18. Khan MA, Haller JA. Ocriplasmin for Treatment of Vitreomacular Traction: An Update. Ophthalmol Ther. 2016 Dec;5(2):147-159. [PMC free article] [PubMed]
19. Eckardt C, Eckardt U, Groos S, Luciano L, Reale E. [Removal of the internal limiting membrane in macular holes. Clinical and morphological findings]. Ophthalmologe. 1997 Aug;94(8):545-51. [PubMed]
20. Muqit MMK, Hamilton R, Ho J, Tucker S, Buck H. Intravitreal ocriplasmin for the treatment of vitreomacular traction and macular hole- A study of efficacy and safety based on NICE guidance. PLoS One. 2018;13(5):e0197072. [PMC free article] [PubMed]
21. Juncal VR, Chow DR, Vilà N, Kapusta MA, Williams RG, Kherani A, Berger AR. Ocriplasmin versus vitrectomy for the treatment of macular holes. Can J Ophthalmol. 2018 Oct;53(5):441-446. [PubMed]
22. Prospero Ponce CM, Stevenson W, Gelman R, Agarwal DR, Christoforidis JB. Ocriplasmin: who is the best candidate? Clin Ophthalmol. 2016;10:485-95. [PMC free article] [PubMed]